



## Megacities: Boundless growth?

March 12, 2008

**More people live in cities than in rural areas.** 2007 ushered in the first ever period in which more of the Earth's inhabitants have been living in cities than in rural areas. The urbanisation process is visible on every continent and will continue for decades to come.

**Cities have reached previously unheard-of proportions.** Today, one million inhabitants can be found in over 400 cities, more than twice as many as 30 years ago. And there are 20 urban agglomerations which are each home to more than 10 million inhabitants. The birth of such megacities has been witnessed in Asia and Africa in particular. More than half of these mammoth cities are currently to be found in Asia.

**The opening-up of economies promotes the development of megacities.** The strong growth in the Earth's population and gains in agricultural productivity are the main reasons for the emergence of megacities. The opening-up of economies and the technological revolution have speeded up this development in recent years.

**However, smaller cities grow faster than megacities.** Although megacities are economic powerhouses, smaller cities grow faster. There are evidently factors that temper growth in megacities.

**Clustering brings with it major costs.** High property prices, traffic congestion, growing environmental problems and social cohesion issues reduce the economic advantages of very big cities and this favours smaller cities on the rise.

**Potential in cities can be leveraged.** The expansion and modernisation of urban infrastructure frequently fails to be implemented due to a lack of funds. By 2030 USD 40 tr needs to be invested in urban infrastructure worldwide. Funding gaps cannot be plugged without the deployment of private financing models.

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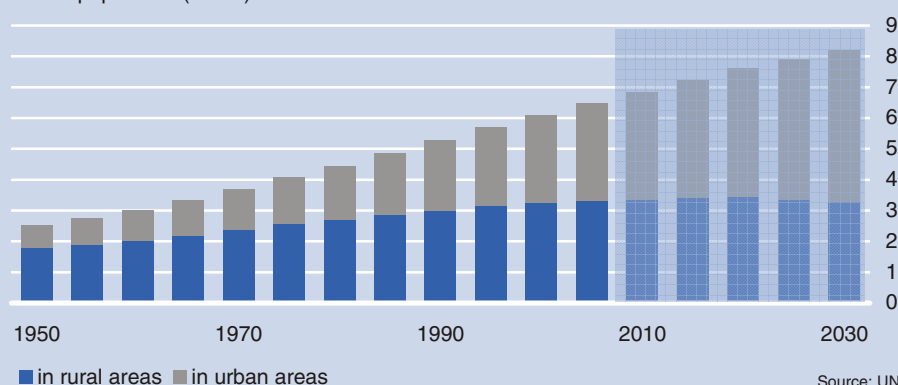
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### The future is urban

Global population (billion)





# 1. Urbanisation with seven-league boots

Are cities dying? This was the question posed by the Harvard economist Edward Glaeser about ten years ago. Glaeser's question encapsulated the euphoria of the dotcom era. Several economists really did expect that constant improvements in communications technologies, falling transport costs and computer-generated productivity gains would cancel out the agglomeration advantages enjoyed by cities. Cities would thus become less important. Glaeser was sceptical and has been proved right – at least up until now.

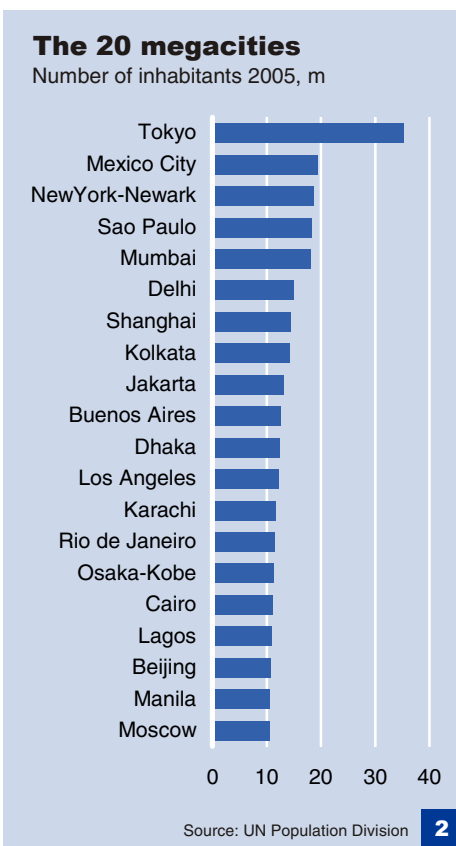
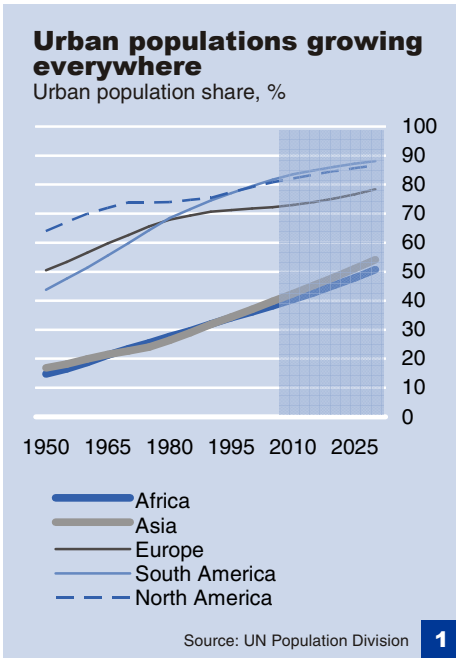
Just 200 years ago a mere 3% of the Earth's inhabitants lived in cities, whereas 30 years ago the figure had already climbed to more than 33%. And according to United Nations estimates, for the first time in history city dwellers now outnumber rural inhabitants. Since 1995 the global urban population has increased by 600 million (+23.5%). A further shift in population distribution appears inevitable. If the forecasts of UN researchers prove correct, the world's urban population will grow by an average of 1.6 m every ten days until 2030. That figure is roughly equivalent to the population of Hamburg. In 25 years nearly two-thirds of the world's population will be living in cities.

In a collaborative conference project with the London School of Economics the Alfred Herrhausen Society is therefore right to herald the urban age.<sup>1</sup> Is this development a blessing or a curse for mankind? Which challenges must be met and by whom? This report is the opener in a series of analyses that attempt to outline answers, formulate recommendations for decision-makers and illustrate the implications for market participants. Our attention will be focused on the new urban giants, the megacities, because they are where all the opportunities and problems will become visible on a bigger scale. It is already clear that the challenges in the coming decades are enormous, but this is also true of the opportunities for mankind. What, however, is also clear is that there is no single formula that suits all cities.

## Metropolises, global cities and megacities

The main reason why a one-size-fits-all approach cannot be adopted is that although cities have common features they also possess numerous unique characteristics. Among the things that cities have in common are high housing and population densities (in most cases exceeding 2,000 inhabitants per km<sup>2</sup>) and a so-called centre/periphery divide with regard to the cost of living – above all in property and land prices. If a city also performs an important commercial, cultural and political function for its region or even the whole country it can be called a metropolis. Such a major importance can usually be assumed for cities boasting some 500,000 inhabitants or more. Global cities are those metropolises whose political, cultural and commercial influence extends across the entire globe (e.g. New York City, Tokyo or London).

