

How an Effective Spatial Data Infrastructure can support Land Administration in Vietnam?

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Key words: Spatial Data Infrastructure, land registration, land administration, Vietnam

SUMMARY

Efficient land use and management plays an important role in maximizing the potential benefits of sustainable socio-economic development. To facilitate access to, delivery and sharing of spatial data and in particular land data, each nation has been establishing a spatial data infrastructure (SDI), which is an initiative for creating an environment in which all stakeholders can cooperate and improve the update and exchange of data in an efficient and cost-effective manner. However, the lack of a well-established framework for technical and institutional arrangements as well as an overall policy for the acquisition, management and distribution of spatial data information presents a common constraint to the SDI development in many developing countries. Vietnam is no exception to this global trend. Limitations in data coordination and sharing results in issues such as duplication of data collection and production, data incompleteness, non-standardized or poor quality data, and more importantly, inefficiency and low financial sustainability. The land information has not been disseminated effectively and the related land services are affected by limitations in the institutional framework and spatial data infrastructure. This paper addresses the problems and provides a literature review on how an effective spatial data infrastructure can support the land administration system in Vietnam.

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1. INTRODUCTION

The introduction of global positioning system, geographic information system and remote sensing has resulted in a breakthrough in earth observation and has been supporting development since the late 1970s. As a result of this development, the term Spatial Data Infrastructure (SDI) was first introduced in the mid-1980s when researchers discussed the need for spatially related information sharing within a nation. It was later officially mentioned in an executive order issued by the US President Clinton in 1994 as critical to national priorities (The US Federal Government, 1994). In 1998, Coleman and McLaughlin introduced an SDI definition, which described the relationships of the elements in the development of SDIs. The definition illustrates that an SDI includes components of spatial data, database, metadata, data networks, technology, institutional arrangement, policies and standards as well as end-users (Coleman and McLaughlin, 1998). Rajabifard *et al.* (2002b) argued that ‘SDI is fundamentally about facilitating and coordinating the exchange and sharing of spatial data between stakeholders in the spatial community’.

SDIs have been viewed by different perspectives depending on the countries’ approach and the awareness of government organisations to the understanding and development of SDIs (Rajabifard *et al.*, 2002b; Thellufen *et al.*, 2009). The understanding of SDI and its potential benefits are somehow different even within the SDI community (Grus *et al.*, 2007). However, all the definitions and understandings of SDIs have a similar overall goal, which is to improve access to, and the use of spatial data by means of improved data sharing and updating.

A recent report published by International Federation of Surveyors – FIG (Stuedler and Rajabifard, 2012) asserts that SDI and land-ownership information are two of the six key elements to build a Spatially Enabled Society. To achieve the goal, a well-organized and efficient land administration and management framework needs to be in place. The increasing involvement of governments in SDI development has been experienced for a few years in both developed and developing countries. Unfortunately, the investment in the development of SDIs has not always been very effective, especially in developing nations.

Land administration, of which the Cadastre is core (Williamson *et al.*, 2010), is associated with many complexities, dimensions and themes. Land data updating and sharing, land tenure securities as well as access to land information for sustainable development are important areas of reform.

In Vietnam, land is the property of all the people and is managed by the State – the representative owner (Vietnam National Assembly, 1992). The Vietnam land administration system is a multi-level system from central to communal level (Vietnam National Assembly, 2003). Similar to the overall principle of any land administration systems, the land

administration system in Vietnam reflects both the social and legal relationships between two entities including people (as land users) and land parcels. It is widely recognised that the continuing land administration system reform has been a pivotal driver of Vietnam's rapid growth and poverty reduction (World Bank, 2008).

Williamson *et al.* (2010) asserted that the lack of a well-established framework for technical and institutional arrangement as well as an overall policy for acquisition, management and distributions of spatial data information presents a common constraint to the SDI development in many developing countries. Vietnam is no exception to this global trend despite the fact that the Government has spent large investments in improving the management institutions and geographic data collection. As discussed later in this paper, limitations in data coordination and sharing in Vietnam result in issues such as duplication of data collection and production, data incompleteness, non-standardized or poor quality data, and more importantly, inefficiency and low financial sustainability. In many cases, the land information has not been adequately disseminated and the related land services have not been provided effectively due to limitations in the institutional framework and information mechanisms as well as an inefficient land portal.

This paper aims to explore the benefits of an effective SDI in land sector and reviews how recent developments towards a National Spatial Data Infrastructure (NSDI) in Vietnam inform land administration. For the remainder of the paper we will refer to an SDI for the land administration system as 'SDI Land'.

2. TOWARDS AN EFFECTIVE NATIONAL SPATIAL DATA INFRASTRUCTURE

The literature shows that the last two decades has witnessed significant worldwide efforts to develop Internet-based infrastructures such as NSDIs or National Spatial Information Infrastructures (NSIIs) to make spatial data and information more accessible and shareable to support science, public policy as well as improve public services to citizens and business. By 2008 there were more than one hundred SDIs at the national level and many others at sub-national levels (Budhathoki *et al.*, 2008). This number has likely grown considerably by now.

