Implementation strategies for geo-standards in the framework of SDI

Danny Vandenbroucke
K.U.Leuven, Spatial Applications Division (SADL)

Background

Spatial Data Infrastructures (SDI) aim to facilitate the access, exchange, use and sharing of spatial data in order to contribute to the performance of business processes. SDI consist of technological and non-technological set-ups (or a combination of components) in and between the participating stakeholders. To make the technological components 'talk' with each other, they should be interoperable. Therefore, standards are used to make this happen. But in practice, in many SDI, standards are poorly adhered to, and often interoperability problems remain.

Research objective and research questions

The aim of the research is to get a better insight in possible implementation strategies for geo-standards.
We currently do not know what the impact is of the application (or not) of geo-standards on SDI performance. We also don't know why standards are applied (or not) and if there might be different options/scenario's (for different stakeholders) for implementing standards (i.e. if there can be any flexibility in their application without jeopardizing the SDI).
Research Question(s):

1. What is the impact of the application (or not) of standards on the performance of the SDI?
    a. Which standards are used by and between SDI stakeholders in Flanders? Why are those standards used? Why are standards not used? What are the problems encountered implementing those standards?
    b. What is the impact of the use of standards on the interoperability? How can this interoperability be measured?
    c. How does the application of standards impact the SDI performance? What are the key parameters from the technical point of view that can measure SDI performance?
    d. Are there any alternatives (options) for the way standards are applied in an operational SDI environment? Are alternatives different for different types of stakeholders?

Hypotheses: a systematic application of (international) standards will improve the performance of the Flemish SDI, but not all the nodes and chains in the SDI network should implement standards in the same way.

Theoretical approach and methods

The research is part of the multi- and interdisciplinary research project SDI for Public Sector Innovation. The SDI is analyzed from a network perspective, i.e. a network of public sector stakeholders (data producers, users, coordinating bodies, facilitators, ...) in and between which spatial data are flowing in view of their use in business processes. Therefore the Social Network Theory is an important basis for the research. The diffusion theory is used as a basis to better understand the implementation of standards. Diffusion Theory has already been applied in the past to analyze SDI development (see e.g. Masser, 2005), but also

to better understand standardization processes in information networks (see e.g. Weitzel et al., 2002).
Regarding the methods, a combined approach is envisaged:

- Survey regarding the data flows and mapping of the characteristics of organizations and relationships (including characteristics of the degree of technical standardization – LISI model; the degree of semantic interoperability)
- Case research – i.e. the analysis of 4 business processes - with in depth interviews (including questions on the application of standards) to gather qualitative information.
- Specific survey on the application of standards amongst all the Flemish SDI stakeholders to gather quantitative information.
- Test set-up of different application schemas of standards to validate the results and have an in depth view on the impact (see also Booz Allen Hamilton, 2005).

Expectations

My expectations for the workshop are: 1) to get a good overview of the SDI PhD research carried out by different disciplines at different institutes; 2) to learn more about the theoretical basis and methodologies applied, 3) to get feedback on the proposed research objectives/questions & theoretical/methodological approach and 4) to get insight in how different PhD research could reinforce each other and lead to real multidisciplinary/interdisciplinary research.

References

Booz Allen Hamilton (2005). *Geospatial Interoperability Return on Investment Study*. NASA, USA.
Masser I. (2005). GIS Worlds, *Creating Spatial Data Infrastructures*. ESRI Press, Redlands, USA.
Weitzel T., W. Oliver and F. von Westarp (2002). Modelling Diffusion Processes in Networks, in *Information Age Economy – Networks: Standardization, Infrastructure and Applications*, Physica-Verlag, Heidelberg, Germany.