

# IRAN SDI INITIATIVE: STUDY PHASE OF NSDI

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### ABSTRACT:

In Iran, development of National SDI (NSDI) was formally started from 2005, according to the law of "the fourth economic, social, and cultural development plan (2005-2009)", enacted by parliament in 2004. As the first step, referring to the mentioned law, the ministerial board assigned the National Center for Spatial Planing (NCSP) in Iranian Management and Planning Organization (MPO), as secretary and coordinator of NSDI in Iran. As several valuable spatial data activities had been individually conducted by national mapping agencies, ministries, and national organizations, NCSP decided to make a comprehensive study with respect to spatial data, from an SDI perspective, in Iran. The study aimed at:

1. Investigating the experiences of different countries involving in development of SDI
2. Assessing current status of Iran from an SDI perspective
3. Development of NSDI Strategic Plan for Iran
4. Development of NSDI conceptual model for Iran
5. Development of NSDI action plan

K.N.Toosi University of Technology was requested to carry out the study, in the context of a research project. This paper describe the results of the research briefly, with particular emphasize on the second and the fourth steps.

## 1. INTRODUCTION

Spatial Data Infrastructures (SDI) has been recognized as an essential requirement for knowledge-based sustainable development. Development of SDI is a challenging task which requires attention to different social, technical, economical, and institutional topics (Masser, 2005). Currently, more than half the world's countries claim that they are involved in some form of SDI development (Crompvoets et al 2004), as part of their infrastructural activities. Budhathoki and Nedovic-Budic (2006) highlighted that such wide interests in developing SDIs is because of a functional SDI is an important asset in the societal decision and policy making, effective governance, citizen participation processes and private sector opportunities.

As a general definition, Masser (2005) maintains that SDI: "...supports ready access to geographic information. This is achieved through the coordinated actions of nations and organizations that promote awareness and implementation of complementary policies, common standards and effective mechanism for the development and availability of interoperable digital geographic data and technologies to support decision making at all scales for multiple purposes. These actions encompass the policies, organizational remits, data, technologies, standards, delivery mechanisms, and financial and human resources necessary to ensure that those working at the (national) and regional scale are not impeded in meeting their objectives".

Iran is a developing country located in the Middle East region, with a centralized governmental system. Development of Iran NSDI was formally started from 2005 according to the enactment of the parliament in 2004. Referring to the enactment, a high level document entitled "the NSDI Special Development

Plan Document (NSDI-SDPD)" (MPO, 2005) was prepared and then approved by the ministerial board. The document includes mandating statements for NSDI development. It also clarifies the Iran NSDI vision, core components, coordinator, and secretary as well as main stakeholders.

## 2. IRAN GENERAL SDI MODEL

Figure 1 shows the general Iran SDI model including its core components and their relationship with each other (Mansourian and Valadan 2008). The general model illustrates that, by better use of technologies, proper policy-making, standardization and creating accessing networks, the relation between people and data can be facilitated (Figure 1). NSDI-SDPD has also accepted the hierarchy nature of SDI for Iran, including the horizontal and vertical relationships between different levels of SDI from local to national.

By adopting the Luzet (2004) model, NSDI-SDPD mandates ministries and national organizations to be the main stakeholders and data custodians of Iran NSDI. They must accept the responsibility of production and updating the NSDI's data, based on and during their daily businesses. In other word, stakeholders should produce data through their daily businesses including road management, urban planning, land management, tax collection and so forth. Although there may be many data providers, the datasets they provide must be integrated in order to develop NSDI's datasets. Once these datasets are shared between data users, each user does not have to develop the data by oneself; the user can avoid duplicated efforts of data production. Consequently, by sharing the cost of developing the NSDI's data, data production cost can be minimized and shared between the users.

NSDI-SDPD highlights that with such a partnership model much benefit is revealed when updating. Since data are updated during daily business of organizations, they are updated most frequently. Therefore, the users are assured of using up-to-date datasets in an SDI environment. In addition, these data producers develop most detailed spatial data with high quality based on their business requirements. Another benefit of using NSDI's datasets lies in the fact that these commonly used datasets enable the users to easily share other spatial data with other users.

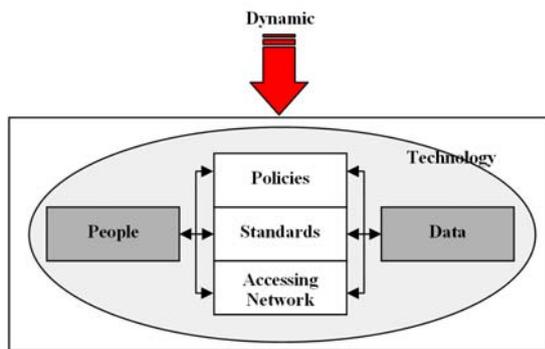


Figure 1: Iran SDI General Model (Mansourian and Valadan, 2008)

Regarding the coordinating body, the Spatial Planning Council (SPC), whose chair is the Vice President (in management and planning) and its members are vice ministers (from Iranian ministries), is assigned as the supreme decision-making body for Iran NSDI. National Center for Spatial Planning (NCSP), in Iranian Management and Planning Organization (MPO), is also the secretary and coordinator of NSDI in Iran (MPO, 2005).

### 3. INTRODUCTION

Due to the several valuable spatial data activities which had been individually conducted by national mapping agencies, ministries, and national organizations, NCSP decided to make a comprehensive study with respect to spatial data, as the initial step for developing Iran NSDI. The study aimed at: investigating the experiences of different countries involving in development of SDI, assessing current status of Iran from an SDI perspective, development of NSDI Strategic Plan for Iran, development of NSDI conceptual model for Iran, and development of NSDI action plan.

