EL COLEGIO DE MÉXICO

CEDUA Centro de Estudios Demográficos Urbanos y Ambientales

CENTRO DE ESTUDIOS DEMOGRÁFICOS URBANOS Y AMBIENTALES

No. 6

URBAN DEMOGRAPHIC GROWTH: THE CASE OF MEGACITIES

Documentos de investigación

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Centro de Estudios Demográficos,Urbanos y Ambientales
México, D.F; Mayo de 2012
Documento preliminar para discusión.

A paper prepared for
Handbook of Research Methods and Applications to Urban Economies

Urban Demographic Growth: The case of Megacities

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One of the main facts about contemporary urbanization consists on the accelerated increase in the number of megacities. Megacities have been defined by the United Nations (UN) as urban concentrations containing more than 10 million people (United Nations, 2010). In 1950 there were only two metropolis with that reaching that number (New York and Tokyo), while in 1980 two more were added (Mexico City and São Paolo), and for 2010 there were 21, where 324 million people were living, 4.7% of the world population. The objective of this chapter is to analyze the evolution of megacities from a demographic perspective, their role on the urban national systems where they are located, and their economic and competitiveness importance in the global sphere.

Population growth and spatial concentration in the Twentieth Century

During the Twentieth Century the world population was multiplied as never did before and as it never will again. In 1900 the total population was 1.7 billion people and in 2000 was 6.1 billion, which meant that the population increased three times more at an annual growth rate (AGR) of 1.3% (table 1). In the XIX Century, the demographic growth was 1.7 times more, when the number of people increased from 1.0 to 1.7 billion people at an AGR of 0.5%, while recent population estimations made by the UN for 2100 show a population of 10.9 billion people[1], which means an increase of 1.8 times more and AGR of 0.6%. In absolute terms, world population increased by 4.5

[1] http://esa.un.org/unpd/wpp/Excel-Data/population.htm
[2] http://www.census.gov/compendia/statab/2012/tables/12s0022.xls.

billion people in the Twentieth Century and this amount will be less than that will occur in the XXI Century, which will be 4.8 billion people. The challenges derived from the demographic expansion in the XX Century were due to both the intensity and the magnitude of the population growth.

Nearly 90 percent of population growth took place in places classified as less developed countries (LDC) by the United Nations during the 20th century: all countries in Africa, Asia (except Japan), Latin American and the Caribbean, and Oceania (except Australia and New Zealand). China and India were the countries with the highest absolute population growth between 1950 and 2000, with about 700 millions of people in each of one, likewise Indonesia, USA, Brazil and Pakistan, with increases of more than 100 million of people. On the other side, United Arab Emirates, Qatar, Western Sahara, Kuwait and Djibouti have more than 5% of AGR. In 2000 China population was higher than the group of more developed countries (MDC), and ten nations had 100 million people or more (China, India, USA, Indonesia, Brazil, Russia, Pakistan, Bangladesh, Japan and Nigeria), and concentrated 60% of the world population.

Table 1
World population, 1800-2100

	Total	Growth		
Year	(billion)	Absolute	Relative	AGR[a]
1800	1.000			
1900	1.650	0.650	1.65	0.50
2000	6.123	4.473	3.71	1.32
2100	10.917	4.794	1.78	0.58

[a] Annual growth rate.
Source: United Nations, Department of Economic and Social Affaires.

This unprecedented increase in the world population in the XX Century had three causes (table 2): i) increase in the quality and coverage of health services, which made a sensible decrease in the crude death rate (CDT) and specially in the infant mortality rate; ii) increase in the relative income of families, producing little change in the crude birth rate (CBR) and making the average size of families larger, and iii) technological

development, not only in the medicine and productive process fields but also in communications and transports, from a significantly public investment.

Between 1900 and 2000 the world CDR decreased from 26 to 9 persons per one thousand inhabitants per year; in the MDC, the fall occurred mainly in the first middle of the century, while in the second middle the event was observed more clearly in LCD. In 2000 the MDC had higher CDR than the LDC. Any country with a history of high fertility has an age distribution with a high proportion of young people (Li and Tuljapurkar, 1999). On the other side, during the first middle of the century the world CBR showed no changes, despite the decrease occurred into MCD. But, in the second middle there was a decline of the rate in both groups of nations and with similar speed. The early downward of the mortality rates and the fertility decline, only decades after the reduction in mortality, resulted in population growth during the century, especially in the first half. By 1950, the natural growth was 18 persons per 1 000 inhabitants at year, and in 2000 the ratio declined to 13 persons.

Table 2
World natural growth, 1900-2000

	1900	1950	1980	2000
	Crude death rate [a]			
World	26	19	11	9
More developed countries	22	10	9	10
Less developed countries	33	23	11	9
	Crude birth rate [b]			
World	36	37	28	22
More developed countries	32	22	15	11
Less developed countries	42	44	33	25

[a] number of deaths per 1 000 population.

[b] number of births per 1 000 population.

Source, United Nations, Department of Economic and Social Affaires.

The evolution in CDR and CBR gave space to formulate the demographic transition as a general model of change through time, which deals with the transit of high, low and maintained rates of fertility and mortality. This model was proposed by W. Thompson and F. Notestein. At its initial phase, a high rate of fertility is combined with a

decreasing mortality that generates natural growth rates close to 3% annual average, while in its final phase the fertility rate decreases lower than the replacement rate (2.1 births) and a natural growth rate close to cero ((Benitez, 1998; Dahan y Tsidon, 1998). On the other side, the second demographic transition refers to the combination between population growth and new arrangements in formation, dynamics and dissolution of the households (Ogden and Hall, 2004).

The demographic transition generated a series of changes in the demographic dynamic such as slower population growth, higher life expectancy, lower fertility, ageing of the population, reduction of average household size and decrease in traditional family households, and the rise of other types of them (Coleman, 1996). It was also combined with a strong process of spatial concentration of the population. In 1900 there were 218 million people living in urban areas; the world was 13% urbanized. By 1950 the urban people grew to 729 million, 29% of total population, and to 2.8 billion in 2000, with an urban percent of 46. In absolute terms, the urban population grew in 2.6 billion people, and its average growth rate was 2.6% during the 20th century; it means twice the total population growth. The significant increase of population and its concentration in urban areas are two of the most relevant facts in the demographic expansion in the XX Century. However, the urbanization occurred, mainly in MDC, was already a topic for reflection since the XIX Century (Weber, 1967).

