



FIG President

O. Univ. Prof. Dr.-Ing. Holger Magel

Chair of Joint Board of Geoinformation Societies (JBGIS)

Director of TUM Institute of Geodesy, GIS and Land Management

on

**Geographic Information for
Sustainable Development –
Global Trends and Perspectives**

at Map Asia 2006, 30 August in Bangkok, Thailand



Disposition

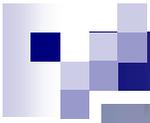
- 1. Our endangered and rapidly developing world needs sustainable development**
2. Sustainable Development is not achievable without Good Governance and comprehensive Land Management
3. It's all about Geographic Information – global trends and perspectives from the view of FIG



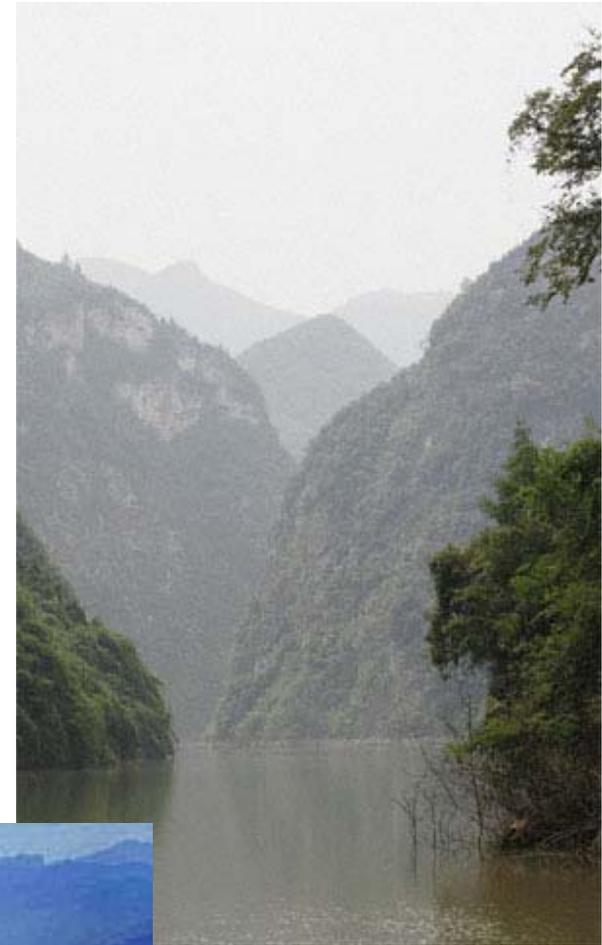
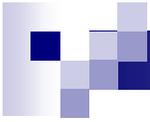
Our endangered and rapidly developing world

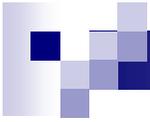
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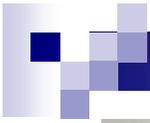


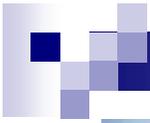




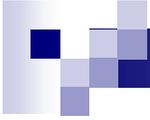












Villagers Threatened in Forced Land Expropriation

April 24, 2006

Human Rights in China (HRIC) has received reports that officials have colluded with developers in **Jinjiang City, Fujian Province** to forcibly repossess prime farm land and a gravesite for the construction of a power station.

Sources in China told HRIC that the controversy began this past February, when local officials in Jinjiang's Longhu Township began issuing eviction notices to villagers without providing for any public meeting or consultation. The notices stated that villagers would receive 25,000 *yuan* per *mu* of land for 30 *mu* to be repossessed for construction of a new power station. The villagers, who believed that more than 30 *mu* would ultimately be repossessed, objected to prime farmland being used for this purpose. For that reason, almost none of the affected villagers agreed to sell off their rights to the land. Local officials then approached the villagers again with promises of higher compensation, but the villagers firmly refused to negotiate. Sources say that at this time, township officials deployed construction officials to forcibly take possession of the land under threat of bodily harm to the villagers.

Sources told HRIC that on March 22, one of the villagers telephoned two brothers surnamed Shi, who years ago had immigrated to the Philippines and Hong Kong, and told them that their grandmother's gravesite, for which they had paid 4,000 *yuan* in the 1990s, was being reclaimed for the power station for a compensation of 200 *yuan*. The brothers immediately contacted the Chinese Embassy in the Philippines to request that embassy officials investigate the matter, and to ask the Chinese government to protect the property rights of its overseas citizens. However, the brothers received no reply from the embassy, and on March 29 they learned that developers had already cut down several trees that were considered an important element in the *feng shui* of their grandmother's grave.

HRIC is concerned that villagers of Longhu Township are at risk of losing their economic livelihoods without access to any viable remedy. HRIC is also concerned that this expropriation threatens the desecration of a grave. Incidents of forced land expropriation by local officials, made possible only under duress or threats or violence and without adequate compensation to villagers directly impacted, are on the rise across China. HRIC calls for land rights protections of rural citizens to be strengthened and implemented under Chinese law, including aligning compensation standards to the fair market value of land and securing procedural protections for farmers.