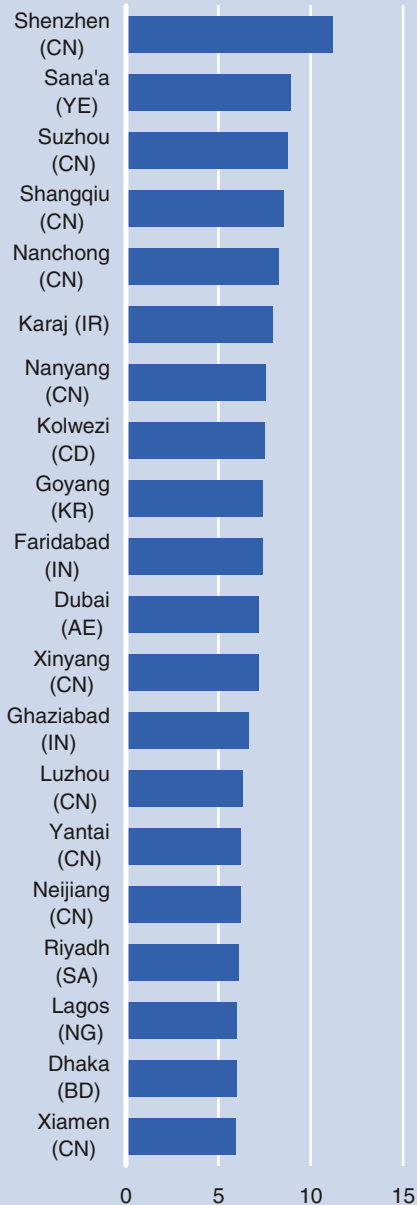
How does a megacity differ from a global city? As a rule, only very big cities are also global cities, but a certain number of inhabitants is not however a prerequisite for global city status. Global cities are thus not necessarily also the biggest cities in the world. For a megacity, by contrast, the number of inhabitants is the sole defining factor. The literature on this topic designates a variety of thresholds for



<sup>1</sup> See [http://www.alfred-herrhausen-gesellschaft.de/en/urban\\_age.html](http://www.alfred-herrhausen-gesellschaft.de/en/urban_age.html).

### Explosive growth

Mean population growth 1975-2005, % p.a.



Source: UN **3**

megacity status. The most commonly used definition comes from the United Nations, namely that a megacity must have a minimum of 10 million inhabitants.<sup>2</sup> Two things are important here: firstly, the boundaries of an administrative district are ultimately set arbitrarily. In most cases they reflect only the functional boundaries at a certain juncture. If the current functional importance of a city is to be determined, the entire agglomeration has to be assessed. This means that, for example, New York City with around 8 million inhabitants would not qualify as a megacity according to the UN definition. The New York-Newark agglomeration, by contrast, has more than 18 million inhabitants. The differentiation becomes even clearer if we take Tokyo as an example: some 8 million people live in the city of Tokyo, but the urban agglomeration is home to over 35 million inhabitants. So what we refer to below is the entire agglomeration rather than the nominal city.

Secondly, the threshold for designating a megacity is also a matter of personal taste. A city with 9 million inhabitants probably faces the same problems as a city with 10 million inhabitants. Especially in developing countries estimates of the size of an agglomeration are also very imprecise, they can fluctuate by up to 30%, because the number of inhabitants in an agglomeration without a functioning registration system has to ultimately be determined via aerial photography from space.<sup>3</sup> That is why different sources arrive at differing lists of megacities. Here we have used UN data.

### The urban world

The emergence of megacities is merely one facet in the much more extensive urbanisation process, which has been underway for centuries and which has gained appreciable momentum over the last 50 years. In 1950 some 30% of the Earth's inhabitants, i.e. nearly 750 million people at that time, lived in cities<sup>4</sup>; today 50% of the roughly 6.5 billion people on Earth are city dwellers. The urban population has thus grown by around 2.7% per year; the rural population over the same period has risen by "just" 1% p.a. In 1975 there were 179 cities with one million inhabitants or "M1-cities" as we shall call them for convenience in the rest of this report. By 2005 the figure had risen to more than 400.<sup>5</sup> Especially in Asia and Africa cities have literally been "mushrooming". In China alone the United Nations has logged nearly 100 cities with one million inhabitants. And whereas 30 years ago there were only three urban agglomerations with over 10 million inhabitants (Mexico City, New York and Tokyo), today there are already 20 such megacities – and only four of them are in industrial nations (New York, Los Angeles, Tokyo and Osaka-Kobe).

So while the last 30 years have seen the number of city dwellers more than double, the number of people living in M1-cities has grown by no less than 150%, and the number of people living in megacities has risen by an even more stunning 450%. Now nearly 40% of all city dwellers live in cities that are home to 1 million

<sup>2</sup> In the meantime several cities have even reached such a scale that it made sense for UN Habitat to create a new category of "hypercities" or "metacities". Hypercities are defined as agglomerations of at least 20 million inhabitants.

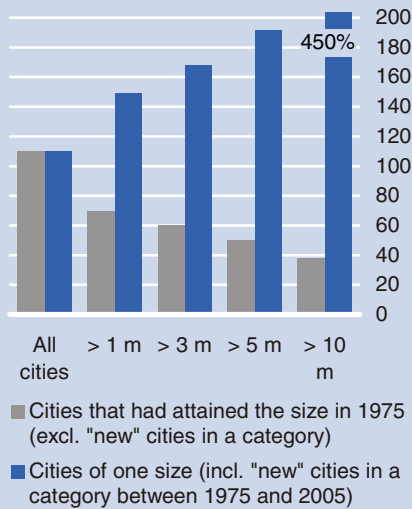
<sup>3</sup> Tibaijuka, A. (2006).

<sup>4</sup> Based on the data used by the UN, we define cities as urban agglomerations. The terms are used interchangeably.

<sup>5</sup> The first city in history to boast one million inhabitants was Rome in 400 AD. The Chinese city of Xian had more than one million inhabitants during the Tang dynasty (618-907). The share of the world's population for both Rome and Xian was thus similar to that of Tokyo today.

**The bigger the city, the slower its growth**

Population growth 1975-2005, %



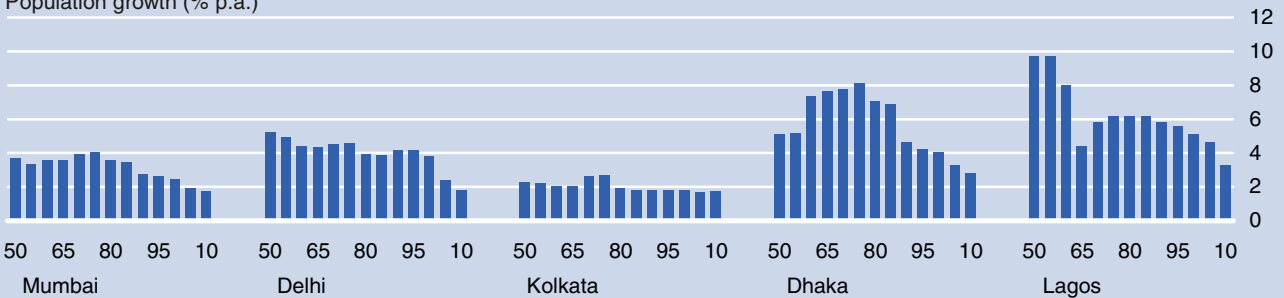
Sources: UN, DB Research **4**

people. This should not lead us to the conclusion that cities with more than 1 million inhabitants grow faster than medium-sized cities, as the faster population growth observed in M1-cities and megacities is not only due to the fact existing cities are attracting more inhabitants but also because over time more cities are joining the club of M1-cities and megacities. Stripping this statistical effect of a larger total population out of the growth rates makes it clear that smaller cities are expanding much faster than particularly large ones.

