A Survey Related To 3D Property

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Abstract

A questionnaire survey was carried out on 114 personnel from government authorities and professional companies administering cadastre registration in Penang, Selangor, Kuala Lumpur, Putrajaya and Johore. The aim of the study was to elicit the opinions of the respondents and to appraise their understanding on five study areas, viz. land legislation, land administration, cadastre registration, and cadastral survey and mapping issues. The respondents were from State Lands and Mines Office, State District Land Office, Department of Survey and Mapping Malaysia, Department of Director General of Lands and Mines Office, State Local Authority and Licensed Land Surveyors.

Keywords: 3D, Property rights, Cadastre, Land, Administration, Registration

1. Introduction

One of the important issues with regard to property is the inadequacy of vacant land for rapid development. Many countries, including Malaysia, do not have enough vacant land on the ground surface to cater for the rapid development. Forrai and Kirschner (2002) observed that the availability of land use for future and further construction would be both expensive and limited in general. This is particularly true in big cities that see increasing numbers of mixed settlements amidst modern skyscrapers. This can be supported from a finding of questionnaire survey done in this research where fifty (47.2%) out of 106 respondents agreed and 16 (15.1%) respondents strongly agreed that some of the buildings had been built on top of each other or crossed boundary edges in real estate developments in Malaysia. As the demand and competition for space on land surface intensifies, the three-dimensional aspect in property formation assumes an increasing importance.

In recent times, this three-dimensional aspect plays a significant role in determining the rights of property unit through legislation, especially in areas with multi-level mixed developments in Malaysia. It supported by almost equal numbers of respondents (45 or 42.5% and 42 or 39.6%) strongly agreed or agreed respectively that there was a need for a legal registration status of 3D property. The so-called *THREE-DIMENSIONAL (3D) PROPERTY* that skyscrapers and other multi-level developments in urban areas are often regarded as; is a special category of property, separate from the traditional property, although in many countries, including Malaysia, have integrated these two types within the same legislation. Examples of such property unit can be found in the following situations: property above surface, such as constructions on top of each other, overhead infrastructure and utilities & the use of air space; property on surface, such as multi-storey buildings and landed properties in gated and guarded community; and property below surface, such as underground infrastructures and utilities.

2. Research hypothesis

The hypothesis is that - *what contents in general, in the relevant legal documents, documents of title and documents of strata title, certified plan and certified strata plan have to be amended or in order to translate the legal expression from traditional cadastral practice to future cadastral practice for 3D property* - whether a new legislation should be introduced or only amend the present legislation where type of provisions in the new 3D property rights' regulations and practices are needed to be inserted in the National Land Code 1965 (Act 56), Strata Title Act 1985 (Act 318), and the Building and Common Property (Maintenance and Management) Act 2007 (Act 663).

On the other hand - *what kinds of criteria are required to establish and implement in cadastral procedures where these 3D property rights could affect the Cadastral and Land Administration Systems practices* - if the present legislation is adequate, then in regards to the technical aspects.

3. Research objective

In view of the current Malaysian Cadastral System, the main task of this research is to reformulate, further improve and enhance the usefulness of the existing cadastral system and title registration of multi-layer properties. To realise this, the objectives of this research are:

a) To establish the fundamental principles in cadastral survey and mapping of 3D property rights by studying cadastral systems in Sweden, and to match those systems to the needs of the Malaysian Cadastral System.
b) To examine the rights of land and property that dimension above, on and below the ground surface as provided by the National Land Code 1965 (Act 56), Strata Title Act 1985 (Act 318), the Building and Common Property (Maintenance and Management) Act 2007 (Act 663), Certified Plan and Document of Title, and to make recommendations for changes to facilitate a modern Malaysian Cadastral and Land Administration Systems.

4. Research methodology

This study was divided into three stages. The first stage involved secondary data collection and analysis. The second stage involved development of the research instrument, primary data collection and data analysis. The third stage involved refinement of the research instrument, final data collection and further data analysis. The respondents were classified into six main groups, namely, State District Land Office (PTD), State Local Authority (Valuation and Property Management Department and/or Town Planning and Development Department) (PBT), Department of Director General of Lands and Mines Office (JKPTG), State Lands and Mines Office (PTG), Department of Survey and Mapping Malaysia (DSMM), and Licensed Land Surveyors (LLS) from Penang, Selangor, Kuala Lumpur, Putrajaya and Johore. The data was then analysed using the quantitative approach. In the third stage, the findings from second stage were used to refine the research instrument further.

