Space for geo-information: network for geo-innovation in the Netherlands

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INTRODUCTION

At the end of 2004 the innovation program "space for geo-information" started with a budget of 20 million euro. It was the formal start of an innovation program on geo-innovation in the Netherlands. One of the key characteristics of this program is a joint innovation ambition of the geo-research community, geo-data producers, geo-companies and geo-users. In this paper the background, mission, approach and some preliminary results of the program are presented and discussed. Two other similar program's in the world are GEOIDE in Canada en CRC-SI (SI-Spatial Information) in Australia.

BACKGROUND

Various studies in the Netherlands indicated that the flow of research results to applications in society is far from optimal. The research results are mainly published in scientific journals and not enough used by companies and organizations. It is not clear if these statements or perceptions are really true, but the fact is that this was (and still is) a widespread opinion among policymakers. In order to change this situation a governmental innovation program, called BSIK was launched. The goal of BSIK is to fund innovation program's on strategic fields, where academic researcher, companies and users work in close collaboration on innovation. The philosophy behind the BSIK organization is that by joint activities of (fundamental) research and companies the knowledge exchange is stimulated, leading to much shorter "time to market" for new and innovative products. For the overall program 800 million euro was available. These funds need to be matched with a similar amount form the program partners. After a very severe competition, finally 37 projects were selected. They range from nano-technology to climate change. One of the programs selected was "Ruimte voor Geo-Informatie (RGI)", or Space for Geo-information in English.

MISSION AND OUTLINE OF THE PROGRAM

The overall mission of the RGI program is:

"Enhancement and innovation of the geo-information infrastructure and the geo-knowledge community in the Netherlands towards sound and efficient public administration and a robust business".

The innovation of the national geo-information infrastructure (NGII) plays a central in the mission. The further enhancement and innovation of the NGII was selected as the binding element for projects in the program. In order to achieve the mission the program was originally subdivided into 6 subprograms. They are presented in ***Figure 1***. The subprograms 2, 3 and 4 represent the supply of geo-information to the society by the NGII. Subprogram 2 is focused on the innovation of the NGII, subprogram 3 on the development authentic registrations and finally subprogram 4 on new and innovative methods for geo-data dissemination. On the left part of the figure the demand for geo-information is presented. As an interface between supply and demand two program's are situated.

One on social issues (1) and one on business and product innovations (6). These two subprograms contain projects that investigate the potential for new geo-information products and geo-information support for existing and new issues in society. The whole framework is supported by subprogram 6; fundamental and strategic research. For each subprogram detail objectives are formulated. For program 5 (fundamental and strategic research) the following items are selected as the main spearheads:

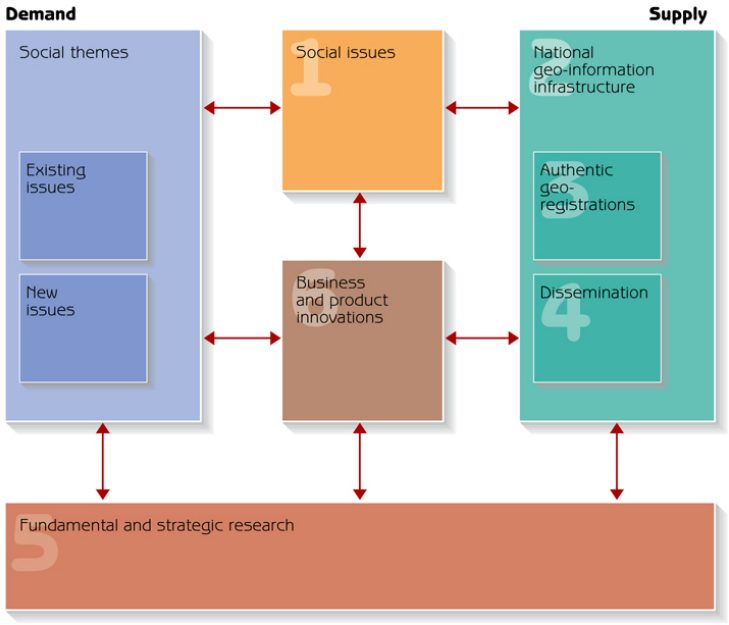

Figure 1: The 6 original subprograms of Space for geo-information.

a. Geo-information infrastructure concepts

This scientific/technological research theme facilitates the dissemination (use and sharing) of geo-information and services as one of the important enabling technologies for realising the Netherlands NGII in a European (global) context:

