Spatially Enabled Society – Role of the Cadastre

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SUMMARY

The evolution from paper to digital maps was a significant step in the use of spatial data and information. The many technologies and gadgets available nowadays on the web as well as in our hands provide spatial information to more people for increased use and functionality. Modern societies are as much in need of spatial information in order to make the right decisions at the right time. Concepts such as eGovernment, good government, civic participation, land administration and land management play an increasingly important role, mainly in regard of the urgent issues of sustainable development.
The key to attain sustainable development is sound land governance based on reliable land information. Land governance is about the policies, processes and institutions by which land, property, and natural resources are managed, while land information is providing basic information about land use, land ownership and land values. Especially the documentation of land ownership through a reliable cadastral system and the consequential accountability is a crucial element not only from a social and economic point of view, but also from an environmental point of view.
Such factors are at the base of a spatially enabled government and society, in which «location» – provided by a positioning infrastructure – and «spatial information» – provided by a spatial data infrastructure – are readily available to citizens and businesses. The cadastre in its own right and with its information on land ownership underpins any nation's ability to manage land and its resources. The cadastral data, however, need to be integrated in broader land administration systems in order to contribute to the overall goal of sustainable development.
This paper will investigate what a spatially enabled society entails, how the cadastre and the cadastral land surveyors fit in and what their contributions look like.

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1. INTRODUCTION

This text is of interim character. It provides a first framework of the work that the Short-Term Task Force on "Spatially Enabled Society" is embarking on. The Task Force was established by the FIG Council and endorsed by the General Assembly in May 2009 in Eilat. It will deliver its final report by the end of 2010.

2. PROBLEMS THE WORLD IS FACING

The global discussions are very much concerned with topics that have economic, social and environmental elements, and which are all related to long-term sustainability:

- Millennium development goals: The first of the eight main goals is about the eradication of poverty, which can strongly be related to land and ownership of land.
- Climate change and global warming: These topics are of true global scale and affect humankind as a whole.
- Disaster management: Examples are the effects after the tsunami in 2004, which destroyed much of the infrastructure in several countries. Already weak land registration and cadastral systems have become defunct after the disaster, and for financial sharks, it became effortless to manipulate land registration documents and to evict previous land owners. In Aceh, about 80% of the land documents have been destroyed, which posed huge problems for the reconstruction (Abidin et al., 2006).

3. ANSWERS TO THESE PROBLEMS

As many other problems, these global problems have a spatial dimension. It is generally recognized that about 80% of decisions are related to space, i.e. are land-related. When considering the way how architects are preparing and planning their projects, an analogy might help to understand how such global problems might be tackled.

Architects are preparing, planning and control their projects by first building prototypes and models of the future objects. Architectural models can be physical representations or more often nowadays virtual models in digital format. These models are basically a tool, which helps to illustrate and describe the future object in an as comprehensive and realistic way. This is increasingly required in order to understand the future operation and effects of the object itself, but also how it interacts and affects the context it is embedded in. In other words, a cardboard model might not be sufficient anymore, but a complete data model has to be established, based on data and information about reality. Simulations of the future object

are most realistic, when the data model, as well as data and information are as close to reality itself.

Answers to the previously mentioned global problems need to be based in the same way on data models, supplied with up-to-date data and information. Models serve to document the actual situation, develop projects, and test the impacts of planned projects on the environment. Models also need to take the correct spatial position into account, as they play a key role in global processes (everything happens somewhere).

The cadastre and land administration component is essential in the sense that it represents the landownership connection, i.e. the relationship between humankind to land. Land ownership is crucial for establishing the link person to land because this also establishes the right to use land, but also the responsibility and accountability of land use. The landowner is given the right to use the land, but he also will take on the long-term responsibility in a sustainable way.

4. SPATIAL ENABLEMENT

Spatial ability can be defined by:

- rules for representing the real world situation;
- the existence of a legal framework;
- a reference between reality and the model;
- having the ability to position objects correctly;
- having represented situations correctly;
- disposing of the needed human resources an technical tools;
- having as much spatial information as needed;
- area coverage.

Elements for delivering IT and spatial services are:

Elements	Dominating Actors	Objectives	Performance indicators
Hardware	IBM, 1980s	to provide technical infrastructure	performance
Software	Microsoft, 1990s	to provide technical infrastructure	performance
Services	Google, 2000s, Apple 2010s?	to cater for client's needs	client satisfaction, market share
Data, Informa-tion (up-to-date)	technicians	to provide basis for services	spatial coverage
Data Models	engineers	to structure and define the data	well developed
Semantic	moderators	to help speak the same language and understand each other	well developed
People	society	to express needs	

5. STATEMENTS

Based on the above considerations, the following statements can be anticipated

1. A precondition for spatial enablement is the modelling of reality, i.e. spatial enablement is best practice, when real world reality is modelled as closely as possible.
2. For establishing real world models, there is a need of modelling rules and tools.
3. Indicators how to measure spatial enablement are:
   comprehensiveness
   coverage
   reliability
   accuracy
4. A crucial element in dealing with global problems is the information about land ownership, i.e. a cadastre is crucial for establishing the link people to land.

6. CONTINUUM OF SPATIAL ENABLEMENT

Societies are in different levels of a continuum of development and can be categorized accordingly.

7. CONCLUSIONS

As mentioned, this paper is a first rough interim report of the Task Force. This framework will considerably be developed and expanded over the following course of actions.

REFERENCES

Abidin, H.Z., T.S. Haroen, T. Supriyanto, Benny and E. Heryani (2006). Post-Tsunami Land Parcel Reconstruction in Aceh: Aspects, Status and Problems. FIG XXII Congress, Munich, Germany, TS45.3, 13 p.

BIOGRAPHICAL NOTES

Dr. Daniel Steudler graduated from the Swiss Federal Institute of Technology (ETH) in Zurich in 1983, earned the Swiss license for licensed land surveyor in 1985, and did a M.Sc.Eng. degree at the University of New Brunswick, Canada from 1989-91. In 2004, he completed a PhD degree at the University of Melbourne, Australia. Since 1991, he is working for the Swiss Federal Directorate of Cadastral Surveying and since 1994, he is involved in the activities of FIG-Commission 7.

Dr. Abbas Rajabifard is an Associate Professor and Director of the Centre for Spatial Data Infrastructures and Land Administration at the Department of Geomatics, the University of

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