There has been some common components identified by researchers in most SDI initiatives (Coleman and McLaughlin, 1998) and they have been categorized in different ways depending on their role within the framework (Rajabifard *et al.*, 2002b).

Rajabifard *et al.* (2000) proposed an SDI hierarchy containing both horizontal and vertical relationships among its jurisdictional levels. The core components of an SDI in a dynamic model which considers the fundamental role as well as the reaction of people (the user community) and data as one category was later introduced to examine the nature of the SDI hierarchy by the same authors (Rajabifard and Williamson, 2001). The main technological components including access network, policy as well as standards have been considered as the second category (See Figure 1). In this dynamic model, the components of an SDI can be updated and expanded to include new environments to support different disciplines such as archaeology and built heritage, marine and coastal management as well as disaster risk management (Hamylton and Prosper, 2012; McKeague *et al.*, 2012; Molinaa and Bayarrib, 2011; Vaez and Rajabifard, 2012).

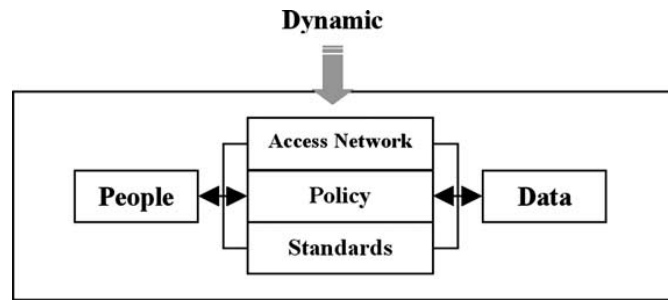


Figure 1. SDI components (Rajabifard and Williamson, 2001)

Williamson *et al.* (2010) argued the application of technology in the land sector to stimulate the establishment of multipurpose land information systems, responds to the demands for comprehensive information about environment, social, economic, and governance conditions in combination with other land related data for sustainable development. Unquestionably, the objective can only be achieved when the utilization of Information and Communication Technology (ICT) is included in a comprehensive strategy.

SDI is about providing support to spatial data applications in different sectors, and comprises human resources, policies and institutional arrangements, standards, data and technologies. One of the roles of SDI is to provide the platform for leading to the spatial enablement of societies and governments to provide required information services and facilitate public administration (Bejar *et al.*, 2012; Williamson *et al.*, 2010).

Bennett *et al.* (2013) argued that land administration systems are critical public infrastructure that deliver public capital, private wealth, stability, and improved environmental outcomes. It has also been argued that an efficient and effective land administration system supporting sustainable development requires an effective SDI (Williamson *et al.*, 2010). Access to land information will be improved through an SDI-based platform in which people and information are linked. The land information from local to national levels will be aggregated and synchronised automatically to support the land administration system. This also supports and builds environmental data as a pre-requisite for sustainable development.

The well-known butterfly diagram proposed by Williamson *et al.* (2010) as shown in Figure 2 illustrated that the future of land administration relies heavily on an SDI as an essential infrastructure to perform its functions through the cadastral engine to spatial enable government and lead to sustainable development. The diagram describes that the land administration functions require integrated information of which land parcel is central and all data and information about built and environments must be associated.

