

Rapid Urbanization and Mega Cities: The Need for Spatial Information Management

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XXIV FIG International Congress 2010, Sydney

11-16 April 2010



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- **FIG Commission 3 Activity during the 2007-2010 term**
- **Objectives and methodology of the research**
- **The phenomenon of rapid Urbanization**
- **The rise of Mega Cities**
- **Problems Identified in Mega Cities, challenges we need to address**
- **The Need for Developing New Spatial Tools**

This presentation will only include the Introduction to the FIG publication 48: Rapid Urbanization and Mega Cities: the Need for SIM

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2007-2010: rapid urbanization & its impacts

FIG Commission 3 “Spatial Information Management”

- Identification of spatial tools and general principles, norms and standards for good governance using reliable spatial information, and provision of practical guidance

A central theme has been the

- *formal access to land, property and housing for all*
- *environmental monitoring, climate change disaster prevention and management*

- Annual Workshops
Greece (2007) – Spain (2008) – Germany (2009) – Bulgaria (2010)
- Expert Group Meetings

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Synergies : UN/CE WPLA

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Objectives of the joint research – authors of the FIG pub 48

➤ **The goal of this research is to investigate the emerging needs, the current trends and the extent of using SDIs in selected mega cities, but also to identify the emerging possibilities for using new technical tools for the governance of sustainable large urban areas applied by the surveying- mapping- data processing community.**

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The image shows the cover of a FIG report. At the top left is the FIG logo with 'RE PUBLICATION NO.48' below it. To the right, it says 'FIG REPORT'. The main title is 'Rapid Urbanization and Mega Cities: The Need for Spatial Information Management'. Below the title is a collage of three images: a cityscape, a modern building, and a satellite view of a city. At the bottom, it says 'Research study by FIG Commission 3' and the FIG logo again.

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Contributors-methodology

Contributors: Prof Rahmi Celik, Anthony Adeoye, Makis Apostolatos, FIG delegates-presenters, local organizers of the Workshops and meetings, and Prof Stig Enemark.

Methodology

- **Identification of experience gained through the past and current FIG Com3 activity to improve management of expanding urban areas**
- **Review of existing publications and other sources**
- **Internet research on specific problems of Mega Cities and on existing SDIs**
- **On site visits to a selected number of Mega Cities and interviews with individual decision makers in city administrations**
- **Review and assessment of data received from questionnaires**

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Homo sapiens did not start as an urban citizen!

120,000 years until the end of the last ice age when the very first "human settlement" appeared, and about

6,000 years more until the classical antiquity when people established large cities to live together for

security and prosperity, for trade, but also for worship.

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The World Goes to Town



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Culture & market have in a way replaced religion

- **visitors**
- **Investors**
- **large international corporations, are attracted by the largest cities worldwide for the museums, exhibitions, cultural events, fashion, theaters, art galleries, etc.**

Cities became centers of learning, innovation and sophistication

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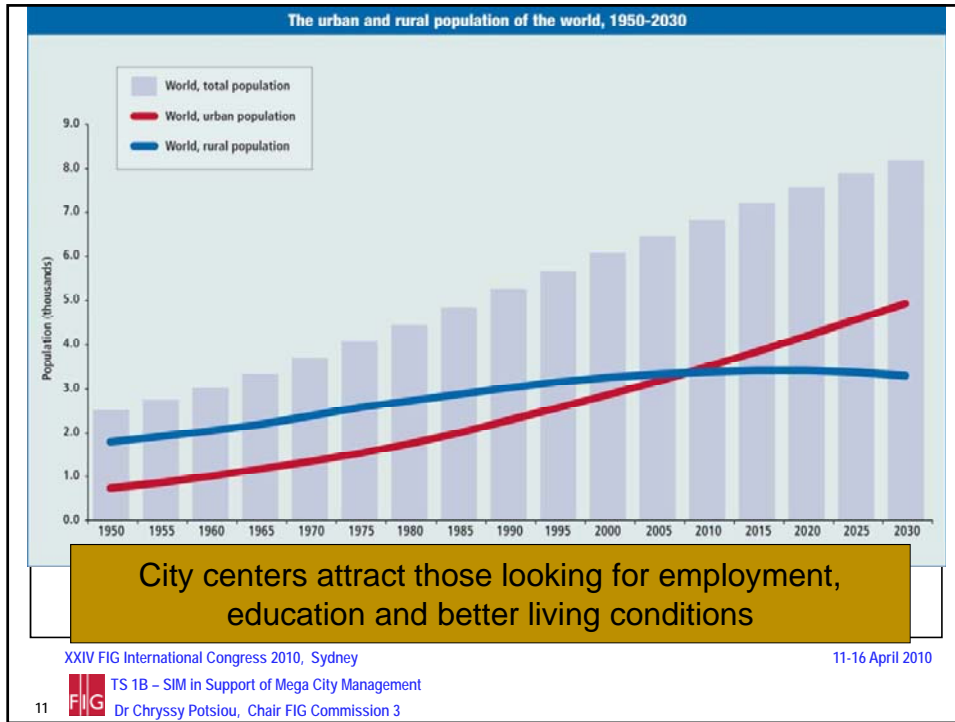
Global proportion of the urban population increase