Urbanisation is unequivocally a global phenomenon, but it is not following the same pattern everywhere. Of course the development of industrial nations is further advanced: in Europe city dwellers already represent 75% of inhabitants, while in North America the figure is actually more than 80%. In the highly populous continents of Africa and Asia, however, most people still live in rural areas (60%). Urbanisation – measured as the change in the share of the overall population that lives in cities – is already slowing in Europe and America on account of the advanced level that has been attained there. In Asia and Africa, however, the urbanisation process is picking up pace slightly.

**Cities in emerging markets and developing countries continue to grow at a slower rate**

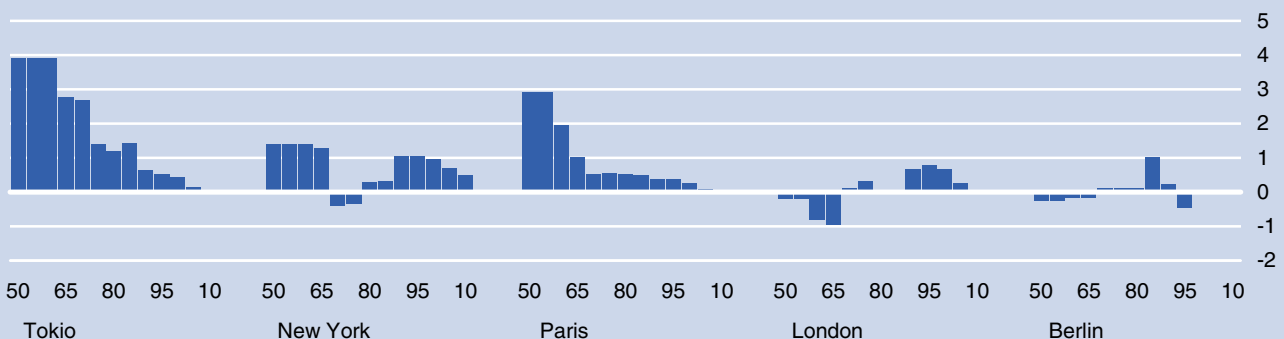
Population growth (% p.a.)



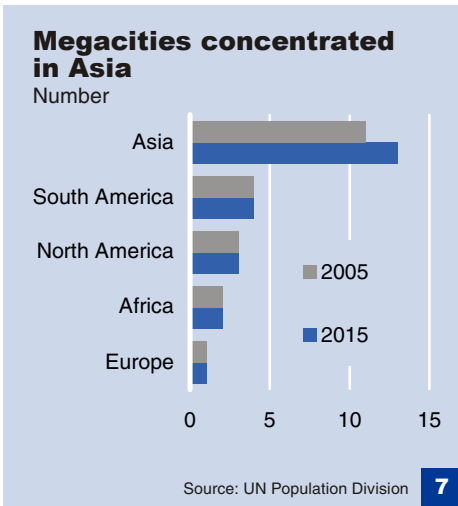
Source: UN Population Division **5**

**Little growth of cities in industrial nations**

Population growth, % p.a.



Source: UN Population Division **6**



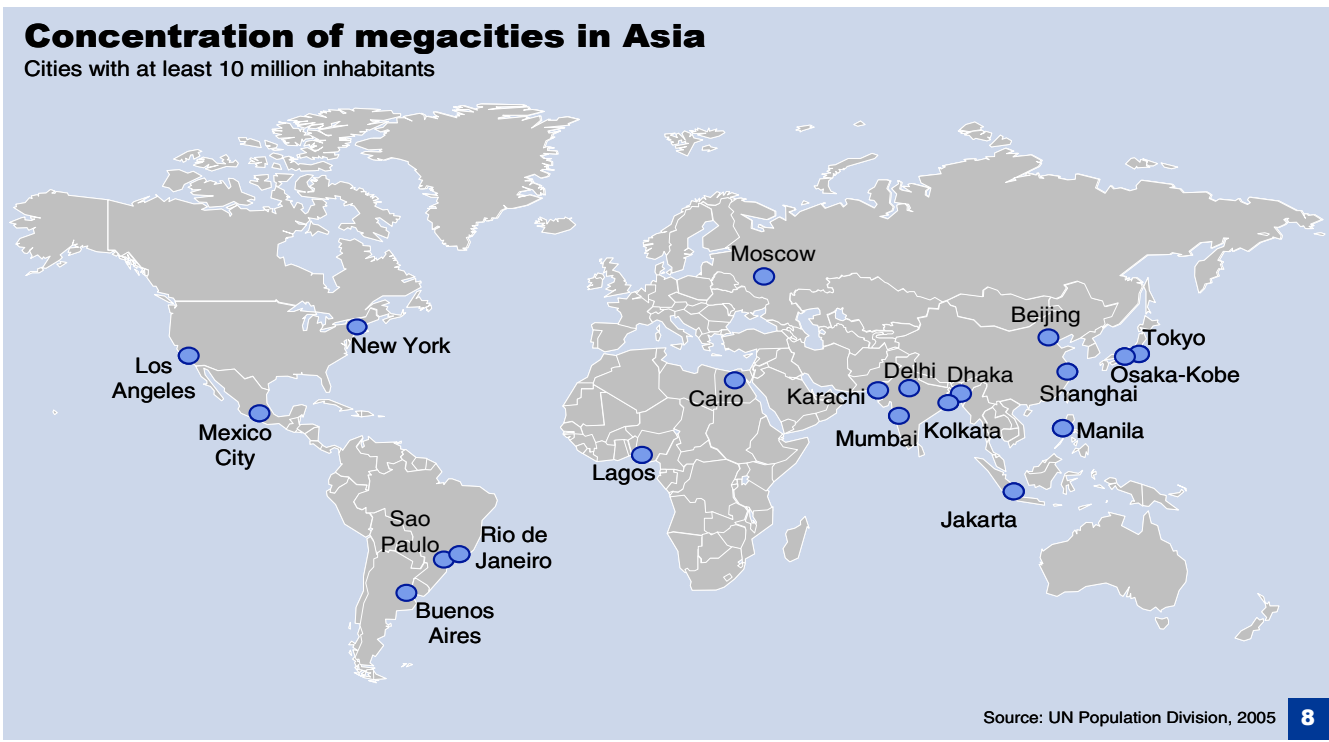
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## Global distribution of megacities

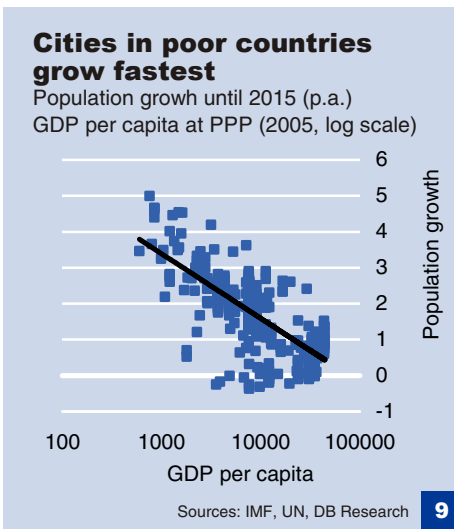
Of the world's existing 20 megacities more than half are in Asia, four are in South America, three are in North America (including Mexico), two in Africa and one in Europe (Moscow). Still, the two global cities of Paris and London only fail to qualify by a wafer-thin margin. By far the largest agglomeration is Tokyo which together with its conurbation is home to a total of 35 million people. There are four other cities that each boast around 20 million inhabitants (Mexico City, New York, São Paulo and Mumbai).