5. Research significance

In Malaysia, strata and land properties, especially in mixed multi-level development, have become common, so the basis of the land and strata title arrangement is well tested. However, critical research on the problematic areas of land and strata title development in Malaysia has not been sufficient. Although research continues in universities and law-related agencies, most of such studies relate only to the technical aspects of the 3D registration rather than to the legal aspects, the studies by Chong (2006) on the legal and organisational aspects notwithstanding. The current research will attempt to examine and address some of the most problematic issues relating to the future development of multi-level building in mixed development.

6. Analysis

A systematic record of land matters involving registration of the details of transaction, such as transfer of land and interest, lease, charge, easement and change of condition of the land is very important in land administration, planning and development. For this, a good land administration system is needed. As stated in the United Nations Economic Commission for Europe (1996), land administration consists of a Cadastral Survey and Mapping Registration System, and a Land Registration System. These two systems are very important for the formation of a good Land Administration System. As known by land administrators and land surveyors in Malaysia, cadastre is an information system consisting of a series of maps or plans showing the size and location of land parcel/parcels together with text records that describe the attributes of the land (Tan, Khadijah and Ernest Khoo, 2009a). It supported by the results of the questionnaire survey that showed more than half, 23 (51.1%) and 28 (62.2%) of the respondents felt that the current cadastre system, surveying and mapping methods were understood by land administrators and land surveyors in Malaysia. The basic land code in land administration adopted by many countries includes special legislation governing the operation of the cadastral survey and mapping, and land registration systems that addresses the nature of the land and real property. Land administration in every country is aimed at ensuring an undisturbed performance of ownership rights. Thus, the ability to fulfil this task demonstrates the extent of society's ability to organise the legal basis for land ownership. In this regard, legal relations must be precisely defined in land law and in other laws that are related to properties.

Thus, there is a necessity to find a suitable cadastre solution for multi-layer constructions. The traditional cadastral system and land registry based on ground surface have not taken into consideration to register this utilisation of land in a three-dimensional situation. As in Malaysia, only 11 (24.4%) respondents felt that the current registry was adequate and 4 (8.9%) remained unsure while there were two-third, 30 (66.6%) of the respondents who either agreed or strongly agreed that the current cadastre system was unable to handle the registration of 3D properties under the existing legislation.

3D properties can divide into public ownership, common ownership, management ownership and private ownership, the main problem is to clearly define and protect the rights in 3D properties. This requires the 3D Cadastral System. Within the constraints of the present land registry system, various difficulties were encountered in registering the ownership and other rights of properties that are located on, above or below the ground surface. Based on the analysis from the 45 returned questionnaire from Department of Survey and Mapping Malaysia (DSMM) and Licensed Land Surveyor responding to whether the legal system recognised the various 3D properties, 14 (31.1%) answered in the affirmative whereas nine (20%) disagreed. Nearly half (22 or 48.9%) the respondents skirted the issue. The aim of the cadastre is to survey, record and register the rights and interests to the land that the law recognises, as these rights and interests as a legitimate relation between a rightful claimant and a certain lot of land. Therefore, without a clearly defined law, the mechanisms for acquisition, transfer, protection, restriction, creation as well as recording or registration of these 3D property rights and interests are meaningless in the cadastre (Molen, 2003).

Traditionally, the Malaysian Cadastral System consists of different structures. Where, the jurisdiction for land registration is under the administration of the state government while cadastral survey and mapping is under the federal government and is managed by different government authorities. It was generally felt that, there should be one, and only one, authority conferred with the power to grant and authenticate land titles. There was concern that the security of tenures could otherwise be jeopardized. Accordingly, 82 (77.4%) respondents expected it to be easy to register properties in 3D with a single authority although 24 (22.6%) respondents thought it would be similarly easy with multiple authorities.

There are two systems in the Malaysian Cadastral System, namely Cadastral Database Management System (CDMS) and Computerised Land Registration System (CLRS) operated by the Department of Survey and Mapping Malaysia (DSMM), State Land and Mines Office (PTG) as well as District Land Office (PTD) respectively (Tan, Khadijah and Ernest Khoo, 2009b). Both systems deal with properties located below, on and above the ground surface. There are 68 (64.2%) respondents felt that the law should place responsibility for maintaining the 3D land register on a specific government authority while 25 (23.6%) respondents did not agree while 13 (12.3%) respondents responded that they did not.

The Cadastral Database Management System database stores information about land attributes, spatial objects and other things while the Computerised Land Registration System database stores information on land ownerships, land tenures and so on. From the 45 returned questionnaire from Department of Survey and Mapping Malaysia (DSMM) and Licensed Land Surveyor, more than two-third, 37 (82.2%) of the total respondents either strongly agreed or agreed that DSMM should be responsible for maintaining the survey and mapping of registered 3D properties, whereas only 5 (11.1%) respondents were moderate in their view. Nevertheless, these two systems work separately in each organisation and have different legal aspects, which are still in traditional method.