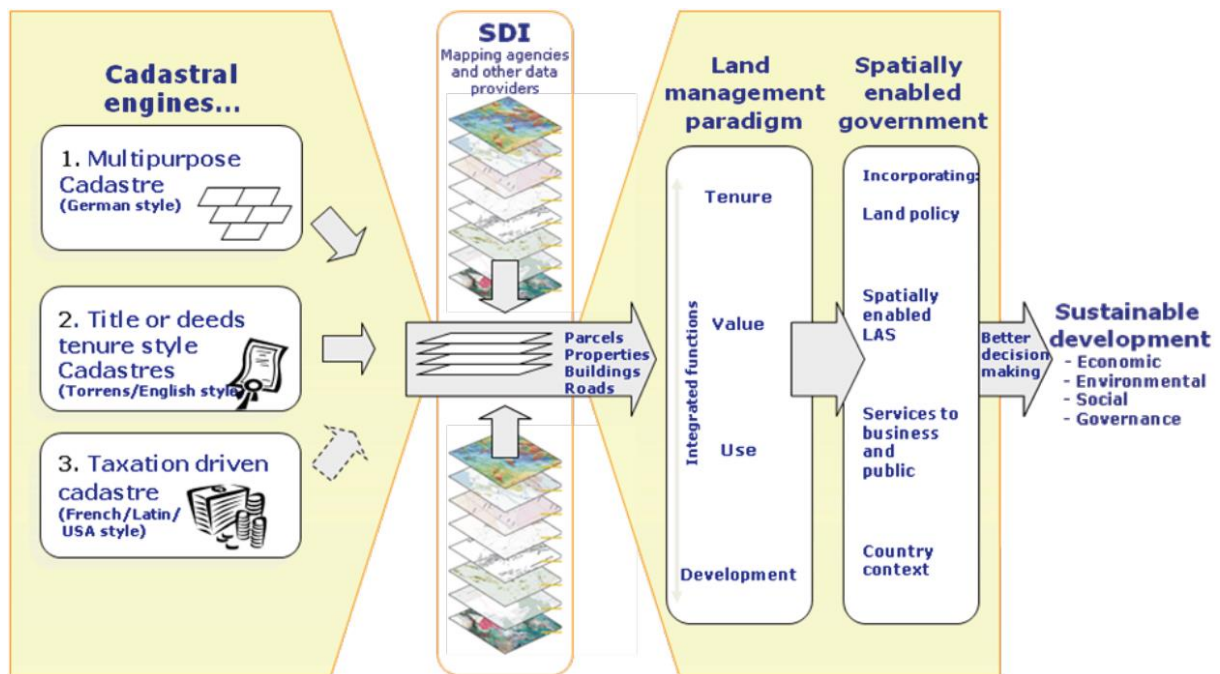


Figure 2. Land administration relies on an effective SDI (Williamson *et al.*, 2010)

SDIs are established at various levels from locally to globally or within a specific discipline (such as the land sector) to support decision-making for sustainable development of that particular level (Rajabifard *et al.*, 2002a). At the national level an SDI Land is a sub-infrastructure of an NSDI. An SDI Land is viewed as a framework that would support efficient and effective land services including land tenure, land taxation, and land management, and Rajabifard *et al.* (2000) state it is increasingly recognized by governments in developed countries as an essential resource that supports the economic, social and environmental interests of a nation. The range of functions in a land administration system such as land tenure security, land valuation, land use planning, land development as well as cadastral require access to complete and up-to-date information about the built and natural environments which can be facilitated by an SDI (Binns and Rajabifard, 2006). Any development of an SDI within a specific sector (e.g. land) should be consistent with national standards and guidelines associated with an NSDI.

In considering whether an SDI is effective we can look to the literature on assessment of SDIs. Giff and Cromptoets (2008) presented a critical analysis of a framework to assess SDI based on its performance indicators including accountability assessment, development assessment, and knowledge assessment. The study provided a review of performance indicators and their value in the assessment of SDI (Giff and Cromptoets, 2008).

An SDI goal-oriented assessment view has been developed by Grus *et al.* (2011) based on the multi-view SDI assessment framework for assessing the realization of SDI's goals. The assessment view includes 72 potential indicators covering all of the aspects of an SDI such as data exchanges, institutional interoperability, standard and policy arrangements, and SDI capacity including public private partnerships as well as financial investments.

Borza and Craglia (2012) developed a methodology to estimate the social and economic benefits of SDIs using a case study on *e-Cadastr*. The study presented that the change of society and culture would be required to achieve a complete shift from paper-based to digital services. Besides that, the reliability and interoperability of digital database and services would be considered to improve.

The introduction of automated and standardized land registration systems has brought with it great advantages as it can improve data access and linkages with relevant customers to benefit the service standards as well as prevent data duplication and inconsistency. Its database has become a reference data component of any SDI (Çağdaş and Stubkjær, 2011). Accessible information on who-owns-what and the results in administrative processing for land tenure application hinders corruption. An example is the delivery of the mobile land registration office model which is conducted by using portable computers that are connected to the core database through internet connectivity to do land registration in Indonesia. This model supports reducing distortion and deceptions of data which may happen due to using of intermediaries to access land registration services (Cook *et al.*, 2008).

The benefits that NSDIs can bring include (Borza and Craglia 2012, Cetl and Tomi 2009, ESRI 2010, Shariff *et al.* 2011):

- *Reducing time and the redundancy of data production.* The connection of spatial data, data producers, and data consumers in a preferred framework will keep infrastructures and costs for data production and maintenance economical. Duplication of spatial data will be prevented as data is collected once. The availability of data to users will also be guaranteed.
- *Supporting access to spatial data* by enabling discovery of existing spatial data and related services at all levels. Investors as well as individuals can benefit from the provided platform in which all needed maps can be accessed for individual purposes. Private sector will have more opportunity in providing services regarding spatial data. The public private partnership will be created and promoted.
- *Enhancing transparency of government and decision-making* as well as improving cooperation among government bodies and other stakeholders in related sectors, especially in land management. This will contribute to the economic development at all levels by providing a new dialog channel between government and business as well as between government and citizen.
- *Providing the foundation* in a consistent and cost-effective manner for Disaster Risk Reduction programs such as tsunami warning system, forest fire as well as flood mitigation.
- *Maintaining data integration and security.* Authoritative versions of data will be shared to authorized users. Mechanisms for the creation of data and metadata will also be regulated.

