Towards a NSDI for Vietnam

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Key words:

SUMMARY

GIS technology has found its application in many professional institutions and governmental agencies, in various activities fields in Vietnam since the early years of the last decade. At the first onset, being fascinated by the powerfullness and versatility of different hardware and software systems, GIS developers and users in our country were attracted solely in concrete applications, without paying attention to organisational issues in implementation of GIS technology. They engaged in GIS activities without coordination. As a consequence, many single-handed GIS users experienced the difficulty in pushing their activities forwards, due to the lack of investment and the incompetency in experience and knowledge. Efforts have to be made therefore to establish a geospatial data infrastructure, upon which organisations and individuals from the governmental and private sector, concerned with geographic information, will practice efficiently the access and sharing of geographic data and information in a cooperative manner.

The Vietnam Association of Geodesy Cartography and Remote sensing, deeply concerned on its responsibility to foster and promote professional knowledge and activities in the country, is trying its best for the establishment of a spatial data infra- structure. Presently efforts are centered in:

- setting up an institutional agreement between organisations and individuals, concerned with geographic information, to facilitate and optimize the acquisition, sharing and usage of spatial data.

- encouraging and assisting individual agencies in reorganizing their own database and the adaptation of technological procedures, stipulated in the above mentioned institutional agreement.

- encouraging and assisting local authority, namely provincial government, in establishing and exploitation geographic information database to support local decision maker in socio-economical undertakings.

- urging the appointment of a National Committee of Geographic Information , to manage the GIS-technology development, thereby the establishment of a NSDI will be of prime priority.

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1. INTRODUCTION

Since the early years of the last decade, GIS-technology, the subsequent result of the integration of information technology in geography sciences, has found its application in various institutions and agencies, in different activities fields like surveying and mapping, land administration, natural resources investigation and management, environment study and preservation, infrastructure construction, defense, etc … Results acquired during the first implementation years are promising. It consists in facilitating data collection, processing, retrieval and information display, both in soft- and hard-copy, but years after, problems arise, one after another.

Many institutions and agencies in our country engaged in GIS activities without coordination. It can often be found that many different agencies collected the same data at the same or different time. In many cases this duplication of efforts, time and money is due to the fact that this organization can't be aware or can't make use of data collected by others.

GIS users and developers used to built their own datasets, in their own manner, procedure and standards. As a result the sharing of these datasets between organizations is difficult, due to many incompatibilities between the datasets. This, in one hand hinders the best utilization of the data acquired, in the other hand, inhibits the timely upgrading of the system. To keep the GIS regularly up-dated and upgraded, an enormous quantity of diverse data has to be collected, processed, and analyzed. Under deficiency of collaboration and agreement between GIS developers, it is difficult to an organization alone to be able to realize further development in GIS implementation. Thus, single-handed GIS-users and providers are pushed into dilemma. This is due to the fact that, right at the beginning, organizations are sucked into the technological aspect of GIS, while its essential organizational issues are underestimated.

Since years, this scenario of GIS implementation had been experienced and investigated in many countries. Enormous efforts have been centered on the establishing of an infrastructure, which can facilitate the data acquisition and sharing, from which both information consistency and investment saving can be gained. Many organizations had been appointed for the establishment of GI-infrastructure of local, national, regional and international level. This is too, the only way to get through the above mentioned dilemma in GI technology development in Vietnam. This paper is focused in making clear to the directives and main measures, enabling the successful establishment of a NSDI in our country.

2. A LITTLE MORE ABOUT GIS CONCEPT

GIS has been commonly defined by many authors as: " A computer-based system that provides the following four sets of capabilities to handle georeferenced data: 1. Input; 2. Data management (data storage and retrieval); 3. Manipulation and analysis; 4. Output." (S.Aronoff et al). Outgoing from the technological aspect, this definition describes the functional capabilities of a GIS, rather than pointing out, how it can be best implemented. In order to reach a rational implementation and a successful utilization of GIS, organizational factors have to be taken into consideration. For that, GIS has to be investigated in its very organizational nature.

GIS, first of all, is a system, i.e. a group of connected entities and activities that interact for a common purpose, as defined in the NCGIA core curriculum. The kernel of a system is the final purpose of its establishment. System design, data to be collected and processed, can be varied according to a predefined goal. Since the first years of its existence GIS have been developed to assist decision making in various kinds of undertaking and research for economic and social development. It is yet proverbial, as every human activity, regardless of it was political, military or socio-economical, have to be planned, executed and terminated on the earth surface within a determinate geographical environment.

Data is the most important component of a GIS and can be very different, depending on the ultimate goal of the system. Regardless of its predefined goal, data in a GIS is commonly composed of:

- Fundamental data sets, used mostly for geometrical georeferencing of features and phenomena of interest. It includes at least coordinates, elevation and digital map system, upon which thematic data can be cross-referenced, displayed and analyzed. Other fundamental data sets can be communication network, administrative boundary and geographic name system, . . . These latter enable the consistency and congruence of thematic data in different GIS.
- Thematic data, which can vary depending on GIS application purpose. Thematic data can be collected, using remote sensing techniques, exploiting existing thematic maps, thematic studies, governmental census and socio-economical statistic survey.
- Metadata, commonly defined as "data about data", which describes the origins, characteristics and changes of the data. Metadata tell GIS users and providers how the data was collected, its consistencies and how to make best use of them.

The diversity of GIS data in species (basic data, thematic data, metadata) and format causes many difficulties to the single-handed GIS users and providers and sometimes pushes them in impasse, because:

- In order to keep GIS regularly updated and upgraded, an enormous quantity of data have to be collected, processed and analyzed, for that, large investment of time and money is required.
- The diversity of data sometimes exceeds the jurisdiction and knowledge competency of a single organization.