After the final survey of an individual parcel of land or a number of lands, a cadastral map, or better known as the Certified Plan would be produced for those plot/plots of land. A Certified plan is prepared following the format determined by the Department of Survey and Mapping Malaysia. It shows the lot boundary in various scales with a given plan number as well as any information pertaining to the lot location, number, area, bearing and distance. Out of 45 respondents, 26 (57.8%) respondents were of the opinion that all perimeter boundaries of the 3D property were identifiable. Nevertheless, 13 (28.9%) respondents thought otherwise, while the remaining six (13.3%) were unsure whether physical or virtual boundaries were identifiable. Many respondents felt that other relevant information on 3D properties and their regulation should be collated. Unlike the situation where the limits of the properties were only surveyed and indicated on plans, 3D geographical visualization methods could be employed to record many identifiable features as land users, facade, front, back, and side elevations, services, utilities, lamppost, traffic lights, even the roof, and the whole multitude can be captured and shown. The captured features and data would vary according to need.

There was a strong group of 99 (93.4%) respondents that supported the development of a new legislation integrating 3D property rights aspects. Present cadastral mapping is moving towards a system whereby property can be manipulated, processed, and managed in a three-dimensional environment. The mapping system that is being contemplated in Malaysia provides vital information, including location and ownership for properties. Whereas the current cadastral information serves present needs, there will be a time when the currently compiled information can no longer cater to more advanced and complex situations that result from innovative developments of the big city. What will inevitably be required, therefore, is a more advanced system that incorporates suitable legislative and technical solutions in parallel with the implementation of 3D property rights.

In Malaysia, the cadastral system that has served us for more than a century may not be able to continue doing so due to the lack of an advanced level of legal and technical framework. Only 12 (11.3%) of the respondents were very satisfied and 36 (34.0%) respondents were satisfied with the current legal institutions in enforcing the land law. Twelve (11.3%) respondents were dissatisfied and 2 (1.9%) very much so. It would appear, therefore, that the legal institutions needed to be further improved to enforce land law satisfactorily. This is because land use is becoming so intensive, where different types of properties are now located in a complex three-dimensional configuration, especially in the city centre (Ahmad Nasruddin and Abdul Rahman, 2006).

When asked whether Malaysia had a statutory system of land registration, which recorded land rights, including ownership in a 3D environment, there was a significant group of 65 (61.3%) respondents that agreed whereas 29 (27.4%) respondents disagreed and another 12 (11.3%) respondents were not sure. The current Malaysian cadastral system and land law for properties in three-dimension are slow to change and still use traditional legal and law expression for land and property tenure (Tan, Khadijah and Ernest Khoo, 2010). About half, 20 (44.4%) respondents strongly agreed and 15 (33.3%) respondents agreed that the main obstacle in adopting 3D cadastre was that the legal and organisational systems were slow to change and adapt.

Examples of which are the National Land Code 1965 (Act 56), Strata Title Act 1985 (Act 318) and the Building and Common Property (Maintenance and Management) Act 2007 (Act 663). Based on the analysis from the 106 valid returned questionnaires, 76 (71.7%) respondents were of the opinion that there was no land law, which embodied a right for people to hold and dispose of private rights in land in a 3D environment. Nineteen (17.9%) respondents thought the Strata Titles Act 1985 (Act 318) provided for this while remaining 11 (10.4%) respondents were unsure. Only 10 (9.4%), 11 (10.4%) and 16 (15.1%) out of 106 respondents thought that the Strata Titles Act 1985 (Act 318), the National Land Code 1965 (Act 56) and other land law such as Building and Common Property (Maintenance and Management) Act 2007 (Act 663) were respectively adequate and appropriate to support the land administration system in 3D environment.

