Workshop "Exploring Spatial Data Infrastructures" Report
19-20 January 2006, Wageningen, the Netherlands
Lukasz Grus (Wageningen University)

On 19th and 20th January, Centre for Geo-information at Wageningen University
organized the workshop "Exploring Spatial Data Infrastructures". The aim of the seminar
was to foster discussion about the key research issues for developing an approach to
establish National Spatial Data Infrastructure (NSDI) assessment framework (See
Appendix 1 for detailed program). Detailed information about the workshop can be found
on www.geo-informatie.nl. The workshop focused on the following issues:

- Concepts and future development of NSDI
- Approaches and main issues concerning establishment of assessment
  framework
- Crucial criteria and measures of an SDI assessment framework.

The workshop consisted of seven oral presentations followed by discussion
See for workshop power point presentation files under the web address:
http://www.grs.wur.nl/UK/Workshops/Exploring+Spatial+Data+Infrastructures/Program/
As a result of the workshop, all participants agreed on the importance of the NSDI
assessment. All of them stressed the difficulty of this task due to NSDI complexity and its
dynamic nature. They proposed various approaches and agreed that the NSDI assessment
framework will be multi-faceted series of tools.

Each presenter was asked the following question:

What are the crucial and most important factors for assessing NSDI?

Prof. Dr. Ian Masser agreed that assessment of NSDI is important in general.
However the fact that we are not assessing a static but rather moving target is what makes
it difficult. It is not easy to assess NSDI as evolutionary process in snapshots. Not only
static components of NSDI should be measured but also measuring the dynamics is
crucial issue in the assessment.
Dr. Abbas Rajabifard sees assessment of NSDI as essential. In his opinion it is not
going to be one assessment model. Because of dynamic nature of NSDI we have to put
some flexibility into the model so that it will be generic. He stressed also that due to
diverse NSDI implementations in many countries the model should allow for adopting it
to different circumstances. It should also be a kind of self assessment tool for NSDI
professionals in order to help them identify where they are with NSDI status in reference
to their strategy and priorities.
Dr. Erik de Man suggested that assessment framework may be based on
comparing profiles rather than measuring predefined set of indicators. He also argues that

instead of building a framework with set of indicators we should concentrate on analysis what kind of dilemmas users have in one particular NSDI implementation and how they deal with them.

Annemiek Verrips from CPB Netherlands Bureau for Economic Policy Analysis was asked what would be her approach or suggestions for NSDI assessment. In her opinion a wealth fare analysis would be a very good framework to assess short term effects of NSDI and monitor its development in consistent way. By making short term results visible it is always easier to get political support. Monitoring development of NSDI would help the policy makers choose the best ways and make good decisions in the whole process of NSDI creation. Cost benefit analysis is also an option in evaluating NSDI.

Dr. Bastiaan van Loenen was asked what the key variables for characterization of NSDI are. In his opinion key issues that have to be measured while evaluating NSDI are framework datasets, technical aspects and Interoperability.

According to Danny Vandenbroucke key variable in NSDI evaluation is user appreciation. Crucial is to measure user's satisfaction from NSDIs ability to resolve problems.

Additionally two task assignments sessions were organized. Twenty two participants (see Appendix 2 for participants list) were divided into three discussion groups and were asked to answer seven questions concerning key issues in development of framework to assess NSDI. Each session finished summarizing the group results.
A summary of the group task assignment sessions is presented below:

Question 1: Is it possible to develop assessment framework for SDI?

Three key issues dominated the discussion on this question:
- Clear objectives of the assessment must be defined
- Multi-faceted frameworks
- NSDI as moving target

Most of the participants answered this question *"Yes, but…"* The participants agreed on the importance and necessity of NSDI assessment framework. Discussion raised questions of defining clearly the purpose of NSDI assessment framework. The main purpose of the assessment framework will be to provide worldwide benchmark for NSDIs. This will be the basis to determine the critical factors for success and failure.

Most of the participants agreed that one assessment framework can not measure all relevant aspects of NSDI. Most likely it will be not one, fixed framework but rather flexible series of tools. Selection of variables describing NSDI characteristics should also be flexible.

Important issue mentioned several times was the dynamic nature of NSDI. This makes an assessment more difficult and complicated as we will measure not stable body but complex and changing phenomenon. Dynamic nature of NSDI is the crucial issue. NSDI was compared as a moving target and its assessment will require various tools. As NSDI is in ongoing transformation, its variables and indicators may also change over time. The assessment framework to be complete should measure static characteristics of

NSDI (components) as well as its dynamics (changing relations between components, emergence of internal/external factors, overall NSDI development changes etc.).