3. BARRIERS TO THE IMPLEMENTATION OF SDIs

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Despite the considerable benefits of SDI and the degree of implementation mentioned above, there are many factors that provide barriers to the effective implementation of SDIs. These include:

- *The lack of an overall policy for spatial data information acquisition, management and distribution* in the land sector presents a common constraint to the development of SDI. Policy is one of the important components of an SDI and provides guidance on information management issues such as data ownership, usage, exchange, access and security (Steudler and Rajabifard, 2012). This also indicates the regulations on the licensing and copyright of data as well as to allow for electronic storage and transactions and effective inter-agency coordination on data sharing and protocols. The limitations of awareness of this component may have critical impacts on the development of SDIs (Thellufen *et al.*, 2009).
- *The limitations on the institutional arrangements* identified in the last section and also in the following section impacts on the coordination of stakeholders at national level and therefore on the development of SDIs. Poor communication among central organizations and limited high level support are often two impediments. An institutional framework ensuring the government departments will work together to avoid redundancy must be clearly identified. The way in which private and academic sectors can contribute should be recognized and encouraged in land and SDI projects (Cook *et al.*, 2008; Rajabifard *et al.*, 2006).
- *The use of different data standards* – to implement consistent standards for geospatial data requires a sizable investment and significant time to modify all the unstandardized data before integrating in the database (Moses *et al.*, 2012).
- *Poor metadata* – Inconsistent and incomplete knowledge about the availability and quality of spatial data results in major technical obstacles to data sharing and updating (Steudler and Rajabifard, 2012). This is also partly due to inefficient technical standards for spatial data including cadastral data standards. The potential users will face difficulties accessing relevant information.
- *The weak of capacity to ICT infrastructure* can impede the development of SDIs. This includes limitations in capacity building, skill training, as well as limited awareness of SDI developments and existing spatial information. Development of ICT frameworks are important elements in land projects that build modern land administration systems. *The concurrent running of two systems* imposes not only extra costs compared with the purely paper-based systems but creates the risk of inconsistency between the systems over time and limits the development of an automated system (Cook *et al.*, 2008). Besides that, the limited computer literacy in a community is an impediment to e-government development. This means that the major part of intended user group will not realize fully the benefits of being able to access information via the Internet.

4. THE DEVELOPMENT OF AN SDI LAND IN VIETNAM

The strategy on ICT development in Vietnam by 2010 and vision for 2020 has been approved by the Prime Minister of Vietnam since October 2005 (Government of Vietnam, 2005a). The strategy emphasized that the development of ICT shall be increased in every sector and must become one of the most important factors of socio-economic development. One of the important parts of the strategy is to develop an information system and integrated databases in every sector (e.g. land, natural resources and environment; population and labor; rural and agriculture development).

In the land sector, the use of ICT is one of the most important priorities for the development of a modern land administration system in Vietnam and is clearly embedded in the planning for sustainable socio-economic development (Government of Vietnam, 2005b). This priority provides an advantage to the implementation of an SDI Land. As evidence, since its establishment in 2001, The Ministry of Natural Resources and Environment (MONRE) has made a considerable progress in the production of topographic, cadastral maps and the integration of natural resources information. The development and utilization of satellite imagery, aerial photography as well as GPS continuously operating reference station (CORS) for spatial data collection in Vietnam has provided significant benefits such as reducing the time required to complete land services, improving the accessibility to land information by all stakeholders, and minimizing the cost for data collection and acquisition.

The General Department of Land Administration (GDLA) of MONRE is mandated as the lead agency for the development of an SDI Land clearing house, spatial data standards, cadastral data content standards, and a national digital geospatial data framework and partnerships for land data acquisition in Vietnam. GDLA is responsible for advocating with the other government agencies for necessary laws to reform public land, land registration and other land regulations for more efficient resource management system in the country (Government of Vietnam, 2008). Since 2000 there have been some studies on the development of an NSDI for land, natural resource and environment management in Vietnam. On the other hand, the research on SDI presents that there was un-satisfactory work related to development of spatial information infrastructure in other sectors despite the high demands observed across the sectors (World Bank, 2011).

In the early 2000s MONRE, the focal point for land administration at the central level, developed the comprehensive *Program for the Development and Modernization of Land Administration for 2005-2020*. The *Strategy for Information Technology Application and Development for the Management of Natural Resources and Environment to 2015 and towards 2020*” was then approved by the central Government (Government of Vietnam, 2005b). This strategy required a significant increase in the development and use of geospatial technology. Firstly, by 2015, two third of the equipment used in survey and mapping as well as for land data capturing shall be converted into digital format and by 2020, the whole process shall be automated. Secondly, the national database on natural resources and environment shall be fully integrated in government network, regularly updated, and given online access to database by government agencies by 2015 (Government of Vietnam, 2005b). Although the term SDI had not been mentioned in the strategy, it still made a strong case for investment in this area.

Recently, a study on the development of an NSDI strategy has been conducted by a joint working group of the World Bank and GDLA funded by the AusAID under a trust fund managed by The World Bank (World Bank, 2011). The aim of the research was to draw a road map for development of an NSDI for the sustainable development in Vietnam.

In addition, there have been significant achievements in development of some of the components of an SDI Land in Vietnam. At the central level, the national coordinating system connecting to the international geodetic network has been constructed based on the National Geodetic Reference System – VN2000. The topographic maps at scales of from 1/1,000,000 to 1/2,000 have been created in digital format to cover the whole country. The collection of land management and cadastral records based on land parcels have been undertaken in both analog and digital formats at local levels. The administrative and geographic place names catalogues have been published along with systems for continuous updating. Vietnam has given priority to developing a comprehensive land information system (LIS) policy and strategic framework for standards and procedures to support an integrated national LIS as spatial information is increasingly acknowledged as a national resource essential for sustainable development.