The distribution of the existing megacities is certainly striking. It logs when cities were particularly strong magnets for migrants in the past. If we narrow our focus down to the last 30 years, the dynamic nature of the process in Asia becomes even clearer. All 20 cities with the fastest population growth in the last 30 years are to be found either in Asia or Africa. This list contains ten Chinese cities alone. The outstanding example is the Chinese city of Shenzhen: between 1975 and 2005 its number of inhabitants has grown by a factor of 23. Globalisation and industrialisation were the key catalysts.

Ultimately there is a clear dichotomy between urban growth in developing countries and emerging markets on the one hand and the established industrial nations on the other. In industrial nations metropolitan areas have for decades been attracting new inhabitants at a rate of just 1% per year at most. In the Tokyo region the growth rate fell rapidly from 4% in the 1950s to less than 1% in the 1980s. In many European and US metropolises only marginal growth is discernible. In emerging markets it is a different story: their metropolises are in very many cases often enjoying growth of some 4% per year, while growth is seldom slower than 2% per year. At a growth rate of 2% p.a. the number of inhabitants doubles every 35 years, while a 4% growth rate shortens this period to 17 years. Although these cities have also seen their growth rates decline in the last few decades, this slowdown has been less pronounced than in the industrial nations.



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## Urbanisation and income developments

Two key conclusions can be drawn from the sections above: developed economies regularly have higher urbanisation rates than less developed economies. At the same time, however, ground is being made good by some of these economies. The simple hypothesis that can thus be derived is that cities in poor countries will expand the fastest going forward. This is precisely what is indicated by the UN Population Division forecasts. For the world's 400 or so M1-cities a strong negative correlation can be established between the size of a country's GDP and the expected population growth in that country's M1-cities.

The logarithmic scale in Figure 9, however, obscures an exciting deviation from this simple linear correlation: if Figure 9 is drawn with a simple scale instead of a logarithmic x-axis, then the trend is no longer linear but is a U-curve. This means that M1-cities in very prosperous countries are again becoming more attractive. This may be because this group includes major global cities (such as New York, London, Paris, Tokyo etc.). These cities benefit not only from migration from other parts of their own country but ultimately also from migrants from all over the world.

## 2. Reasons for the development

So what are the driving forces behind the emergence of these new megacities? The question we shall address below is why cities offer more and more people net benefits compared with rural regions and people therefore take the plunge and move to the city. But we shall also attempt to find out why these net benefits are so appealing at this particular time.

### Why cities emerge

Whether Jericho 10,000 years ago, New York 500 years ago or Shenzhen just a few decades back, cities have provided market places and thereby promoted the division of labour and trading. Being located next to rivers, oceans or other key trading routes has therefore been instrumental. Trading enabled city dwellers to specialise. This specialisation resulted in qualitative and quantitative productivity gains. In the beginning these increases in output were only sufficient to enable regional trading between the city and the surrounding area. For this, agricultural productivity gains had to be made at the same time, as after all city dwellers had to be fed as well. A purely subsistence economy could not achieve this.

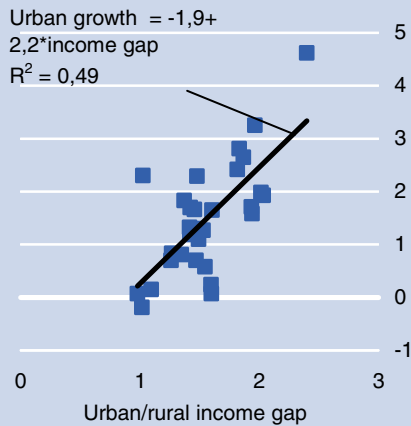
Even though trading has changed markedly through the millennia the fundamental mechanisms for the development of a city still apply today. The Chinese city of Shenzhen, for example, was a small town until 1980. Only after it was designated a special economic zone could it truly reap the benefits of its prime location on the Pearl River delta. The free trade that had been facilitated helped the city to experience an unparalleled boom. Today, Shenzhen has over 7 m inhabitants – 23 times as many as 30 years ago – according to the UN. In the end this was only made possible by the economic liberalisation and participation in the global exchange of goods.

The second major driver of urban development is population growth, above all population growth in rural areas. In regions with low growth in agricultural productivity this can lead to supply bottlenecks in rural areas. Growth in cities is then an expression of relative attractiveness. Those leaving rural areas judge their prospects to be

### Productivity gains drive growth

### Rich cities attract people from rural areas

City growth 2005-2010 (% p.a.) relative to income gap



Income gap is the quotient of average GDP in cities divided by mean GDP in rural areas of a country. The higher the figure, the bigger the incentive to move to a city

Sources: UN Population Division, IMF, PWC

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### Cities facilitate generation of economies of scale and thus specialisation gains

less bleak in the city than the alternative of remaining in the countryside. Especially in developing countries, though, this becomes a difficult decision in favour of the lesser of two evils, as detailed in Chapter 3.

When all is said and done, it is true for all cities in the world that population growth is less of an internal organic phenomenon, but rather is largely the result of migration. In most nations the majority of migrants are people moving from rural areas within their own country. The growth of cities ought then to be fastest in those countries where the gap between urban and rural incomes is particularly wide. In fact we do find precisely this correlation for megacities: the larger the difference between urban incomes and rural incomes, the faster cities expand and the faster the growth forecast by the UN also going forward. Only for a few global cities with strong demand for highly specialised professionals is international migration the primary source of population growth.

### Amplifying effects

Cities allow specialised activities. Bigger cities also enable more extensive specialisation. Significant economies of scale are generated during the provision of both private and public goods. There are also strong network effects: especially in sectors in which recruiting and retaining staff with special skills is the critical issue for a company, what can easily occur is a clustering of companies, because moving their home to a new location is an inconvenience for many people. The formation of clusters and the resulting networks however in turn generate efficiency gains.

One major economy of scale lies in the very fact that public goods can be more easily funded in densely populated areas, as the sometimes very high costs can be shared out among more paying customers. This applies for example to the provision of network-based infrastructure and educational facilities. In both cases it is to be expected that a desired level of quality can be delivered at a lower cost per user in a city than in a rural area. These public or at least collectively enabled goods, however, not only enrich people's lives; they also positively impact long-term economic growth. A well-educated society achieves productivity gains. This boosts urban incomes and this attracts more migrants.