Source: <http://www.hrichina.org>



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UN Millennium Development Plan – Goals

- Eradicate extreme poverty and hunger
- Achieve universal primary education
- Promote gender equality and empower women
- Reduce child mortality
- Improve maternal health
- Combat HIV/AIDS, malaria and other diseases
- Ensure environmental sustainability
- Develop a global partnership for development

„It is very dangerous or even contra-productive if the engagement of the global community is limited to naive optimism and a pure belief in dollars. This can be called an “**utopian nightmare**”. Poverty can be fought successfully only by a long-term therapy. Besides of more money, all states both in the north and in the south should move from the summits into the ,**low lands of reality and practice**“

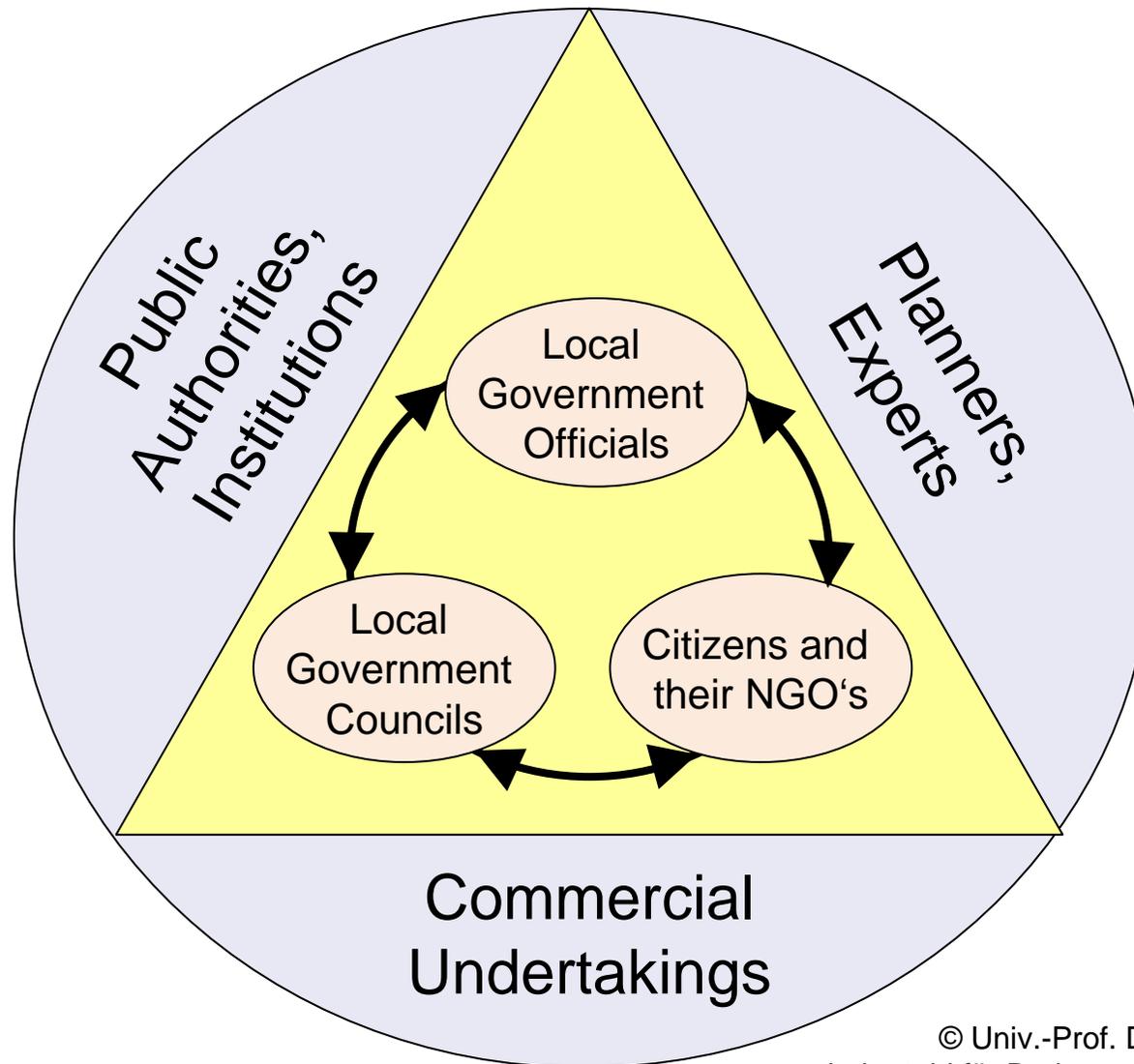
Arne Perres in Süddeutsche Zeitung 15.09.2005



UN Development Programme's (UNDP's) CHARACTERISTICS of GOOD GOVERNANCE

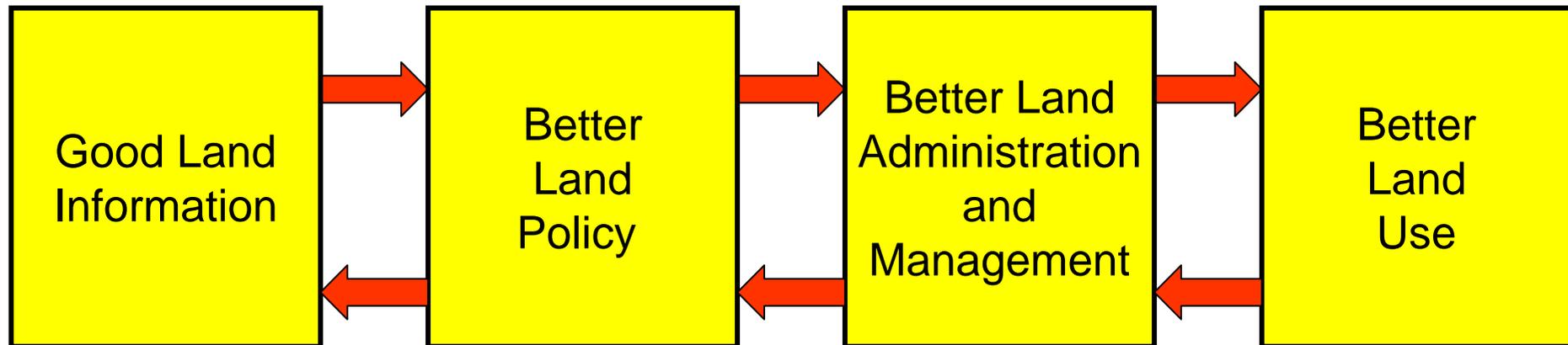
- 1. Participation**
- 2. Rule of Law**
- 3. Transparency**
- 4. Responsiveness**
- 5. Consensus Orientation**
- 6. Equity**
- 7. Effectiveness and Efficiency**
- 8. Accountability**
- 9. Strategic Vision**
- 10. Subsidiarity**
- 11. Security**

