POLICIES FOR DEVELOPMENT OF UNIFIED AND COMPATIBLE SOFTWARE TECHNOLOGY SYSTEM FOR SETTING UP CADASTRAL DATABASE FOR MODERNIZATION OF LAND MANAGEMENT SECTOR IN VIETNAM

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Abstract:

Land management is a "hot" topic in Vietnam during recent years. The successful setting-up of a cadastral database for modernization of S&T based land management sector has a very important value.

Actually, numerous softwares for land management are introduces to use in Vietnam but there is not high level compatibility between them. Therefore, the products cannot provide effective management to meet social needs.

On basis of surveys and analysis of in-use softwares for cadastral database, this paper proposes policies to develop a unified and compatible software technology system to enhance effective land management works.

Keywords: *Cadastral database; Land management.*

1. Overview of cadastral database

Land is a specific means of production almost for all activities. Legal policies of land management, through numerous amendments and revisions, have become a main driving force for strong shifting in social life. However, the means for effective management remains non-integrated leading to self-raised activities in land use right market which falls out of State control.

S&T policies always keep an important role in land management works and one of the most effective control measures is the rules of registrations and the solution for that is modernization of cadastral database to enhance the effective land management works.

In order to modernize cadastral database, the first step is to set up the unified and compatible software technology system.

As practice shows, software technology in Vietnam is very diversified but in general, they are of self-raised nature, separately developed while policies do not yet facilitate them in activities and development and cadastral software is in the same position.

During recent years, cadastral database and land management are in center of attention for numerous individuals and organizations. Many workshops were organized and many scientific works were made for this topic. However, almost all of these activities were focused on the presentation of actual situation of land management works and used land management software *but no single study for policy matters*. Therefore, the author of this paper has conducted a study of *policies for development of a unified and compatible software technology system for modernization of land management sector in Vietnam*.

First of all, we need to introduce the notions used in this paper.

- *Policies* is "a set of institutionalized measures issued by a competent authority or management authority where priorities are set up for one or few social groups to stimulate their activities for certain priority targets in development strategies of social systems" [14, p.29];

- *Cadastral database* [3] is collection of structures information of cadastral database. Cadastral database includes cadastral space database and database of cadastral nature [10];

- *Cadastral space database* is database on position and form of land piece, houses and other assets attached to the land piece; database on hydraulic system, irrigation system, transport system, control points, boarder database, database on geographical names and other notes; database on landmark lines and points of land use plans, construction plans and other plans, safety and protection corridor lines;

- *Database of cadastral nature* is database on land managers, land users, house and asset owners, organizations and individuals related to transaction of land, house and attached assets, database on the actual situation of land use, house and attached assets, database on rights and duties related to land use, ownership of house and attached assets, database on transaction of land, house and attached assets;

- *Products of unified and compatible software* means that they, when being used, would produce the same results which can be used without any conflicts.

As practice shows, the summary of cadastral database from non-unified and non-compatible software would not give integrated products. Since there are a lot of difficulties for searching, updating, summarizing and adjusting information in high ranked systems. The use of unified and compatibles software would provide as a lot of convenience.

2. Overview of issued land management policies

2.1. Law on Land 2003

Law on Land 2003 had been promulgated by the National Assembly on 26th November 2003 and got valid for implementation from 1st July 2004. This important law gives active contributions to push up modernization and industrialization of the country. The implementation of this law requires the fast modernization of management system. Strategies for development and application of information technologies in fields of resources and environment up to 2015 and vision to 2020 approved by the Prime Minister on 6th October 2004 put the set up of information systems for land management as focused tasks where this project is a key project.