Year	Urban population	Proportion
1900	220 million	13 %
1950	732 million	29 %
2005	3.2 billion	49 %
2030	4.9 billion	60 %

Source: UN Population Division

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World Issues

- Democratization
- Privatization of lands & registration of property rights
- Rapid urbanization (access to property rights, regularization of land)
- Free market economies
- Accelerated development
- Climate change
- Global financial crisis
- New era of peace and harmony

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Need for Spatially enabled societies

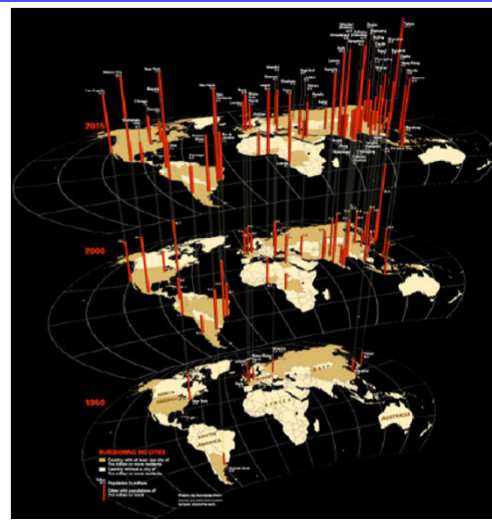
- Reliable spatial information 
- Education 
- Professional ethics 

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Megacities: home to 10 million or more



- 2015 Latin America, Central Africa, Asia
- 2005 Latin America, India, North America, Asia
- 1950s New York, Tokyo, Buenos Aires, European Capitals

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Urbanization can be viewed as an indicator of development


- Concentration of the most dynamic economic activities in urban areas often produces economies of scale and leads to social and economic benefits
- It is a matter of human rights that people are free to choose where they will live

However....

- Nobody wants to live in a city which is congested, suffers constant blackouts and frequent floods, with few parks, awful schools and clinics, devoid of any buildings of charm and character, governed by incompetent public sector
- It is a matter of good governance to achieve sustainable urban growth
- Restrictions on private rights in the use of land in terms of air, soil and water pollution have to be applied and accepted by all market participants.
All must assume the costs of the natural resources they consume, knowing that their competitors do the same!

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Waste management - garbage treatment


6,000 tons of trash are produced daily in this city of >4M people

Greece has successfully managed to close about 800 open landfills and avoid high EU penalties. However, the costs for the regeneration and mechanical recycling procedure are also high



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Energy insecurity

Public Power Corporation in Greece will pay up to 2,2 billion euros a year for carbon emission licenses unless it shifts away from its dependence on lignite.


Consumers could expect a rise in electricity bills of 45% by 2013



Greece




Hanoi



Albania

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Traffic Management



Mumbai, India



Hanoi, Vietnam






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Fresh water is very expensive





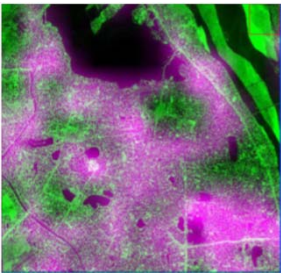
Delhi (India) draws 75% of its drinking water from Yamuna river into which the city dumps quantities of sewage to join a cocktail of farm chemicals and industrial effluents, including arsenic

