

SDI performance from a technological perspective

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Abstract

Spatial Data Infrastructures (SDI) aim at improving access to and use of geospatial data for a wide variety of uses, in the public, as well as in the private sector. SDI consist of a set of technical set-ups and organizational arrangements within and between its stakeholders. Especially the latter are recognised to be most critical. SDI can be modelled as a network of nodes (representing data producers, users, facilitators, coordinating structures) connected by links through which data flow as driven by demand and supply and constrained by technical and organisational resistances.

There is agreement amongst scientists and practitioners that inevitably an SDI is complex and dynamic in nature. Many organizations contribute to its development and many more make use from it. Grus et al. (2006) describe SDI as Complex Adaptive Systems. This statement implies that assessment of the performance of SDI must take a multi-dimensional view. - In this paper we formulate a number of considerations for assessments to take into account. Only the technical point of view is considered.

Since SDI initiatives emerged in the 90-ies, there have been attempts to describe them and – in a few cases – to assess and monitor their development. Obviously, the variety of objectives the assessments have served, have lead to a variety of assessment approaches. Some authors focused on the qualitative description of the SDI initiatives or parts thereof (e.g., Masser, 1999). Others tried to assess their status and development over time (e.g., Van Orshoven et al, 2004). Some paid more attention to the methodology with - sometimes - particular cases or countries studied (e.g., Rodriguez-Pabon, 2005). An extensive overview of assessment approaches is provided by Grus et al. (2007). Most of these efforts however are not applied to SDI on a permanent basis, they do not consider the operational environment in which the SDI is embedded (Vandenbroucke et al., 2008) nor the SDI user perspective (Nedovic-Budic et al., 2008).

Obviously assessing SDI from the users' perspective is a challenge. Apparently simple questions as 'Who are the users?' and 'How (or for what purpose) are they using geospatial data?' are hard to answer. SDI have indeed not been designed as well defined solutions to a particular set of problems. Rather, SDI provide a generalized answer to the frustration of GI users in the public and private sector who (still today) encounter significant barriers to access and use geospatial data.

The research project SPATIALIST aims at analyzing the technical, legal, economic, sociological and public administrative requirements to develop a performing SDI for the public sector in Flanders, Belgium. In this context we examine the access to (data flows) and use of spatial data in particular business processes as parts of the overall SDI-network. Use of geospatial data is analysed from the perspective of the public authority uses in view of policy preparation, monitoring and evaluation, as well as from the 'end-users' perspective (e.g. services for citizens, businesses).

To measure SDI-performance from the technical point of view, we think that it is necessary to work in a sequential approach:

First, we have to characterize the different organizations (nodes) in the network, the way they interact (links and chains). We need to know which components are in place in the different

organizations (e.g. data production and use, service set-up and use). We also need to know how spatial data flow between organizations. Particular attention must be paid to the use of standards. This is a key element since it is expected that their implementation largely determines the degree of interoperability within the network (leverage of resistance against data flows) and therefore severely influences the possibilities for access and instant use of geospatial data. It is also necessary to know how standards are implemented. Univocal standards may indeed be implemented in distinct ways. Overall this step is necessary to assess the SDI (at the different levels) against what we expect to exist in a 'mature' SDI.

In a second step we need to measure the effectiveness of the way the SDI components are contributing to the goals of the SDI, i.e. to improve access and instant use of data within business processes (policy making, provision of information to citizens and businesses, etc.). The activities in which data and information is accessed and used should therefore be clearly defined. The flow of the data and related operations must be inventoried as well (e.g., the need to pre-process data before they can be used). A potential unit of measurement can be "time" related to access to the data. The advantage is that it applies at all levels and that this information is straightforward to collect.

In a third step the results can be evaluated against the input needed. It is not because the process is working more effectively (access to the data is easier), that the overall business process is more efficient. E.g., implementation of certain standards might be very costly or too complex for some organizations, or technical implementation of certain legal boundary conditions could become very complex. At this point, also perception and priorities of different types of stakeholders should be taken into account. The MAMCA (Multi-Actor Multi-Criteria Analysis) could be an important tool to take these into account at the level of a particular business process (chain) or at the level of the SDI as a whole (network).

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