The specialisation of skills and the manufacturing of goods via the division of labour does not however end at the narrow boundaries of industrial production or tradable services. The financial strength of cities does actually facilitate numerous specialisations in art and culture, and in science and education. That the openness to science and an extensive range of educational opportunities are very important for economic growth has now become one of the accepted basic economic truths.<sup>6</sup> On top of this there is also empirical evidence that cultural and ethnic diversity and the associated tolerance required positively impact economic growth. This tolerance attracts creative types and active people, and this ensures diversity and economic dynamism.<sup>7</sup> Also, art and culture are consumer goods. A city facilitates the provision of a large supply of these consumer goods, and for most people this has a value – even if it is only an option value. Cities then develop an additional vitality, because economies of scale are generated not only on the

<sup>6</sup> Bergheim, S (2005).

<sup>7</sup> Florida, R. and G. Gates (2001).

**Big cities contribute more than proportionately to national output**

production side, but also in consumption in the form of greater choice.<sup>8</sup>

It is a fact that empirical analyses – at least of industrial nations – regularly come to the conclusion that productivity is correlated with the size of a city. Depending on the sector and design of the analysis productivity gains of between 3% and nearly 30% have been recorded when the number of inhabitants doubled. Quigley concluded in 1998 that: “Larger cities contribute more than proportionately to national output.” This productivity edge is enormous especially in developing countries and emerging markets: the inhabitants of São Paulo and Bangkok constitute some 10-15% of the population of Brazil and Thailand respectively. According to UN Habitat data, however, these cities generate over 40% of the gross domestic product of their respective countries. According to a number of estimates, Mumbai alone generates 40% of India’s tax receipts.

**Why do agglomerations occur?**

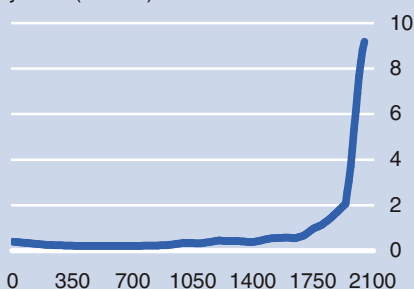
Economic reasons

Factor	Example
<b>1. Economies of scale</b>	
in production	Operations economies of scale
in consumption	Public goods, parks, stadia
<b>2. Joint inputs</b>	
in production	Advertising, legal advise
in consumption	Art and culture, gastronomy
<b>3. Transaction costs</b>	
in production	Matching in the labour market
in consumption	Reduced search costs in the retail sector
<b>4. Law of large numbers</b>	
in production	Insurance markets, asset liquidity
in consumption	Substitutable goods

Sources: Quigley (1998); DB Research **11**

**World population increased fourfold in 100 years**

Number of people in Earth since the year 0 (billions)



Source: US Census **12**

**Why megacities are emerging now**

Cities attract migrants with their higher productivity and above all with the higher wages that come with it. This also applied in decades past. But why are megacities forming at this particular time?

Three factors play a part:

**Population growth:** The most obvious reason is the population boom in many countries which started only a few decades ago. The world’s population did not reach the one billion mark until around 1750. Before this, the global total grew at an average rate of 0.05% per year. Subsequently, this growth accelerated: it did not even take 200 years to reach the two billion mark. And in the following years, especially after the second world war, the pace picked up to as much as 2% per year, so within 70 years the number of people on the planet rose to the current total of nearly 7 billion. Megacities are thus largely the result of an increase in life expectancy and a decrease in infant mortality, in other words medical advances and better hygiene.

<sup>8</sup> Quigley, J. M. (1998).

**Prospects in the agricultural sector:** The fact that particularly cities benefited from this population dynamic was attributable to both the productivity gains in agriculture and to the new employment opportunities in industry. Greater capital investment in agriculture reduced the need for labour and at the same time enhanced the outlook in cities. The higher degree of capital employed thus works as a push factor in rural areas while acting as a pull factor in urban areas.

**Climate change increases exodus from rural areas**

Additionally, growing industrialisation, unsustainable farming methods and climate change trigger huge losses of farmland acreage: in China alone some 3,000 to 6,000 km<sup>2</sup> of farmland are lost every year.<sup>9</sup> Africa probably suffers losses of a similar scale. This aspect also compels part of the rural population to head for urban areas. Since we are no doubt on the cusp of a period of deep-seated climate change, the growing scarcity of agricultural land is likely to ensure that people continue to move to cities in future – especially in developing countries and emerging markets.

**Opening-up of economies:** These two growth factors were reinforced by the opening of a growing number of economies in the 20<sup>th</sup> century. This applies not only to the opening of goods markets thanks to reduced trade barriers, but also to fewer restrictions on the production factors labour and capital. This higher mobility of goods, capital and people enables a greater international division of labour, and this generally tends to bolster the cities, for that is where the bulk of value added is created.

**Technological revolution also leads to new clusters**

Besides, the technological revolution, i.e. the digitisation of information and the new data networks, has enabled information and knowledge to be shared more rapidly and with fewer complications all over the world. This has resulted in the band of cities constituting the economically powerful regions of Europe – the famous “blue banana” described by Roger Brunet<sup>10</sup>, that stretches from Manchester down across Germany’s Ruhr area to northern Italy – becoming a global network of business hubs. In his bestseller “The world is flat”, Thomas Friedman illustrates how much the modern means of communication have helped to dismantle the old hierarchies between the first, second and third world. The catchy slogan of a “flat world” still gives an incomplete picture though insofar as it is ultimately not the entire world which has become a global village but merely the hubs which are heavily integrated into the global network of goods, capital and data flows. It is mainly these hubs, i.e. the megacities and global cities, that fit so well in the picture of a flat world. They benefit particularly from the trend. Globalisation and digitisation have thus helped to drive the development of megacities, for they have amplified the advantages of the division of labour and the formation of clusters. Since there are no indications that this integration of the goods, labour and capital markets will abate going forward, it is likely that megacities will continue to profit from economic opening. The upshot is that considerable investment opportunities are to be had in the cities – not only for real estate investors, but also for those who finance the users of the real estate.

**Opportunities for investors**

<sup>9</sup> See Heymann, E. (2006).

<sup>10</sup> See Brunet, R. (1989) and Ackermann, J. (2006).

### 3. Megacities face mega-problems

It would be wholly inadequate to reduce urbanisation to the record on economic success. In fact, many people probably associate gigantic cities such as Mumbai, São Paulo and Mexico City with precisely the numerous problems inherent in urban agglomeration: expensive real estate, pollution, traffic snarls, adverse impact on health, crime and ultimately the problem underlying all these aspects – the difficulty of governing megacities.

#### 1. The costs of urban agglomeration

Cities are areas of population agglomeration, and agglomeration means that resources will become scarce. One could imagine that a city is like a club: up to a certain limit, current club members are happy to welcome new members because they enrich life in the club. From a critical threshold, however, the club's capacities no longer suffice to ensure problem-free enrolment of new members. Unlike with a private club, though, it is not easy to control migration into a city. Therefore, it may possibly become overcrowded, and the growing competition for space, mobility and resources ultimately means higher financial costs or at least a decline in the quality of living for the city dwellers.

