



THE THREE AGES OF MEGACITIES

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INTRODUCTION

Megacities may be congested and complex, but are also among the planet's most exciting places to live. They have proven effective at stimulating creativity, innovation, freedom and economic development.

These opportunities often offer improved quality of life, which in turn leads to an increase in urban migration. Megacities have the potential to reduce poverty and improve living conditions for a large proportion of the population – if they are managed properly and make the most of their advantages.

Even if the rise of the megacity has made a significant contribution to the development of society, there is a desperate need for new urban models to tackle the associated social, economic and environmental pressures in a sustainable way.

To maximize the potential of megacities, upcoming challenges such as inequality, crime, unemployment and environmental impact must be addressed.

These challenges change over time, broadly corresponding to what can be described as the city's maturity level. While many other factors also come into play, the maturity level of a megacity can provide guidance on the sort of ICT solutions that can assist at that particular stage of development.

This report highlights some of the effects of, and challenges stemming from, rapid urbanization and the emergence of megacities. It looks at how governments can manage the largest cities in the world, the significance of a city's maturity level, and what "good quality of life" means for city dwellers around the world.

WHAT DEFINES A MEGACITY?

A megacity is a metropolitan area with a total population in excess of 10 million. It can be a single metropolitan area or two or more metropolitan areas that converge. It is difficult to define the outer limits and accurately estimate the population of megacities.



LIVING IN AN INCREASINGLY URBAN WORLD

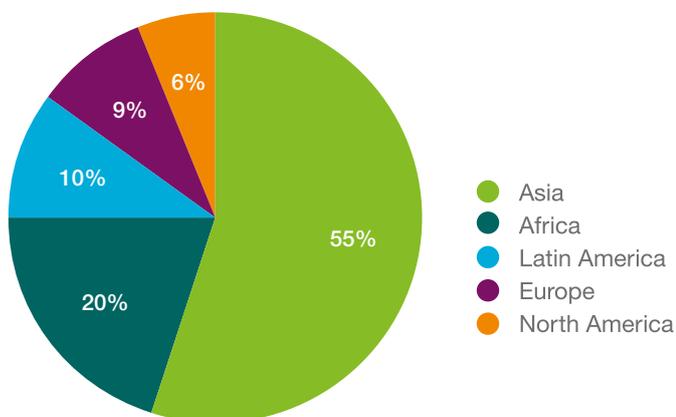
Rapid urbanization in emerging economies

Today, 50 percent of the world's population lives in cities, a figure expected to reach about 70 percent by 2050. Almost all demographic growth over the next 30 years will be urban, and there is a constant stream of people moving from rural areas to cities.

Urbanization is fastest in emerging economies; the highest growth is expected in Asia and Africa, where some cities are growing by more than 6 percent a year. Increasing migration from rural areas, in combination with a high birth rate, is driving a dynamic urban growth process – and most of the increase is taking place in poorer neighborhoods.

As a result, many people have to cope with poor infrastructure in terms of water, sewage, sanitation and other services. Other problems include growing urban divides and increased inequality.

Distribution of the world's urban population in 2050



The 2011 World Urbanization Prospects report shows that the majority of the world's future urban population will live in Asia.

Dreams of economic growth and a better life

From a governmental perspective, urbanization is closely linked to modernization, industrialization and rationalization. The population shift from rural to urban areas is driven by the economies of scale that make urban centers more productive. More efficient use of resources, with resultant improvements in sustainability, is seen as one potential advantage of living in the city. Economic growth is another factor: one-fifth of the world's GDP is generated in the 10 most economically important cities, the majority of which are also among the largest in the world. In China, the government is actively promoting urbanization because of its enormous potential for investment and consumption, a major factor in terms of continued growth. Yet there is also a worldwide awareness of the fact that urbanization and economic growth come at a cost, both in terms of wealth distribution and environmental impact.

