

World urbanization – new visions

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Abstract

According to 2005 United Nation Revision, the world continues to urbanize quickly. Between 2005 and 2030, the world's population is expected to increase by 1.7 billion people, from 6.5 billion in 2005 to 8.2 billion in 2030. Virtually all this increase is expected to be concentrated in urban areas. In 1950 there was just two mega-cities, New York and Tokyo, but their number had reached 20 by 2005 and is expected to rise to 22 by 2015, of which 17 will be located in developing countries.

As the world entered a new era of globalization in the last decades of the twentieth century, labour markets have become increasingly interdependent and mobility has increased, both in magnitude and complexity. Population migrations towards better conditions lead to a loss of homeland, abandonment of a cultural environment, while also prompting the need to create a new homeland. The families with different ethnic backgrounds have different lifestyles that they would like to protect. The time in which we live, “the digital era”, is a time of constant and big change. Space is the only limiting factor in possible changes in the future. Changes and progress are an inseparable part of modern living, and they reflect a growing degree of education, the ever-rising living standards and wealth. Evolution in social behaviour leads us towards new concepts of approach to modern design of the city and housing, to new concepts of resolving the issue of housing units and environment. The entire process must be part of the ecological system of balancing life on Earth.

Keywords: urbanization, megacities, sustainable development, ICT.

1 World Urban Population – UN prediction

According to the United Nation 2005 Revision of World Urbanization Prospects, the twentieth century witnessed rapid urbanization of the world's population. The global proportion of urban population increased from a mere 13% in 1900 to



29% in 1950 and reached 49% in 2005, which means that urban dwellers numbered 3.2 billion people in 2005. Over the next 25 years, the world's urban population is projected to increase to 4.9 billion people by 2030, roughly 60% of the world's population. By 2030, two out of three people will live in urban areas, with most of the explosive growth occurring in developing countries.

Urbanization is taking place at different speeds on different continents. In 2005, China, India and United States of America had the largest numbers of urban dwellers in the world. In Africa and Asia, which are still mainly rural, the urban population will double between 2000 and 2030: the accumulated urban growth of these two regions during the whole span of history will be duplicated in a single generation. Currently, Africa has the lowest urbanization level, but the fastest urban population growth. Asia's prospects are especially daunting, given the anticipated rapid population increases and demands for energy and raw materials. By 2030, the towns and cities of the developing world will make up 81% of urban humanity.

1.1 Megacities

The increasing number of mega-cities of more than eight million inhabitants illustrates in itself the major demographic and geographical trends of the past century. In 1950, only two cities, London and New York, were that size. In 1975, there were 11 mega-cities, including six in the industrialized countries. In 1995, there were 23, most of them, 17, in the developing countries. In 2015, the projected number of mega-cities is 36, 30 of them in the developing world and most, 22, in Asia. With 35 million residents in 2005, the metropolitan area of Tokyo was by far the most populous urban agglomeration in the world. Tokyo was followed by Ciudad de Mexico and New York-Newark, each with 19 million residents, and Sao Paulo, with 18 million people. In 2005, mega-cities accounted for about 9.3% of the world's urban population.

Mega-cities are not the fastest growing cities in the world. Of the 20 mega-cities identified in 2005, 13 had populations that grew by less than the average annual growth rate of the world's urban population during 1975–2005 (2.4%). Between 1975–2005, only Dhaka in Bangladesh, Lagos in Nigeria, Delhi in India, Karachi in Pakistan, Jakarta in Indonesia, Bombay in India and Manila in the Philippines experienced an urban population growth higher than 2.4%. In 2015, the world's six biggest cities are expected to be Tokyo, Bombay, Lagos, São Paulo, Dhaka and Karachi.

According to the place and manner of development, megacities can be divided into two groups:

1. large agglomerative systems occurring in highly developed countries. The base of development is high technology. Population growth brings issues of multi-culturality.
2. large agglomerative systems occurring in developing countries. Their growth is primarily linked to natural population growth and still predominantly mono-cultural – Asia, South America, Africa.

According to the World Urbanization Prospects: The 2005 Revision – Government views and policies, in 2005, half the Governments in the world



expressed a strong desire to modify the spatial distribution of its population. In many developing countries, policies aimed at redistributing the population try to reduce or even reverse rural-urban migration trends. Governments in less developed countries are more likely to implement policies to reduce migration to urban agglomerations than countries in more developed regions.