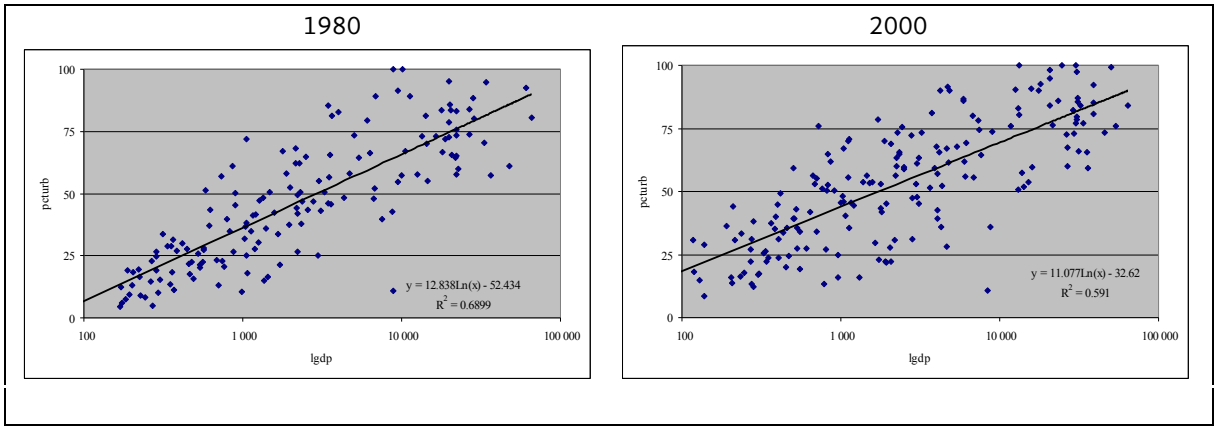
In the first literature about urban studies an intrinsic or bidirectional relationship between urbanization and industrialization is recognized. Urbanization is defined as the process of concentrating population in urban areas and the dichotomist transformation in the social and cultural behavior of population. Industrialization is conceived as a change towards higher participation of employment in the manufacturing industry inside the labor market, or the increasing importance of this sector in the productive structure of the city (Castells, 1980; Goodall, 1972; Unikel, Ruiz and Garza, 1978). It can be said that industrial urbanization is the population concentration in urban areas occurred in a specific moment of the national economic development, but not necessarily of the city's industrialization, this is, the automatic and natural local productive structure. For this to occur it must both exist a minimum

size of the city (Richardson, 1973), and an accumulation of the general conditions of production (Marx, 1930:172-173).

The not necessary industrialization of the city and the emergence of the global economy have both been factors to point out the relationship between urban development and industrialization and formulate alternative positions about the factors of urbanization. It would seem that, for at least the last two centuries, economic factors have been prime motivators of urban development. Firstly, it was industrial urbanization. Then, in the twentieth century, tertiary urbanization has become increasingly important (Goodall, 1972). Likewise, a group of cities have been specialized in high-order services, such as financial and producer services (Sassen, 2000), which have made appear the proposal of tertiary revolution, meaning the economic sector that dominates the economic structure and dynamic of the contemporary city (Garza, 2008: 35).

Urbanization and concentration of economic activities have generated the association between urbanization and income. The semi-log function is the statistical model that best adjust that relationship (figure 1). When this function is applied for all the countries with 100 thousand and more inhabitants it was found that 69% of the cross-country variation in urbanization was explained by variations in gross domestic product (GDP) per capita in 1980. The coefficient of determination fell to 59% in 2000. National urbanization is highly supported by its economic development specially in countries with $ 1 000 or more GDP per capita, but in countries with less than that, there are another variables influencing urbanization (like natural growth, geographical position or insertion to the global trade).

Figure 1
Urbanization and income, 1980-2000



Source: Author's calculation based on data from the United Nations.

Urban population growth was accompanied by an expansion in the number of cities, although the increase of cities was lower than that in population. In Mexico, for example, urban population in the XIX Century multiplied by 25 times (from 3 to 74 million people), while cities expanded by 12 times (from 33 to 399).

The high degree of concentration, characterized by the rapid urbanization, is also reflected in strong primacy into several national urban systems (Henderson, 2002). The urban horizon in Mexico was transformed by the economic growth during the second half of the XX Century, and the larger metropolitan areas were the main scenario. Mexico City increased its share in the nation manufacturing GDP from 33% in 1950 to 47% in 1970, but this share turned back to 33% in 2008. It was a deindustrialization process caused both by internal causes inherent to the metropolis (exacerbation of agglomeration diseconomies), and by the global context (productive restructuration and relocation of automotive, electronics and chemical production).

The world urbanization occurred in the second half of the XX Century, especially in LDC, had the following characteristics: i) high level of concentration in large cities; ii) cities are merging to create urban settlements on a massive scale; iii) generation of urban primacy; iv) appearance and maintenance of regional disparities, v) maladjustments and imbalances between population concentration and governance, and vi) increase in the residential and diary mobility between the inner

city and the satellite or dormitory cities and suburban neighborhoods (Henderson, 2002; O'Donoghue, 1999; United Nations, 2010a). After the Second War World, cities were seen generally as agents of development and nodes of progress that could spread their benefits to the rest of the national territory through two stages: i) from the MDC to the LDC, and ii) from more develop toward less develop regions inside the country. This process was called *modernization* and was based on the hierarchical structure of existent cities and where diffusion the diffusion of growth and the adoption of technological innovations would be transmitted from large to smaller cities, helping in the convergence among countries and inside them (Potter, 1990). However, the development programs in LDC showed barely moderate rates of economic growth, without substantial modification in the life quality of rural areas, then the development of these countries have been concentrated in some large cities.

During the XX Century the hierarchy of the world largest cities showed the following transformations: i) increase in the population size, ii) increase in the concentration in relation to total population, and iii) loss of importance of cities in the MDC, Europe and America in favor of urban agglomerations located in LDC and in Asia (table 3). In 1900 the 20 world largest cities had a total population of 36 million people and concentrated 2.2% of the world population. From them, 11 were located in MDC and 9 in LDC. Europe was the continent with the higher number of large cities, ten, followed by Asia with 6. The four most populated cities were from the MDC, while Buenos Aires was the fifth most populated and first among the LDC. On the other side China and India were nations of great surface and large urban tradition.

Table 3
The world largest cities, 1900-2000

Rank	1900		1950		2000	
	City	Population (millions)	City	Population (millions)	City	Population (millions)
	World population	1 650.0		2 532.2		6 122.8
	Largest cities	35.7		96.9		271
	Share	2.2		3.8		4.4
1	London	6.5	New York	12.3	Tokyo	34.5
2	New York	3.4	Tokyo	11.3	Mexico City	18.0
3	Paris	3.3	London	8.4	New York	17.8
4	Berlin	1.9	Paris	6.5	São Paulo	17.1
5	Buenos Aires	1.9	Moscow	5.4	Bombay	16.1
6	Vienna	1.7	Buenos Aires	5.1	Delhi	15.7
7	Chicago	1.7	Chicago	5.0	Shanghai	13.2
8	Shanghai	1.5	Calcutta	4.5	Calcutta	13.1
9	Tokyo	1.5	Shanghai	4.3	Buenos Aires	11.8
10	St. Petesburg	1.4	Osaka	4.1	Los Angeles	11.8
11	Manchester	1.4	Los Angeles	4.0	Osaka	11.2
12	Osaka	1.3	Berlin	3.3	Rio de Janeiro	10.8
13	Philadelphia	1.3	Philadelphia	3.1	Dhaka	10.3
14	Moscow	1.2	Rio de Janeiro	3.0	Cairo	10.2
15	Glasgow	1.1	St. Petersburg	2.9	Karachi	10.0
16	Budapest	1.0	Mexico City	2.9	Moscow	10.0
17	Tianjing	1.0	Bombay	2.9	Manila	10.0
18	Istanbul	0.9	Detroit	2.8	Seoul	9.9
19	Hong Kong	0.9	Boston	2.6	Beijing	9.8
20	Bombay	0.8	Cairo	2.5	Paris	9.7

Source: United Nations, Department of Economic and Social Affaires.