However, despite these developments it could be argued that there is not yet a comprehensive and standardized SDI Land in place.

5. KEY ISSUES IN VIETNAM LAND ADMINISTRATION SYSTEM

5.1 Reforms in Land Administration in Vietnam

Vietnam started the land management modernization program in the early-1990s by a joint UNDP-AusAID technical assistance for designing a modern land administration and management system. Unfortunately, the project design was not implemented. Later, during the period from 1997–2007, two projects were undertaken including CPLAR¹ and SEMLA. Both focused mainly on capacity building ranging from the strengthening policy development, building capacity for agencies at the central level to providing training for staff at the grass root levels (World Bank, 2008).

Vietnam government is concurrently implementing two large land modernisation programs in whole country. Vietnam Land Administration Project (VLAP) - one of the largest World Bank funded projects in the world has been implemented in Vietnam since 2008 with an estimated budget of US\$100 million. The objective is the establishment of a modern land administration system by which land related services and land information are delivered efficiently and effectively. VLAP covers 9 out of 63 provinces and cities and will be expected to complete cadastral survey and mapping for 1.4 million ha, issue about 5.1 million land use right certificates as well as manage 18 million land parcels (World Bank, 2008). By the end of June 2012, the Project had completed cadastral mapping for 0.4 million ha and issuing land use right certificates to just over 0.5 million land parcels, equivalent to 29.4% and 9.9% (respectively) of the end-of-project targets (World Bank, 2012). The project is scheduled to finish by end of 2013.

¹CPLAR: Vietnam-Sweden Cooperation Programme on Land Administration Reform

Another large government-funded land management program - “Cadastral Survey and Mapping, Land Registration and Establishment of cadastral database” - managed by 54 provinces and cities commenced in 2011 and has focused mostly on spatial data collection.

Although there has been considerable change in the land management sector since the introduction of the 1986 “*Doi Moi*”² policy, it remains incomplete and there is still a considerable gap need to be filled up to implement a modern, transparent land administration system in Vietnam.

5.2 Land Registration Services Delivery

In Vietnam, the government has committed itself to the development of a modern land administration system. Such a transparent system is an important service tool for public services delivery provided by the government and is clearly embedded in the planning for sustainable socio-economic development (World Bank, 2008). The system contributes to good governance and should further strengthen the trust of local people in land activities.

Since the late 1990s, with the purpose of the completion of land registration processes as well as the issuance of land use right certificates to land users, the Government of Vietnam has invested a vast amount of money to develop the land information and registration system with the strong support from donors such as Australia, Sweden, ABD, and The World Bank (World Bank, 2011).

According to the General Statistics Office (2010), 72 per cent of the total land area had been allocated to land users by 2009. However, the formal recognition of the rights of land use through the issuance of land use right certificates to secure land tenure and formal land transactions (including the legal protection of land use rights and access to formal credit) is much slower. For instance, by 2010, almost 31.3 million certificates had been issued, covering only half of the total number of land parcels (World Bank, 2010).

The institutional setting for land management in Vietnam has been improved by separating the state management and public provision as well as establishing a unified and decentralised system of state administration on land at all levels (Vietnam National Assembly, 2003; World Bank, 2010). However, there is a considerable gap between land policy and its practical implementation.

The Land Registration Office is the government agency that provides land registration and related services. By end of 2011, Land Registration Offices had been established in all provinces and cities, while a half the districts had set up their Land Registration Offices. The standards for human resources, facilities and services for Land Registration Offices have not been developed yet. The procedures for land registration and statistics have been issued and revised several times as the result of technology development and application in the land sector. However, implementation at the local level has not been improved, and is still complicated and lacks transparency (Government of Vietnam, 2011). The complexity, discretion and secrecy involved in the registration and issuance of land use right certificates could encourage corrupt

²“*Doi Moi*” (“*Đổi Mới*” in Vietnamese) is the name given to the economic reforms initiated in Vietnam in 1986 with the goal of creating a "socialist-oriented market economy" in Vietnam.

behaviour (Embassy of Denmark *et al.*, 2011). A recent survey conducted in 2008 on Household Living Standards in Vietnam (VHLSS) found that there is a significant room for improvement with 35 per cent of interviewees perceiving that the procedures for application for and issuance of land use right certificates are complicated and un-transparent (World Bank, 2010). Meanwhile the issuance of land registration standards, which is expected to detail the procedures of land registration and statistics, has not been made yet. The consequence is that the unofficial transactions of land use rights may still happen in spite of the government's efforts. In fact, the estimated incidence of registered transactions is only one-fourth of total number of land transactions at most (World Bank, 2010).

