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**Article**

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## Creating public–private partnership of a real estate database through web geographic information systems

### 1. Introduction

A central element in planning and management for urban development is information about the capital stock of facilities and real estate exchanges. This information is difficult to collect not only because the cost of collecting such information is high but also because real estate firms, aiming to preserve commercial secrecy, are not willing to share such information. With the advancement of geographic information systems (GIS) technology, geographically referenced information is of particular importance for urban development planning and management. Approximately three decades ago, when planners started to apply database technology to collect information necessary for public planning, the available computer capacity, digital data, and database software were limited. At that time, the creation of a database system was a straightforward task: a public agency provided funds for an information technology specialist group to collect raw data about particular facilities, and the group installed the completed system in the agency for daily use. With the invention of the internet and GIS, the process of creating such a system is now extremely complex. This is because the task does not merely provide a total technological solution; it also involves financial, legal, marketing, intergovernmental, system design, and organizational issues. In particular, the public sector must cooperate with the private sector for the system to function smoothly.

The Taipei City Government initiated a real estate digital database project that integrates geographic information across departments within the government and major real estate firms in Taipei to provide a platform through which the public sector, private sector, and citizens can exchange information. This editorial first reports the design of the system in Section 2. In Section 3, the effectiveness of the system is described, and Section 4 provides a conclusion.

### 2. The system

#### 2.1. Background of the construction of the Taipei City Real Estate Digital Database

Real estate plays a key role in the urban development process because it is a critical asset not only of urban development, and further, the related economic activities strongly affect local development. Housing, commercial buildings, factories, stadiums, public facilities, and other structures comprise the physical environment of urban development, and activities take place in and between these facilities. Planning and management related to real estate development must be based on useful and accurate information to make effective decisions, and the timely provision of such information can enhance governmental service delivery to businesspeople and the general public.

With the progression of the information age, the construction and provision of a real estate digital database is an urgent task for urban development planning and management. The main reason is that the digital database provides basic, timely, and accurate information for decision-making in urban development planning and management as well as convenient services for businesspeople and the general public. Therefore, the development of an information system in the Taipei City Government for land management and urban development should not be constrained to the individual construction of digital databases; rather, it should also consider the conditions of governmental organizations to integrate these systems comprehensively, enhancing the usefulness of data.

The planning and construction of the real estate digital database represent an extremely important, meaningful mission for six purposes: 1) providing references for urban operations and management decision support systems; 2) enhancing the transparency of real estate information to serve and satisfy users' needs; 3) stimulating real estate transactions for the essential consideration of real estate

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taxation and institutional reform; 4) improving and revitalizing the quality of urban real estate transactional industry; 5) incorporating soft urban revitalization mechanisms; and 6) enhancing and developing the objective of publicizing real estate market values.

The Taipei City Government designated the Department of Land to be responsible for the construction of the real estate digital database, and to complete the project smoothly, it was divided into two phases: a planning phase and a construction and operation phase. The first phase of the project started in the 2004 fiscal year and was targeted at planning (for which the National Taipei University took responsibility); it was completed by the end of 2004. The second phase of the project (from 2005 to 2006) was focused on the planning report, “Taipei City Real Estate Digital Database Construction and Operation”, which was online in June 2006. The database is now available for daily use to provide services within the Department.

## 2.2. Functional introduction to the Taipei City Real Estate Digital Database

The Taipei City Real Estate Digital Database information system was based on careful planning and includes the following main and associated functions of uses for governments, domestic businesspeople, and the general public.