For 1950, the scenario had not important variation because again 11 from the 20 largest cities were in MDC and 9 in LDC, but the most relevant change was the experimented enhancement for the American continent, when they increased to 9 their participation, while the European cities decreased. Los Angeles, Detroit and Boston, as well as Rio de Janeiro and Mexico City emerged inside the most populated cities. On the opposite side, , London left the world supremacy to New York and Tokyo, while Vienna, Manchester, Glasgow, Budapest and Istanbul abandoned the list. The whole population of the 20 largest cities increased to 97 million people and their participation in the world population grew to 3.8%.

The loss of hegemony of the MDC into the world largest cities occurred in the second half of the century, when their contribution decreased to five in 2000, against

15 located in LDC. Likewise, America and Europe left to be the continents of concentration of large cities, and their placed was occupied by Asia, when its representation was elevated from 5 cities in 1950 to 11 in 2000. The main part of the contemporary urbanization was carried out in cities of the developing world, especially in the "Asian urbanization phenomenon", which was characterized by higher growth rates of urban population than those observed in the rest of the world (Palen, 2002:316-317).

Megacities: demographic patterns

Contemporary distribution in the territory has been characterized by showing more complex patterns each time. Four forms of economic-demographic concentration can be identified: i) urban agglomerations; ii) urban regions; iii) urban corridors, and iv) mega-regions (United Nations, 2010a).

Urban agglomerations refer to the concept of metropolitan area, this is the urban area that has exceeded the geographical limit, named politic-administrative, and has occupied the land of two or more administrative divisions. The operational delimitation of urban agglomerations takes into account the following elements: demographic component, has to do with population growth and residential mobility; ii) labor market, deals with structure and dynamic of the local economy, rhythms of employment decentralization and diary mobility due to jobs; iii) territorial conformation, is determined by the characteristics of urban sprawl –continuous, sectorial, axial or leap frog-, and iv) political dimension, in relation to the degree of fragmentation of the national territory into minors administrative divisions.

Urban agglomerations are generally the most dynamic areas of economic and demographic change in most of the national systems of cities. The word "metropolis" has been used routinely as a synonymous of large city (Kasinitz, 1995). The proliferation of urban agglomerations during the second half of the XX Century has been a recurrent framework for the study of new patterns in the national processes of urbanization. The systems of settlements are divided, on one side, between urban and rural, and on the other, between metropolitan and non-metropolitan.

The study of urban agglomerations has been directed both to the analysis of interdependence between the central city and its periphery, and to the following up of the intrametropolitan evolution or metropolitanism stages, which describe the displacements, first of population and then of economic activities, from the central city to the periphery (Busquets, 1993; Suarez-Villa, 1988). There are four stages of metropolitanism: i) urbanization, or concentration of population in the central city; ii) suburbanization, or emergency of growth in the periphery either continuous or discontinuous; iii) disurbanization, or absolute loss of population in the central city, and iv) reurbanization, or repopulation of the central city, generally occurred due to programs and politics of regeneration and redevelopment.

Throughout the planet, the technical and operational criteria that are used to delimitate urban agglomerations are inspired in less or more measure in the Standard Metropolitan Areas (SMA) from the Unites States, which are spatial units officially recognized. The SMA are delimited through the county where the city is located, with population of 50 thousand people at least, and adjacent counties that contain urban areas of the central city, or that they have no continuous urban area but they are urban, from the economic structure point of view , and that at least 15% of their employed population works in the central city (Pacione, 2001:23; Rain, 1999:750). In 2010, 366 SMA were defined with a range of population between 55 thousand people (Carson) and 19.4 million (New York-Northern New Jersey-Long Island).[2]

In the United Kingdom, the the Standard Metropolitan Labour Areas (SMLA) are defined in a similar way than the SMA but they do not have official status (Goodall, 1987:301). In Mexico, on the other side, the first official delimitation of metropolitan zones was based on information from the population census of 2000 (Secretaría de Desarrollo Social, Instituto Nacional de Estadística, Geografía e Informática and Consejo Nacional de Población, 2004), and followed specifically the operational criteria from the Census Office of the United States. According to that document, Mexico had 55 metropolitan zones in 2000 and 56 in 2005.

[2] http://www.census.gov/compendia/statab/2012/tables/12s0022.xls.

According to the United Nations, in 2010 there were 442 urban agglomerations in 110 countries with population of 1 million or more inhabitants. In those there were 1.3 billion people, 22% of the total population, the countries with the higher number of millionaire urban agglomerations were China (88), India (46), USA (42), Brazil (21) and Mexico (12).[3] One of the challenges that these concentrations face is governance, since, for example, it is necessary the coordination and correspondence among the diverse agents, entities and levels of government for service provision (Otgaar, *et al*, 2011). The sphere of metropolitan administration has gone from the creation of sectorial coordination to the conformation of metropolitan governments with proper autonomy and finance. The international experience has shown that there is no ideal model for metropolitan governance because there are structural and circumstantial elements from the global, national and local scales.

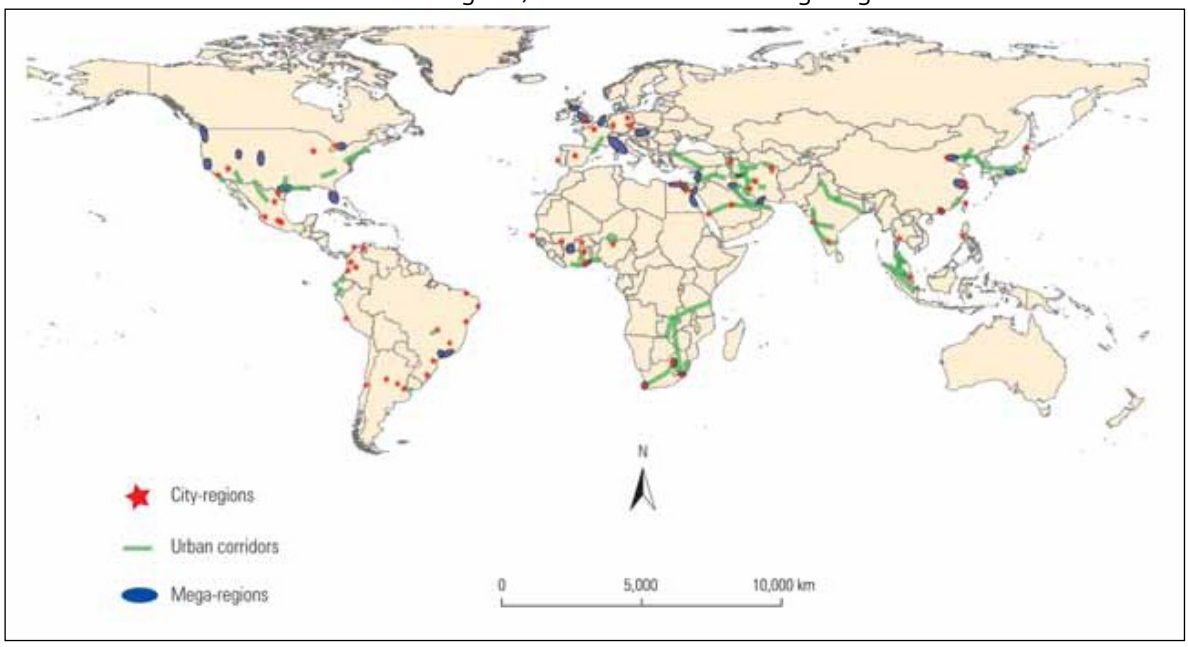
The urban regions are urban agglomerations that are extended beyond their administrative frontiers and absorb other influential urban and regional areas (figure 2). These regions contain a large urban agglomeration, generally of more than 1 million inhabitants, and surrounding urban areas of minor size in a radio up to 160 kilometers (100 miles), or a number of urban areas where no relevant domination by one of them. There are series of interrelations and interdependencies in this configuration of settlements that are shown in population redistribution, economic specialization in each population center and complex social processes (Meltzer, 1984:163).