One of the important legal regulations of land is the first-time registration of land use, set-up of cadastral maps, cadastral files and issue of certificate of land use right, registration of changes in land use when the land user accomplishes rights and duties. This is the pre-conditions for State to manage land *(from stage of construction, amendment of legal systems; set-up of land use plan systems with high feasibility; good implementation of assigned decisions for land use and land lease, permission of changes of land use purpose, land withdrawal, compensation and surface clearance, financial duties of land users, operation of a healthy and open market of land use rights on real estate market; inspection and checks of land management and use works; settlement of disputes, claims and denounces and measures to recover negative aspects in land management and use)* land users get protected by the State in terms of rights and duties of land use for their activities of investment and use of lands in efficient manner.

2.2. Decision No. 08/2008/QĐ-BTNMT dated 10th November 2008 (Norms 2008) by Ministry of Resources and Environment on issuance of Norms for cadastral maps, Scales 1/200, 1/500, 1/1000, 1/2000, 1/5000 and 1/10000.

The State indicated the implementation of many measures for pushing up the issue of certificates of land use, certificates of ownership of house and attached assets in conformity to Decision 07/2007/QH12 dated 12th November 2007 by the National Assembly on the socio-economic development for 2008, local governments focused efforts to guide and to push up the set up of cadastral maps and issue of certificates of land use. The results of the three years of implementation of the Decision were great. However, the registration and the issue of certificates of land use for some land categories were low, particularly for specific use land and residential lands in urban areas, the set up of land database was also late, non-unified and non-integrated, the land use was not

effective, the updating and amendment of cadastral files were not implemented fully and regularly as required by regulations.

2.3. Decision No. 1166/QĐ-BTNMT dated 17th June 2011by Ministry of Resources and Environment on issuance of the set of unit prices of construction of database and software to support the construction of database of resources and environment. According to it, the set of unit prices of products is the made at highest rate for payment of completed products supported by State budgets for units in Ministry of Resources and Environment

The early completion of the modern system of land management will contribute an important part to mitigate negative aspects, corruptions, wasted use, speculative activities on real estate market; to solve well disputes, claims, denounces for a stable social development; to create new tools for environment protection in land use plans, to secure the sustainable development of land use plans in process of development of economy and industries; to support the set up of E-Government during administrative reforms,, to promote high economic effectiveness of investments, to enhance the collection sources from land, to create much higher efficiency of land use in comparison to agricultural cultivation and other non-agricultural production-business activities.

Actually, there are many policies issued by administrative agencies but they are not integrated and do not offer a high legal corridor for setting up a unified and compatible system of database.

At the same time, existing policies show that the set up of a standard software or a set of unified and compatible softwares form land management remain in pilot stages and they are applied in limited scopes only.

3. Actual situation of cadastral database system in Vietnam

Survey data shows that the digital land maps for the whole country were basically completed. However, management softwares were not developed fully. They are not unified and compatible, particularly there was not policies for management and development of software which lead to low efficiency of land management works.

- Results of measurement for setting up of cadastral maps

By December 2011, the measurement works were completed for 25,071 hectares making up 76% of the total volume of lands to be measures over the whole country.

- Results of establishment of cadastral books

Statistic figures show that the completed volume of works in 46 provinces/cities is as follows:

Commune level: 6995/8000 *(87.44%)* of communes had completed the establishment of record books where 70% follow the old format *(before Law on Land 2003)*. 6444/8000 *(80.55%)* of communes had completed the establishment of cadastral books.

Province level: 5487/8000 *(68.59%)* of communes had completed the establishment of record books where 69% follow the old format *(before Law on Land 2003)*. 4840/8000 *(60,50%)* of communes had completed the establishment of cadastral books.

- Results of issuance of certificates of land use

By end 2012, in total 35,394,800 certificates were issued for the area of 20,264,000 hectares where for agricultural lands: 16,173,000 certificates for the area of 8,316,500 hectares *(85.1% of the total area)*; for forestry lands: 10,371,500 hectares *(86.3% of the total area)*; for aquatic production lands: 1,068,000 certificates for 579,000 hectares *(83.8% of the total area)*; for rural residential lands: 11,671,000 certificates for 436,000 hectares *(79.3% of the total area)*; for specific use lands: 150,000 certificates for 466,500 hectares *(60.5% of the total area)*; for religious organizations of lands: 18,800 certificates for 11,300 hectares *(82.2% of the total area)*.