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High urban densities

High urban densities in Hanoi



Satellite image Master plan Cadastral map



← Also in Europe

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Results of rapid urbanization hit rich and poor alike

UK New Orleans Greece Sao Paulo Delhi Hanoi

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Informal Urban Expansion

Informal Settlements → Informal Real Estate Markets

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Climate change

(a) GtCO₂-eq/yr

Year	CO ₂ from fossil fuel use and other sources	CO ₂ from deforestation, decay and peat	CO ₂ from agriculture, waste and energy	N ₂ O from agriculture and others	F-gases
1970	28.7				
1980	35.6				
1990	39.4				
2000	44.7				
2004	49.0				

(b) CO₂ emissions by source

Source	Percentage
CO ₂ from fossil fuel use	56.6%
CH ₄	7.9%
N ₂ O	14.2%
CO ₂ from deforestation, decay of biomass, etc.	17.2%
CO ₂ (other)	2.8%
F-gases	1.1%

(c) CO₂ emissions by sector

Sector	Percentage
Energy supply	25.9%
Industry	18.4%
Transport	13.1%
Forestry	17.4%
Agriculture	13.8%
Residential and commercial buildings	7.9%
Waste and wastewater	2.8%

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Place matters - all have a spatial dimension

- Food, water and energy insecurity
- Informal development, high urban densities, dilapidated city centers
- Lack of green areas and of buildings reflecting local cultural heritage,
- Transportation problems, traffic congestion and accidents
- Lack of basic services, insecurity of tenure, informal real estate markets
- Unsustainable land use and inefficient land administration systems
- Creation of slums, criminality
- Difficulty in natural hazards management
- Water, soil and air pollution, climate change
- Weak institutions to resolve conflict
- Inefficient administration, bad governance

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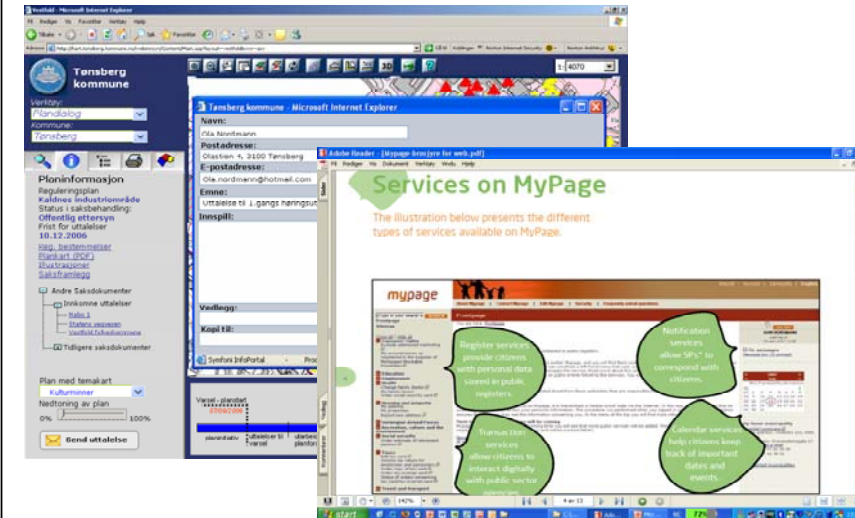
City governance

- **Unclear and overlapping responsibilities amongst internal and external agencies in areas such as planning, infrastructure, development and land use controls, transportation, environmental management and water management.**
- **Rationalization of functions and effective levels of cooperation and information sharing are needed**
- **Political differences often create tensions in the consistent implementation of projects.**
- **Many Mega Cities support some level of civil society participation in the planning and design of their services.**
- **Spatially enabled web based services are providing new opportunities to more closely involve citizens in land administration functions**

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SDIs and Digital Planning Dialogue



The screenshot displays a Microsoft Internet Explorer browser window. The main content area shows a webpage titled 'Services on MyPage' with a green header. Below the header, there is a list of services with callout boxes: 'Register services provide citizens with personal data stored in public registers', 'Spatial data services allow citizens to interact digitally with public services', 'Notification services allow MP's to communicate with citizens', and 'Online services help citizens keep track of important dates and events'. The background shows a municipal website for 'Tønsberg kommune' with various navigation links and a sidebar.


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➤ Innovative uses of spatial information tools to manage Mega Cities

➤ Spatial Information Policy Constraints

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