There are three general forms of urban regions conformation (Champion, 2001:664): i) by diffusion, where the nodal center of the region develops centripetal diffusive forces towards the rest of the regional subsystem of cities but also develops centrifugal forces towards other urban areas located beyond its influential zone; ii) by incorporation, where the urban expansion of the regional node goes annexing smaller population centers to its influential zone and those were before self-sufficient localities in terms of employment and services, and iii) by fusion, where the functional union of

[3] http://esa.un.org/unpd/wup/CD-ROM_2009/WUP2009-F12-Cities_Over_750K.xls.

population centers, which were previously independent and with a similar size, is originated by improvements in accessibility and transport system between them.

Figure 2
Selected urban regions, urban corridors and mega-regions



Source: United Nations (2010a).

There is a considerable number of urban regions, some examples are Madrid, Paris and Lisbon in Europe; Cape Town, Cairo and Lagos in Africa; Riyadh, Bangkok and Kuala Lumpur in Asia; Mexico City, Säo Paulo, Lima and Buenos Aires in Latin America. For example, Mexico City's urban region is by far the most complex and has the highest population and economic concentration in the country. The central node of that urban region is Mexico City and its surrounding is connected by highways in a radial axis and with a star form, those connecting to other urban agglomerations with a population range between 170 thousand and 2.3 million inhabitants. The population in this region was 24 million people, 22% of the national total in 2010, while the GDP in 2008 was 312 billion dollars, 29% of the total. The GDP per person was 1.3 times higher than the national, which shows the good use of agglomeration economies for locating economic activities. The urban subsystem showed greater presence of specialized cities in services (to consumer, producer and of social character) and industry. This region has

experienced a productive restructuration from industries to services, which have been concentrated in Mexico City, especially those oriented to producer, and the metropolis has initiated a process of deindustrialization and centripetal diffusion for manufacturing growth towards other localities in the subsystem and outside it.

On its side, the urban corridors are a group of urban agglomerations with more than 1 million inhabitants connected among them through transport routes and lineal highways. This concept is closely related to that of megalopolis, a term used in the 1960s for referring to the Northeast of the US, a territory characterized by being one particular type of region with one highway and that resulted from a historical process where growth of cities, labor division and resources evolution are involved (Gottmann, 1961). The US megalopolis is an extended surface that covers large cities and agricultural production areas; its demographic concentration is higher than that in other countries of the world. It contains one of the largest industrial districts in the world and it is the most important financial and political hub of the world. Its population in 1960 increased to 38 million people, while in 2010 it increased to almost 60 million. It is located in the Northeast coast of the Atlantic Ocean and covers 700 kilometers (440 miles) from the south of New Hampshire to the north of Virginia. The urban agglomerations inside this megalopolis are Boston, New York, Philadelphia, Baltimore and Washington, with population ranges between 2.3 and 19.4 million inhabitants.

There are other urban corridors but they are not as consolidated as that in the Northeast of the US: i) Nagoya-Osaka-Kobe-Kyoto, in Japan, with an extension of 200 kilometers (125 miles) and 16 million inhabitants; ii) Säo Paulo-Rio de Janeiro, in Brasil, with 300 kilometers (190 miles) and 32 million people, or iii) the bi-national Bruxelles-Rotterdam-Amsterdam, with an extension of 220 kilometers (140 miles) and 4 million inhabitants. It is important to mention that the United Nations considers the first two as mega-regions. However, due to its conformation along one highway axe this category seems more adequate.

Finally, the mega-regions are large concentrations of people and economic activities that have developed by the following: i) spatial expansion of urban

agglomerations geographically connected and other urban configurations; ii) fusion of regions with high demographic density; iii) good use of large markets; iv) great amount of qualified labor, and v) relevant economic capacity and of innovative activities. These mega-regions contain an urban agglomeration with population at least of 5 million people and had a geometrical surface delimited by other large metropolis at the edges. According to the Unites Nations, the largest 40 mega-regions of the world only occupied a small part of the national territory but they have 18% of the population, generate 66% of the GDP and 85% of the technological and scientific innovation (United Nations, 2010a).

The Chinese mega-region of Hong-Kong-Shenzhen-Guangzhou is maybe the most evident example of type of concentration. The triangle formed by these three urban agglomerations covers 10 thousand square kilometers (almost four thousand square miles) its population in 2010 was 25 million people.

Megacities are defined by the United Nations as those urban agglomerations containing 10 and more million inhabitants. These are considered, in some cases, considered as a new phenomenon of contemporary urbanization (Kaplan, Wheeler and Holloway, 2009; Kraas, 2007; Roland *et al*, 1994), but not in all the cases (Bugliarello, 2009). Cities emerged 10 thousand years ago and from them cities such as Athens, Baghdad, Rome, London, Paris and Beijing became so powerful and populated that influenced other urban agglomerations.

The United Nations established October 31 2011 as the birth date for the 7 billion inhabitant of the world. From then, one megacity would concentrate at least 0.14% of the world population, percentage that would be related to a place of 3.6 million inhabitants in 1950. In that year, there were 11 urban agglomerations with that population size, while in 2010 the number of urban agglomerations containing 10 million or more inhabitants was 21.

The contemporary evolution of megacities is related to globalization and then they depend on ecological, socioeconomic and political change, as well as on local and regional processes. These large agglomerations present a dual reality because on one side, they have modern and efficient buildings and infrastructure but also because they

are a place of slums where poverty is concentrated. Megacities grow because they are powerful instruments of economic and social development for the country where they are located, and because they offer opportunities for social mobility. Their positive aspects are urban design, educational system, labor market and interactions between social and economic agents. Among they challenges are: i) provision of employment in quantity and quality enough for the labor supply increase; ii) economic sustainability; iii) quality of life for the inhabitants; iv) security for disasters through prevention and mitigation; v) public safety, and vi) governance and governability to solve conflicts and offer public services. Their problematic is difficult to understand mainly because of their relatively short existence. The rapid transformation from rural to urban and the development of urbanism have been more dramatic than the demographic explosion (Palen, 2002).

In 2010 there were 21 megacities in the world with a population of 324 million people and they concentrated 4.7% of the total population and 9.3% of the urban world (table 4). Seoul reached the category of megacity in 1990 but from that date onwards it has experienced depopulation and in 2010 it had 9.8% million people. In 2020 there will be seven new megacities: Bogota, Chongqing, Guangzhou, Jakarta, Kinshasa, Lima and Shenzhen.

In 2010, a total of 16 megacities were located in LDC and five in MDC; likewise 10 were in Asia and six in America. Megacities are mainly a phenomenon that occurs in the LDC, and in Asia and America. Megacities are different among them because they are the result of two effects: i) economic, which has to do with the good use of agglomerations economies for local growth, but also the existence of agglomeration economies, and ii) location, which is represented by the demographic size of the country where it is located and by the limits the country imposed to development and local competitiveness (Polèse, 2005; Roland *et al*, 1994). The size of the megacity shows a trade-off between the benefits derived from productivity en the employment growth and the increases in the cost of life due to population expansion.