- Interoperability; OpenGIS/ISO architecture and standards
- Geo-information infrastructure (networks, metadata, catalogue services, data, organisation)
- Integrated use of geo-information from multiple sources
- Using positioning and wireless network connection to create location-based services (LBS)

b. Spatio temporal modelling

Geo-information processing is based on spatial data and process modelling. The Bsik knowledge project Space for Geo-information embraces a number of spatial modelling research topics:

- Integrated spatial data and process modelling
- 3D modelling
- Modelling temporal dynamics
- Modelling the semantics (ontological development)
- Multi-scale modelling (and generalisation)

- Modelling uncertainty (related to quality)
- Consistently maintaining the data and process information in a digital environment (databases)

c. Geographic man-machine interaction

The next main research topics are investigated under this theme:
- Visual analysis and interactive use of geo-information
- Presentation and exploration of quality (fuzzy objects)
- Explorative interaction with spatial-temporal (process) models
- Advanced man-machine interfaces for designing 3D/4D plans
- 3D-visualisation, Virtual/Augmented Reality (VR/AR) and multimedia
- Mechanisms for coping with the dynamics of an open knowledge environment

d. Geo-information & Society

This main research theme covers the following topics that need to be investigated within the context of Space for Geo-information:
- Geo-information user needs
- Legal aspects (data-ownership, use rights, privacy, liability, accessibility)
- Financing (payment models, realisation of e-banking, security)
- Organisation (definition of core data sets, institutional arrangements, coupling of basis data sets)
- Management and maintenance of data and processes within the NGII
- Cultural aspects and competences (attitudes, integrated approach instead of domain specific approach of problems)
- Awareness and cooperation

ORGANISATION OF THE NETWORK

For the implementation of the program an independent organization was founded. In ***Figure 2*** the overall structure is presented. It is not the task of this organization to execute projects, this is done by the network partners in the field, but to select and monitor projects and to facilitate networking between the project partners and organizations.

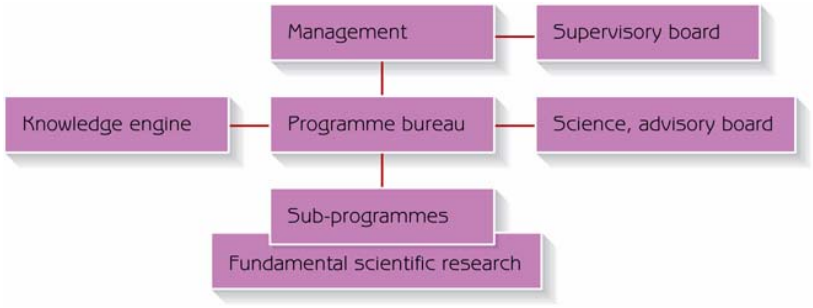

***Figure 2*:** The structure of the RGI Organization.

The program bureau is the operational unit of RGI. It facilitates the development of a rolling research agenda, the tender procedure for projects, payment and control of project subsidies, network support, etc. The final decisions on for instance the funding and termination of projects are made by the RGI Management (now also called RGI board). They have a meeting about every two months.

The overall supervision is done by supervisory board with high level governmental officials. They meet twice a year. For the formulation of the rolling research agenda, the selection and the evaluation of projects the science advisory board and the knowledge engine (now called the user advisory board) play a crucial role. Both groups consists of about 10 people of respectively scientists and end users. They meet at irregular intervals. A more or less similar organizational structure is also implemented by the GEOIDE program in Canada and CRC-SI in Australia.

As mentioned before the actual work is done in projects by the project partners. In order to select projects, RGI followed a yearly tender procedure. Until now three tendering cycles are executed. The tender procedure is not a standard procedure in BSIK. In fact, we are one of the few programs that follow this approach. The reasons are:

a) GI-network development is a important aspect of the mission. With a tender procedure we stimulate people outside the GI domain to participate;

b) Quality of research and applications. With a tender approach we were able to select the best projects;

c) GI-innovations. With an open tender procedure we stimulate people to formulate innovative proposals and think “out of the box”;

d) GI-awareness. The awareness among politicians and the public on the importance of GI in society is low. With a tender, that receives media attention, the awareness for the field increases.

The tender procedure has as a drawback that we are not able to formulate the exact scope and direction of a project. We are dependent on the offers by the field. After three rounds, however our overall conclusion is positive. Especially the intensive GI-network that has been established as a result of the approach is impressive.