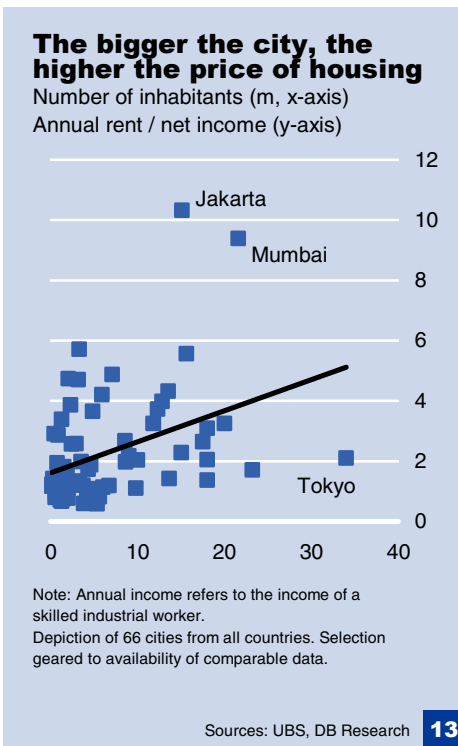
##### *High real estate prices and tall buildings*

This situation becomes most evident on the real estate markets, and the issue is not just a scarcity of living accommodation. At the end of the day, all types of property use are in competition. The persons willing to pay the highest price decide whether the inner-city areas will be built up with offices, shopping centres or dwellings. Not only convincing theoretical models show that real estate prices are higher in big cities than in smallish cities. There is also lots of empirical evidence – for all types of real estate. For example, there is a (weak) positive correlation between the share of income claimed by housing rents and the size of a city; in other words, living in a large city is not only more expensive in absolute terms but also in relative terms.<sup>11</sup> In this case, global cities and megacities enable higher wages and salaries thanks to higher productivity. However, part of this wage growth is lost to higher real estate prices. Besides, this price effect applies not only to real estate but also to many consumer goods. It is only natural that a sandwich bought in the City of London has to be more expensive than anywhere in Yorkshire if both shop rents and wages are higher in London.

So people who live in megacities only benefit from productivity gains if these override the higher cost of living there. This presumption generally holds if people move to a megacity voluntarily. In such cases, the migrants' expectations obviously play a key role: do they rate their chances of obtaining a net pay rise higher than the risk of a decline? It is precisely the broad spectrum of life opportunities in big cities that give these expectations a particular hue. The availability and reliability of information are crucial. For instance, if there is better information available on income potential than on real estate prices, expectations could be distorted, since the burden of the higher prices is underestimated.

A further visible aspect of this growing scarcity of land is the efficiency of its use, i.e. the development of high-rise buildings for both residential and commercial purposes. In Hong Kong there are

#### The city as a club



#### High-rise buildings are visible indication of scarcity

<sup>11</sup> See e.g. Just, T. (2008).

**Slums and high-rise buildings are two sides of the same coin**

roughly 7,500 tall buildings with at least 12 storeys, in New York about 5,500. But emerging markets are increasingly home to tall buildings, too. São Paulo already had over 3,000 high-rise buildings back in 2005. At just over 550, the number in Shanghai seems modest in comparison. However, at the time of the survey alone a further 300 were under construction.<sup>12</sup> The high value of land naturally also means that available space in inner-city areas rapidly becomes the site of new building projects. This reduces the amount of land available for parks, recreation and general purposes, accordingly.

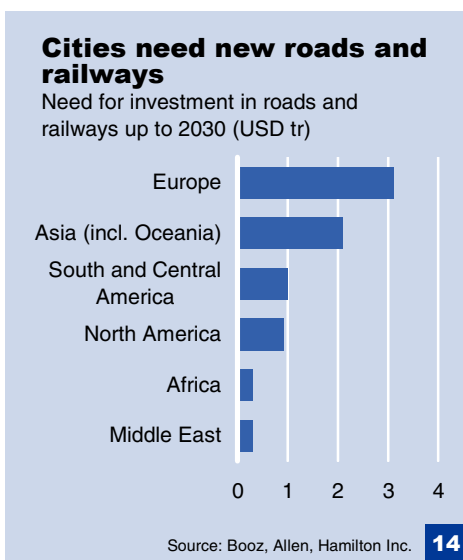
Besides, the growing scarcity of land in city centres also results in amenable living conditions becoming unaffordable for very many people. Therefore, slums are the side-effect of the upswing in the real estate markets, particularly in the megacities of the developing countries and the emerging markets. At first glance the juxtaposition of modern high-rise buildings and slums may appear contradictory. In actual fact, though, these are two sides – at least in a development phase – of the same coin.

UN Habitat, the United Nations Settlement Programme, estimates that a total of one billion people live in slums around the world. Over the past thirty years the number of slum dwellers has doubled, and despite ambitious targets and declarations<sup>13</sup> it will be virtually impossible to stop the number from increasing. Most of the chances of improving the quality of life in cities as discussed above do not hold for people in slums. Their life expectancy, state of health, employment opportunities and standard of education are not higher than in the countryside, and in fact are often lower. In any case, UN Habitat says that the comparative values are considerably lower than the values for city dwellers who do not have to live in slums. And of course hardly any of the numerous slums are integrated into the urban infrastructure networks.

**Transport: Rien ne va plus**

In 2005, Katie Melua landed a smash hit with her song “Nine million bicycles in Beijing”, and many people really do still associate images of bustling streets filled with bicycles with Chinese cities. However, the reality is less romantic, for it is becoming increasingly difficult for even bicycles to get from point A to B. Over 3 million cars already jam the streets of the Chinese capital, being joined daily by a further 1,100 new vehicles.<sup>14</sup>

The growing extent of developed land and the distance between home and place of work typical of a world based on the division of labour often prohibit commuting by bicycle or on foot. Besides, emerging markets in particular often lack an adequate public transport system. Building up public transport from scratch is extremely expensive; the planning phase takes a very long time; and the construction of underground railway systems in particular ultimately requires the dismantling of existing structures. Rapidly expanding cities thus face the challenge that traffic movements by (motorised) individuals are growing much faster than the transport infrastructure, so traffic jams will occur as a matter of course. Considerable increases in incomes are enabling more and more people to buy their own car. As a consequence, road traffic has to bear the



<sup>12</sup> All data for 2005 and from www.emporis.com.

<sup>13</sup> Take, for example, the Global Strategy for Shelter of 1988 or the particularly prominent Millennium Declaration of 2000.

<sup>14</sup> See Neue Zürcher Zeitung (2007). Bald 3 Millionen Autos in Peking. March 2, 2007.