The 21 megacities of 2010 were located in 15 nations; India has the most of them with three, followed by Brazil, China, Japan and the USA with two. The nations

with one megacity were Argentina, Bangladesh, Egypt, France, Mexico, Nigeria, Pakistan, Philippines, Russia and Turkey. One megacity was located in a country with at least 40 million inhabitants or with urban population of 37 or more million people. It is true that the lower the country's population size the greater the importance of its megacity in the patterns of economic-demographic concentration and in the structure of the urban system.

Table 4
Megacities: demographic indicators, 2010

Rank	Megacity	Country	Population			Rank-Size[b]
			Total[a]	% National	% Urban	
1	Tokyo	Japan	36 669	29.0	43.2	1.76
2	Delhi	India	22 157	1.8	6.1	0.75
3	São Paulo	Brazil	20 262	10.4	12.0	1.11
4	Bombay	India	20 041	1.6	5.5	0.75
5	Mexico City	Mexico	19 460	17.2	22.6	1.45
6	New York	USA	19 425	6.3	7.4	0.82
7	Shanghai	China	16 575	1.2	2.6	0.42
8	Calcutta	India	15 552	1.3	4.3	0.75
9	Dhaka	Bangladesh	14 648	9.9	31.7	2.26
10	Karachi	Pakistan	13 125	7.6	19.8	1.36
11	Buenos Aires	Argentina	13 074	32.4	34.8	1.67
12	Los Angeles	USA	12 762	4.1	4.9	0.82
13	Beijing	China	12 385	0.9	1.9	0.42
14	Rio de Janeiro	Brazil	11 950	6.1	7.1	1.11
15	Manila	Philippines	11 628	12.5	25.4	1.87
16	Osaka	Japan	11 337	9.0	13.4	1.76
17	Cairo	Egypt	11 001	13.6	30.0	3.64
18	Lagos	Nigeria	10 578	6.7	13.4	1.14
19	Moscow	Russia	10 550	7.4	10.3	1.44
20	Istanbul	Turkey	10 525	14.5	20.0	1.28
21	Paris	France	10 485	16.7	19.6	1.42

[a] thousand people.

[b] slope of the function Ln(Pobn) = Ln(Pob 1) - Q Ln(n), using the five largest cities of the country.
Source: Author's calculations based on data from the United Nations.

The participation of megacities in the total and urban population of the country where they were located had a wide range of variation. From the total population point of view, Buenos Aires and Tokyo concentrated approximately 30% of the national total, while in the opposite side the Chinese and Indian megacities did not reach 2%. On the

other side, in terms of urban population, Buenos Aires, Cairo, Dhaka, Tokyo and Manila concentrated a fourth or more, while the Chinese ones did not get 3%.

The Rank-size rule is one of the ways for analyzing the graphical pattern of the structure of a national urban system. Every urban system is characterized by the existence of a large number of small and medium cities and a reduced number of large cities. According the logarithmic formulation of G. Zipf (1949), the city's population of range *n* is estimated with the following function:

$$\text{Log}(\text{Pobn}) = \text{Log}\,(\text{Pob1}) - Q\,\text{Log}(n)$$

Where *Q* measures the slope of the adjustment line between rank and size. If the slope is close to one, then the population size distribution in the urban system is adjusted to the rank-size rule; if greater than one there exists a primacy situation; if minor than one it shows a system with a certain homogenous distribution.

Megacities are synonym of national urban systems of high primacy (table 4). China, India and the US were the most populated countries in 2010, contained more than one megacity and their urban system has certain homogeneity in the size of the main cities. Brazil and Nigeria were the fifth and tenth most populated countries, their urban systems were adjusted to the rank-size rule. On the opposite side, the remaining ten countries were hierarchical urban systems: Bangladesh, Egypt, Japan and Philippines with very high primacy, while Argentina, France, Mexico, Pakistan, Russia and Turkey with high primacy. The higher the participation of the megacity in the urban population of the country the greater the primacy; the bigger the population size of the country the lower the primacy. Primacy was not related with the development level of the country.

Population growth is the result of two components: i) natural, or the difference between births and deaths, and ii) social, or net migration balance, is the difference between the immigrants and emigrants. The greater the territorial surface the lower the effect of the social component. Then, the net migration balance is a relevant factor in the population dynamic of cities, a little less one in regions or subnational spaces, and of less interest in most of the nations of the planet.

The urban development cycle, or differential urbanization, is a process of change where large, medium and small cities, experienced differential phases of growth, and this is determined by the destination of internal migration flows. In a first phase migrants go to the main city; in the intermediate phase they go to intermediate cities, while in an hypothetical final phase most of the migration has the small cities as its destination (Geyer and Kontuly, 1993).

The cycle of urban development can be analyzed through the transition model of mobility (Zelinski, 1971). In the initial phase, the primary city increases its participation in the total demographic of the country and the origin of the migrants is mainly from rural areas, although from urban areas is also possible if this phase is extended in time. In the intermediate phase the primary city begins to experience agglomeration diseconomies and immigration slows in favor of intermediate cities; here it is also possible to have a change in the rural-urban type as the predominant migration flow towards the urban-urban type; the final phase or counterurbanization, is not necessarily a phase in the general model of the urban development cycle but a fact related to specific territories and economic and social forces that produce a differential regional development (Coombes, Dalla Longa and Raybould, 1989).

The urban development cycle model establishes that the contribution of the social component in the city's population growth depends on its size, position at the national urban system and effect in time. There is another perspective that has mathematically demonstrated, and with empirical data, that when time passes by the natural growth of cities is higher to the social one, independently of the existent migration rate; likewise, the grater the value of the migration rate the faster the migration component of city's increase falls (Keyfitz, 1980). One complementary contribution is the new economic geography, which suggests that globalization produces a negative correlation between concentration and openness because products oriented to international commerce have more freedom to select the location in smaller urban areas (Krugman and Livas, 1996).

These assumptions show that deconcentration is a fact, the primary city of the national urban system and tend to lose importance in its economic and demographic

concentration. The factors that stimulate deconcentration are: i) agglomeration diseconomies; infrastructure investment in territories outside the influence area of the primary city; iii) economic promotion policies in peripheral cities, and iv) initiatives for government and public activities decentralization.

In spite of the previous arguments, megacities seem not to stop their growth. Between 1980 and 2010 these 21 concentrations grew in 137 million inhabitants, where Bombay, Delhi, Dhaka and Shanghai stand out with increases of more than 10 million people. On the opposite side, Osaka and Paris increased their population in less than two million people (table 5). From the 137 million new inhabitants in megacities, 92 million were originated from natural growth and 45 million from social (internal migration), this establishes a ratio social growth to natural growth of 0.49. Contrary to what was expected, that ratio increased from 0.35 in the 1980's to 0.58 in the first decade of the new millennium, which means that in-migration was more important every time in the demographic behavior of megacities as a whole or in other words, that their population attraction forces increased with time.

In the period 1980-2010 there were 11 megacities that registered positive and permanent net migration balance. The cities that stood out because of their migrant's volume were Delhi, with more than 10 million in-migrants, and Dhaka and Shanghai, with more than seven million. In relation to the ratio social growth to natural growth the lost significant cases were Beijing, Dhaka, Delhi, Shanghai, Moscow and Tokyo, where most of the growth was from the social component. In the four first megacities the origin of in-migrants was mainly from rural areas, while for the last two most of the migration was urban-urban. In China, the rural-urban migration was strictly regulated by the central government until the end of the seventies, when the residential registration system was relaxed and not only permitted labor flows of state-owned enterprises employees but also of those engaging in self-employed business (Boyle, Halfacree and Robinson, 1998:22). It is important to mention that in urban areas, the major responsibility for providing housing rests on work-units, for people engaged in state-owned enterprises and other public sector organizations, and housing bureau is responsible for providing and allocating housing for other workers (Balchin, Isaac and

Chen, 2000:164). On the other side, Bombay, Istanbul, Karachi, Lagos and Paris had also positive net-migration, but the amount of natural growth was higher than the social.

