
# Workshop Report

## 'Multi-view framework to assess (National) Spatial Data Infrastructures (N)SDIs,

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Joep Crompvoets and Lukasz Grus

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**Objectives Workshop**
The main objective of the workshop was to arrive at a comprehensive (N)SDI-assessment by presenting and discussing about different views, multiple approaches and user/practitioner demands, by exploring key indicators and strategies for application.

**Preparation Workshop**

*Choice of participants* In order to achieve the main objective, it was decided to invite (N)SDI-assessment experts, developers, practitioners and users. Appendix 1 presents the list of participants.
*Program Workshop* The program offered presentation sessions, plenary debates, and group work activities to share ideas, explore on-going (N)SDI-assessment research, future developments including state-of-the-art approaches, and to network mainly with professionals from academia and government who are interested in (N)SDI-assessments. The Workshop was divided into six sessions: 1) Introduction to Multi-view framework to assess (N)SDIs; 2) Multi-approaches; 3) Users'/practitioners'demands; 4) Matching user demands with assessment approaches; 5) Application of Multi-view framework; and 6) Conclusions and Future steps.

**1. Introduction to Multi-view framework to assess (N)SDIs**
The first session of the workshop was about (N)SDI-assessment in general and its difficulties. (N)SDI assessment is problematic for the following reasons: (N)SDIs are dynamic, multifaceted and complex. In other words it deals with (N)SDI as a moving target, the diversity of its understandings and complexity built by dynamic interactions between components. There is high evidence that (N)SDI behave like Complex Adaptive Systems - dynamic networks of many agents acting in parallel and constantly, and reacting to what the other agents are doing (Waldrop, 1992). In order to improve our understanding to (N)SDI-assessment, analogies such as the "collage" and "patchwork" can be useful since they exemplify well (N)SDI similarities in functioning in different administrative regions and diversity of participants. Furthermore, analogies of the commonalities between infrastructures and (N)SDI are needed to take a pulse of (N)SDI.

(N)SDI assessment can be done for control, social learning, sense making and exploratory purposes (Georgiadou presentation) or knowledge, development, and accountability purpose (Grus after Chelimsky 1997).

On the basis of the above reasons, a multi-view (N)SDI assessment framework is proposed. This framework 1) covers multiple assessment purposes; 2) acknowledges the dynamic, complex, and multi-faceted character of (N)SDI; 3) acknowledges multiple actors with the different views on (N)SDI; 4) reduces the potential biases of assessment outcomes; 5) includes the possibility to analyze (N)SDI-behavior.

**2. Multi-approaches**

The first part of this session was about an introduction on indicators followed by a plenary session about the determination of appropriate indicators to assess (N)SDIs. In general, indicators can be used for policy makers, entrepreneurs and/or scientists reflecting their different demands. The result of the plenary session was a long list of potential indicators (see appendix 3). This long list could be a reflection of (N)SDI's complexity, multifacets, dynamics, and different target groups. It appears that many indicators are strongly related to the usability of (N)SDIs. This is in contrast to the low number of indicators relating (N)SDI-technology. Other indicators listed refer to (N)SDI's outcomes and (social and economic) impacts.

The second part focused on different existing assessment approaches. Some of them can be categorized into the different purposes as written above. For example, the (N)SDI-readiness, legal and generational approaches could be used to increase our knowledge about (N)SDI and to assess its development. The State of Play and Performance based management approaches could help to assess (N)SDI's accountability.

The main points of attention that rose from the presentations dealing with the initiatives to assess (N)SDIs were:

- More emphasis is needed on the assessment of the use of (N)SDIs
- Metaphorical thinking may help to assess (N)SDIs
- Still is missing a theoretical framework informing the expected benefits,. e.g. impact on innovation, competitiveness, productivity, environmental and social
- There is a need to look also at the potential dis-benefits of (N)SDIs
- It is (probably) not possible to use a (standard) CBA methodology with a single success criteria/metric to assess the cost-benefit for a (N)SDI
- Do not focus just on (N)SDI, but on its utility for application that have policy/social/economic value to society
- Assessment should indicate an (N)SDI-initiative's maturity

**3. Users'/practitioners' demands**

Another session of the workshop was about the users' and practitioners' demands to (N)SDI-assessment results. Several potential users and practitioners at different levels and with different tasks (GSDI, UNSDI (UN), INSPIRE (EU), (Africa), RGI (NL), GeoNovum (NL), Kadaster, GeoConnections (CAN), and CIDERC (Cuba) were asked to answer the following questions:

1. Who are the (potential) users of the (N)SDI-assessment results?
2. Why do users need these results?
3. What are the usability demands to (N)SDI-assessment? Simple? Comprehensive? User-friendly? Understandable? Communicative? Fully automated?
4. What are the demands to the assessment results? Qualitative? Quantitative? Monetary terms?
5. What are the key indicators to be collected?