Sustainable Local Authority in Partnership with the Inhabitants

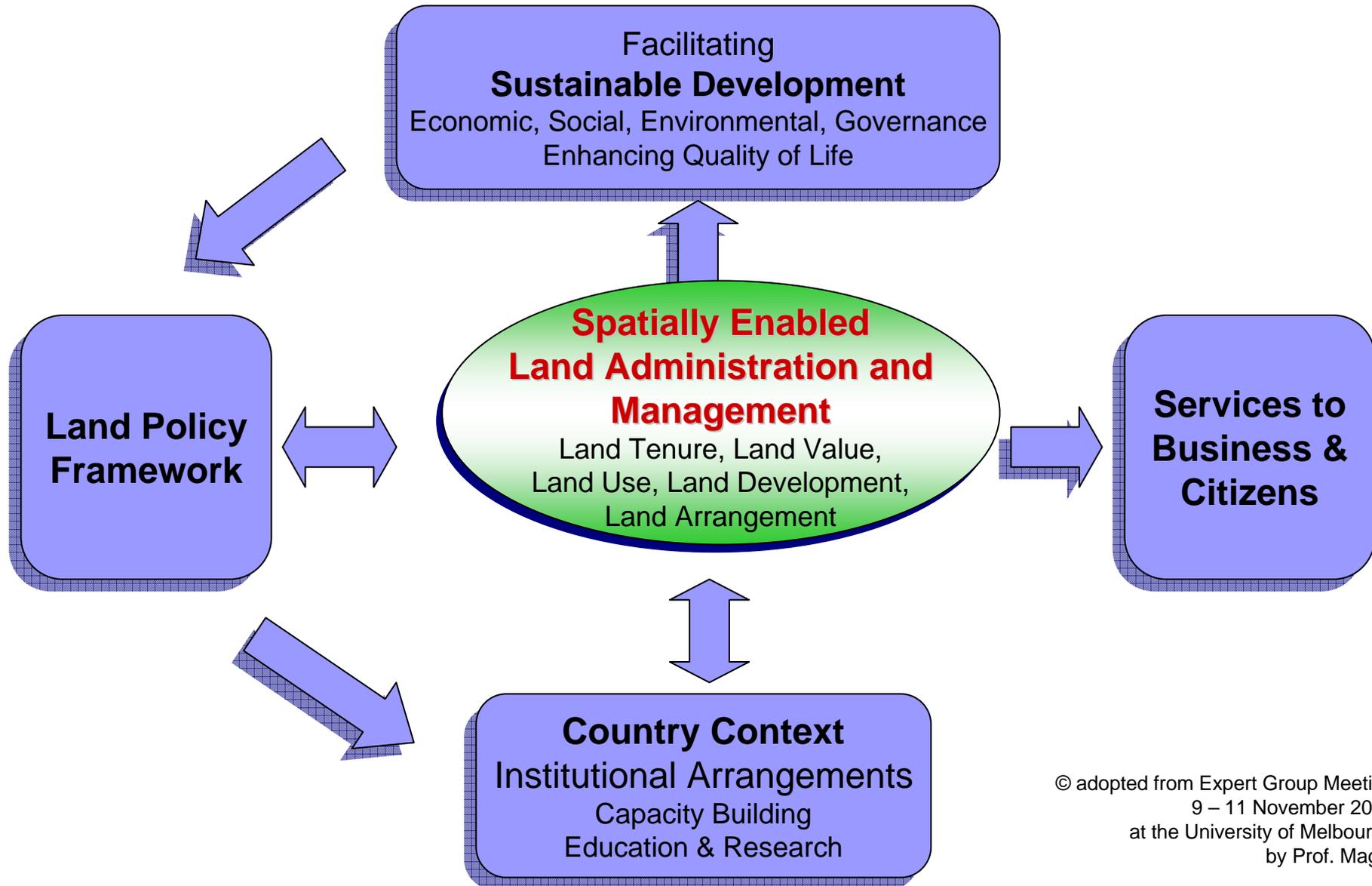




Sustainable development, MDG and Good Governance are not attainable without sound Land Administration (LAS)



A Land Management Vision



© adopted from Expert Group Meeting
9 – 11 November 2005
at the University of Melbourne
by Prof. Magel



**The Nairobi Statement
on Spatial Information
for Sustainable Development**

**2nd – 5th October 2001
Nairobi, Kenya**

**INTERNATIONAL FEDERATION OF SURVEYORS FIG
in co-operation with
THE UNITED NATIONS**



Modern LAS in **developed economies** should facilitate sustainable development through public participation and informed and accountable government decision-making in relation to the built and natural environments. The interface between the LA infrastructure, the professions and the public will increasingly be **serviced by information communication technologies designed to implement *e-government* and e-citizenship.**

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Developing countries face the challenge of pro-poor land management and administration and are aiming for as prompt as possible enhancement of authority services. These countries face the issue of how to organise land information in support of their governance.