Opportunities for growth and prosperity influence people's decisions to move to large, dense, crowded, traffic-choked cities all over the world. From the individual's perspective, it is about improving quality of life – seeking opportunities, freedom and a sense of belonging. The urbanization trend is reinforced by pull and push factors alike. Pull factors include economic opportunities, attractive jobs, better schools and hospitals, a modern lifestyle and so on. Cities are exciting, with more places to go, people to meet, activities to engage in and things to see and experience. On the other hand, push factors driving people out of rural areas can include poverty, unemployment, low standards of housing and infrastructure, lack of educational facilities, climate change, and so on. Many people move to the cities to escape a feeling of hopelessness, seeing no decent alternatives. They are willing to endure poor living conditions in the city in the hope of a better life for their children. The lure of the city, despite all its associated problems, is one of the major forces leading to the emergence of the megacity.

Megacities in 2025

Based on 2011 World Urbanization Prospects report.



Top 10 cities by population, in millions*	Top 10 cities by GDP (2008)
Tokyo, Japan, 39 (27)	Tokyo, Japan
Delhi, India, 33 (22)	New York, USA
Shanghai, China, 28 (20)	Los Angeles, USA
Mumbai, India, 27 (19)	Chicago, USA
Mexico City, Mexico, 25 (20)	London, UK
New York, USA, 24 (20)	Paris, France
São Paulo, Brazil, 23 (20)	Osaka/Kobe, Japan
Dhaka, Bangladesh, 23 (15)	Mexico City, Mexico
Beijing, China, 23 (15)	Philadelphia, USA
Karachi, Pakistan, 20 (14)	São Paulo, Brazil

*Forecast population for 2025, with current populations in parentheses. World Urbanization Prospects report.

Top 10 cities by GDP, 2008, PricewaterhouseCoopers.

MORE ABOUT MEGACITIES

By 2025 it is estimated that about 630 million people will live in close to 40 megacities around the world. Japan's capital Tokyo will still be the largest of them all, followed by Delhi and Shanghai, in India and China respectively. The list is dominated by cities in Asia, but several in Latin America and Africa will also grow rapidly. In addition to these megacities, about 400 million people will live in cities of 5-10 million, and just over 1 billion people are expected to live in cities of 1-5 million. But most of the world's urban population will still live in cities of less than 1 million people.

DIVERSITY OF THE MEGACITY CHALLENGES

What do cities need to address to work efficiently?

The rise of the megacity has made an enormous contribution to the development of modern society. However, bigger populations also create challenges that megacities must address in order to retain their advantages. Some of these challenges include well-known areas such as transportation, water, unemployment and urban divides. Other challenges include those seen from the residents' perspective: perceived quality of life and individual drivers. These challenges cannot be treated separately; a holistic view of them should be taken because each sector can affect the others.

Challenges differ depending on maturity level

Each megacity – depending on its stage of development, location and culture – has its own unique challenges and opportunities. For instance, the top priority in the Bangladeshi capital of Dhaka is flood prevention, while Beijing faces tremendous transportation and air-quality issues. Lagos in Nigeria is struggling to provide even rudimentary health services for people with HIV/AIDS and malaria, whereas the health challenges in New York refer to health-care inflation and diseases of prosperity such as obesity, diabetes and cardiovascular problems. Although circumstances vary, cities at similar stages of economic and social development have several common challenges, allowing them to be classified generally according to their maturity levels.