### Bus systems are often more sensible than new underground railway

#### The bus system in São Paulo

São Paulo has probably the most complex bus system in the world today, and it is an operating success. Over 26,000 buses on nearly 2,000 routes carry up to 11 m people daily. Within one week the total number of passengers would nearly equal the population of Germany. By comparison: the Tokyo subway carries “only” 7.8 m passengers per day, even though almost twice as many people live there. The key to the success of the bus system is the specially implemented bus lanes. This means bus commuters can avoid the traffic jams on the streets. The bus thus travels faster than cars. Furthermore, the far-flung network ensures that many places throughout São Paulo can be reached. The comprehensive network of routes and the shorter travel times are responsible for the success of the bus network. A further advantage for the city is that it is much easier and cheaper to widen the roads than to build tram lines or even underground rail systems. It would never have been possible to build a comparable underground network with the same amount of funds.

adjustment burdens for a very long time. But since the long planning deadlines, scarcity of public funds and limits on space also hold for the expansion of road infrastructure, daily commuting times of up to four hours are not unusual in megacities either.<sup>15</sup>

As a rule, cars are not a good answer to agglomeration problems since the area used per passenger is not efficient. This applies in particular if every car only carries one or two persons. A joint local transport system makes much better use of the scarce resources. This saves space and thus time. However, an underground railway network is not necessarily the best solution in developing countries and emerging markets. True, the underground makes very good use of the space. But, for one thing, its construction or expansion is very expensive and, for another, potential future traffic flows have to be anticipated today. This is much more difficult in very fast growing cities than in cities with an already established structure. For this reason, bus systems are often more sensible alternatives at least for several decades. The construction of a bus lane costs only a fraction (one-tenth or even only 2%) of a comparable underground line. Such a solution can be adapted more quickly to new requirements. The experience gathered in São Paulo and Curitiba in Brazil serves as a good example (see box).

However, traffic problems are by no means confined to developing countries and emerging markets. According to the Texas Transportation Institute, American commuters spent roughly 3.6 billion hours stuck in rush-hour traffic jams in 2000. Monetary disincentives such as the congestion charge for central London should therefore be used more often to put a value on scarcity. However, there are limits to what can be done here, too: the impressive pictures of professional “people-pushers”, who help optimise the capacity utilisation of the Tokyo underground system, probably make it abundantly clear that with nearly 3 billion passengers per year the network has reached its limits. For it holds equally for the cities in industrial countries that the modernisation and expansion of existing underground systems can only proceed slowly. Booz Allen Hamilton, the management consultants, estimate that USD 7.8 trillion will have to be invested in the world’s urban roadways and railways – with over half being allocated to Europe and North America. To make it easier to raise the funding, the authorities should look more often into private-sector financing models.

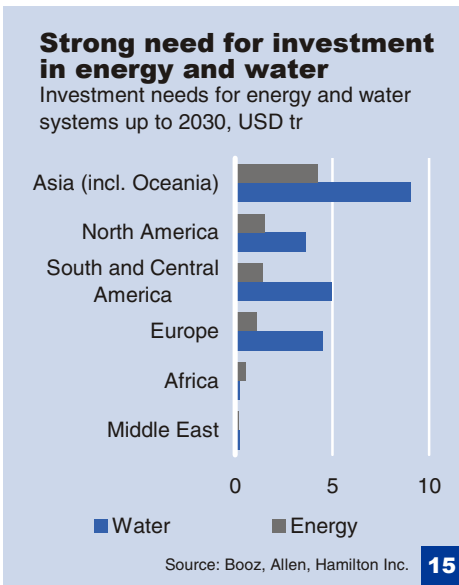
## 2. The pollution in urban agglomerations

The growing strains in the transport sector not only mean lost time in traffic jams, but also more environmental and health problems, i.e. external effects that are not factored in via the market. In this regard, vehicle exhaust fumes are only part of the “poison cocktail” in the big cities. In the young and prospering industrial cities in emerging markets especially, many pollutants find their way into the environment unfiltered: the World Bank estimates that 16 of the world’s 20 most polluted cities are in China – economic success and environmental challenges go hand in hand here.

At the same time, the economic ascendancy of cities leads to a rapid increase in energy consumption: there is a very close correlation between the prosperity level of an economy and its energy consumption. Of course, this holds not only for nations but also for regions and cities. São Paulo, for example, consumes 60% of Brazil’s energy, even though it is home to only 15% of the

<sup>15</sup> Guizzo, Enrico (2007).

**By 2030 nearly USD 4.5 tr will need to be invested in Asian energy networks and power stations**

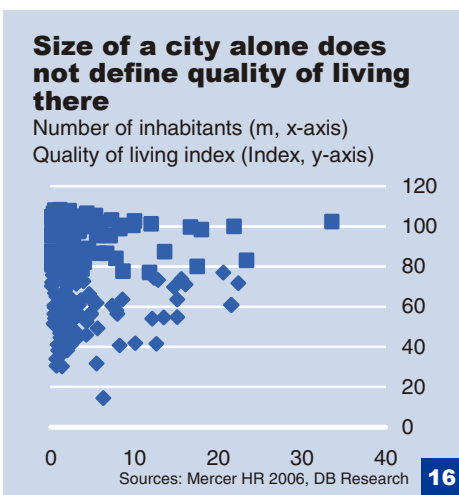


inhabitants. All in all, cities are responsible for 75% of the global emissions of the greenhouse gas carbon dioxide.

So if the economy continues to boom, it is likely there will be further strong increases in the consumption of energy. It thus comes as no surprise that Booz Allen Hamilton found in their study that there is a huge need for investment in urban infrastructure especially in Asia. They say that by 2030 nearly USD 4.5 trillion will need to be invested in Asia’s energy networks and power stations alone. This represents nearly half of the global investment required in this sector.

Two aspects are important here: first, the cities are most unlikely to get by also in terms of their energy supply without help from private-sector financing and operator models. Second, it is vital that the prices of energy reflect the scarcity conditions, so people can be motivated to start saving and thus reduce the pace of increase in energy consumption as well as the related environmental damage.

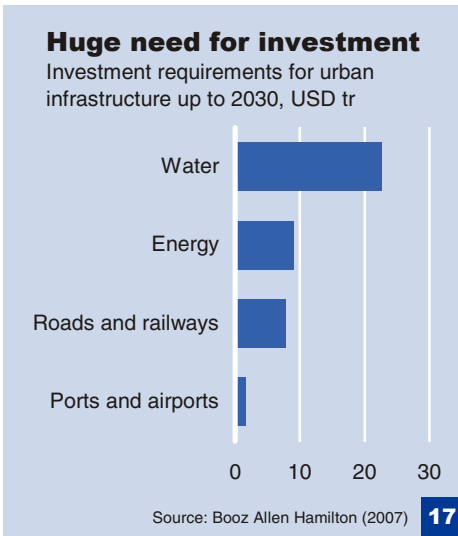
The pollution is serious especially in areas where there are insufficient means to clean it up or where in fact there are new pollutants even in the water. While 100% of the households in the industrial countries are hooked up to a potable water supply, this applies to only every second household in many cities of the developing countries. Given the booming population growth the supply ratio has in fact deteriorated in many cities over the past few decades. If, as in Cairo, pipelines for potable and non-potable water run parallel to one another, leaks can rapidly lead to contamination. However, it would be foolish to presume that there is a backlog in demand for investment only in the developing countries and the emerging markets. Many European and North American water systems suffer from the chronic financial straits of the municipalities. Four out of five sewage lines in Germany have reached the end of their technical useful life or have even exceeded it. All in all, some USD 9 trillion needs to be invested in the water and sewage networks in Europe alone over the next 25 years. For Asia, the investment needs are even estimated to total nearly USD 16 trillion. Without private investors this will be pretty well impossible. If market-based solutions are to be the answer, these very challenges may well offer opportunities for private investors. All in all, a total of USD 40 trillion will need to be invested in all infrastructure areas across the board.