E-citizenship is the mobilisation of society to engage in planning, use and allocation of resources, using technology to facilitate participatory democracy.

E-government involves putting government information and processes on-line, and using digital systems to assist public access.

E-governance is e-democracy – helping to govern society through the use of the Web.

Prof. Stig Enemark, FIG Vice-president:
The Emerging Land Management
Paradigm – a major challenge for the
global surveying community.
In: Geomatics World. July/August 2006.

Disposition

1. Our endangered and rapidly developing world needs sustainable development
2. Sustainable Development is not achievable without Good Governance and comprehensive Land Management
3. **It's all about Geographic Information – global trends and perspectives from the view of FIG**

The **most important change** is that geospatial information is becoming more widely used and appreciated by professionals and the public. This is at least partly because technology is providing the means to collect data, extract information and distribute it to a very wide range of users; but is also because people see a need for geospatial information.

The **general public** sees this through the media, which reports on wars and disasters with the help of satellite data, and through the use of in-car navigation systems.

Prof. Ian Dowman, ISPRS President:
Promoting Capacity Building.
In: GIM International. July 2006.

Professionals and government see it through the response to disasters on the ground and through such possibilities as road charging. There is therefore strong pressure on the geospatial industry to produce the information which is required and the tools to use it effectively. There is a clear trend towards making use of all available data and integrating it to generate the required information.

Prof. Ian Dowman, ISPRS President:
Promoting Capacity Building.
In: GIM International. July 2006.

Some say that GIS is not actually going 'mainstream' because the marketing focus is too orientated towards specialist groups. What would you say to these sceptics?

.... Nevertheless, enterprise solutions and IT strategies that include GIS are growing rapidly. We see it in our business growth and the interest being shown by a whole new community of users. **GIS is increasingly being implemented as enterprise information systems.** This goes far beyond simply spatially enabling business tables in a DBMS.

Interview with Jack Dangermond,
President and Founder, ESRI.
GIM International. August 2006

A Changing Role for GIS

Utilities, telecommunications, transportation and civil government are **traditional** GIS markets in the sense that they are long-term users of GIS. But lots of things are **changing**:

1. Need to share and access geospatial information at an **enterprise level** (not only as department tool)
2. Issue around data is no longer acquisition or format but **fitness for purpose** (e.g. accurate data!)
3. The **trend of information sharing continues**, so web enablement of applications and changing their architecture to thinner clients will remain
4. **Changes in legislation**: EU and national legislation is becoming a big drive for IT incl. GIS

New Markets of GIS

1. Greater use of GIS in segments like insurance and risk underwriting
2. Online and ASP mapping markets are linked to traditional GIS markets
3. GIS usage in the personal navigation market

Future Role/Function of GIS

“The issue is less about GIS as a series of standalone applications, but more about how geospatial data, information and functionality, which typically resides within a GIS, can be used and leveraged across an organisation.”

The integration of spatial information, including temporal aspects, will increasingly be embedded in processes leading to optimised decision making and transparency.

Communication, cooperation and networking form the basis for knowledge sharing processes, and will create a shifting mindset that is more efficient and dynamic, enabling geo-data to be used effectively in the development of a modern society.

G. Muggenhuber, R. Mahoney: Changing
Minds in an Evolving Society.
FIG Article of the Month. July 2006

„The real challenge is to understand people's approach to the utilisation of technologies and services and to make decisions at the policy level“