Some participants stressed the importance of a clear vision or objective of NSDI initiative. Vision or objective should clarify what NSDI aims for. Then the assessment framework can measure the distance between the present state of NSDI and the target included in the vision.

Question 2: What are the obstacles for development of such an assessment framework?

In summary the main obstacles are:
- Various description of SDI
- Complexity and diversity of NSDI
- Who is assessing? (self-assessment or external organization)
- Difficulty with obtaining data.

All groups agreed that the lack of one coherent definition of NSDI is an obstacle for assessment framework development. Clear objective, vision, purpose and description of NSDI concept may simplify the assessment procedure.

Participants stressed complexity and diversity as important obstacles for evaluating NSDI. Cultural, political, economic, institutional, organizational differences between countries make worldwide assessment of NSDI difficult. Also each NSDI initiative itself is complex and unpredictable. That is why its evaluation requires multi-faceted frameworks.

If some measures will be based on surveys, the question rises *Who will answer? What is the target group to choose?* Final users of NSDI should evaluate if the initiative meets their needs and expectations. However users can be different and may have various expectations and needs. Self-assessment first and focus groups are methods mentioned by participants.

Another major obstacle may be the difficulty of obtaining data. Poor availability of reliable, understandable and objective quantitative data can be a threat. Problem with qualitative data is their objectivity which refers to the choice of proper respondents. Some participants point out that choice of contact person for data sources and way of asking for information is crucial. Due to the fact that some countries and its organization may tend to hide true data, the problem may be to guarantee reliable source of information. Very often the most important and interesting information are not included in official publication.

Other obstacles mentioned were language barrier, lack of commitment and willingness from all stakeholders to participate and question who pays the cost of assessment.

Question 3: What are the characteristics of ideal NSDI?

This question, according to respondents, was the most difficult one.
Answers can be put on two axes:
- When it fits the (potential) needs of the users.
- When all relevant stakeholders are involved.

Respondents' answers may be grouped in two categories: those referring to the user satisfaction and those referring to stakeholders' involvement. One group referred to the first category. According to them ideal NSDI is only when it fits (potential) needs of the (end) user and the end user is satisfied. Another group stressed the importance of all stakeholders involved in NSDI use (this refers to the highest level of innovation adoption according to Rogers' diffusion of innovation theory) and multilevel networking. Another group listed other characteristics of ideal NSDI. NSDI should be reliable, continually appropriate, worldwide, open, user friendly, useful. NSDI must be also invisible.

Questions 4: What are the possible assessment approaches suitable to evaluate NSDI? What are the criteria to select the best method?

Participants listed the following approaches towards NSDI assessment:
- Land Administration framework model
- Dilemma approach - assessment should go into understanding dilemmas and how we deal with them
- Profiles - analyzing NSDI profiles by means of spider diagrams
- Narratives - stories from different stakeholders as vehicles of valuable information
- Cost benefit analysis
- Benchmarking (State of play)
- Grid or matrix
- Scenario studies
- Social constructivist approach?
- Process approach
- Focus groups

None of the groups were in the position to provide important criteria in order to select the best method

Question 5: What are the criteria for choosing variables and indicators?

- Objective
- Worldwide applicability
- Focus on NSDI development
- Based on five SDI components

Most groups agreed that the criteria to choose variables and indicators cannot be explicitly indicated as they are dependent on e.g. assessment purpose. The purpose of the assessment can be to monitor, benchmark, compare, give feedback on NSDI. The choice of variables will depend on the function of the assessment. However few respondents suggested that variables and indicators should be manageable, measurable and linked to the SDI as a whole in order to be able to apply the framework on a world scale. Chosen variables should be applicable to various assessment models (e.g. maturity matrix). One group mentioned that the assessment framework would be a kind of hybrid of interrelated

variables. Some of the variables will be more general and others describing NSDIs features in more detail (multileveled). For consistency reasons the variables and indicators should be based on five NSDI components.

Question 6: What are the key indicators (variables) for characterization of an NSDI?