The present land utilisation indicated that there is a growing need for above and below ground space. This traditional paradigm requires amendment. There are also issues pertaining to the cadastral map, the traditional paper based and digital method of Certified Plan and Document of Title, as they are no longer legally and technically adequate. A case in point is storeys with different heights are represented as an identical flat plan in the multi-storey mixed developments. This is a clear indication that traditional cadastral method cannot illustrate the actual height of each storey and which depicts how each storey lies on top of the other. A survey shown seventeen (16.0%) respondents opined that current land laws were being enforced adequately in all types of development and 56 (52.8%) thought the law recognised 3D property rights in mixed developments. Meanwhile, eighty-two (77.4%) respondents and 39 (36.8%) respondents respectively thought otherwise. This is due to lack of recognition or reflection in the cadastre. It is clear that the modern urban living and land usage needs are pushing hard on the existing laws. As an example, the transport hub at Kuala Lumpur Sentral where railroads, light rail transport systems, hotels, condominiums, car parks and various forms of utilities all crisscross over the same plot of land makes compliance with the provisions of laws difficult on the ground. Indeed, 88 (83.0%) respondents agreed that the practice on the ground reflected the provisions in the current land laws while 13 (12.3%) respondents responded that they did not.

Owning to the above-mentioned reasons, ownership of these 3D properties can be easily infringed and subsequently resulting dissension and legal issues. These problems associated with 3D properties can only be solved through suitable legal and technical approaches, thereby underlining the pressing need for comprehensive legal and technical solutions for 3D properties.

Based on the survey findings, nearly half, 48 (45.3%), out of 106 respondents were dissatisfied with the Strata Titles Act 1985 (Act 318) and National Land Code 1965 (Act 56) regarding 3D property, with a further seven (6.6%) feeling very dissatisfied. Another 33 (31.1%) respondents found the situation acceptable while only 18 (17%) of the respondents either very satisfied or satisfied on this issue. It would seem that these two legislations need further improvement. There are three common cases in the situation of overlapping properties above, on and below ground surface. First is air space parcel. For example, sky bridges, balconies, bay windows, and public transportation and utility networks above reserved road, such as the monorail, light rail transit's rail track and their station as well as transmission lines. Second is on surface construction property. For instance, mixed development scheme under Strata Title Act 1985 (Act 318) that mixes shop houses at below and residential houses at above. Finally is subsurface construction property. For example, public transportation and utilities network construct below reserved road, for instance the monorail, light rail transit's rail track and their station as well as pile lines.

Furthermore, it seems that these problems associated with a 3D property could be solved by proposing suitable legal, organisational and technical methods. Therefore, there is a pressing need for comprehensive 3D property solutions that would entail changes in the relevant laws as prescribed in the legal documents mentioned above. It was found that more than half, 61 (57.5%), of the respondents felt that there were no government regulations in place for the 3D property legislation while a large number, 36 (34%), remained unsure. For this reason, a large proportion (83.9%) of the respondents was either in agreement (51 or 48.1%) or in strong agreement (38 or 35.8%) that new laws should emerge to put 3D property rights on sounder legal footing.

As has been discussed by Paulsson (2007), the forms of 3D property rights can vary when it comes to ownership, delimitation, that included in the common property and how the management should be carried out. The ownership can range from membership in an association or stockholder in a company, or owning a share in common property with the right to use an apartment, to having full ownership of an independent 3D property unit. Condominium means ownership of single apartments, while the independent 3D properties are larger units, or units not delimited by a specific building. The condominium system is usually well defined and has many similarities in the different countries. It consists of two components, both of which are necessary for its constitution, namely the ownership to a part of a building and a system of organisation to deal with the interaction between the owners that are dependent on each other within the same scheme. It is also seen as a threefold unity, with the individually owned unit, a share in the common property and the membership in the owners' association as the three parts.

A main difference between the independent 3D property type and the condominium type is the level of cooperation between the property units. The relationship between independent 3D property units can be compared with the relationship between traditional property units on the ground, where general rules for neighbour relations apply, or agreements are made. For the condominium type, the relationship between the property units are more interdependent and sharing, the freedom of action is more limited for the owners and a certain legal framework is needed to regulate the co-ownership relations (Sandberg, 2001). Regarding the interdependence between properties, it is possible to make a clear distinction between public rights and common rights. For public rights, the principle is that the relationship with the neighbouring properties should not be more extensive than for neighbouring surface properties. On the other hand, for common rights, where the apartments as individual parts are closely interrelated, it is important to regulate the relationship between the individual owner of the shares, their duties, rights, responsibilities and the common properties parts (Onsrud, 2001).

Through the years, a number of changes in the legislation have been necessary to carry out, minor changes as well as reforms that are more thorough. A reason for the need for the many amendments to the law during the years is that the society has developed, along with different development and building types. The fact that many countries have used the New South Wales strata legislation as a model for their own 3D property legislation, for example, the Strata Titles Act 1985 (Act 318) in Malaysia has many similarities with the New South Wales system where both are provided within common law.