Table 5
Megacities: population growth, 1980-2010
(thousand people)

Rank	Megacity	Total growth			Natural growth			Social growth			1980-2010		
		1980-1990	1990-2000	2000-2010	1980-1990	1990-2000	2000-2010	1980-1990	1990-2000	2000-2010	Total	Natural	Social
	Megacities	41 972	48 356	47 135	31 024	31 537	30 402	10 949	16 819	16 733	137 463	92 963	44 500
1	Tokyo	3 981	1 920	2 219	1 561	923	223	2 421	997	1 995	8 120	2 707	5 413
2	Delhi	4 167	6 005	6 426	1 379	2 005	2 548	2 788	4 000	3 878	16 598	5 932	10 666
3	São Paulo	2 686	2 323	3 163	2 775	2 446	2 012	- 89	- 123	1 152	8 173	7 233	940
4	Bombay	3 650	3 778	3 955	2 149	2 537	2 606	1 501	1 241	1 350	11 383	7 291	4 092
5	Mexico City	2 302	2 710	1 439	2 938	2 843	2 427	- 636	- 133	- 989	6 450	8 208	- 1 758
6	New York	484	1 760	1 579	1 596	1 851	1 762	- 1 112	- 91	- 183	3 824	5 209	- 1 386
7	Shanghai	1 857	5 401	3 351	983	847	753	874	4 555	2 598	10 609	2 582	8 027
8	Calcutta	1 859	2 168	2 494	2 241	2 245	2 115	- 382	- 76	379	6 522	6 601	- 79
9	Dhaka	3 355	3 664	4 363	998	1 531	1 516	2 357	2 133	2 848	11 383	4 044	7 338
10	Karachi	2 099	2 874	3 104	1 966	2 088	2 016	133	786	1 088	8 077	6 070	2 007
11	Buenos Aires	1 091	1 334	1 227	1 511	1 381	1 117	- 420	- 47	111	3 652	4 009	- 357
12	Los Angeles	1 372	930	949	973	1 253	1 166	399	- 322	- 218	3 251	3 392	- 141
13	Beijing	1 422	2 969	2 628	884	735	555	537	2 235	2 073	7 019	2 174	4 845
14	Rio de Janeiro	1 012	1 208	1 147	1 970	1 588	1 271	- 958	- 381	- 124	3 367	4 829	- 1 462
15	Manila	2 018	1 985	1 670	1 843	2 029	2 055	175	- 43	- 385	5 674	5 926	- 253
16	Osaka	1 045	130	172	546	313	72	498	- 183	100	1 347	932	415
17	Cairo	1 713	1 109	831	1 944	1 722	2 025	- 231	- 614	- 1 194	3 653	5 692	- 2 039
18	Lagos	2 192	2 469	3 345	749	1 276	2 031	1 442	1 192	1 314	8 005	4 057	3 949
19	Moscow	850	1 018	545	563	390	261	288	628	284	2 414	1 214	1 200
20	Istanbul	2 155	2 192	1 781	999	1 150	1 254	1 156	1 042	527	6 128	3 403	2 725
21	Paris	661	409	746	455	385	617	206	24	129	1 816	1 457	359

Source: Author's calculations based on data from the United Nations.

There were four megacities that had negative net-migration during the eighties and nineties, and positive in the first decade of the new century: Buenos Aires, Calcutta, Osaka and Säo Paulo. On the other side, Los Angeles and Manila had negative net-migration from the nineties, and Cairo, Mexico City, New York and Rio de Janeiro experienced out-migration since the eighties and it was higher than one million people in all the cases. These four megacities are examples of the agglomeration diseconomies appearance due to their economic evolution and their subsequent territorial and economic activity deconcentration.

In sum, the nations with megacities are characterized for having diverse stages in their urban development cycle: i) Bangladesh, China, India and Pakistan in initial phase of population concentration and increasing volumes of internal migration from rural areas to primary cities; ii) France, Japan, Nigeria Russia and Turkey in the final part of the phase of concentration, with decreasing volumes of internal migration and emergency of urban-urban flows towards the largest city, and iii) Argentina, Brazil,

Egypt, Mexico, Philippines and the USA in phase of polarization reversal, decrease of migration flows and important presence or urban-urban migration originated in the main city. The slope of the Rank-size coefficient has been increased in nations within the initial stage and the opposite has happened in those countries within the phase of polarization reversal. There was no association between the phase of urban development and the country's level or dynamic of development, except in those positioned at the initial phase of concentration; and there was no relation between commercial opening and population deconcentration.

Megacities are not necessarily the result of demographic and economic growth in the country they are located. The good use of agglomeration economies in megacities, as well as the appearance of diseconomies, does not depend on the absolute size of the city but on the specific conditions related to its historical evolution and that of the national urban system where it is located. It seems that megacities are a group of cities similar only in their size, 10 million people, but they got to that population size through different paths. It is not possible to generalize a demographic path for all of these large population concentrations.

Megacities and economic change

In cities there are the economic functions of production, distribution and consumption (Goodall, 1972:19-47). At the same time, the city is a dynamic group of interrelated and interdependent markets that are characterized by their density, specialization and action of diverse agents; these markets include land and housing, labor, transport and public services (Hirsch, 1973:13-16). The prerequisites for a city to exist were labor division and transfer of goods and services. Labor division impacts the achievement of scale economies, which means the increase more than proportional of production when there is an increase in the amount of factors used (land, labor and capital). The transfer refers to the need of a city for exporting goods and services, allowing the city to import production means and consumption goods; the transference is understood as open economy.

Scale economies are effective when the economic activity is concentrated in only one location, which decreases transport costs (Hochman, 1990). Such performances in the territory have been called agglomeration economies and they refer to the decreasing costs when the scale of the urban economic activity is growing, this is city size. Agglomeration economies are divided into urbanization, location and complex economies (Parr and Bud, 2000:603). Urbanization economies are internal to the city but external to economic activity; they promote diversification of the local economic base and they are associated to the market size, characteristics of the labor market, infrastructure of transport and communications, health and education equipment and public services.

On the other side, localization economies are internal to an industry or sector but external to the productive unit; they refer to the advantages offered for a certain activity or group of activities, which results in specialization of the local economic base; favorable physical-geographical conditions, the existence of a specialized labor market, availability of services oriented to producers for specific activities, and access to specialized information channels. Finally, complex economies, as well as location economies, are internal to economic activity but external to a productive unit, but they refer to the possibility of exchange or interrelation among enterprises, creating a cluster of activities or a vertical integration in the social ratio. In the specialized literature there is another type of agglomeration economy called scope economy, which results from the increasing scale performances obtained by one firm when it produces a variety of products or services instead of having various firms producing only one product or service (Mills and Hamilton, 1994:20-21).