Despite the developments in land reforms mentioned in the Section 4.1, the land sector is still ranked as one of the three most corrupt public services in Vietnam and the volume of civil disputes and administrative complaints related to land is at the highest rate compared with the other public sectors – at least 70 per cent (Embassy of Denmark *et al.*, 2011; World Bank, 2009). The VHLSS reported that more than 85 per cent of households think there is corruption in applications for land use right certificates. While companies seem to be experiencing less corruption with land use right certificate applications, as much as 37 per cent of enterprises revealed that they paid unofficial money for land titling and land information purposes (World Bank, 2010). Although individual amounts may be small, they can add up to a vast amount compared with the public investment in the land sector. One of the reasons is that the decentralisation has provided local authorities with a greater autonomy in land sector without clear accountability or interoperability in neither organisational arrangement nor data sharing policy.

5.3 Land Database and Land Information System Development

Land management in market economies relies heavily on ICT by which the information can be accessed easier, faster and more consistently. Williamson (2008) described the involvement of ICT in land administration as a series of five stages including *manual systems* (before 1980), *computerization* (1980-1990), *online land administration* (1990-2005), *e-land administration* (2005-2010), and *i-Land* (2010 onwards). The implementation of ICT in land administration in some developed countries has already been in stage 4 – *e-land administration* or even in stage 5 – *i-land*. For example, in New Zealand (since 1996) and the Netherlands (since 1999), the ICT capacities have been utilized to deliver land administration functions and services online.

The development of a land database and LIS in Vietnam has experienced a significant achievement for recent years (World Bank, 2011). The first land database management system was built under the CPLAR project in 1997. The system performed on individual computers and was separated into two systems including FAMIS³ for cadastral survey and mapping and CADDDB⁴ for cadastral documentation management. The use of software had been piloted widely in all provinces and cities and then it had been incompletely replaced by another modern LIS.

³ Fieldwork and Mapping Integrated Software

⁴ Cadastral Document Database Management System

In 2010, MONRE issued the cadastral data content standard, which was developed based on the geographic information standard ISO 19100 and the draft of Land Administration Domain Model (which has been approved as an official International ISO Standard on November 1, 2012), for the purpose of setting up a standard for the development of LIS software in the country. After the issuance of this standard private sector investments in land administration activities were expected, especially in providing services in land registration and information system contracts. However, the implementation and development of land database and LIS as well as the participation of private sector in providing services in application of ICT in land sector did not meet expectations. State agencies have limited capacity at local levels and poor understanding of data standards whilst the private enterprises are not ready to invest in a new market that used to be mainly provided by state-owned enterprises.

Presently, there are some models for LIS have been developed by MONRE's agencies - in particular ViLIS⁵ and ELIS⁶. The implementation of LIS at all scales however has not been commenced, and there is a concurrent use of both traditional and modern systems in all provinces. The result is that the delivery of land administration services by means of modern methods continues to be limited. There is an urgent need for improvement of current LIS models to comprise a standardised system which is reliable, efficient, and interoperable.

Despite the above significances, it must be recognized that the Vietnam land administration system development process is still at the stage of *computerization* (as outlined by Williamson, 2008) where the digital cadastral database is being developed. The development is also heading into early stages of *online land administration*.

On the other hand, the cadastral records are stored and managed by different departments and institutes and usually become out-of-date after a year of establishment since they have not been updated regularly (Government of Vietnam, 2011). Moreover, cadastral data is archived in single database managed by their owners, is not integrated with the other information such as land use planning, urban planning or tax database, and is in incompatible formats. Another problem with the existing LIS is that the land information is often not disseminated effectively due to limitations in institutional capacity as well as the lack of an inefficient land portal.

5.4 Land Information Accessibility

The level of access to land information and security of land tenure, which is an indicator of the PCI⁷, has been the second important factor for attracting foreign direct investment in Vietnam. This indicator has also been a sensitive issue that hinders foreign and private investments in Vietnam (Thu and Perera, 2011). The stable use of land is still the first concern that a multi-national company considers when investing in many countries, including Vietnam. In addition,

⁵ ViLIS – Vietnam Land Information System has been developed and updated by Remote Sensing Centre of MONRE and has been approved by MONRE as a core software for land information system used at Land Registration Offices in the whole country since February 2007

⁶ ELIS – Environment and Land Information System has been developed by Information and Communication Department for Natural Resources and Environment of MONRE

⁷ PCI is the Provincial Competitiveness Index published annually by the Vietnam Chamber of Commerce and Industry (VCCI), which provides information on governance at the provincial level in Vietnam

at the grass roots level, the high demand of individuals and households for land information and accessibility to land titling in order to access formal credits in Vietnam has been recorded (World Bank, 2010).

The access to land information becomes a special indicator to examine transparency in Vietnam. This should be supported by ICT as the Electronic Transactions Law has been enacted since 2005. The introduction of the Electronic Transactions Law is expected to support to create a government service portal with less bureaucracy, highly responsive, and transparent. However, to date there have been no regulations for access to electronic land information in Vietnam (Martini, 2012).

According to the PCI data, the level of access to land information in Vietnam remained rather weak and had been decreased over time in the period from 2006-2009 (Figure 3). Nevertheless, fewer than half of the interviewees said they could access and were satisfied with the information on land use planning at communal levels (World Bank, 2009).