- 1) Location query and overlay function: A location query can be made by the user by inputting and selecting various data, including addresses, roads, landmarks, land registration numbers, administrative districts, and construction numbers. Once the user designates the relevant conditions, the system will display maps and attribute data that match these conditions. Mapping overlay provides cadastral maps, terrain maps, administrative maps, cadastral file maps, urban planning maps, landmark maps, building maps, and air photograph maps for spatial mapping analysis.
- 2) Real estate basic information query function: This function provides the user with the ability to query basic real estate data, such as the zoning ordinance for land development, the property right status of land and buildings, the status of construction and land use permits, and the provision of real estate taxation information (including land price tax and increased land valuation tax).
- 3) Real estate transaction information query function: This function mainly provides the user with the ability to query real estate outlook information, and general consumers can query the information about pre-construction sales, constructed buildings sales, rented buildings, and public housing services. Companies can query information about the renting and sales of factories, lots, shops, offices, and state-owned properties to provide the user with a platform of complex transaction information.
- 4) Environmental information query function: For environmental information, the function collects real estate-related information that is scattered around the public and private sectors for query, mainly including the information about the population, household incomes and expenditures, industrial and commercial services, crimes and noise, traffic, amenity facilities, NIMBY (Not In My Back Yard) facilities, community, and under-represented groups facilities, with more than one hundred data items as comprehensive as possible.
- 5) Basic and advanced statistical function: Basic statistics are created using the data of the aforementioned basic information, transaction information, and environmental information to identify statistical information for a specific spatial and temporal scope. In addition, this function categorizes these statistical functions for cross-statistical analysis. At a minimum, the contents include statistics about corporation operations, real estate renting and sales information, planning controls and public facilities, hazards mitigation information, and so on.
- 6) Decision support system function: The decision support system is one of the innovative functions of the database. It is created to support decision-making and research for the general public, real estate agents, construction companies, valuation companies, governmental departments, and academic institutions. It includes a weighting analysis for NIMBY facilities and dwelling risks: the user selects the items for which he or she thinks the nearby NIMBY facilities and dwelling risks would affect real estate values, and through the database’s analysis, obtains an analytical value and location for the purchaser to select a location where dwelling risks are small and far from NIMBY facility invasion. Alternatively, the planner delineates locations to reduce external costs derived from NIMBY facilities.
- 7) Location analysis for housing purchase, factories, and shops: This function proceeds with the factors of the user’s considerations in selecting the locations for housing, factories, and shops and affordability when choosing appropriate locations for real estate investments or corporation operations as references.
- 8) Weighting analysis for amenity districts: This function mainly provides the user with familiarity with the status of convenient, safe environmental quality for a particular district. The user can independently select the variables that he or she thinks are influential from the system, and through the system’s computation, he or she can become familiar with the service levels of the public facilities and dwelling safety.
- 9) Legal query function: Designed in the associated functions of the database, this function includes legal query services of land administration laws and real estate transaction laws.
- 10) Associated function: This function includes electronic services, such as an electronic newsletter and a broadcast bulletin board, to provide the user with more legal and other related information.

## 2.3. Effectiveness of the Taipei City Real Estate Digital Database

The construction and use of the Taipei City Real Estate Digital Database for the public sector would provide comprehensive real estate basic and statistical data sources for government departments or researchers to conduct research and make related decisions. Furthermore, for planning decisions, governments can apply the function of weighting analysis for NIMBY facilities to assess the NIMBY levels of selected locations to layout the NIMBY facilities and reduce their effects. Companies could also apply the weighting analysis

function to select locations for factories and shops. Housing purchasers and dwellers could understand housing locations and the quality of the dwelling environment through the weighting analysis for housing purchase and amenity analysis. The publicized, transparent real estate transaction information could not only reduce the risks of transaction costs but also promote the purchasing power of real estate transactions. Therefore, the comprehensive and multi-functional Taipei City Real Estate Digital Database would be very effective for prospective users in the future.

### 3. Conclusions

A competitive city must be capable of managing and operating public databases with effective, advanced technologies, and the real estate database plays a crucial role. The construction of a real estate transaction database can provide citizens, the architectural industry, real estate appraisers, real estate agents, banking investors, and governmental decision-making units with sufficient, timely information about real estate status to enhance normal real estate transactions, reduce wasted investments, and create efficient urban land use and regional development. Therefore, it is a single strategy that addresses multiple objectives.

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