The agglomeration of economic activities in the city generates positive externalities that increase productivity of firms, then, growth became endogenous. The relationship agglomeration-productivity exists because of four elements (Beeson, 1992): i) more productive specialization and in the labor market; ii) adoption and development of new technologies; iii) human capital accumulation and, iv) education institutions development. However, growth in productivity seems to have a limit when

there is an increasing agglomeration level and it opens the arguments in favor of the optimal city size (Alonso, 1970; Richardson, 1973; Evans, 1985).

The debate about the optimal city size is relevant when the economic performance and the provision of collective satisfiers are taken into account in megacities. The optimal city size is a category that must be defined in a determined time and place (Begovic, 1991:99). The urban problems are not generally worse in large cities, except those related to congestion, land rent and crime. Large cities preserve economic advantages so life quality in then is rarely worse than in smaller cities from the same national urban system (Gilbert, 1996:1-24).

There is public, periodic and enough information about macroeconomic variables for countries but not for smaller geographical scales, such as administrative divisions, subnational regions or cities. In this document a estimation of GDP and gross national income has been elaborated for the main cities of the world in 2005.[4] The results for the case of megacities are the following (table 6).

Between 1995 and 2005 the world GDP increased from 33.3 to 45.3 trillion dollars (at 2005 constant prices), with and AGR of 3.1%, while the GDP per capita moved from 5 812 to 6 970 dollars, with and AGR of 1.8%. The GDP is a measure of the total flow of goods and services produced by the national or local economies over a specified time period, normally a year, so this is an indicator of production and behavior of the economic activity. The world GDP of 2005 was 4% of the primary sector, 29% of the secondary and 67% of the tertiary. The tertiary sector has been the most dynamic in the stage of globalization given that its participation in the world GDP in 1980 was 64%, three percentage points less than in 2005, while the primary sector has preserved its contribution about 4% of the total GDP. The increase of the tertiary sector has been in detriment of the secondary sector.

[4] The sources of information for that estimation were the following: the United Nations (http://unstats.un.org/unsd/snaama/dnlList.asp); Organisation for Economic Co-operation and Development (http://stats.oecd.org/Index.aspx?datasetcode=REG_DEMO_TL2); City Mayor Statistics (http://www.citymayors.com/statistics/richest-cities-2005.html); the World Bank (http://data.worldbank.org/indicator/NY.GNP.MKTP.PP.CD?page=1); Ni and Kresl (2010), and Polèse (2005).

Table 6
Megacities: economic indicators

		Values				Rankings[e]					
Megacity	Country	GDP[a] 2005	AGR GDP[b] 1995-2005	GNI[c] 2005	GNI PC[d] 2005	Population 2010	GDP 2005	AGR GDP 1995-2005	GNI 2005	GNI PC 2005	CI 2007-2008
World		45 354.0	3.14	56 929.0	8 749						
Total megacities		5 642.6	2.81	6 885	22 772						
Share		12.4		12.1							
Tokyo	Japan	1 538.3	1.57	1 339.6	37 607	1	1	369	1	70	3
Delhi	India	59.1	9.45	175.7	9 011	2	90	82	31	243	213
São Paulo	Brazil	225.5	2.57	393.0	21 077	3	17	334	7	121	201
Bombay	India	57.0	7.32	169.6	9 318	4	97	125	34	236	114
Mexico City	Mexico	246.6	3.29	371.6	19 837	5	12	301	8	127	74
New York	USA	1 069.9	3.29	1 069.9	57 130	6	2	302	2	7	1
Shanghai	China	104.0	12.81	243.4	16 030	7	42	44	18	156	41
Calcutta	India	43.1	6.52	128.1	8 967	8	116	143	46	244	333
Dhaka	Bangladesh	27.6	7.78	82.4	6 561	9	141	111	74	302	431
Karachi	Pakistan	42.1	5.13	133.8	11 516	10	119	181	45	200	331
Buenos Aires	Argentina	165.6	2.42	365.2	29 094	11	25	344	9	98	24
Los Angeles	USA	637.2	3.10	637.2	51 790	12	3	311	3	14	6
Beijing	China	72.3	12.15	169.2	14 769	13	66	52	35	172	66
Rio de Janeiro	Brazil	124.5	2.11	217.0	19 093	14	36	357	21	131	258
Manila	Philippines	25.3	3.42	66.7	6 201	15	144	295	99	312	323
Osaka	Japan	406.3	1.16	353.8	31 428	16	7	377	10	92	67
Cairo	Egypt	20.2	3.75	68.4	6 475	17	159	268	91	305	286
Lagos	Nigeria	33.4	8.42	64.2	7 321	18	131	96	103	294	454
Moscow	Russia	80.5	5.48	174.2	16 723	19	58	166	32	151	30
Istanbul	Turkey	110.1	5.28	176.0	18 122	20	40	174	30	136	375
Paris	France	554.1	2.31	485.6	48 057	21	4	349	4	19	4

[a] Gross domestic product in billion dollars.

[b] Annual growth rate of the GDP.

[c] Gross national income, in billion dollars, converted to international dollars using purchasing power parity rates. An international dollar has the same purchasing power over GNI as a U.S. dollar has in the United States.

[d] GNI per capita in dollars.

[e] ranks for population, GDP, AGR, PPP GNI and GNI PC are based on the 387 world largest urban agglomeration in 2010; the rank for competitiveness index is based on a 500 cities worldwide sample.

Source: Author's calculation based on data from The United Nations; Organisation for Economic Co-operation and Development; City Mayors Statistics; The Wolrd Bank; Ni and Kresl (2010); Polèse(2005).

For its part, the GNI is the total resident's income of an economy in a given period after providing for capital consumption. The GNI used in this document is that converted to international dollars using purchasing power parity (PPP) rates. An international dollar has the same purchasing power in anywhere as an USA dollar has in the United States. GNI at PPP is a useful indicator for analyzing consumption patterns. The world GNI in 2005 was 56.9 trillion dollars, and 60% was from final consumption expenditure, 23% from gross capital formation and 17% from government consumption expenditure. Between 1980 and 2005, the globalization period, the share of the final consumption was without change, but the government consumption expenditure fell from 20 to 17%, and the gross capital formation gained those three percent points, from 20 to 23%. However, the ratio exports-imports to GNI was the most important change in the world consumption patterns, which raised from 27% of the GNI in 1980 to 56% in 2005.

Globalization and trade are synonymous processes, and globalization and deindustrialization have coincided in time. Manufacturing production and its labor demand has decreased in various nations, regions and cities; this contraction is called deindustrialization (Tregenna, 2009:2008). For a city, deindustrialization is explain by the new division of labor, real income evolution, change in the expense structure of population, relative prices, complementary processes or substitution between manufacturing goods and services, and Dutch disease. These causes are from national or global scales, so they work as exogenous conditions, or causes in the city, which are complemented with local elements, or causes from the city among which the following stand: i) agglomeration diseconomies, or increase in the production costs associated to city size (Richardson, 1973);

ii) opportunities derived for vertical disintegration (Li and Lu, 2009), and iii) loss of competitiveness for being more anchored to competitive advantages related to scale (territorial and distributive) and less with the development of competitive advantages based on quality (business and institutional) and that implied local collaboration among firms, participation of local government in the economic promotion of cities and agreements and interrelations among social agents (Malecki, 2002; Sobrino, 2010). Deindustrialization is associated to economy size and demographic volume and it is common in developed nations and in large cities. There is evidence about the absolute loss of production and manufacturing employment in large cities such as London (O'Donoghue, 1999), or in the megacitiess of Mexico City (Sobrino, 2012), New York (Drennan, 1997) or Tokyo (Banasik and Hanham, 2008).