The establishment of land books, particularly cadastral books, was not fully completed in local level, the rate in province level being lower than the one of district and commune levels. Not many local governments follow the new format *(less than 10%)*; a majority of them follow the three formats for the total three stages of issuance of certificates of land use *(Cadastral book format according to Decision No. 56-ĐKTK dated 5th November 1981, Cadastral book format according to Decision No. 499-QĐ-ĐC dated 27th July 1995 and Circular No. 1990/2001/TT-TCĐC dated 30th November 2001; Cadastral book format according to Circular No. 29/2004/TT-BTNMT dated 1st November 2004)*.

The land management sector has low qualified staff and out-dated equipments.

4. Evaluation of software technology system of cadastral database

4.1. Overview remarks

Actually, there exist so many information systems developed by various organizations. Ministry of Resources and Environment had issued a document to permit the use of the following main software of cadastral database:

- ViLIS software developed and applied by *General Department of Land Management*;

- ELIS software developed and applied by *Information Technology Agency* of Ministry of Resources and Environment;

- TMV.LIS software developed and applied by *Vietnam Resources and Environment Corporation* of Ministry of Resources and Environment.

The three softwares were provided by three different organizations and in the use they do not show highly unified and compatible.

Therefore, it is possible to make the following remarks:

- Policies are improved for development of unified and compatible technologies for land management;
- Global policies are improved for a unified land information system for all the levels;
- Solutions are drafted and tested for technological policies to set up different softwares used for data transfer between software technology systems. Ministry of Resources and Environment is building up focused districts for application of different softwares;
- New products gradually meet the needs of use for setting up of land database in the E-Government project as guided by the policies of the Government.

4.2. Detail evaluation

On basis of practical application of software technologies for cadastral database, we would do the preliminary analysis for one of them, namely ViLIS software developed by General Department of Land Management.

- Put into application earliest (more than 10 years) and gained proven quality;
- Implemented in the largest scale over the whole country;
- Supported by World Bank (with USD100 million funded) to modernize the land management sector. The Project had selected ViLIS software and put it into application;
- Regularly added and updated according to technological standards and amended legal documents (policies of land management are regularly changing due to the complexity of this sector).

4.2.1. Sub-systems of ViLIS system of software

ViLIS system has the following sub-systems:

- Sub-system for exchanging and sharing land information (taken over from Land Information Gate built in VLAP projects for 9 Provinces) permits: access for searching macro-scale information and services for local detail information and updating;

- Sub-system for integrating data from central level to local level permits to structure and manage integrated services which secure the connectivity and uniformity between the two main parts (central and local) of national land database over the whole country;

- Sub-system for managing data and administrating systems to provide strong and advanced tools for managing and operating the systems in stable and safe manner in conformity to real conditions and organizational structure of land management sector;

- Sub-system for supporting, analyzing data and forecasting the changes of land use to provide summarized information and reports of activities of various levels, statistic reports, land inventory reports, data, management of planning works, registration and issuance of certificates of land use;

- Sub-system for editing, standardizing data to secure the data used in the system to follow standards and regulations as required;

- Sub-system for data input to permit the load of structural and non-structural data or to permit data transfer in digital structured format into the system;

- Sub-system for exchanging data with taxation and bank sectors to provide services of data access, data out-loading for necessary services (tax calculation, banking activities and blocking service);

- Sub-system for on-line reporting based on web service to provide summary reports of other fields related to land management (results of measurement, issuance of certificates of land use, changes and shift of land use purpose, planning, compensations for surface clearance, etc.). This sub-system updates data automatically and the software summarizes automatically data for central and provincial levels.

4.2.2. Software technologies and contents of ViLIS

ViLIS software was developed on platform of commercial softwares. The platform technologies used in ViLIS software include:

a. Technologies for database administration system of

ViLIS provides various solutions for database administration system. VLAP Project had selected the following components of database administration system:

- System Microsoft SQL Server Standard which is used for storing land database of province and district levels.