2 Implications of urbanization

There are many implications of urbanization; from poverty and inequality to natural and manmade disasters which call for better sustainable planning for urban growth.

2.1 Impact to environment

“Current global development trends are incompatible with sustainable development and ability to build the future. Sustainable development is the most important political concept at the start of the 21st century”. Franz Josef Radermacher

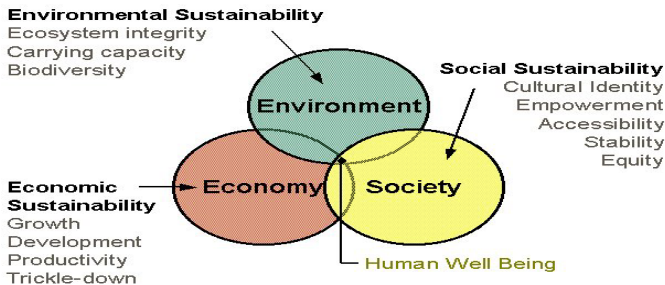


Figure 1: Economic, environmental and social dimensions of sustainability.

Environment sustainability (natural and man-made) and social and economic sustainability are indispensable for global sustainability. Concentrating human populations in cities is an environmental necessity to create economies of scale and resource efficiencies. The growing awareness of ecological dependence between man and the environment in which he lives is increasingly present on the global level, on the level of striking a dynamic balance between natural and man-made effects on the planet's whole system. Cities embody environmental damage done by modern civilization. A small portion of the world's population consumes nearly 80% of the planet's resources and produces 80% of its environmental pollution. Buildings are responsible for a large portion of the world's total energy use and raw material consumption and are also responsible for around 25% of timber harvest and 16% of fresh water withdrawal. Urbanized areas produce 40% of the solid waste destined for local landfills. Experts and policymakers increasingly recognize the potential value of cities to long-term sustainability. If cities create environmental problems, they also contain the

solutions. The principle of subsidiarity related to that tells us the following: open issues are resolved in the areas where they emerge. That means on the lowest possible hierarchy level, at the place where issues are created and where people feel at home, but still high enough so that all of those truly responsible can sit at the same table. Ecological dependence strikes at the very root of man's existence in space, of his expansion. There are six billion people in the world today and the number keeps growing. One of the key issues for future development is the potential of man's influence on natural environment, which is in a state of dynamic balance. Dynamic balance is a precarious balance. Ecological dependence and sustainable development are the basis for our efforts to create a dynamic balance of the environment.

2.2 Homeland

Space is the only limiting factor in possible changes in the future. In that respect, research of homeland as an overall notion of a milieu (environmental, ecological, cultural) inhabited by people is one of the foundations of research. Natural features of the homeland are related to geographical features. The natural and the man-made manifests itself through human presence. Homeland without human presence is the natural environment, while the homeland is part of the mental system. The Earth's global system consists of a series of homelands, that is the starting point in our thinking. Population migrations towards better conditions lead to a loss of homeland, abandonment of a cultural environment, while also prompting the need to create a new homeland. Dynamic balance is the development of the homeland.

Every year, 2 to 3 million people emigrate in the world. More than half go to the United States, Germany, Canada, and Australia. At the outset of the 21st century, 130 million people live outside their country of birth.

2.3 Poverty

"There can be no urban environmental solution without alleviating poverty".
Janice Perlman

The current concentration of poverty, slum growth and social disruption in cities present a threatening picture: Yet no country in the industrial age has ever achieved significant economic growth without urbanization. Cities concentrate poverty, but they also represent the best hope of escaping it. 100 million people in the world (above all children) have no permanent lodging. Alleviating urban poverty is essential to ensuring urban environmental regeneration. The urban poor tend to occupy the most ecologically fragile and service-deprived areas of our cities.

Another significant threat to urban safety today is forced eviction and insecurity of tenure. They are often linked to bulldozing of squatter settlements and slums in developing countries, as well as to processes of gentrification, beautification and urban redevelopment in the cities of both developed and developing countries.



In many cities today, crime and violence have become a significant cause of fear and insecurity. Between 1990 and 2000, incidents of violent crime per 100,000 persons increased from 6 to 8.8. Crime is a growing and serious threat to urban safety all over the world.