The answers appeared to be very varied, not very clear and straightforward. As the main results are considered, that public GI-organizations (such as ministries, GI-councils and

international governmental agencies) are the organizations most interested in these results, and not the private companies; that these (N)SDI-assessments serve the (N)SDI-coordination and performance, (N)SDI-investment decision making, (N)SDI-capacity building, and the monitoring and reporting activities relating to (N)SDI-policies; and that the assessment procedures should be simple, easy, straightforward, partly automated, and standardized with illustrative, concrete, comparable, and standardized results. Finally, it appeared to be impossible to define the key indicators from a user or practitioner perspective.

**4. Matching user demands with assessment approaches**

This plenary session focused on answering the following two questions:

1) How to assess (N)SDIs?
2) How to bridge the gap between (N)SDIs and user's objectives/requirements?

Four groups were formed to answer these questions. Each group answered these above written questions differently. A reason for this differentiation might be that the purpose of (N)SDI and so its assessment is still not clear.

(N)SDI assessment is strongly dependent on the purpose of the assessment (performance [efficiency, effectiveness], trend capturing, and exploration). This purpose of the assessment determines the selection of indicators, the approaches and techniques.

In the process of assessing (N)SDIs we should consider the representativeness of indicators, their sensitiveness, reliability, robustness and validity.

In order to arrive at a more comprehensive assessment, it is strongly recommended to use the results of different applicable assessment approaches (NSDI-Readiness, INSPIRE state of play, Performance based management, etc.).

In order to bridge the gap between (N)SDIs and users' requirements we should evaluate the adaptability of (N)SDI development to users' requirements which is crucial for having more self-sustaining (N)SDIs. When specifying the user's requirements it is important to be aware that there is a gap between what users say they need and what they really need.

In addition to the aforementioned purposes of assessing (N)SDI, the assessment of its societal impacts is necessary to close the gap between (N)SDIs and its users.

**5. Application of Multi-view framework**

The topic of the last plenary session was to determine two groups of indicators: 1) performance indicators; 2) impact indicators, using the list of indicators determined (see appendix 3).

As the key performance indicators the following were determined (between brackets the number of frequency is placed):

- Is (N)SDI operational or conceptual? (2)
- What is the objective of your (N)SDI? (1)
- What are the main components of (N)SDI? (1)
- Are the core data collected once and reused by many? (1)
- Does a coordinating body exist? (2)
- Do communication channels with users exist (complains, requests)? (2)
- What % of users are dependent on middleware services? (1)
- Is the (N)SDI sustainably funded ? (2)
- Is the (N)SDI-performance being monitered? (2)

The key impact indicators can be grouped in three categories: economic, social and environmental. As the examples of economic impact indicators the following were determined:

- Does (N)SDI increase the consumption of spatial data and services?
- Does (N)SDI reduce data duplication?

The social indicators the following were determined:

- Does (N)SDI improve awareness?
- To what extent is policy improved?
- How (N)SDI impact the poverty reduction?

No specific environmental indicators were determined.

## 6. Conclusions and Future steps

The last session was about the Workshop conclusions and future steps to improve the (N)SDI-assessment.

*Conclusions*

The main conclusions of this Workshop are that:

- (N)SDI-assessment is still in its infancy.
- (N)SDI-assessment is complex, but should be not too complicated
- (N)SDI-assessment should include multiple views using multiple methods
- Users in particular should be strongly involved in the (N)SDI-assessment
- Assessment practices beyond the SDI-domain should be strongly examined
- It is still very difficult to determine the key indicators to assess (N)SDIs

*Future steps*

As the main future steps to improve the (N)SDI-assessments are considered:

- Just do it
- Apply and test it
- Involve assessment experts outside the (N)SDI-community
- Focus strongly on users and practitioners
- Maintain communication about (N)SDI-assessment issues
- Exchange good practices on (N)SDI-assessment
- Collect stories on good (N)SDI-practices
- Be specific about the purpose of the (N)SDI-assessment under consideration
- Aim for a standardized assessment
- Determine operational indicators

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Appendices

APPENDIX 1 List of participants

APPENDIX 2 Workshop program

APPENDIX 3 List of indicators determined

APPENDIX 1

**List of participants**

- Wiebe Aans
- Ruby Beltman
- Aldo Bergsma
- Floris de Bree
- Arnold Bregt
- Sytze de Bruin
- Nama Raj Budhathoki
- Jandirk Bulens
- Watse Castelein
- Max Craglia
- Joep Crompvoets
- Tatiana Delgado Fernández
- Hans Dufourmont
- Lyande Eelderink
- Rafael Espín Andrade
- Nicola Ferré
- Garfield Giff
- Yola Georgiadou
- Lukasz Grus
- Gerard Heuvelink
- Katleen Janssen
- Jerry Johnson
- Henk Koerten
- Peter Laarakker
- Rebecca Last
- Kate Lance
- Martin van de Lindt
- Roger Longhorn
- Erik de Man
- Ian Masser
- Jacqueline Meerkerk
- El-Sayed Omran
- Harlan Onsrud
- Pepijn van Oort
- Yvette Pluijmers
- Paula Rojas
- Danny Vandenbroucke
- Jan Cees Venema
- Wies Vullings
- Tamme van der Wal
- Frederika Welle donker
- Jaap Zevenbergen