In Malaysia, there is a lack of proper legislation regarding 3D property in land and cadastral law to cater for the registration of any related legal and technical aspects. Based on the analysis from the 106 valid returned questionnaires, 76 (71.7%) respondents were of the opinion that there was no land law, which embodied a right for people to hold and dispose of private rights in land in a 3D environment.

Many conflicts seem to exist between laws and statutes with the current cadastral status. Therefore, the rights associated with this registration should be clear in the registry titles issued. About one-third (33.0%) respondents thought that the current land laws defined 3D property rights clearly while 61 (57.5%) responded that they did not, and 10 (9.4%) were unsure. As a result of this, perhaps better 3D visualization should be developed and employed.

For example, firstly, Strata Title Act 1985 (Act 318) allows land to be subdivided into parcels or land parcels based on the area occupied. Secondly, National Land Code 1965 (Act 56) allows air space rights above ground surface up to a maximum of 21 years in form ranging from an absolute conveyance to splitting off individual rights associated with the air space parcel. A majority of the respondents, 69 (65.1%) out of 106, thought that the new 3D property should be registered as leasehold rather than freehold properties. If leases were registered, two thirds of the respondents, totalling 73 (68.9%) and 22 (20.8%) felt that the leases should run at least 60 or 99 years respectively to maintain the worth of the asset and for it to be easily transferable. Eleven (10.4%) respondents opined that the lease should only be 21 years. This is always used in complicated urban multi-level mixed developments, or in the allocation of property rights concerning underground facilities in large urban areas (Mytrofanova, 2002).

There are currently many arguments about the surface under different categories of land use, subdivision, partition and amalgamation. These arguments would evidently be different if 3D property rights are used. Without the possibility of using 3D properties, other legal rights have to be used to allow separate parties to use different parts of one building or property. Such rights invoked include easements, common property, joint property or joint ownership with an individual right to use a specific part. However, each of these forms has certain disadvantages and limitations. The need for numerous uses of space and access to three dimensionally defined spaces in general is not resolved satisfactorily with only the traditional definition of property, thus calling for the introduction of ownership rights to three dimensionally defined spaces. To make such rights possible, different and new legal institutions have to be created, such as condominiums and air rights (Sandberg, 2003). Again, 3D property rights can take on different forms and can vary from full ownership to rights of different extents (Paulsson, 2007).

Some common law jurisdictions have legislation permitting air space rights above ground level in forms ranging from an absolute conveyance to splitting off individual rights associated with the air space parcel. This is often used in a complicated town development in large multi-layer construction projects or in the allocation of property rights concerning underground facilities in massive urban areas. It can be said that the legislation found in common law legal system allows for a vertical division of space, with one party owning the strata structure, another one owning the land surface, and yet another owning the air rights. However, for civil law system, this is more tricky due to a stricter adherence, which the owner of the land has ownership that also extends unlimited into slay and down into the earth. Conversely, this traditional doctrine was formed at a time when there was little use for subsurface space (Sandberg, 2003).

7. Discussion and conclusion

Most traditional cadastral systems are based on two-dimensional (2D) registers that deal only with properties on the land surface. These systems are unsuitable for today's multi-level reality. To cater to both above and below surface constructions and to enable the registration of real properties that are not limited to the land surface, it is necessary to amend the legislation. A three-dimensional (3D) approach for Cadastral System and Land Registration System can provide a better means to manage our modern world. The existing Cadastral Systems do have a number of inherent advantages like responsibility for proprietary rights, up to date information coverage and good mapping (Benhamu and Doystsher, 2003). These advantages notwithstanding, they suffer from a number of weaknesses arising from their 2D limitations that result in their dealing only with properties on the land surface.

Specialists from many countries are studying the legal status of modern structures and properties with the objective to define and register these entities both legally and technically. Inconsistencies and irregularities that may crop up in future can be avoided by registering all real property objects, both under and above the ground surface, as 3D properties in the land registry. Accordingly, the legal and technical aspects of registering real property objects incorporating 3D methodologies in the Malaysian Cadastral System should be promulgated as a new field of research in both the legislative and technical frameworks.

Research on 3D property rights and 3D cadastre is being carried out in several countries like the Netherlands and Sweden. The latter has been practising 3D property formation since 1st January 2004. From the present survey, the majority (57.5 %) of the respondents felt that the current land laws failed to define 3D property rights clearly. A large number (83.9%) of respondents thought that new legislation that integrated 3D aspects in cadastre registration, survey and mapping issues would address this anomaly. In this connection, government departments and agencies under various authorities are currently involved in preparing for the Cadastral System and Land Registration System in Malaysia. This is timely in view of the need for effective registration of 3D real properties and the improvement of the legal and technical regulations concerning 3D property rights.

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