Case Studies on Mega Cities

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SUMMARY

Commission 3 has produced a major publication entitled *Rapid Urbanization and Mega Cities: The Need for Spatial Information Management, FIG Publication No. 48, 2010.* This paper summarizes the results of questionnaires and interviews provided by senior administrators in seven cities used as case studies for this publication. The study has highlighted some interesting facts about how city administrators see spatial information being used to solve real problems in the world's largest cities. Overall, there was strong support for greater use of spatial information and tools to enable better management of these cities.

Disclaimer: Note that the following report is based upon data received from questionnaires and interviews involving individual people in city administrations. Therefore, the data reported here may not represent the broader view of other stakeholders and cannot be seen as an *official* statement of fact from any city administration. The data is further subject to interpretation by the author and, while based on the data provided by correspondents, any views expressed within this report are those of the author.

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1. PROJECT BACKGROUND

1.1 Project Initiation

In 2006 FIG Commission 3 set up a working group (WG3.2) to identify relevant spatial tools that will support development and use of spatial data infrastructure (SDI) by city authorities in the world's largest cities.

Based on cooperation with other working groups and commissions WG3.2 was tasked with:

– Support discussion on the role of local and regional SDI in managing mega cities
– Identify institutional, policy and legal frameworks that can be incorporated in SDI to address mega city issues
– Identify specific technical innovations in SIM that can improve management of mega cities

1.2 Work Program

The working group adopted a pragmatic approach, based on working with administrations in mega cities to identify key problems they face both now and in the future; use an international network of experienced spatial information practitioners to identify potential solutions; and then develop materials that provide a practical guide to international best practice in the use of SDI to better manage our cities. This information has been used as input to the Commission 3 publication to be presented at the FIG Congress 2010 in Sydney.

The working group made use of voluntary time of its members and sought to involve administrators in selected mega cities. The working group developed a questionnaire about current problems facing mega cities and their current use of SDI. The questionnaire was distributed in early 2008 to contacts in 13 mega cities. A number of city administrations responded to the questionnaire. Also, the working group facilitated fact-finding visits to interview senior administrators in a further three cities.

1.3. Selected Case Studies

In all, initial data was obtained from 7 cities either by their direct response to the questionnaire (Q) or by a personal visit and interviews by working group members (V):

Hong Kong SAR, China (Q)
Tokyo, Japan (Q)

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Seoul, Korea (Q)
Istanbul, Turkey (V)
London, United Kingdom (V)
New York City, USA (V)
Lagos, Nigeria (Q)

2. SUMMARY OF INFORMATION GATHERED

2.1 Key Problems Facing City Administrations

Problem	HK	Tokyo	Seoul	Istanbul	London	NYC	Lagos
Informal settlements (land tenure, development approvals, building control)	N	Y	N	Y	N	N	Y/High
Traffic management	Y/Med	Y	Y	Y	Y	N	Y/High
Natural hazards (floods, earthquakes, fires)	N	Y	Y	Y	Y	Y	Y/High
Unclear responsibilities and mandates (within or between administrations)	N	N	N	N	N	N	Y/High
Uncoordinated planning	N	N	-	N	N	N	Y/High
Water management (fresh water supply and waste-water disposal)	Y/Med	Y	N	Y	N	N	Y/High
Provision of continuous electrical power	N	Y	N	N	N	N	Y/High
Visual pollution and garbage disposal	Y/Med	Y	N	N	N	Y	Y/High
Air and water pollution control	Y/Med	Y	Y	N	Y	Y	Y/High
Population growth	-	-	-	Y	Y	-	-

Notes:
- Unreported

Informal settlements are a problem in only some cities. Further research may indicate that it is a problem mainly in countries where development controls and tenure systems are immature. A particular problem reported by one city is development being allowed in water catchment areas used by the city, but not under development control of city planning authorities. Some of the experience with planning and development laws, regulations, procedures and systems used in some of the cities may be useful to others.

Traffic management is a common problem. City transport and police agencies were not part of the initial information gathering. Given the commonality of the problem, this may be an area for further study.

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Natural hazards and emergency management were high on most cities' lists. Risk profiles from floods, fires, earthquakes and other hazards differ between cities, but capacity to plan, prepare, respond and recover from disasters is a common issue.

It appears that unclear responsibilities and mandates (within or between administrations) is not a major issue for most cities. However, all cities appear to have problems with overlapping responsibilities amongst internal and external agencies, leading to operational dysfunction such as a multitude of agencies holding non-accessible spatial data. It is clear that solutions to problems facing mega cities require concerted response from many internal units and regional and national agencies in areas such as planning, infrastructure, development and land use controls, transportation, environmental management and water management. Mandates might be clear, but rationalisation of functions may still be needed.

It seems that in many mega cities, the city administration does not have responsibility for all matters covering the full area of the city. Several cities reported that their city administration did not have control over development, but rather it was the responsibility of local government units (an average appears to be around 30 municipal authorities within the area of the "greater city"). In some cases, other levels of government had land use and development control responsibilities. So, even if city planning is centrally coordinated, often city administrations have little control over the implementation (ie land use and building controls) of these plans. In short, some city administrations have control over key city development functions; others do not.

Another area for further study may be the role of infrastructure providers, such as utility services, not being part of the planning and development process. In many cases, these authorities are not part of the city administration, being privatised or at another level of government.