- Indicators should be based on five components
- Indicators should measure the synergy between components
- Indicators should reflect the degree of NSDI development
- External and internal events affecting NSDI should be measured

Most of the groups did not list "ready to use" indicators as it dependents on the research. Instead respondents indicate what characteristics of NSDI should be measured. Two groups mentioned effectiveness and efficiency. One group argued that the baseline for indicators should be five NSDI components: Data, People, Access Network, Standards and Policy. Synergies between these components should be also measured. This assures that the dynamics (constantly changing circumstances between actors and components and overall and continuous development of NSDI) are evaluated. Another group mentioned that the degree of technical development, user's satisfaction and stakeholder involvement should be measured. Another group proposed five categories of NSDI indicators and variables: technical, user, organizational, policy and stakeholders. They suggested number of variables that help to identify the distance to the ideal NSDI. Those are: end-user perspective, degree of stakeholders' involvement, the number of stakeholders agreeing on the vision, leadership, accessibility and availability of NSDI services, quality of datasets, education and capacity, sustainable funding, level of awareness on different levels, transparency and consistency of policies related to NSDI. The important part of the evaluation should be measuring external and internal events. For example, external factors like change in country's political direction may influence to large extent the NSDI development.

Question 7: How to integrate key variables in order to assess NSDI?

Discussion on this question can be summarized as:

- Flexible integration (hierarchy of variables), depending on goal and available data

Participants referred here again to the flexibility of the framework and hierarchy of variables. Some of the variables (indicators) are on higher (superficial) level, another are on lower (more real and detailed) level. Thus the integration of variables can also be flexible depending on defined hierarchy and the purpose of assessing NSDI. Some participants even suggested that it is very difficult if not impossible to integrate key variables.

Summarizing the results of the workshop, five main recommendations seem to be crucial while developing a framework to assess NSDI:

- Assessment framework should measure dynamic nature of NSDI. Important is that we would like to evaluate moving rather then static target. This will require consideration of specific tools and evaluation techniques
- Complexity of NSDI implies that its assessment framework will be a flexible series of tools measuring its components separately. It is hardly possible that one model will evaluate all complete NSDI. Dynamic nature is an important feature of NSDI that has to be assessed.
- Due to its complexity NSDI variables and indicators will be rather a hybrid of interrelated components measuring various aspects of NSDI
- Assessment of NSDI should be based on user's rather than producer's appreciation.
- Assessment framework should be simple.