#### 3.1 Investigating the Experiences of Different Countries Involving in Development of SDI

At this stage, the SDI activities of nine countries were investigated and documented. The study included developed conceptual models, challenges and problems, past and current activities, recommendations for SDI development, SDI assessment factors, influencing partnership factors, etc. In addition, different concepts, theories and models relevant to strategic planning, SDI, GIS, collaboration models, Information Communication Technology (ICT) and organizational behavior were reviewed. As a result of such a study, different factors affecting development of SDI and should be considered for the assessment (next stage) were identified.

#### 3.2 Assessing Current Status of Iran from an SDI perspective

The research continued through assessing 'current status of the country with respect to spatial data from an SDI perspective' as well as 'current environmental situations that can affect the development of NSDI'.

Thirty ministries and national organizations that were relevant to spatial data (producer, value-adder, or user) were assessed with respect to spatial data, from an SDI perspective. An integrated questionnaire survey, inspection and interview approach was adopted for assessing current status. Although the questionnaire satisfied all information required for the assessment (from different technical, technological, social, institutional, political and financial), the inspection and interview could provide the authors with better understanding of the current situation. To do the assessment, 140 meetings (each of which lasted more than half a day) were held with different departments of all ministries and national organizations that may be the producer, value-adder or user of spatial data. Furthermore, user requirement analysis with respect to national base spatial datasets was conducted.

In addition, all laws and approvals that were relevant to creation of national base maps, establishment of national databases, ICT development, spatial planning, human resource capacity building, etc. affecting development of NSDI were gathered and studied. Moreover, the experiences, outcomes and structures of various councils and committees in the country whose activities were similar or relevant to the SDI topic were investigated. Current environment of the country was also explored from political, economical and cultural perspectives.

Two fundamental models were adopted as a base for the assessment: 'the basic organizational behavior model' (Robbins, et al., 1994) and 'status of spatial data with respect to access' (Mansourian, 2004). The basic organizational behavior model has the advantage of simplifying an organization by breaking it into individual, group and organizational levels, but still related to each other. Such breaking, simplifies organizational assessment that can be conducted in each level individually but still having their relationship. Organizational behavior also describes organizational variables with respect to each level of an organization which provides an appropriate framework for the assessment process in this project. The variables that were identified and utilized were:

- Individual level: motivation, value, skill, skill-to-fit, and perception;
- Group level: regulations, available standards and specifications, technology, resources, structure, culture, and relationships; and
- Organizational level: regulations, political situation, technology, culture, willingness, resources (particularly financial resources), and current relevant activities.

Regarding 'status of spatial data with respect to access' in the context of decision-making, user's required spatial datasets may have any of the four statuses including availability, accessibility, applicability and usability with regard to access to data as below. Availability, accessibility and applicability are data functions that are essential to the three functional components of decision-making –intelligence/problem formulation, design and choice (identified by Simon (1960) and still the basis of modern decision process theory and decision science as cited by

Cleaves (1999) according to Feeney and Williamson, 2003). Availability is about the existence of spatial data as well as the quality and specifications of available data. Accessibility is about the capability of accessing to available data for use. Applicability is about the relevance of the available data to the user's needs and required applications. It is also about capability of easy and rapid use of available and accessible data in the user's environment. Usability is about how much the available spatial data are used by users. In this regard, different factors may affect such situation. Various parameters with respect to each of the mentioned factors were identified and investigated during the assessment.

### 3.3 Development of NSDI Strategic Plan for Iran

At the third step, NSDI strategic planning was conducted based on the results of assessment. It included an SWOT analysis to distinguish strengths, weaknesses, opportunities, and threats for NSDI development in Iran. Then the goals of NSDI were described and finally different strategic recommendations were offered for NSDI implementation.

### 3.4 Development of NSDI Conceptual Model for Iran

The strength of an SDI initiative lies in the interconnected and cohesive nature of its five core components. With this in mind, according to the results of the assessment and the strategic plan, Iran NSDI conceptual model was developed by examining and expanding each of the components of Iran NSDI. The NSDI conceptual model clarifies different activities that should be conducted, various aspects that should be considered, and fundamental requirements that should be defined in the context of each core component for a successful NSDI implementation in Iran. Following, the main classes of identified factors with respect to each of the NSDI components are described briefly:

- Data Component: Content, scale and resolution, metadata, data collection technologies, spatial data management systems, Geospatial Information Systems (GIS), and distributed data management.
- People Component: Data custodians, private sector, academic sector, value-adders, and end-users
- Standard Component: Interoperability, metadata standard, data quality standard, specifications, and distributed architecture of Iran NSDI designation approach.
- Accessing Network Component: Communication infrastructures, information networks, spatial web services
- Policy Component: SDI development approach, developing SDIs at lower levels, connecting SDIs at different levels, policy for standards development, policy for data collection and updating, financial model, capacity building, security constrains, stewardship, privatization, research and development, collaborative projects, persuasive policies, supportive policies, short-term and long-term projects, and coordinating body.

### 3.5 Development of NSDI Action Plan

The NSDI action plan was developed by proposing different projects/activities and relevant time table for development and implementation of NSDI in Iran. These projects would result implementation of NSDI conceptual model. In other words, for each factor in NSDI conceptual model, to be implemented, one or more projects were proposed.

## 4. CONCLUSION

Development of SDI in Iran was started from 2004. This paper described study phase of Iran NSDI including five main stages. The basic models adopted for organizational assessment was explained. In addition, development of SDI conceptual model, based on NSDI core components were depicted, in brief.

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