2.4 Natural and manmade disasters

All human activities, including architecture, take part in disturbing the natural balance. Man's existence is related to that balance, along with all events like war, destruction, climatic disasters etc. Disasters, natural and human-induced, are yet another current threat to urban safety. Recent evidence suggests that natural and human-made disasters are increasing in frequency the world over, and that this trend is partly linked to climate change. From 1975 to 2005, the number of disasters in the world increased from 100 to 400 per year. Hurricane Katrina, the Asian Tsunami and the Pakistan Earthquake are some of the recent disasters that exposed our woeful lack of preparedness.

3 Cities – potential for the future

Quality of life for most people in the future will be determined by the quality of cities. Subsistence of the world population depends on the continuation of the explosive growth of cities, most notable in the developing countries. Many of the new urbanites will be poor. At the same time such rapid growth creates new problems of the survival of cities, as they will not be able to absorb quick population increase. Uncontained growth of megacities, (cities with over 10 million dwellers) particularly in the developing countries, is becoming a focal issue. Their future, the future of cities, the future of humanity itself, all depend very much on decisions made now in preparation for this growth. We should be aware of the future role of cities as the dominant type of settlement for humanity. Cities will play this role not only as a matter of fact, but also as a matter of necessity. In an intensive rural occupation pattern this would certainly lead to an ecological disaster.

“Cities are the fundamental building blocks of prosperity, both for the nation and for families. There's the crazy notion that the way to deal with a city's problems is to keep people out of them.” Marc Weiss, chairman of the Prague Institute for Global Urban Development

Urbanization, the increase in the urban share of total population is inevitable, but it can also be positive. A mega-city enjoys the advantage of concentration of talent, opportunities and resources. However, these cities are often associated with high stress and alienation from nature in the daily lives of people. The potential benefits of urbanization far outweigh the disadvantages: the challenge is in learning how to exploit its possibilities.

3.1 Basis for research of new methods

There is a need to re-examine the tools available for planners, to meet the need of massive urbanisation in the world today. There are at least three areas that



directly affect the research of new methods of urban and architectural design and in the last century they were defined as generating big changes in the society and having a great impact on the development of modern civilization: the investor's economic power, ecological dependence, ICT – Information and Communication Technology. Engineers and architects again face new challenges, stemming from the big and fast changes due to the enormous increase in investors' wealth. Investors' economic power gets more prominence in the ever larger and complex tasks of design, which demand more and more complex teams with experts from different fields, while the full circle is closed through implementation and maintenance of newly created material values. Economy is competition. Sustainable development is the framework for that competition. For us, sustainable development is the homeland that we develop and maintain on the basis of criteria of eco-social-market economy, which is essentially a dynamic balance of the natural and the man-made. The framework of the competition is the cultural, the civilizational (including ecology) and the economic. Globalism of ecology and homeland directly affects the future that is related to the overall balance of the world. In that sense, the architect emerges as one of those on the team that studies the phenomenon of preserving life on Earth. In that respect, research of genius loci as an overall notion of environment (ambient, ecological, and cultural) inhabited by people should be the base of investigation.

Digital revolution changes not only the nature of architectural output, but also the location, and that causes a re-definition of architectural output's link with cultures of particular regions. Considerations about architecture and urban planning in the new context of digital telecommunication revolution, miniaturization of electronics, digitalization and the growing dominance of software in relation to materialization are of crucial importance, according to William Mitchell: "Contours of as yet invisible cities of the 21st century are emerging. Architects are faced with most diverse tasks, imagining and creating digitally related environment for the ways of life and types of community we may wish".

3.2 Effects on the research of the new methods of urban and architectural design

The quality of life for most people in the future will be determined by the quality of cities.

In recent years we are witnessing a rapid and drastic transformation of the cities in Europe and the world. Changes in the physical reality are as present in internal structural mutations of the old urban matrix as in the uncontrollable growth of the new, amorphous suburbia. In its endless expansion, it swallows the important landscape and agricultural interspace between the natural environment and the artificial urban form.