<p>Urban divides and segregation</p> <ul style="list-style-type: none"> > Poverty > Inequalities and gaps 	<p>Education</p> <ul style="list-style-type: none"> > Equal opportunities > Continuous learning 	<p>Pollution</p> <ul style="list-style-type: none"> > Industry and transport > Health and environmental effects 
<p>Health</p> <ul style="list-style-type: none"> > Hospital capacity > Diseases 	<p>Jobs</p> <ul style="list-style-type: none"> > Unemployment and underemployment > Unofficial work sector 	<p>Waste</p> <ul style="list-style-type: none"> > Infrastructure and landfill sites > Consumerism culture 
<p>Water</p> <ul style="list-style-type: none"> > Fresh water supply > Waste-water management 	<p>Energy</p> <ul style="list-style-type: none"> > Supply and infrastructure > Consumption in buildings and industries 	<p>Corruption</p> <ul style="list-style-type: none"> > Public confidence > Efficiency and competitiveness 
<p>Housing</p> <ul style="list-style-type: none"> > Lack of living space > Informal housing 	<p>Transportation</p> <ul style="list-style-type: none"> > Infrastructure capacity and efficiency > Public transport 	<p>Quality of life</p> <ul style="list-style-type: none"> > Access to basic infrastructure and utilities > Opportunities, freedom & belonging 

Low maturity

Megacities with a low maturity level tend to be characterized by high growth rates driven by migration and natural growth, much of it in informal settlements. Examples include Delhi, Dhaka and Lagos. Gaps between social groups are seen more often here than in other types of cities, and infrastructure such as transport, water and energy is lacking or not available to everyone. For example, in Manila, the capital of the Philippines, only 11 percent of the population lives in housing that is properly connected to waste-disposal facilities. Consequently, massive investments are required for new systems and transformative solutions. The focus is on answering basic governmental and resident needs as the cities expand. This includes finding solutions to poor living conditions, unemployment and underemployment, health, safety, education and corruption.

DELHI



ABOUT THE CITY

- > The capital of India
- > Political and economic hub of northern India
- > Expansive area encompassing several surrounding towns

SELECTED DETAILS

- > Complex and unclear municipalities
- > General lack of infrastructure and inadequate capacities
- > Modern metro, but with only five lines
- > Among the highest crime rates in India
- > Booming land prices

DEMOGRAPHICS

- > Approximately 22 million people in the whole urban region
- > One of the fastest-growing cities in the world
- > Many living in slums without access to basic services
- > Many ethnic groups and cultures

ENVIRONMENT

- > Extremely hot summers
- > Monsoon period with heavy rains
- > Home to a large number of trees and birds in the green New Delhi

Medium maturity

Megacities with a medium maturity level, such as Istanbul in Turkey, São Paulo in Brazil, and Shanghai, often have challenges similar to less-mature cities owing to a lack of infrastructure and inadequate capacity. However, they have better planning mechanisms and more financial resources to cope with the challenges. These medium-maturity megacities can have the

resources that low-maturity cities lack, and fewer legacy systems to consider than cities with a high maturity level. Several of these cities are showing the first signs of an ageing population, a slowdown in their annual growth rates and greater demand as a result of increased wealth. As these trends continue, it is important to find solutions for inclusive growth, as well as to consider the environmental drawbacks of strong economic growth.

SÃO PAULO



ABOUT THE CITY

- > Strong regional influence on commerce and finance
- > Holds many high-profile events
- > A growing city economy, among the largest in the world

SELECTED DETAILS

- > A history of urban planning projects, social exclusion, and segregation
- > Focused e-governance push
- > Severe traffic congestion
- > Limited subway system, with ongoing expansion plans
- > High crime rates falling
- > Huge helicopter fleet

DEMOGRAPHICS

- > A sprawling city with 20 million people
- > The largest city in Brazil and the southern hemisphere
- > Poor migrant workers living in ghettos and slums

ENVIRONMENT

- > Located on a plateau close to the Atlantic Ocean
- > Humid subtropical climate with abundant rainfall
- > The (polluted) Tietê river is an important source of fresh water

High maturity

Megacities with a high maturity level and a slow growth rate built their infrastructure to serve populations one or two generations ago. Their challenges mainly reflect the need to renew old or obsolete systems that may no longer meet service expectations and regulatory requirements. Transportation is one system that comes

under a lot of pressure, where the challenge is to make the deeply embedded infrastructure more efficient. London's subway system, for example, urgently needs to be optimized, overhauled and expanded. Mature cities such as London, Tokyo and New York also need to stay competitive and be attractive to current and future inhabitants.

