

Identifying and prioritizing the challenges of data sharing and spatial information

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Extended Abstract

Introduction

Data sharing is one of the key issues in the success of Spatial Data Infrastructure (SDI). Data sharing can prevent the repeated production of spatial data by various organizations and institutions, and provide the reduction of the costs, prevention of the resource losses, helping the economic development and using the capabilities of spatial data in processes of decision-making. But, evidences suggest that the realization of the spatial data sharing has always faced numerous challenges and problems, and that the SDI development goals will not be achieved without solving them. Therefore, the main objective of this research is to provide a strategy for identifying and prioritizing the sharing of spatial data in the country.

Materials & Methods

The framework of the research is based on surveying, the concept of risk, and the use of a fuzzy inference system. In order to objectify this framework, a case study was conducted with the participation of 19 organizations in East Azarbaijan province. At first, various sources were reviewed and the 25 probabilistic sharing challenges were identified. Then, with the help of a questionnaire, experts' viewpoints regarding the probability of the occurrence and severity of the impacts of the challenges were investigated. The questionnaire consists of two parts. The first part focuses on the demographic information of the experts such as affiliation, years of experience, and academic degree, which were used to determine the experts' importance weight. The second section measures the probability and the impact intensity of each identified challenge. To measure the factors of probability and impact intensity, a five level verbal rating scale including, very high, high, medium, low and very low (as verbal terms) was used to maintain the balance between simplicity and comprehensiveness. In the next stage, a fuzzy inference system, with two inputs and one output, 25 fuzzy rules, Gaussian membership functions and the field inference engine were developed to process the views of the experts and to calculate the fuzzy scores of each of the challenges using Matlab^R software. Having determined the sharing challenges scores, a cluster analysis was carried out to divide them based on the score related to the groups (clusters), so that, the challenges inside a cluster are very similar (but not identical) to one another but very different from the challenges in other clusters. Since there is no need to specify the numbers of clusters in hierarchical methods in advance, the hierarchical method was used as a clustering technique to group the challenges. Then, the results were evaluated by a number of knowledgeable experts.

Results & Discussion

According to the findings, the most important challenges which had the highest scores and were also in the same cluster, include: lack of a Geoportal for searching, access and evaluation, lost problems or metadata, lack of coordination among different organizations for spatial data sharing, fear of disclosing of organizational spatial data and information, the lack of up-to-date spatial data and information, the tendency to parallel work (the lack of investigation of other organizations for spatial data and information needed by the organization) and the lack of specialist in spatial data and sharing the information. Moreover, 25 challenges of spatial data were categorized into five homogenous groups (clusters) by applying a hierarchical cluster analysis. Based on the results, the overall geometric mean value of the 25 challenges of the spatial data and information sharing was calculated as 62.76% that shows the existence of the important challenges in the realization and implementation of the spatial data sharing and SDI initiatives in organizations. Analyzing the results with regard to the two types of sharing challenges revealed that the organizational challenges with a geometric mean of 55/56% were more important than the technical challenges with a geometric mean of 44/44%. These results may mean that, in order to overcome the organizational challenges, more time and efforts have to be taken into consideration in the planning and development of SDI compared to the technical challenges.

Conclusion

It seems that there is no accurate and complete picture of the concept of the spatial data sharing in the majority of the organizations, and it is often interpreted as putting spatial data and information of the organization in the hands of others. However, a significant part of the sharing issue is associated with the metadata sharing that prevents the repeated works and spending unnecessary credits of the organizations, and make the available data to be accessible with spatial services in different formats after an agreement between data providers and consumers, and to be used in decision making processes. The information gap in this regard is very tangible in the organizations, nevertheless, it would be possible to change the views and behaviors of individuals and organizations by creating capacity, and eventually to be hopeful that the willingness of organizations to participate in data sharing improve. Finally, the following recommendations were suggested in order to improve the status of the data sharing: individual and organizational attitude changes towards the issue of data sharing, increasing technical knowledge and empowering organizations in spatial technologies and clarifying the benefits of spatial data sharing and its socioeconomic roles in society, specifying the leader organization and forcing organizations to create standard spatial databases and metadata.

Keywords: Coordination, Geoportal, Metadata, Obstacles, Spatial Data Infrastructure, Standard