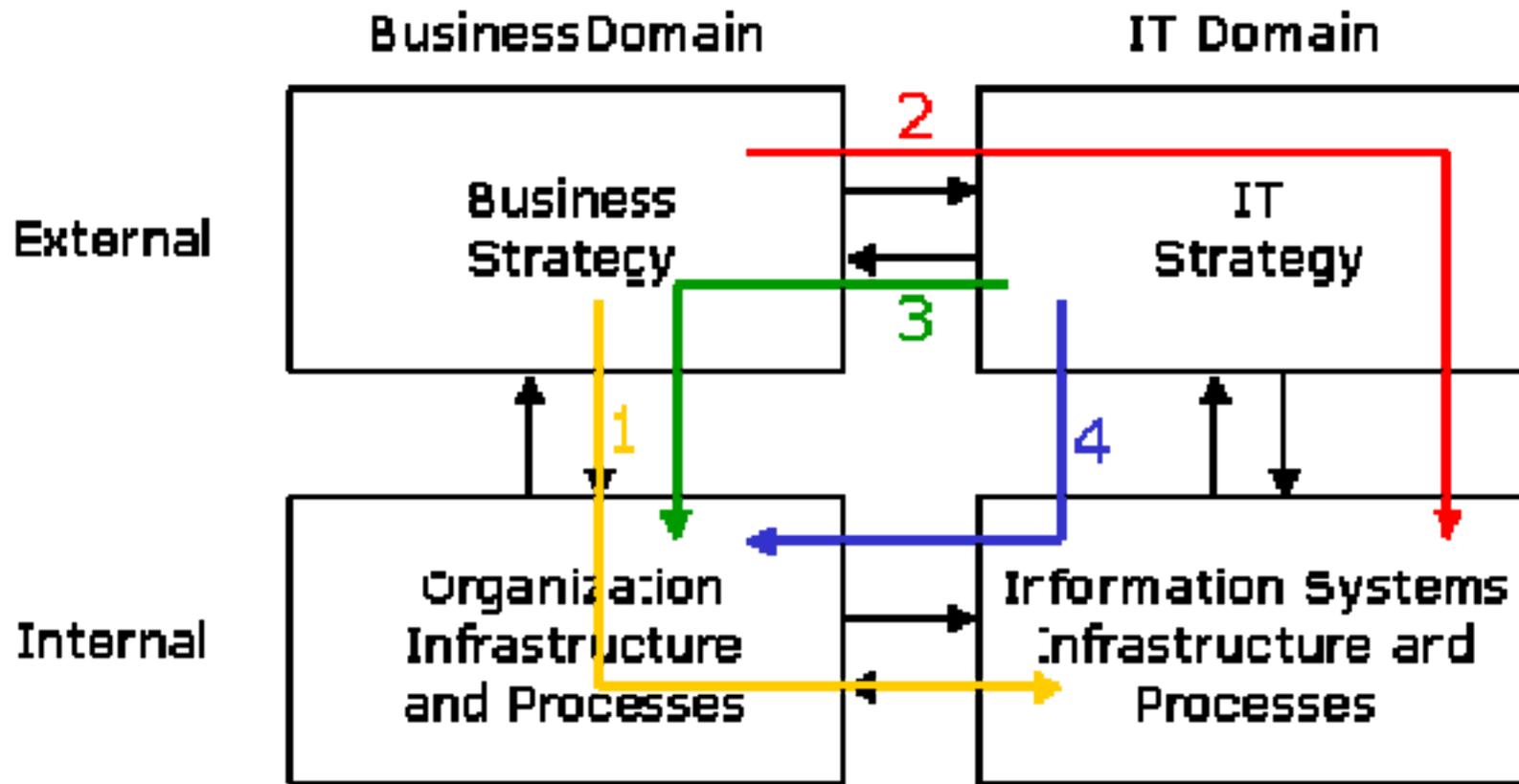
But who should understand?

G. Muggenhuber, R. Mahoney: Changing
Minds in an Evolving Society.
FIG Article of the Month. July 2006

...it is the **LEADERS!!!!!!!**

Many leaders of land-administration organisations are kept away from **strategic issues** and are too busy with the daily problems they experience in service delivery. However, leadership is necessary to develop the future in accordance with clearly set government requirements.

Strategic Alignment Model



The Strategic Alignment model of Venkatraman, Henderson and Oldach, 1993 is a **framework to Alignment Business (strategic and operational) and IT Strategy** (see also Henderson et alii, 1992)

(They describe) **Four Dominant Alignment Perspectives** towards the *analytic alignment* of Business and IT:

- 1. Strategy Execution:** this perspective views the business strategy as the driver of both organization design choices and the logic of IS infrastructure (the classic, hierarchical view of strategic management). Top Management is strategy formulator, IS Management is strategy implementer. [Arrow 1]
- 2. Technology Potential:** this perspective also views the business strategy as the driver, however involves the articulation of an IT strategy to support the chosen business strategy and the corresponding specification of the required IS infrastructure and processes. The top management should provide the technology vision to articulate the logic and choices pertaining to IT strategy that would best support the chosen business strategy, while the role of the IS manager should be that of the technology architect - who efficiently and effectively designs and implements the required IS infrastructure that is consistent with the external component of IT strategy (scope, competences and governance). [Arrow 2]

Source: The Strategic Alignment model of Venkatraman, Henderson and Oldach, 1993

3. Competitive Potential: this alignment perspective is concerned with the exploitation of emerging IT capabilities to impact new products and services (i.e., business scope), influence the key attributes of strategy (distinctive competences), as well as develop new forms of relationships (i.e. business governance). Unlike the two previous perspectives that considered business strategy as given (or a constraint for organizational transformation), this perspective allows the modification of business strategy via emerging IT capabilities. The specific role of the top management to make this perspective succeed is that of the business visionary, who articulates how the emerging IT competences and functionality as well as changing governance patterns in the IT marketplace would impact the business strategy. The role of the IS manager, in contrast, is one of the catalyst, who identifies and interprets the trends in the IT environment to assist the business managers to understand the potential opportunities and threats from an IT perspective. [Arrow 3]

4. Service Level: This alignment perspective focuses on how to build world class IT/IS organization within an organization. In this perspective, the role of business strategy is indirect. This perspective is often viewed as necessary (but not sufficient) to ensure the effective use of IT resources and be responsive to the growing and fast-changing demands of the end-user population. The specific role of the top management to make this perspective succeed is that of the prioritizer, who articulates how best to allocate the scarce resources both within the organization as well as in the IT marketplace (in terms of joint ventures, licensing, minority equity investments, etc.). The role of the IS manager, in contrast, is one of business leadership, with the specific tasks of making the internal business succeed within the operating guidelines from the top management. [Arrow 4]

Venkatraman et alii argue:

The difficulty to realize value from IT investments is

1. due to the lack of alignment between the business and IT strategy of the organizations that are making investments, and
2. due to the lack of a dynamic administrative process to ensure continuous alignment between the business and IT domains.