NEW YORK



ABOUT THE CITY

- > Major impact on global media, art, fashion and entertainment
- > A 'command center' for the world economy
- > Five boroughs with a centralized government

SELECTED DETAILS

- > Extensive public transport system
- > Only US city where most households do not own a car
- > Significantly reduced crime rates due to tougher police tactics

DEMOGRAPHICS

- > A city with 20 million people in the whole urban region
- > The most densely populated city in the US
- > An ethnically diverse city
- > Many billionaires, but extreme income disparity

ENVIRONMENT

- > Landscape greatly altered by human intervention
- > Hot summers, cold and damp winters
- > Pure drinking water from reservoirs including some in the Catskill Mountains

MATURITY LEVEL A GUIDE TO ICT SOLUTIONS

The maturity level of a megacity is often closely connected to its ICT maturity, and therefore affects which types of ICT solutions are relevant and most effective. Megacities have a huge range of ICT opportunities, with countless potential connections, but on a very general level there are similarities between the most appropriate solutions for megacities within each maturity level.

Low maturity

Low-maturity megacities building new urban structures have tremendous opportunities to leapfrog traditional development processes, and ICT can be a significant contributor to these transformative solutions. Examples include mobile-money services taking off in Manila, and the world's largest biometric identification scheme taking place in Delhi and other Indian cities. With corruption a major barrier to collaborative city development, ICT can be an important way to increase the transparency of plans and decisions made by city leaders.

Medium maturity

With the rapid development typical of medium-maturity megacities, ICT solutions can contribute to making public services more efficient and easily accessible, increasing opportunities for people to participate in the growth process. As new systems are introduced, there are of course great opportunities to include ICT as a more significant component from the start. Approaches can be as varied as sensors for advanced capacity planning, and channels to increase the citizen dialog and micro-outsource the gathering of certain types of data.

High maturity

In mature megacities, ICT is already playing a significant role. However, their existing infrastructure heritage must be taken into consideration when building new solutions. For example, continuous monitoring and optimization of various components can allow safer and more efficient use of infrastructure. Improving the use of resources also requires greater resident awareness, and incentives to get people to change their behavior and start living more sustainably. Here, ICT can be used to increase awareness and understanding of the effects of personal behavior, or to communicate a shared city vision.

DIFFERENT CITIZENS, DIFFERENT NEEDS

Challenges for residents also vary depending on the economic and social development of the city.

Many people in low-maturity megacities focus on having an income and somewhere to live, personal security and access to infrastructure such as electricity, water and other utilities. When these fundamentals are in place, residents can focus more on using their time better, reducing costs and being more efficient. As a result, many in medium-maturity cities are looking for guidance as they make choices, transparency in terms of their rights, or independence from inefficient suppliers and public authorities. They may also aim to participate more in activities that give them a sense of belonging. In mature megacities, people are searching for convenience and expect the city to deliver more than fundamental services such as water and electricity. They are increasingly looking for self-fulfillment and the opportunity to pursue their dreams. Major factors include the need for recognition, status and attention.

Categorizing megacities and their residents according to city maturity levels can provide a good understanding of the significant differences between them, and the

challenges they face. However, the needs of city dwellers cannot be explained solely by government-oriented maturity levels. Residents' priorities and attitudes to life vary not only between cities, but also within populations. The definition of "good" quality of life is subjective, depending on individual perceptions, attitudes, aspirations, value systems, socioeconomic backgrounds, local surroundings and cultural environments. People's needs are not as easy to categorize as city maturity. Even if self-fulfillment may be easier to achieve in mature megacities, it is not limited to them.