We face a huge task of modernizing the towns in which urban architecture makes up for as much as 80 percent of the urban tissue. Middle class is the bearer of such modernization, which is closely related to the level of urban housing. That becomes a deeply socio-psychological and mental process. The question of urbanistic and architectural typology is becoming one the



fundamental question of the profession. How to build cities for 10, 15, 20 or 30 million inhabitants? Human identification with space is one of the elementary mental processes which bring him in harmony with the environment. How to achieve this in megacities when such territory is non-identifying and hard to control? It is necessary to define the procedures and methods with which to tackle such concentrated entities. The aim is to control and manage the growth of megacities; it is not about arresting development, but its redirection towards the most suitable spot for development. We are facing a large task of reconstructing the existing megacities, but also the preparation for the development of new ones.

The tissue of the megacities is substandard, not equipped with networks, the stratification is non-existent and it spreads like a tumour. Such megacities require reconstruction which would lead towards a specific system – a network city. New clusters must be planned in the way to make such system become a platform for growth. New cities demand urgent establishment of a new method as a critical factor for successful urbanization. It is necessary to generate a development strategy, legislation and procedures to ensure the implementation of the plans.

It is essential to conduct a value assessment of the big systems, and to establish adequate evaluation systems in order to mark the accomplishments which will bring significant changes. These criteria must be rational, objective and focused on the right goals, and they have to encompass the following areas:

Building and growing more densely and compactly with a precise estimate of the needs of the city and the citizens, through a legitimate visionary, functional and feasible plan, with respect for the local cultural values and heritage. Progress – nature and heritage conservation, as well as careful selection of new areas of development, investment in and commitment to sustainable and renewable energy technologies integrated into the built form; Development – careful management and optimum use of soil as an exceptionally valuable source, regenerate degraded environments and halt biodiversity loss; Transport development – investment in public transit, effective substitution of cars with public transport, creating walkable, mixed use urban environments that permit and encourage walking and bicycling; Beautification of the cityscape – visual coherence and the unity of space and good architecture; Improvement of the environment – attractive residential zones, clean, green environment, together with all additional principles of creation of sustainable cities, like zero carbon: zero waste; local and sustainable materials and goods, sustainable water, equity and fair trade, health and happiness.

It is necessary to gather a team of experts and professionals for the implementation of ideas, together with mayors and representatives of global cities, who show or have the potential to show leadership in sustainable urban planning.

3.2.1 Singapore – Constellation city

Singapore as an example of the Constellation city – a new concept for a megacity can serve as an example for the organization of new cities, but also as a potential example for the reconstruction of the existing agglomerations. The



Constellation city is a collection of several fully independent cities within a megacity, each with a population size of around 1.5 million to 2.5 million people, with their own Central Business District, new towns, mass rail transit system, cultural and institutional facilities. Situated in close proximity, these cities can be connected to one another by MRT or commuter trains. In Singapore, 23 new towns have been planned, all high-rise and high-density. Constellation cities give inhabitants the best of both worlds: a constellation city attracts talent, technologies and finance to generate powerful synergy. Relative independence of each city within a megacity provides less stressful, more convenient and simpler lifestyle. New emerging megacities should be planned at the outset as constellation cities. Existing megacities should upgrade regional commercial centres as full-fledged CBD's, carve out land areas surrounding each CBD to create a city of 1,5 to 2,5 million people. Within each city, there are still regions and new towns. Between cities, there should preferably be green belts.

3.3 Architectural typologies

Cities have historically been seen as the antithesis to nature, intrinsically unnatural and destructive. A major challenge will be in imagining new cities, and new city forms, that acknowledge the intrinsic, innate need for humans to have direct contact with nature and with other forms of life with which we share the planet. In typologies with new vision, horizontal movement becomes vertical. Cities start the upward growth as a direct consequence of the lack of territory. Typology of a residential building is vertically oriented. High dwelling density, 1000-1500 citizens per ha, high-rise buildings with a prominent participation process. The horizontal path is replaced by the much shorter vertical movement. A wholesome vertical collective organization of life is created. With such organization of vertical cities, communal infrastructure, traffic issues, high water consumption, high participation of built areas, a great concentration of movement of people and goods become the key issues. In such limited space individual transport is not possible in today's sense, collective transport is provided, controlled on all levels.

In recent years, many architects and researchers have invested a lot of effort in order to improve and bring living to a high quality level, fitting in with the modern way of life. Computers have become part of the living space and have made our homes network units. New technology, (wireless carriers, sensors), and materials open a whole new range of lifestyle options. The question is: what will be the consequences of new technology on the residential architecture in the near future?