Appendix 1.
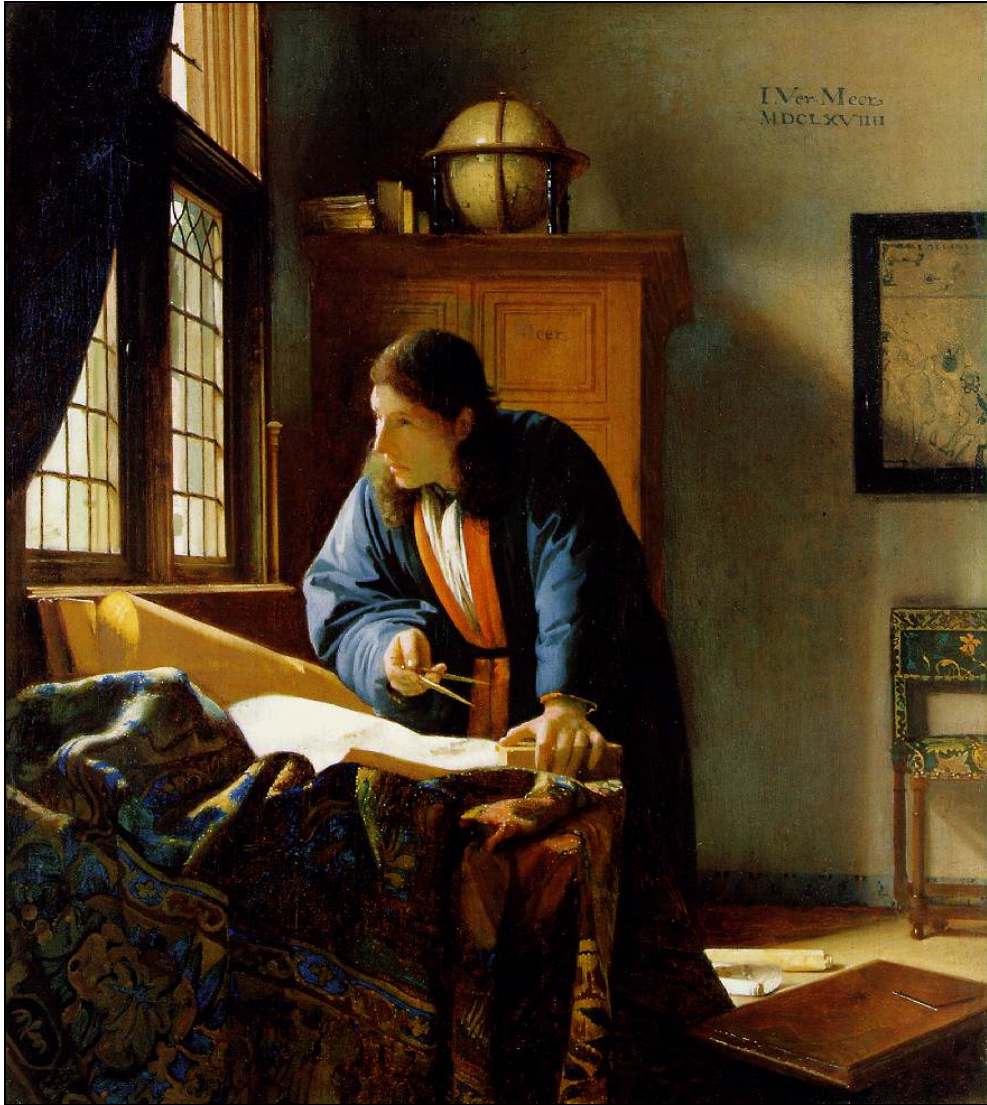
Workshop

Exploring Spatial Data Infrastructures

19-20 January 2006, Wageningen, The Netherlands

Location: Droevendaalsesteeg 3 (Building 101), Room Gaia 1

Final Program

Thursday, January 19th 2006

09:00h – 10:00h	Reception and Registration

Session 1	What are the relevant aspects for the assessment of SDIs ?
10:00h	Opening by Prof. dr. Arnold Bregt
10:15h	*The future of SDIs* Prof. dr. Ian Masser
11:15h	Break
11:30h	*Developing National SDIs: Understanding the Main Challenges and Issues.* Dr. Abbas Rajabifard
12:30h – 13.30h	Lunch

Session 2	Thinking outside the 'box': New perspectives on SDI
13:30h	*SDI as a social phenomena* Dr. E. de Man
14:15h	Break
14:30h	*Evaluating projects: social cost benefit analysis* Drs. Annemiek Verrips
15:15h	Break
15:30h – 17:00h	Group Discussions The participants will be separated into four discussion groups.
17:00h – 17:30h	Group Reports
17:30h	End

19:00h	Dinner at Market in Wageningen

Friday, January 20th 2006

Session 3	Building an assessment framework for SDIs
09:00h	*How to assess the status of an SDI?* Ir. Bastiaan van Loenen
09.45h	Break
10:00h	*The state-of-play in Europe: Monitoring Spatial Data Infrastructures* Danny Vandenbroucke (lic.)
10:45h	Break
11:00h	*Issues on developing assessment frameworks* Prof. dr. Arnold Bregt and Lukasz Grus (MSc)
11:30h	Break
11:45h – 12:30h	Task Assignment The participants will be divided into task groups.
12:30h – 13:30h	Lunch
13:30h	Group Discussion on assessment of SDIs
14:30h	Closing
16:00h – 17:30h	PhD Defense Joep Crompvoets Aula Wageningen University
17.30h-….	Reception in the Aula

The workshop is organized in the framework of the Bsik program "Space for Geo-information", and sponsored by the research school PE&RC.

Appendix 2

Workshop participants:

Ian Masser	masser@onetel.com
Abbas Rajabifard	abbas.r@unimelb.edu.au - project partner
Omran El-sayed	El-Sayed-Ewis.Omran@wur.nl
Frans Rip	Frans.rip@wur.nl
Jendrik Bulens	jendrik.bulens@wur.nl
Bastiaan vanLoenen	b.vanLoenen@tudelft.nl - project partner
	b.v.loenen@otb.tudelft.nl
Reshma Chitnish	r chitnis@yahoo.com
Henk Koerter	h.koerten@tudelft.nl - project partner
Lyande Eelderink	eelderink@itc.nl
Erik de Man	deman@itc.nl
Watse Castelein	watse.castelein@wur.nl
Joep Crompvoets	joep.crompvoets@wur.nl - project partner
Zhanguo Bai	zhanguo.bai@wur.nl
Kate Lance	lance@itc.nl
Katarina Belobradova	Katarina.Belobradova@wur.nl
Armin Feiden	armin@univeste.br
Arnold Bregt	arnold.bregt@wur.nl - project partner
Jitske de Jong	j.d.jong@otb.tudelft.nl
Junt Halbertsma	junt.halbertsma@wur.nl
Lukasz Grus	lucas.grus@wur.nl - project partner
Pepijn van Oort	Pepijn.vanOort@wur.nl
Bas Kok	Bas.Kok@ravi.nl - project partner
Jacqueline Meerkerk	Jacqueline.Meerkerk@rgi.nl

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