GLOBAL GEO(graphic)INFORMATION-TRENDS and PERSPECTIVES from the view of FIG

In the field of spatial or geo(graphic) information management the changes that are occurring can best be observed by considering **four** interrelated areas:

1. Geo-Tools (GIS-Technology)
2. Geo-Data (Spatial Data)
3. Geo-Processes/Geo-Business
4. Geo-Cooperation – Human Interactions

Global GI – Trends and Perspectives

1. Geo-Tools

- *Improved Systems* (everybody can use positioning service like GPS, combined with mobile phones, PDAs and mobile GIS systems:
 - increased interoperability
 - increased performance
 - increased functionality
 - decreased size (handhelds)
 - decreased prize

Global GI – Trends and Perspectives

1. Geo-Tools

- *New Developments:*
 - Web-Mapping/Web services/Web-GIS
 - e-Commerce/e-Government
 - Location-Based Services/mobile GIS Solutions
 - High Resolution Satellite images and digital photogrammetric sensors
 - Low cost navigation systems (e.g. car-navigation)
 - HR Airborne Laser Scanning
 - Improvements in GNSS

Global GI – Trends and Perspectives

1. Geo-Tools

- *Improved Network-Services*
 - Improved rate of internet penetration in the world
 - New web access tools (AJAX, XML)
 - Modern image tiling techniques for Web-based 3D visualization.
 - Online Access to – also cost-free – spatial viewers (Google Earth and Microsoft Virtual Earth) for a broad mass as drivers for spatial data infrastructure services
 - Future research activities to improve web searching (semantic web, topic maps)

Global GI – Trends and Perspectives

1. Geo-Tools

- *International Standards*
 - Interoperability standards are required to allow the merging of different/heterogeneous data sets and to combine geo-data services (e.g. formats, exchange and inter-operability; gateways and protocols; communication equipment, software)
 - Open Geospatial Consortium (OGC) and the official standardisation organisations (ISO, CEN) address the Interoperability issue.

Global GI – Trends and Perspectives

2. Geo-Data

- *Background*
 - “Data are going public” (e-Government, e-Citizen)
 - data are referring to rather different reference frames
 - a challenge for experts
- *Extension of database-contents:*
 - natural resources
 - economic and development oriented data

Global GI – Trends and Perspectives

2. Geo-Data

- *Ensuring the Integrity and Validity of Databases* (make available accurate, detailed and reliable geo-information)
- *Need of Query Shells* as a front-end decision support tool for GIS databases to fulfil the various needs of decisions making.
- *Filtering data streams to extract meaningful information* is needed for environmental monitoring, security, infrastructure operations and transportation applications.

Global GI – Trends and Perspectives

2. Geo-Data

- *Metadata*

- Metadata describe the data model, the thematic content, quality, geometric accuracy, spatial reference system, quality and administration
- Development of Metadata standards as part of a National Spatial Information Infrastructure (NSII)
- Open access to users for metadata (e.g. INSPIRE)
- The research on Metadata Management of Resource and Environment Spatial Database Metadata is of high priority

Global GI – Trends and Perspectives

3. Geo-Processes / Geo Businesses:

- *Background:*
 - National Mapping Agencies were the main producers for GI/Geo-data and public bodies were the main customers
 - Now Geo-information/Geo-data is often produced and maintained by companies who want to make a profit
 - Sensors are penetrating our world widely with new possibilities of applications (monitoring and controlling)

Global GI – Trends and Perspectives

3. Geo-Processes / Geo Businesses / E-Government:

- *Integration of GIS in mainstream IT:* GIS is now accepted as a mainstream technology within government
- GIS became a key tool for *Sustainable Development* (environmental and natural resource management agencies)
- GIS is not any longer an end in itself

Global GI – Trends and Perspectives

3. Geo-Processes / Geo Businesses:

- *GI as fundamental for security issue* (risk management, emergency management)
- *GI as a market product:*
 - *Development of an electronic market place on GI products* (e-market, e-commerce)
 - *Pricing is critical issue* in the delivery process of geo-data

Global GI – Trends and Perspectives

3. Geo-Processes / Geo Businesses:

- *Paradigm Shift:* Geospatial industry is moving from a technology-driven niche to a customer-orientated service. “Solutions” on demand instead of “Data in the stock”
- *GIS as business tool:* GI is not just a technology – it is increasingly part of the way in which commerce, government and academia operate. Approximately 80 % of administrative and economic decisions are based on spatial information.

Global GI – Trends and Perspectives

3. Geo-Processes / Geo Businesses:

- *Promoting GI:*
 - **GIS is in order to protect our homes, our friends, and our own lives and to organise remedial measures.**
 - GIS teaches us how to respect nature and how to understand her actions.
 - **GI distributes spatial information to hundreds of millions people almost immediately via Internet GIS/standardised Web-Services.**
 - Promotion activities are required to raise awareness among potential users about the benefits of using geo-information products.

Global GI – Trends and Perspectives

4. Geo – Cooperation – Human Interactions:

- *Background:*
 - NSDI institutional cooperation is still a weakness – it requires cultural change/mental shift
- *Cooperation to get added value:* The collection of information often was done isolated by specific institutions without scrutinising the existing demand of merged data to get added value. This often led to a shortfall in the return on investment

Global GI – Trends and Perspectives

4. Geo – Cooperation – Human Interactions:

- *New Public Management*: National Mapping Agencies (NMA) introduce(d) business models of the private sector, like project management, management by objectives, cost accounting, and quality management, to achieve a more efficient administration. The concept provides the transition of NMA from a position of power and authority to business-, and customer-orientated service institutions.