In the call for projects two categories are distinguished: 1) RGI-projects and 2) RGI-innovation pilots.

The RGI-projects are projects for about 4 years with a subsidy from RGI ranging from 250 000 - 1 000 000 euro. The project consortium must preferably consist of one or more universities, a research organization, GI-producer, company and members of the user community. The goal is to create in every project a smart mix of organizations and people that stimulate innovation and the flow of knowledge from the universities and research organizations to companies and users. On the other hand it stimulates universities and research organizations to work on practical problems. Our overall feeling is that this “more or less forced marriage” works very well. After two years practical innovative results are appearing that were certainly not realized without this approach.

The RGI-innovation pilot is an approach to stimulate fresh and innovative small projects. This line is a reaction on the overall tendency in the world that acquisition of research funds has become an art and “hell of job”. Quite some time of good researchers is spent on writing research proposals. With the RGI-innovation pilots, RGI wants to limit the paper work and stimulates intuitive good ideas. Only a 2 page proposal is needed for a RGI-innovation pilot. It is evaluated and in the case of a YES, you receive 50 000 euro without further constrains, except of course the justification of the project money at the end of the project.

POJECTS

At the start of 2007 we have about 40 RGI-projects and 30 RGI-innovation pilots running. For communication, management and integration purposes the projects are grouped into four main themes. These themes are: 1) National Geo-information Infrastructure 2) Security & Safety 3) Spatial planning and 4) Consumers & Students. Note that theme 1 is the backbone of the overall proposal as illustrated in ***Figure 1***, theme 2 and 3 are further specifications of the societal issues indicated in the Figure 1 and finally theme 4 is a further specification of the user communities. The research components follow the formulated spearheads, but are application wise also embedded in the four themes. This stimulates the link between the GI related research questions and the application domains. Next, a few examples of projects within the four themes are presented. More information on projects and project publications can be found on the RGI-website (www.rgi.nl).

National Geo-information Infrastructure

Within this theme a large number of projects are executed. All components of the NGII (spatial data, standards, technology, people and policy) receive attention in one or more projects. For instance, one project focuses on the innovation and test beds for geo-portals, another project is analyzing GI-access and licensing policy, a third project focuses on standards and social scientists are investigating the culture of the GI sector and the impact on innovation and data sharing. Also a framework for world-wide assessment of Spatial Data Infrastructures is under development.

Security & Safety

Within this theme projects with security and safety as main focus are positioned. Note that security and safety as such is not the main focus of the projects, the focus is always on the role and application of geo-information within this application domain. Examples of projects in this theme are: real-time (spatial) data support for fire brigades, the use of geo-visualization for the detection of unsafe regions in urban environments, 3D positioning for emergency interventions and location based services for security and safety. In all the examples the focus is on GI-research with security and safety as the context domain.

Spatial planning

Within this theme projects with spatial planning as GI context are grouped. Examples are: the formulation and handling of uncertain in planning objects for spatial planning, the automatic generalization of base topography as support for plan visualization on various scales. The optimizing of GI flows around farms and farmers for better agro-environmental management.

Consumers and Students

Within this last theme all the projects are combined that have citizens (consumers) and students as target group. These two groups are selected, because they receive less attention from the GI community and they are relevant groups for anchoring geo-information in society. In the past the main focus of GI research and application was on government and companies. There is quite some room for innovation and development for the consumers and students as target groups. Examples of projects in this theme are: the use of geo-information for tourist support, the development of education material for high school students and the associated analysis GI-learning capabilities, GI-support for the aging population, and spatial analysis of diseases by and for the consumers.

CLOSING REMARKS

The space for geo-information program is now in its third year. The organizational structure is in place and about 90% of the budget has been allocated to projects. A large network of about 140 organizations has been established. The challenge of all the projects in the program is to create, science based geo-innovation and to foster the flow geo-knowledge from the research labs to companies and society. It is only at the end of the program that we are able to judge if we have reached our goals and expectations. For now, it is already clear that due to the intensive GI-network development in the Netherlands the GI-landscape has already changed towards more collaboration and mutual understanding between GI-Science and GI-practice. An very interesting analysis is the impact comparison between GEOIDE in Canada, CRC-SI in Australia and RGI in the Netherlands in order to derive lessons for further enhancement of GI-research, GI-application and GI-innovation.