For example, some inhabitants of Mumbai, while seeming to struggle financially, may consider material goods unimportant, while others may be willing to spend the little money they have on a car, in spite of traffic congestion and lack of parking. Furthermore, people in collectivist societies are thought to be less self-centered in terms of their needs and ambitions; they are more concerned about being accepted by the community than having personal freedom.

WHAT IS QUALITY OF LIFE?

There have been several attempts to assess what makes life good. The main problems with all these attempts are selection bias and uncertainty in terms of the criteria chosen. Most indicators consider objective properties such as material conditions, level of education and life expectancy. However, measurements like those covered by the Happy Planet Index highlight that there is more to life than GDP growth and other statistics – pointing to aspects such as opportunities for meaningful and engaging activities, feelings of competence and autonomy, and how people relate to one another. These quality-of-life surveys illustrate interesting inconsistencies between the objective and materialistic way of describing the world, and the more emotional aspects of life satisfaction. Economic growth, competitiveness and good infrastructure are not the only things that make people happy.



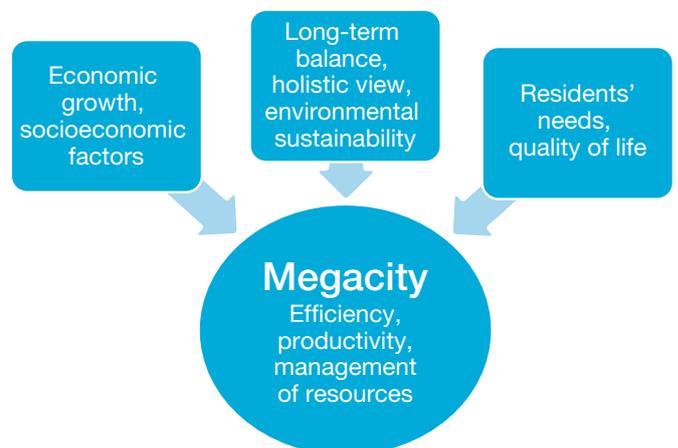
FINDING THE UNIQUE BALANCE FOR EACH MEGACITY

The diversity of megacities means that a challenge in one city can mean something different for another city. Determining factors include a city's maturity level, its geographic location, the demographic profile of its residents and cultural characteristics. Even if the challenges look the same on the surface, the solutions used to address them may differ significantly. Every city is unique, so solutions need to be tailored to fit. A solution to transport congestion in a city like Paris will be different from a solution implemented in Chennai, India. However, at Ericsson we believe that some fundamental building blocks could support both solutions. These building blocks could include a system for identifying individual vehicles in order to enforce congestion charges, or a system to monitor traffic flows throughout a road grid.

Solutions to the challenges of large cities have historically been reactive, focusing too much on existing problems and sometimes lagging behind changes in the way people live and work. Different aspects of city development need to be addressed and, if they contradict each other, be prioritized or renegotiated. This can involve for example the need to plan new housing, while ensuring that some land is kept for parks and recreational areas. Industries can create work opportunities for residents, but the companies may then have problems with waste management, leading to pollution.

New urban-planning models are required, and it is important for city leaders to find a balance between economic growth, environmental considerations and quality of life. There is a need for long-term planning, as well as reactive, short-term solutions, to ensure more integrated, more efficient urban development. Some megacities are so big and demand so much energy that they are forced to risk environmental disaster. Their idea of efficient production, employment and economic development is not in tune with an environmentally sound ecosystem.

There are, however, signs that the increasing use of natural resources is leveling out in more mature and wealthy cities. One reason is that consumption of material resources flattens out at a certain level of income, as consumption shifts from physical goods to the service sector. Such a transition can amplify the benefits gained from the introduction of e-services, as can efforts to empower residents, create new job opportunities and move them from informal to formal employment.



While the challenges are great, the solutions are closely connected. Megacities require sustainable living conditions for their residents, including housing, formal jobs, effective infrastructure, public safety, inclusion and an active dialog with local government. It is essential for city leaders to understand how visions of the future city and its related solutions affect their people, and to create a positive dialog with its residents. Instant communication and feedback, transparency and the right to participate in the policy-making process are now seen as crucial aspects of city development. Growth in megacities needs to be inclusive, and should benefit everyone.

