Modeling property rating valuation using Geographical Weighted Regression (GWR) and Spatial Regression Model (SRM): The case of Kota Kinabalu, Sabah

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Abstract

Property revaluation or reassessment is a compulsory activity for property tax to be imposed on all properties. It was conducted manually, involving exhaustive, time consuming and costly processes. As such there is a growing need to develop alternative valuation models capable of estimating property values of large numbers in a short time with little manpower and low costs. The spatial statistics of geographical weighted regression (GWR) and spatial regression model (SRM) are two of them. This study demonstrates the development of the GWR and SRM in estimating residential property value in areas under the Kota Kinabalu City Hall (DBKK) jurisdiction. It collected and cleaned 5,524 data items. Five valid and significant variables were identified and utilized in the modeling exercise. By using GWR and SRM various tests were conducted to identify and remove modeling errors such as multicollinearity, heteroscedasticity and spatial autocorrelation. It was found that the SRM stood out as the best property rating valuation model for DBKK area compared to the GWR. The SRM analysis also identified the building quality as the main positive influence of the property rates while the location factor provides the least in influence. In short, this study had proved the effectiveness of SRM in producing a property rating valuation model even with problematic dataset. It could also, in addition, easily produce property value maps to indicate variations in property rates and thus improve the management of property rating valuation in local authority areas.

Keywords: geographical weighted regression (GWR), Kota Kinabalu, model error, property rating, property valuation model, spatial regression model (SRM)