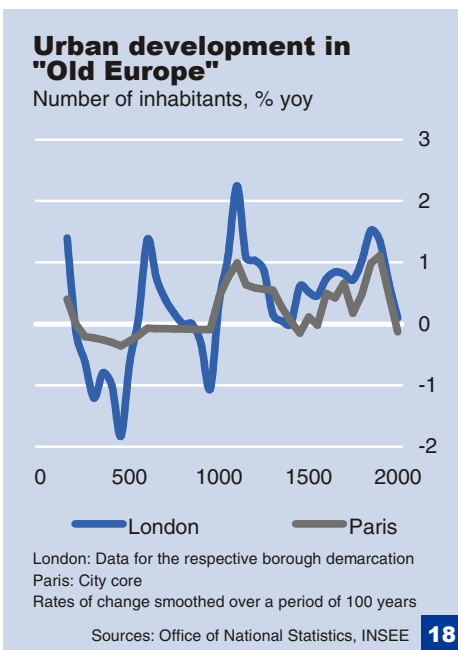
Seen in this light, megacities should presumably offer a low quality of living. And, in fact, there is not a single megacity among the top 30 in the worldwide survey conducted by Mercer Human Resource Consulting on the quality of living in cities. However, if you look at all the cities in the study, there is no clear correlation to be seen between the size of a city and the quality of living it offers. Apparently the size of a city alone does not determine the quality of living there – the costs of urban agglomeration plainly have to be weighed against the many benefits.

**3. Social challenges**

If the analysis is reduced to macroeconomic aggregates alone, the benefits discussed can be netted against the costs. The result then would in all probability be a positive net contribution. This presumption is underpinned by the robust economic and population growth in cities. If the difference between costs and benefits were permanent and negative in a comparison with the areas abandoned,



### Take the subsidiarity principle seriously



such strong and persistent migration flows would not develop. They would very rapidly reverse.

However, the fact that the costs and benefits of urbanisation – especially in megacities – are not divided evenly is a problem. Cities raise a host of allocation issues: these focus not only on the distribution of income and wealth, but on far more important factors which enable social mobility and equality of opportunity: equal opportunities in education, integration of immigrants and an appropriate level of civic participation in politics. The UN Habitat studies on the possibilities open to slum dwellers provide convincing evidence of a substantial opportunities gap in cities. This cements the distribution of income and wealth.

The comparatively high crime rates in large cities are not only attributable to these inequalities or, above all, to the high visibility of these inequalities. They are partly due to the greater degree of anonymity in big cities, which makes prosecution more difficult. It is easier to remain undiscovered in a maze of houses in a metropolitan area than somewhere in the countryside. In addition, it is particularly the economic success which many city dwellers enjoy that partly motivates others to commit property offences; it is simply more rewarding<sup>16</sup> and this intensifies the degree of segregation in the city. The well-to-do stick together, retreating to the protection of gated communities.

Particularly this disintegration of the city into sub-centres raises the complexity of the job for the governing parties. In any event, cities with 10 million or say 20 million inhabitants pose Herculean challenges to their administrations. A high level of complexity does not mean, however, that they are ungovernable. Ultimately, the subsidiarity principle applicable to a country or its regions can also be applied to cities and their districts. It often makes sense to boost private initiatives based on personal responsibility especially to address social problems in the direct living environment. The subsidiarity principle enables countries to be governed which are home to several hundred million people. More direct responsibility for city districts and private initiatives will help to pinpoint problems and solve them. This is also a matter of integrating people into the concrete task of problem management. As a kind of side-effect, the level of anonymity is reduced. Besides, this is an easy way of seeking information locally which otherwise would first have to be compiled and assessed in a central facility.

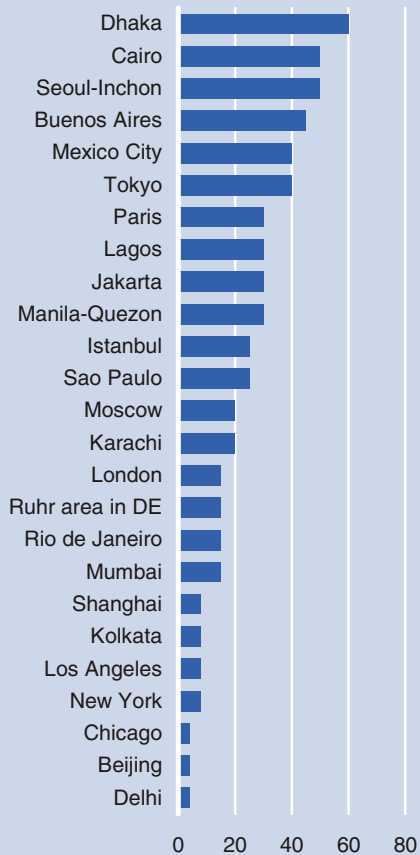
However, it cannot be emphasised often enough that the subsidiarity principle also applies in the opposite direction: some jobs and projects that affect more than one district of a city have to be planned and coordinated at a higher level. In this context it goes without saying that the interests of those directly affected must be heard and taken into consideration. Nevertheless, decisions have to be taken at the higher level. This is necessary, for example, on transport, water and sewage projects.

<sup>16</sup> Glaeser, E.L. and Sacerdote, B. (1996).

## 4. Does the future belong to the cities?

### Major urban agglomerations

Economic strength of the agglomeration, % of national GDP



Source: Munich Re **19**

Over half of the world's inhabitants now live in cities, and only theoretical arguments can be put forward at best to say why the development of the past few centuries might end in the near future. Edward Glaeser's question as to whether cities are dying can reassuringly be answered with "no". There will of course be cities that shrink in size going forward, either because their sectoral base crossed the zenith of development and no new focus could be found, or because of natural decreases in population size. Some cities are known to have shrunk or even collapsed in past centuries. In fact, records on the global cities of Paris and London show they experienced phases of a declining population. These declines very frequently came in reaction to shock situations such as epidemics, wars or changes of regime. They are virtually impossible to forecast in any sensible way; a general rule of thumb for all cities in the world is that the population is unlikely to go down as long as the world population continues to grow.

This suggests that the megacities will continue to grow and that new megacities will arise. One key point to bear in mind, though, is that urbanisation happens mainly in the world's countless medium-sized cities. In future, the populations there are expected to grow faster than those in the megacities. In fact, this will probably be desired and politically managed in order to reduce the costs of population agglomeration in the megacities and better distribute the benefits of urbanisation on a regional basis. Special economic zones have proven effective as instruments of urban development. Financial incentives enable companies to be attracted to specific regions. Once a cluster has been established, the incentives may be discontinued, for the region then develops its own powers of attraction. Of course, this only functions if existing location factors are also taken into account; otherwise, the necessary subsidies may reach slightly prohibitive levels. Political will alone will usually not suffice to secure a permanent solution. In the long term the sustainability of the economy is the decisive factor for urban development.

It looks as though megacities will continue to grow in the decades ahead. However, their growth will increasingly be limited by the costs of population agglomeration and the success of competing locations. These two factors will ensure that not all Americans come to live in New York, not all Indians in Mumbai or Delhi, and not all Koreans in Seoul, for this would be the logical consequence if these limiting factors did not exist.

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