Furthermore, all future building must be green, also in the sense that nature becomes a central part of the urban design programme.

3.3.1 The Seoul Commune 2026

It is interesting to take a look at the project of the Korea-based firm Mass Studies. It came as a response to Korea's rapid technological and architectural development, which the designers describe as "anarchical." Korea is experiencing the fastest urban transition in 40 years. It went from 80% rural



population to 80% urban population. The Seoul 2026 proposal offers a fully-functional community development that is efficient, high-tech, and immensely sustainable. The Seoul Commune 2026 – Towers as part of the park project explores the capacity for living, and alternative and sustainable communities in overpopulated metropolis of the future. This Commune is located in Apgujondong, a central area in the southern part of Seoul. It is located in a large-scale urban redevelopment zone that is possibly one of the most densely populated places on Earth. Covering 393,400 square meters of land and bound by the Han River on the northern side, 15 towers of varying height – from 16-53 floors – function like one giant house in this park-like setting. The community is shaped by the towers and the park, it is a complex network of private, semi-private and public spaces. This method solves the problem of social interaction, connecting the interior spaces with exterior ones, as well as public with private spaces. In this way, the tower becomes the park, and the park becomes the tower, creating a whole. All vehicular circulation moves below the ground and is connected to the underground parking spaces at each of the towers. A monorail loop on the second floor offers public transportation and people movers connect the neighbouring towers. The omnipresent digital technology in this community makes the effective use and management of these spaces possible. These technologies are programmed to protect and allow a certain degree of privacy in the housing units, and they also make individual insight into different public spaces at a particular moment possible. The skeleton of the towers is constructed using different types of glass, from photovoltaic glass to recessed glass panels that create shaded balconies. Atop the glass is a geotextile that allows for the growth of vines and other flora that provide additional cooling and environmental advantages to the building and surrounding site.



Figure 2: Mass studies: the Seoul Commune 2026.

3.4 New sustainable cities – Masdar City

Abu Dhabi has started building Masdar City, the world's first zero-carbon, zero-waste car-free city. The 6.5-square kilometer district, will cost \$22bn, take eight years to build and be home to 50,000 people and require 1,500 businesses and

top minds in the field of sustainable and alternative energy. To remain zero-carbon within its walls, the city will be entirely car free.

All of the transportation system is offset with the inclusion of personalized rapid transport, ensuring rapid transit within the city limits. Outside the walls, the development of the city was strategically sited to link to Abu Dhabi's principal transport infrastructure, the center hub of Abu Dhabi, and the international airport via the existing road infrastructure and new public rail routes. Along with the carefully planned intersection of transportation is the conscientious incorporation of wind, photovoltaic farms, research fields, and plantations, allowing for the Masdar to be entirely self-sustaining. The project is encouraging urban growth while avoiding low density sprawl. Norman Foster, the author of the project, states, "The environmental ambitions of the Masdar Initiative – zero carbon and waste free – are a world first. They have provided us with a challenging design brief that promises to question conventional urban wisdom at a fundamental level. Masdar promises to set new benchmarks for the sustainable city of the future."



Figure 3: Norman foster: the Masdar City.

4 Instead of conclusion

"Every 'First World' city has in it a 'Third World' city of infant mortality, malnutrition, unemployment, contagious diseases and homelessness. Similarly, every 'Third World' city has in it a 'First World' city with high finance, fashion, and technology. In this light, megacities have more in common with each other than with towns and villages within their own countries, and would benefit from sharing urban solutions."

This is primarily our reflection on the direction of research – it is documented enough and open enough so that certain results can be expected. We need to create a climate conducive to experimentation, mutual learning, and collaboration. Introverted approach of any sort or the orientation towards the local decreases the possibility of intervention. Only extrovert approach and openness to the global can bring results. As the world is becoming increasingly urban, it is essential that policymakers understand the power of the city as a catalyst for national development. Cities have to be able to provide inclusive living conditions for all their residents. How can we manage this is one of the greatest challenges facing humanity. All those parameters change rapidly, and

that calls for continuing research and application of modern knowledge, materials, development programs and most recent information technologies, with a strategy of sustainable development. The entire process must be part of the ecological system of balancing life on Earth.

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