Therefore the most effective way of implementing and developing GIS technology is establishing a voluntary but strict collaboration between organizations and individuals concerned with geographic information. Only in this way, GIS data can be shared in greater extend and the best utilisation of GIS can be reached. The GI infrastructure can be understood as the common platform for collaboration of GIS developers and users.

3. THE NSDI FOR VIETNAM

To promote a voluntary but strict collaboration between institutions and individuals concerned with geographic information, an infrastructure for GIS implementation and development must be constructed. It may include:

1. Policies

- Geographic information data is national asset. It assists the government in rationalizing and harmonizing the socio-economical development of the country. Therefore GIS technology implementation and development must be put under the supreme management of the government. For that a National Committee for GIS management has to be appointed, of which the responsibilities may be the following:
  1. Advise the Government on necessary reorganization to achieve the geographic information vision
  2. Oversee the development and management of geoinformation products and identification of new applications
  3. Coordinate all professional bodies, concerned with geographic information to harmonize their activities
  4. Arrange the production and maintenance of fundamental data sets and metadata system.
  5. Develop guidelines on appropriate methodologies for setting up geographic information infrastructure
  6. Ensure the nation's active participation in regional and international geoinformation activities
- Set up a legal framework for GIS activities, making thus the collecting, processing, sharing, distribution and utilization of geographic information legitimate. There are many issues to be considered when working with GI legal framework, but the most important relies on the concept that it has to enable the sustainable development of GI technology for the welfare of the society. In this sense, and outgoing from the actual situation in Vietnam, the following have to be included primarily in the legal frame work:
  1. status and behavior of GI developer, his rights and duties, in particular right of intellectual property right and copyright. This is to ensure the consistency of the informations provided.
  2. rights and duties in data sharing and in information publicizing, to promote the data sharing between GIS developers. Particular attention has to be paid here to informations of national interest.
  3. rights and duties of GIS user.

2. Institutional arrangement

Institutional arrangement is important to establish a good communication and partnership between organizations and individuals concerned with geographic information. The creation of good communication channels within the GIS community allows to establish rational development plan, standards and procedures that promote the production, sharing and trading of geographic data. In the institutional arrangement, obligations and roles of each organization involved will be clearly defined, contribution and utilization of the data will be coordinated. Includes also in the institutional arrangement, the determination of measures and technologies that facilitate the manipulation and sharing of data and informations.

3. Framework of fundamental data

Fundamental data are those mostly used in every GIS like national reference frame, coordinates and elevation system, digital topographic map system. Other fundamental data sets can be the national communication network, the hydrography net, the administrative boundary and geographic name system, etc. . . These latter have to be nationally complete and well fitted in the national reference frame. The completion and sharing of fundamental data, in one hand increase the data consistency and congruence in GISs, in another hand help to avoid duplicating work in data collecting and processing. For that the generation of fundamental data sets is preferably planned to be carried out by professionally specific bodies like the GDLA (Vietnam General Department of Land Administration, now incorporated in the Ministry of Resources and Environment) and institutions in the Ministry of Communication and Transport, the Ministry of Interior of Vietnam.

4. TOWARDS THE ESTABLISHMENT OF A NSDI FOR VIETNAM

Being witness of the actual stage of GI technology development in Vietnam, the Association of Geodesy Cartography and Remote Sensing (VGCR) is trying a three steps NSDI building:

1. Settlement of an agreement between organisations and individuals, concerned with GI.

This is made up for the cause of GI technology development and for the interest of each individual partner. Therefore in this agreement the following topics have to be laid out:

- Rights and duties of each individual partner in sharing data to and using data of others are defined.
- Common data standards, including metadata standards, have to be specified, to which accordingly each individual GIS developer rectifies and reorganizes his database so that it can be communicated with and easily shared to others.
- Allotment in preparation and completion of fundamental data sets, including primarily the reference frame, coordinates and elevation system, digital topographic map system, administrative boundary and geographic name system.
- Following up to the above agreed specifications, individual GIS-developer is obliged to oversee and rearrange his database, making thus the data readily available for sharing and for further development.

- Annual planning of GI activities has to be coordinated, thus enabling the re-use of existent data sets to avoid duplicating work in data collection and processing.

2. Assisting local government in building provincial geodata base.

As the Vietnamese government is trying an upgrade in socio-economical development, authorities at province and district level are encouraged and assisted in elaborating an economic development structure appropriate for the locality. For that, geographic information is of first need. Many central ministries like the Ministry of Sciences and Technology, Ministry of Communication and Transport, the General Department of Land Administration, during the last ten years, have supported their provincial affiliate division in collecting and processing geographic data, in developing their own thematic GISs, using different procedures, different reference, different software, different standards. As a result data sets provided by different local GIS developers can't fit with each other, so that can't offer reasonable regional analysis for an optimal solution output. Institutions and experts in geography sciences are therefore welcome in provinces and districts, to assist local government in overcoming existent incompabilities in developing and exploiting GIS for local interest. This, in one hand support the decision making of local authorities, in another hand opens the way to the building of the national data base.

3. Establishment of the National Committee of Geographic Information.

The above activities indeed will foster the establishment of the National Committee of Geographic Information, which in its turn will officially take the responsibility of building the Spatial Data Infrastructure, as mentioned in the preceding paragraph.

5. CONCLUSION

Vietnamese GIS users and developers are facing a crucial phase of GIS implementation. Shortcoming of the previous development stage is difficult to avoid, but can be compensated. By making up the above proposed infrastructure, the implementation of GIS technology in our country can hopefully be pushed ahead.

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