Environmental management, especially pollution control is another problem area reported by several cities. Again, the experience of some cities in managing environmental problems may be useful to others.

The inevitability of further population growth is likely to be a common issue. Some cities reported that their administrations have little control on population growth. It was a regional or national issue and needed to be addressed at that level. However, city administrations need to address the consequences of growth, which will add further stress to existing systems and facilities, even for those cities not experiencing problems at the moment. Just finding enough housing for people will be a common problem. Monitoring population change effectively and being able to respond through planning and infrastructure development will be major challenges.

Correspondents identified some key tools needed to address these problems. These included:

- Strengthening planning laws to cover not just the planning process, but the monitoring and implementation of the laws.

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- Planning and development control over water catchments and other sensitive areas affecting the city.
- Good communication between all city units and strong partnerships between the city administration and agencies at other levels of government, especially in infrastructure development and maintenance.
- Coordinated planning and implementation involving transportation, utilities and other infrastructure providers.
- Working with the private sector to ensure financial and property markets had the capacity to meet current and future needs for jobs and housing.
- A strong focus on disaster management, including coordinated planning, preparation, response and recovery operations.
- In the developing world, a stronger focus was needed on good governance, institutional development and capacity building.

2.2 Current Use of Spatial Data

It was interesting to note that those senior administrators interviewed by the working group candidly admitted the importance of spatial data and analysis in helping them do their job. As users of spatial information, they personally believed that access to timely and accurate spatial data and tools was a key requirement in managing functions such as city planning.

Correspondents reported widespread use of spatial data in a range of city functions, including:

- Land registration and tenure administration;
- Cadastral survey, mapping and data management;
- Policy development, planning and citizen engagement;
- Land use and development control;
- Transportation planning and road or highway management;
- Public works, infrastructure development and maintenance;
- Environmental protection;
- Coastal, ports and marine management
- Law enforcement and security;
- Public health management;
- Visualisation of urban environment, demographic trends and social conditions for use by elected officials and citizens.

In fact, collection and usage is so widespread that data integration, access and use was hampered by the diversity of data holdings and systems managed by individual units. Getting data for planning processes, for example, can be difficult, costly and slow. Fundamental data management standards were not being used.

Access to data held by other levels of government was also problematic. Collating data across internal units and external agencies was an impediment to providing timely information to citizens.

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All cities reported that they had at least some elements of an SDI. Most cities reported that they had only small "central" GIS units, under-resourced and generally incapable of providing a comprehensive citywide SDI. Missing capabilities included no common metadata, spatial data policies and standards, formal data sharing arrangements between units or agencies or shared data access mechanism.

Most do not have a formal "GIS strategy" across the whole administration. However, most countries covered by this project have national (and in some cases regional) SDI strategies. Unfortunately, at this stage it is not clear to the working group what connection there is between national and local strategies or how national strategies will meet the needs of cities.

Some cities have developed an intranet that could be used to access spatial data held across multiple units.

Several cities have invested in providing access to spatial data as part of public websites, reporting information about aspects of city administration such as land tenure, use, planning, environmental and disaster management information. These could be used as exemplars by other cities.

3. WHAT ARE MOST IMMEDIATE NEEDS?

Correspondents identified some immediate requirements to support creation or further growth of SDI in their cities. They have differing priorities and some have already solved these problems. Those reported include:

- Completion of base mapping covering the city;
- Completion of conversion of base data into digital form;
- Common definitive street address file and integrated cadastral (legal, fiscal and spatial) database;
- Solving internal institutional arrangements to provide access to existing data held by individual units, preferably some type of policy or edict setting up a formalised structure;
- Greater cooperation and cost sharing in new data collection, especially with other levels of government;
- Obtaining stronger sponsorship for SDI development from senior city officials and obtaining commensurate resources to do the job;
- A broader understanding within city administration units about the benefits of integrating and using spatial information to do their job better;
- Access to expertise in areas such as spatial data management and ICT to build capacity for web-based repositories and access mechanisms, data integration and spatial data products; (sometimes this is just a matter of better access to existing people spread across units and sometimes need for external help);
- Development of an agreed spatial data strategy, including data access agreements, prioritisation of new data collection, sharing of resources, use of common data standards and systems interoperability;
- A spatially-enabled one-stop citizen interface.

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BIOGRAPHICAL NOTES

Paul has extensive experience in the development of spatial information policy and has been a senior executive in both national and state/provincial organisations in Australia.

Paul was Executive Director of the national office of ANZLIC – the Spatial Information Council of Australia and New Zealand from 2001 to 2004 where he worked with key users of spatial information in natural resource management, emergency management, counter-terrorism and local government.

He has also held senior executive positions as Chief Information Officer of a NSW government agency, Chief of Staff to the Lord Mayor of Brisbane and Deputy Surveyor-General of NSW. He has degrees in surveying, geography, history and political science.

Since 2004, he has been the Managing Director of Spatial Strategies Pty Ltd, which offers advice on the strategic use of spatial information in government agencies and business enterprises.

He has presented papers and given lectures on land administration reform and spatial data infrastructures at conferences and workshops in Australia, New Zealand, South-East Asia, Middle East, Turkey, Europe, UK and the USA.

Paul is the chair of FIG Commission 3 Working Group 3.2.

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