Using 3D Geographic Information System to Improve Sales Comparison Approach for Real Estate Valuation

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SUMMARY

Geographic Information System (GIS) technology provides valuers with analysis tools to enhanced real estate valuation. The objective of this paper is to illustrate how GIS with three-dimensional visualization can improve traditional real estate valuation approaches. First of all, an integrated database for real estate valuation was built with real estate database, spatial database and valuation thematic database. The integrated database provides professional data support for valuation. Secondly, virtual reality technology combined with digital elevation model was used to construct a three-dimensional visualization environment. Three-dimensional building models can be added for working area reappearance. Through GIS tools, it benefits the understanding of working environment before field work. Importantly, an improved 3D GIS sales comparison approach was proposed as the demonstration of the combination of valuation methods and GIS. In this approach, a flowchart was first introduced, which enhanced the determination method of selecting and querying of comparable cases. Specifically, a 3D GIS valuation model was proposed. In the first place, feature analysis was executed to determine the impact factors of the value of properties, and then quantitative analysis was used to form a quantitative table for further analysis. Next, by utilizing spatial analysis, the feature factors can be accurately measured. In this model, spatial analysis, including spatial query, buffering, network, visibility, and surface analysis, was conducted for factor evaluation such as regional planning, regional prosperity, transportation convenience, landscape, environmental condition, fundamental infrastructure and public facilities conditions. According to the analysis results and quantitative table, each impact factor can be calculated, and represented as matrix. Then, through dimensionless treatment, detailed comparison approach among comparable cases in each factor can be executed, as well as the similarity analysis between the estimated object and comparable cases. Eventually, the most relevant comparable cases can be determined and the accurate adjustment can also be calculated for estimated object valuation. To illustrate the above approach, a prototype system was implemented. Actual data of Shenzhen have been used. The practice shows that more relevant data can be well collected and managed, which further promotes the data usage and data sharing. Second, it highly improves the working efficiency and the valuation accuracy, which further enhances the credibility of real estate valuation work. To sum up, the combination of 3D GIS with real estate valuation shows great benefits to promote valuation approaches, and eventually, it will promote the informatization of the entire property valuation industry.

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