CONCLUSION

Looking at the rapid urbanization and the growth of megacities going on around the world, it is possible to identify a large set of challenges that need to be addressed. These challenges differ depending on the perspective from which they are analyzed.

They also depend on the demographics and circumstances of each city – maturity, social and cultural norms, wealth inequality, location, and political and economic institutions. There is no single set of solutions to suit every megacity and all their residents with their subjective views on quality of life. Any solutions must take local conditions into account. This is also one of the most important considerations for us at Ericsson when we create the fundamental building blocks for ICT solutions to meet megacity challenges around the world. They must be designed for diversity, flexibility, locality, transparency and uniqueness.

Yet it would be unsustainable to leave megacities to address their different challenges in isolation. The building blocks we create must support sharing and collaboration, to enable both a positive, active dialog between megacity government and residents, and an

exchange of knowledge between megacities. Our ICT solutions must allow cities to “learn” from each other, and share any good practices that have been established. Although each city faces its own individual challenges, common factors such as maturity levels can provide a guide for appropriate directions that cities can take.

At Ericsson, we understand that we have to design for dialog, sharing, interconnectivity and collaboration. Through experience we know that the way solutions are used puts requirements on the underlying technology. To develop the right solution, we need to understand the challenges from the perspective of the real users – the residents, governments, industries and so on. We also need to take into account that the introduction of new ICT technology will have a transformative effect on the megacities and create new opportunities for everyone involved.



REFERENCES

This report contains a summary of collected information about megacities and the effects of this extreme form of urbanization. The sources include publicly available material such as reports and data from international organizations, academic studies and business papers from management consultants. In-house research conducted by the User Experience Lab at Ericsson Research, Ericsson Networked Society Lab and Ericsson ConsumerLab is also among the key sources.

According to the United Nations, Department of Economic and Social Affairs, Population Division (2012). *World Urbanization Prospects: The 2011 Revision* the following 37 cities will be megacities in the year 2025. Population in millions and current within parenthesis:

- > Tokyo, Japan, 39 (37)
- > Delhi, India, 33 (22)
- > Shanghai, China, 28 (20)
- > Mumbai, India, 27 (19)
- > Mexico City, Mexico, 25 (20)
- > New York, USA, 24 (20)
- > São Paulo, Brazil, 23 (20)
- > Dhaka, Bangladesh, 23 (15)
- > Beijing, China, 23 (15)
- > Karachi, Pakistan, 20 (14)
- > Lagos, Nigeria, 19 (11)
- > Kolkata, India, 19 (14)
- > Manila, Philippines, 16 (12)
- > Los Angeles, USA, 16 (13)
- > Shenzhen, China, 16 (10)
- > Buenos Aires, Argentina, 16 (13)
- > Guangzhou, China, 15 (10)
- > Istanbul, Turkey, 15 (11)
- > Cairo, Egypt, 15 (11)
- > Kinshasa, DR Congo, 15 (8)
- > Chongqing, China, 14 (10)
- > Rio de Janeiro, Brazil, 14 (12)
- > Bangalore, India, 13 (8)
- > Jakarta, Indonesia, 13 (10)
- > Chennai, India, 13 (9)
- > Wuhan, China, 13 (9)
- > Moscow, Russia, 13 (11)
- > Paris, France, 12 (11)
- > Osaka-Kobe, Japan, 12 (11)
- > Tianjin, China, 12 (9)
- > Hyderabad, India, 12 (8)
- > Lima, Peru, 12 (9)
- > Chicago, USA, 11 (10)
- > Bogotá, Colombia, 11 (9)
- > Bangkok, Thailand, 11 (8)
- > Lahore, Pakistan, 11 (7)
- > London, UK, 10 (9)



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