Global GI – Trends and Perspectives

4. Geo – Cooperation – Human Interactions:

- *Competition:* Public Authorities are now in competition with other geo-data providers, like the organisations, which produce high resolution satellite imagery or those who produce high-resolution digital elevation models, often collected with advanced data acquisition techniques, like laser altimetry and mobile GIS.
- *PPP (Public-Private-Partnership)* is required: Co-ordination is a major problem of GI: huge number of players and stakeholders, e.g. data collectors, software vendors, data brokers, citizens and end users. Even within government, multiple departments are inevitably involved, all with their own agendas set by different Ministers.

Global GI – Trends and Perspectives

4. Geo – Cooperation – Human Interactions:

- *Acquisition of Customer Needs:* Before value-added services can be created, it is necessary that the targeted end-users have been identified, that the requirements they put on the data products and services are known, and that their experience, skills and system configurations have been recognised.
- *Promoting GI to key leaders:* Consequently, actively influencing the key and leading decision makers about the benefit from the introduction of a GI.

Global GI – Trends and Perspectives

4. Geo – Cooperation – Human Interactions:

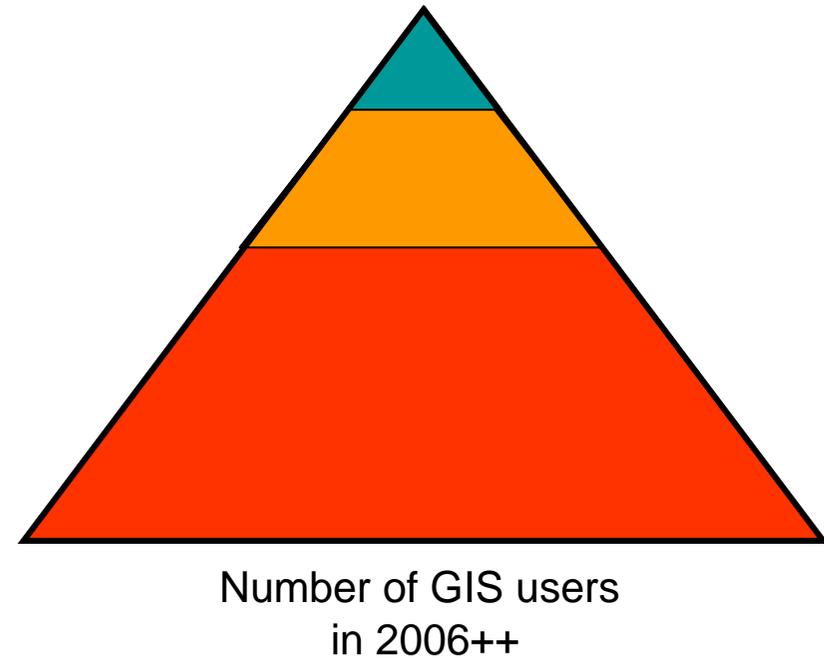
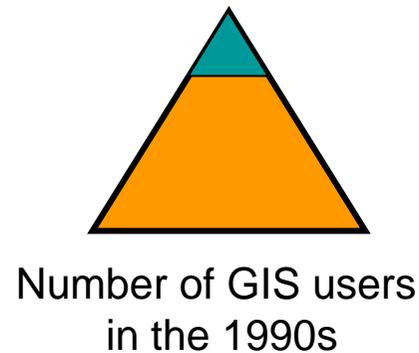
GI as tool for citizen Empowerment: GI will be accepted as a means towards more public participation, supporting the empowerment of citizens. Citizens watch (instead of being watched!) and participate in planning and decisions affecting their lives and interests. That is **an important contribution to building up a Civic Society and local democracy!**

Currently there are three innovations promoting the technical progress in the field of Geo-information: web-services, mobile GIS linked to satellite positioning systems (GPS; GLONASS, GALILEO) and so-called Earth-Viewer like Google Earth.

The opening up of the geo-information market of Google, Microsoft, Yahoo and other companies will vitalise the development and particularly modify the profitable geo-data market. I expect for this year – perhaps even before the Intergeo 2006 – the first contracts will be entered between land surveying offices and Google or Microsoft about the use of geo-data

Prof. Schilcher, TUM
Chair of the Round Table GIS e.V.
Greetings on „Geobasis-information –
strategies, implementation, trends“
Stuttgart, July 2006

Global Trend: Spatial Information and GI technology become mass media



- GIS developers
- knowledgeable GIS users
- GIS non-experts

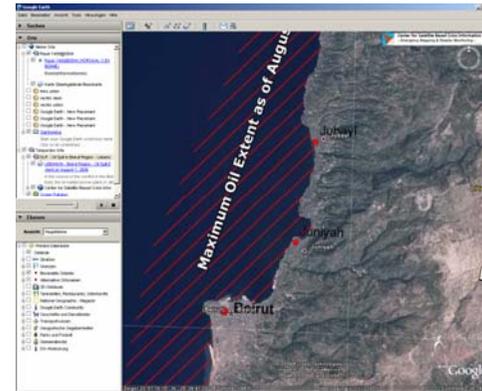
Reasons:

- technical advancements:
- web technology / interoperability
- data acquisition techniques: high resolution remote sensing sensors, high resolution airborne laser scanning
- SDI initiatives (not really yet)
- investment in data and technology from outside the traditional GIS segment: MICROSOFT VIRTUAL EARTH, GOOGLE EARTH ...