APPENDIX 2

# Wednesday 23 May

## 9.00 – 12.30 Introduction to Multi-view framework to assess (N)SDIs

- Introduction — *Joep Crompvoets*
- More Governance, Less SDI: Implications for evaluation research — *Yola Georgiadou*, *Kate Lance*
- The multi-facetted nature of SDIs and their assessment — *Erik de Man*
- Monitoring and assessing (N)SDIs: some general questions — *Ian Masser*
- Behavior of Complex Adaptive Systems (CAS) — *Wiebe Aans*
- Multi-view framework to assess NSDIs — *Lukasz Grus*

## 13.30 – 18.00 Multi-approaches I

- Introduction to indicators — *Arnold Bregt*
- Plenary activity "Key indicators"
- NSDI-readiness — *Tatiana Delgado*, *Rafael Espin*
- Generational approach — *Lukasz Grus*
- Blazing the trail or follow the yellow brick road? On geo-information and organizing theory — *Henk Koerten*
- A legal approach to assessing SDIs — *Katleen Janssen*
- INSPIRE State of Play: generic approach to assess the status of NSDIs — *Danny Vandenbroucke*

# Thursday 24 May

## 8.30 – 12.30 Multi-approaches II

- Assessing the Impacts of SDIs — *Max Craglia*
- SDI Effectiveness from User Perspective — *Nama Raj Budhathoki*, *Zorica Nedovic-Budic*
- Cost – Benefit Indicators to Assess SDI Impact — *Roger Longhorn*
- Designing Performance Indicators to Assist in SDI Evaluation — *Garfield Giff*
- SDI Performance measurement as a function of budgeting processes — *Kate Lance*
- Towards key variables to assess NSDIs in Developing countries — *Lyande Eelderink*
- Quality management in Dutch SDI — *Peter Laarakker*, *Floris de Bree*

### 13.30 – 18.00 User demands

- Global Spatial Data Infrastructure Association *Harlan Onsrud*
- UNSDI: an UNGIWG initiative *Jan Cees Venema*
- INSPIRE Directive: specific requirements to monitor its implementation *Danny Vandenbroucke*
- Africa *Kate Lance*
- "Demands on SDI – Connecting worlds" *Jacqueline Meerkerk*
- GeoNovum (The Netherlands) *Ruby Beltman*
- Kadaster *Peter Laarakker*
- Peformance Evaluation for GeoConnections and the Canadian Geospatial Data Infrastructure *Rebecca Last* *Paula Rojas*
- CIDERC (Cuba) *Tatiana Delgado*

## Friday 25 May

### 8.30 – 12.30 Matching user demands with assessment approaches

- Introduction *Arnold Bregt*
- Group activity
- Plenary debate

### 13.30 – 15.30 application of Multi-view framework I

- Assessing SDI Initiatives: A Ten-Year Retrospective *Harlan Onsrud*
- GSDI Global Survey of SDIs *Harlan Onsrud*
- Group activity "Performance and Impact indicators"
- Plenary debate

### 15.30 – 16.30 Conclusions + Logistics

- Conclusions
- Future steps
- Further steps

APPENDIX 3

**List of indicators determined** as mentioned by the Workshop participants (in brackets the number if frequency more than one is placed)

- Number of suppliers
- Connectivity between suppliers and users
- % of users
- Number of users (3)
- Number of stakeholders
- Capability of being used by high variety of users
- Wideness of use
- SDI-usability
- Usability (3)
- User satisfaction (2)
- Level of use of infrastructure
- Number of participation by citizens
- Number of participation of agencies
- Population employed in SDI
- Size of geospatial employment
- Citizens' empowerment
- Effectiveness and efficiency by using GI
- Efficiency in accomplishing
- Effectiveness
- Impact on society
- Benefit of general public
- Impact on science
- To what degree does it effect decisions of policy?
- Time saved
- Number of new (GI-)products
- Importance in relation to other products
- Quality of data
- Data reliability
- Data accessibility
- Level of the applications
- Number of operations enabled by SDI
- Degree to which GI is integrated into II
- Interoperability
- Available for use in common tools (interoperability)
- Number of errors in portals
- System reliability (2)
- Social justice
- Social equity in access
- Whether it applies to addressing social problems

- Restrictions on use of data
- Existence of a directive mandate
- Number of agreements between agencies
- Degree of data sharing
- Cost of GI for user
- Free downloadable GI
- Is data free?
- Overall costs
- Change in financial investments
- Size of budget
- Geospatial industry revenue
- GI-consumption
- % of complaints
- Extent of problems to which applied
- Vision
- Coordination mechanism