The GDP of the 21 megacities in 2005 was 5.6 trillion dollars. The product generation among megacities was between 20 billion dollars in Cairo to 1.5 trillion dollars in Tokyo, this is differential of 76 times that shows the large difference in the nature and efficiency of de economies inside the megacities. The economic structure of megacities was dominated by the tertiary sector, which contributed between 60% in Shanghai to more than 85% in Los Angeles, New York and Paris. The growth rhythm of the economy in megacities in the period 1995-2005 was lower than that registered in the world total, and with AGR of 2.8% in the firsts against 3.1 in the this last. With

this, their participation in the international total decreased from 12.8% in 1995 to 12.4 in 2005.

In 2005, the GDP per capita in megacities, or their economic efficiency, was 18 664 dollars against 6 970 in the total world, with a difference of 2.7 times and that talks of the good use of agglomeration economies. The range of variation was between 1 916 dollars in Cairo to 54 828 dollars in Paris, this is a differential of 29 times. One of the most related factors to the good use of agglomeration economies is the quantity and quality of productive infrastructure. Provision of public infrastructure is probably the most common and possibly, under specific circumstances, the most effective mean by which governments promote economic growth (Ding, Haynes and Liu, 2008:845). However, the government investment in infrastructure has declined under the globalization era, as it was seen with the fallen participation of government expenditure into the GNI. Infrastructure can be divided into three types (Haynes, 2006: 21-32): i) hard (roads, bridges, ports, airports, water and waste networks, electrical and telecommunications systems); ii) soft (institutional support mechanisms for the exchange of goods and services, financial markets, legal institutions, basic support services for developing human capital), and iii) smart (advanced transport, communication, financial and legal infrastructure). The range in the economic efficiency among megacities was produced, in part, for differentials in provision of soft and smart infrastructure.

According to economic base theory, or export base theory, the non-basic activities, or internal consumption, increase in relative importance as an urban area grows in size, responding to increased local market opportunities (Goodall, 1987:140). This process is not valid for megacities because their share in the world production was higher than their share in the world consumption. The percentages for both shares in 2005 were 12.4% in production, or GDP, and 12.1% in consumption, or GNI (Table 6). The megacities GNI in that year was 6.9 trillion dollars, with a variation range from 64 billion dollars in Lagos to 1.3 trillion dollars in Tokyo; this means 21 times. On the other side, the world GNI per capita was 8 749 dollars and 22 772 in megacities; these values talk about the important differences in quantity and quality consumption patterns in

very large cities against other human settlements. The variation range in GNI per capita among megacities was from 6 475 dollars in Cairo to 57 130 in New York, nine times more. The variant ranges among megacities were less in GNI to respect GDP, aspect that shows a tendency towards more homogenous patterns of consumption among inhabitants in megacities, against a marked differentiation in the forms and use of factors for good and services production.

When a Spearman correlation is applied for the ranking showed in table 6, it is concluded that population size of the megacity was not associated to any economic attribute, while the higher the GDP the higher GNI per capita, but also while the higher the GDP lower the AGR of the GDP, aspect that shows a tendency toward convergence. Likewise, the competitive performance of megacities in the global urban network was mainly based on their volume size of consumption, GNI, and to the consumption patterns of their inhabitants, GNI per capita. Competitive megacities benefit themselves as production and services centers, and nodal poles for the global markets; many command and control functions of the world system are also located in these. However, non-competitive megacities are the absorption pools of rural outmigration, with large percentages of population living below the poverty line. If the relative convergence in GNI among megacities is true, it is also true the enormous differences in quality of life among them. The agenda for the next years must incorporate to improve the ways of living, producing, and mobilizing in megacities.

Final remarks

In 2010 world population reached 6.9 billion people. According to the United Nations estimations, in 2025 population will reach 8.2 billion people and 9.7 billion in 2050. This means that in the following 15 years the absolute growth will be 1.3 billion people, with an AGR of 1.1%, while in 2025 and 2050 the absolute growth will be 1.5 people and an AGR of 0.7%. The growth population rhythm will be lower because of the decrease in CBR, from a total of 20 births for each 1 thousand inhabitants in 2010 to 17 in 2025 and 14 in 2050. The population growth in the following 15 years will be highly concentrated in few nations, where India, China, Nigeria and the United States

will participate with 36% of the new inhabitants. The demographic challenge in the following years will not be the accelerated rhythm of the population but the significant absolute increase.

Urban population in 2010 was 3.5 billion people. Estimations show an urban amount of 4.5 billion people in 2025 and 6.6 billion people in 2050. In the following 15 years the world urban population will increase in 1 billion people, 77% of the total growth, and in 1.8 billion people between 2025 and 2050, 120% of the total growth. The urban areas will be each time more the fundamental scenario for the demographic change, and at the same time, they will have a process of absolute depopulation from the rural areas, mainly from 2025. Another demographic challenge will be the attention of collective satisfiers, employment and quality of life for the each time higher number of new residents in cities.

The tendency to population concentration in cities observes an increase in the urbanization degree, which will pass from 51% in 2010 to 56% in 2025 and 65% in 2050. That concentration will occur in urban agglomerations of larger size each time and with tendency to have complex territorial processes in form of urban regions, urban corridors and mega-regions. National urban systems will show new hierarchy patterns that would become a challenge for governance in those territories for the further patterns of economic and social exclusion. The challenges will be in terms of providing enough quantity and quality of hard infrastructure, and of promoting the development of soft and smart infrastructure. The study of the cities in a world of cities implies a revitalized and experimental international comparability to stretch its resources for theory-building across the world of cities (Robinson, 2011).

This population concentration in increasing size cities has passed to the emergency and increase of megacities, or urban agglomerations with 10 million or more inhabitants. In 2010 there were 21 megacities in the planet, with a population of 324 million people, 4.7% of the world total. For 2025 it will be 29 with a population of 469 million people, 5.7% of the world population. This document has presented a comparative study of megacities and the findings show some common patterns of behavior that are combined with elements of high differentiation among them.

From the demographic point of view, most part of megacities, independently if they are in a LDC or in a MDC, continue operating as attraction nodes of internal and international migration flows, therefore their growth population rhythm is higher than that of the country where they belong. Some of them are receptors of a larger volume of immigrants from the rural areas but others are attractors from migrants from other cities from the same national urban system. If population attraction is a result of the labor opportunities existence then megacity size is not an obstacle for its labor dynamic, aspect that compromises the old concept about the optimal city size.

In the economic perspective, megacities share the fact of being the places with the most concentration of infrastructure and location of high-order services in their national urban system. All of them have an economic structure dominated by the tertiary sector. However, megacities are different in terms of volume and economic efficiency, which is determined in great part by the limit their own country imposed (Polèse, 2005). Contrary to expectations, according the economic base theory, megacities contain more a function of production and less a function of consumption in relation to the international economic system. Differences among megacities are more on the side of production than on the side of consumption.

Megacities are the motors of globalization because they impulse people flows, goods, knowledge and money all over the world. But they are also places of great inequality in the distribution of wealth, economic opportunities, access to collective satisfiers, and exposure to risks. In this document, attention has been drawn about some opportunities and challenges than humanity will face about this type of economic-demographic concentration. Understanding of their past evolution and comprehension of their actual situation are requirements for being capable of offering ideas and policy guidelines to overcome their obstacles and improve their opportunities in the topics of population, economy and sustainable development.

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