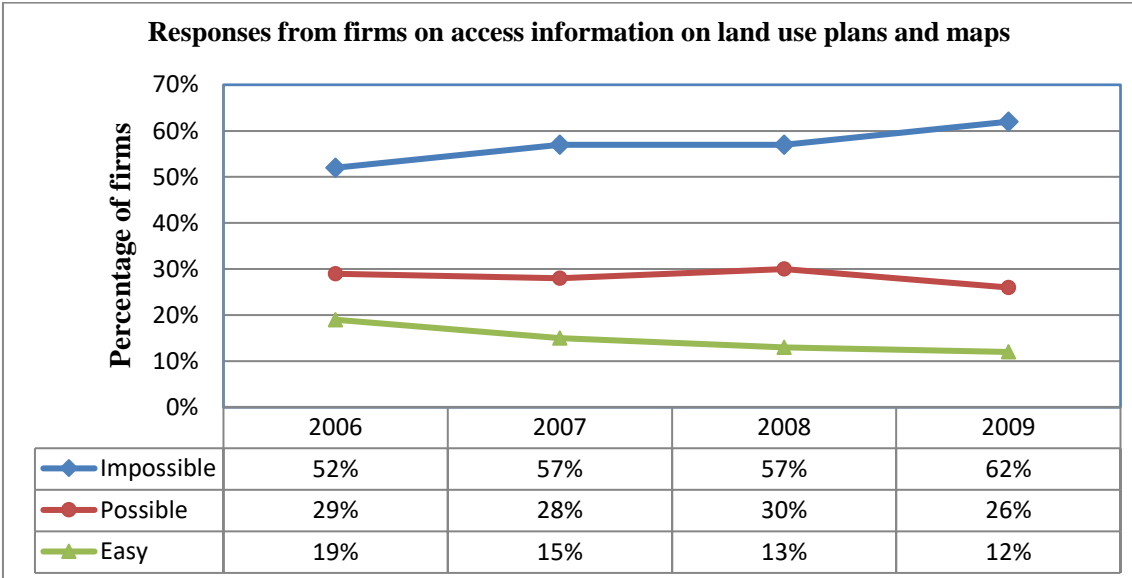


Figure 3. Level of access to land information of business firms (Embassy of Denmark *et al.*, 2011)

A report of a recent survey (Nguyen *et al.*, 2010) financed by The World Bank and the UK Department for International Development (DFID) showed that there was a very uneven publication of land related information at all three levels and also of the kind of information published:

- *Access to land information via non-web based disclosure:* the survey investigated in 12 provinces, 24 districts and 117 communes which were randomly selected. At the provincial level, only six of 12 provinces published information on detailed land use planning and plans and of which, three was evaluated difficult to access by land users and enterprises. The survey recorded a positive result at the lowest level, where 76 out of 117 communes (approximately 65 per cent) made information on procedures for land use right certificate registration available and easy to access.

- *Access to land information via the internet*: the investigation was carried out by visiting 66 websites of 63 provinces and three ministries including MONRE, the Ministry of Planning and Investment, and the Ministry of Construction. Despite the fact that the information regarding the list of procedures and forms for land use right certificates could be found on 59 websites, only one-third contained information that citizens would need to file complaints (Nguyen *et al.*, 2010).

The inefficient dissemination of land information and the difficulties for accessing information are partly sharing its responsibilities in prevention of socio-economic development and anti-corruption efforts in Vietnam.

6. HOW AN EFFECTIVE SPATIAL DATA INFRASTRUCTURE CAN BENEFIT THE VIETNAM LAND ADMINISTRATION SYSTEM

With the direction to build a modern land administration system where all related land services will be delivered mostly online, an effective SDI benefits the Vietnam land administration through: *(i)* improvement of access to land information by all stakeholders; *(ii)* enhancement of government land processes; and *(iii)* contribution to good land governance. Each of these is discussed below.

An effective SDI strongly supports agencies and citizens to access land information by providing an information mechanism and an efficient land portal. The information policy component of an SDI regulates the responsibilities, rights, and restrictions of related stakeholders in accessing land information. This policy also sets information privacy regulations such as the publication of information on land ownership. For example, the policy component will outline the responsibilities of data producers in sharing information as well as the rights and restrictions of data users in accessing information. An efficient land portal will provide a technological channel to access land information via a web-based interface with the support of GIS technology as well as data standards. The improvement of access to land information will result in:

- Sharing and exchanging land information between government, industry and the community. The interaction between governmental authorities (G2G); between government and business (G2B); and between government and citizens (G2C) will be improved. This will avoid the monopoly on spatial data creation and usage which has been recognised in Vietnam for years;
- Improving quality of decision making and reaction times by reducing time and cost of consultation among government agencies in processing a land related request. For instance, the duplicated efforts and a waste of time and budget will be avoided as the data from the different sources would not require validations before it is useable;
- Reducing mistakes and subsequent re-work at an administrative level by sharing information; and
- Ensuring the consistency of land information by integrating and storing information in datasets to use in appropriate contexts.