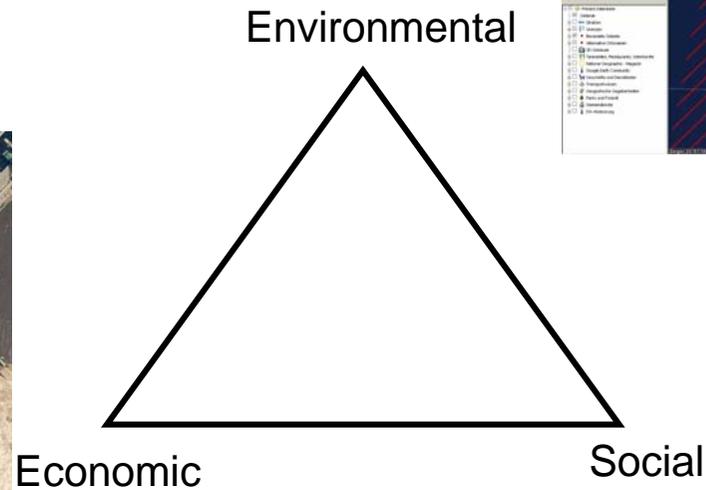
Effects on sustainable development

High resolution spatial information and related technology are available to all citizens (GIS-non-experts)

- spatial awareness
- empowerment through better information
- more participation



oil spill in Lebanon



embankment dam in China



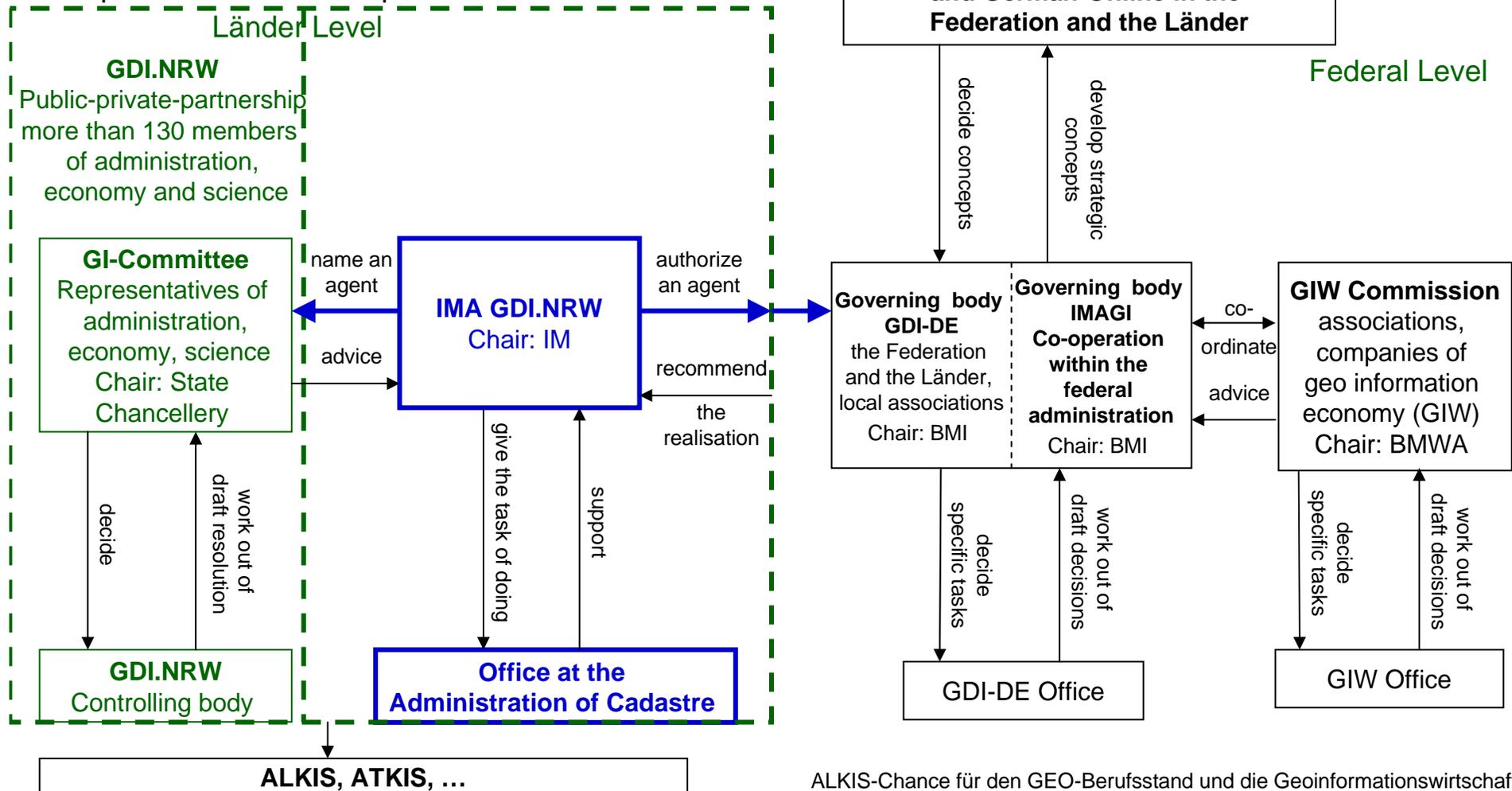
Favela in Rio de Janeiro



Common Development of Geo Data Infrastructure Germany – GDI-DE (NSDI Federal and Länder)

GDI and Geo Information Economy

Example North Rhine Westphalia





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