- Charge-free system Microsoft SQL Server Express which is used for building land database.

b. GIS technologies

ViLIS was developed on basis of ArcGIS of ESRI (USA). Actually, ArcGIS is one of strong GIS technologies which is open and provides many global solutions. ViLIS 2.0 software was developed on basis of commercial version ArcGIS 10. ViLIS used some technological solutions of ArcGIS, namely:

- ArcGIS Server is a space management solution on basis of LAN centralized database model and large networks (Internet/Intranet). ArcGIS is divided into three levels: Basic, Standard and Advanced. Standard version is used in VLAP Project. Standard ArcGIS Server includes functions of space database management (*ArcSDE*), gates of database (*geodatabase check-in/check-out*) and replication service of database. ArcGIS Server is used as platform technologies for providing various solutions such as searching, displaying and distributing land information for large networks

- ArcSDE in ArcGIS Server is used to store land database. On basis of ArcGIS Server, ViLIS develops a land management database module for securing uniformity, integrity and exactness of land information.

- ArcGIS Engine is a product of developers to create GIS applications. ArcGIS Engine provides programming interfaces (*APIs*) for COM,.NET, Java and C++. ViLIS modules are developed on basis of ArcGIS Engine.

ViLIS 2.0 software provides functions to standardize and to transfer cadastral maps to land database, to create links with other information layers. When finished, cadastral database will be basic document officially used for land management works and land information supply.

Land related changes are processed by cadastral methods for merging or splitting land pieces then the data are updated to digital cadastral maps which are stored in cadastral database. ViLIS software had set up a strict procedure to update exactly cadastral maps and other specific information of cadastral files.

The two remaining softwares ELIS and TMV.LIS appeared later but remain in process of improvement. They are being applied in some localities and give promising outcomes

In summary policies for software technologies of cadastral database by Ministry of Resources and Environment reflect the following points:

The Government, concretely Ministry of Resources and Environment, issued many solutions and policies to build up a system of software technologies for modernization of land management sector. The State provided large financial investments but the complexity of the related problems requires more efforts for improving policies, developing software technologies, investment for finance and resources as urgent problems of the land management sector.

- Softwares of land management remain diversified with low connectivity rate of ideas;

- A national scaled organization for research and development of software technologies for land management is under progress;

- Legal documents and polices for land management are changing and amending permanently then causing difficulties for development of software technologies for land management;

- Policy of financial investment for   software technologies development to modernize of land management sector is not enough to meet the scale of a national program.

5. Policy solutions for a system of unified and compatible software technologies of cadastral database

In order to overcome some shortages of the systems of software technologies for cadastral database, the following policy solutions are proposed:

- Policy solutions for a unified and compatible software technologies for management cadastral database: *space cadastral database* and *cadastral specific database;*

- Policy solutions for a unified and compatible GIS*;*

- Policy solutions for a unified and compatible software technologies for the system of and information;

- Policy solutions for unified and compatible technologies for network infrastructure, system safety, test running and implementation;

- Policy solutions for technologies to build up leading softwares;

- Policy solutions for impacts from social policies and financial policies;

- Policy solutions for impacts from legal documents and leading guidelines of authority agencies;

- Policy solutions for top responsible organizations to test, control, implement and distribute softwares over the whole country;

- Policy solutions for unified and cooperative research activities between policy makers and developers of cadastral database software;.

- Policy solutions for quality assessment of software and selection of optimal products;

- Policy solutions for stabilizing, reducing changes and enhancing the quality of legal documents and policies in field of land management then reducing impacts to changes of software;

- Policy solutions for quality assessment and improvement of legal documents.

Conclusion

This paper presents the author's studies to highlight the actual situation, urgent needs and policy solutions for improvement of system of unified and compatible software technologies for land management sector in Vietnam./.

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