An effective SDI will improve and guarantee government processes in land issues. Presently, processes in land issues in Vietnam require the collaboration of many governmental authorities and they are usually long manual processes with some resolved by the intuitive powers of human beings (Martini, 2012). The improvement and assurance of the government process in land sector will be supported by an effective SDI because the geo-information will be available to people who need it, at the time when they need it and especially in the form that they can use it to make decisions. This benefit will result in:

- Reducing government administrative effort and resources by linking government agencies such as land and tax authorities in processing land tax and fee claims and collections; between land authority and commercial bank related a land mortgage to access to credits;
- Supporting greater responsiveness in land related processes more timely, costly and accurately, especially in land complaints and dispute handlings. The paperwork running around agencies regarding these issues will be reduced significantly; and
- Supporting streamlined public services and reduced transaction time by providing service standard which clearly provides a time frame for particular service as well as required forms and related proofs.

An effective SDI will contribute to good land governance which refers to the processes, rules as well as rationalities affecting the way land issues are solved at different levels, particularly in term of openness, participation, accountability, effectiveness and interoperability. Good land governance is critical as a precondition for sustainable development such as encouraging long term investments in land, protecting livelihoods of vulnerable groups like women and ethnic minority, and encouraging private sector development through the use of land as well as land services participation. This benefit will results in:

- Supporting integration of data by accessing directly and ensuring every single error is corrected in the source data;
- Improving communication with the public and easier access for citizens to participate in government land related decision-making such as land use planning community consultation; and
- Increasing inter-agencies collaboration and this contribute to the *e*-government implementation supported by an NSDI;
- Providing opportunities for revenue growth by a land information fee collection regulation under a sustainable financial model. This revenue will help offset the ongoing cost of the system.

7. BARRIERS TO THE IMPLEMENTATION OF AN EFFECTIVE SPATIAL DATA INFRASTRUCTURE FOR LAND ADMINISTRATION IN VIETNAM

In Section 2, we identified the barriers to the implementation of SDIs including:

- The lack of an overall policy for spatial data information acquisition, management and distribution;
- The limitations in the institutional arrangements;
- The limitations in implementations of standards;
- The inconsistencies in and incomplete knowledge about the availability and quality of spatial data; and
- The weak of capacity to ICT to implement infrastructure.

Many of these barriers to the implementation of an effective SDI Land also exist in Vietnam. For example:

- *Limitations in policies concerning access to and use of spatially referenced data* (Martini, 2012; World Bank, 2010; World Bank, 2011). The regulations on information management such as data ownership, usage, exchange and security can present a critical impact on development of an SDI Land. According to Martini (2012), the dissemination of land information may be limited or illegal if legal documents are not set or unavailable. Changes need to be made by issuance of new policies on SDI Land development by central government;
- *Limitations in institutional arrangements* (World Bank, 2009; World Bank, 2010). These limitations can impose considerable constraints in development and implementation of an SDI Land. This immature often include poor inter-organisational communication and leads to the limitations of high level support. In addition, the role which private and academic sectors can play has not been recognised fully;
- *Inconsistencies and incomplete knowledge about the availability and quality of existing spatially referenced data* (World Bank, 2011). This often obstructs the provision of access to data as the stakeholders concerns over data quality. This limitation is come from the monopoly period in development and use of land data among agencies and need to be resolved;
- *Weak utilization of ICT in natural resource management* (World Bank, 2010) which can impede the development and implementation of an SDI Land. It may include limited capacity in education, lack of technical skills in enabling technologies, data management and standards, especially at the local levels. In addition, the limitations in computer literacy as well as insufficient human resources in information technology are impediment to delivery of public land services;

Added to above-mentioned barriers, the development of SDI Land in Vietnam has to face with the following issues:

- *The limitations in investment in SDI developments* (World Bank, 2011) lead an incomplete investment in land information projects. As an example, the land portal established at the central level does not work effectively due to limitation of recurrent and maintenance investments;

- *The limitations in commitment and support from key stakeholders* (World Bank, 2011) result a major constraint to SDI developments. The limitations in a common vision between agencies and stakeholders can lead to financially unsustainable land and SDI projects implementations.

Any further development of an effective SDI Land in Vietnam will need to address these barriers.

8. CONCLUSION

This paper has provided an outline of the major developments in SDIs and Land Administration in Vietnam. However, there are also limitations and barriers to reform that impact performance as discussed in the paper.

While there has been significant reform in relation to both land administration and SDIs the authors believe that further enhancement of and development of an SDI Land would have considerable benefits for the continuing land administration reform process. These benefits were outlined in the previous section and include improved access to land information by all stakeholders, improve transparency in the land sector, and increase efficiency and effectiveness of existing projects and programmes. Ultimately, this will enhance land governance in Vietnam.

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Mau Duc Ngo and David Mitchell

How an Effective Spatial Data Infrastructure can support Land Administration in Vietnam?

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Mau Duc Ngo commenced his PhD study on SDI for land administration at the School of Mathematical and Geospatial Sciences of RMIT University (Australia) in July 2012 as an Australia Development Scholarship (ADS) awardee. The research investigates the development of SDI and aims to develop and implement an SDI model for land sector in Vietnam to enable data updating and sharing as well as access to land information by all stakeholders. Mau is an official of the General Department of Land Administration (Vietnam). He has a bachelor degree in land administration and a master degree in urban planning and management.

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