

# A PROPERTY VALUATION MODEL TO IDENTIFY THRIVING REAL ESTATE OPPORTUNITIES, BASED ON TRANSPORT FACTORS

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**ABSTRACT** - This study is an attempt to comprehend what transport variables (E.g. distance to main city, distance to Major “A”, “B” Roads etc.) has higher or lower impact on a property’s worth and to what extent has it been impacting on a property’s value. In order to experiment it, a valuation model using Geographical Information System and Multi linear Regression has been created for an urban local area, using the foundation of literature and real ground stakeholders’ judgments. The model generates the outcome of the spatial variation of property value, demonstrating the behavioral patterns and trends graphically, considering both the adjacency effect (transport variables) and neighborhood effect. (physical and social environments). This research highlights the prominence in transport variables’ impact on property value over the neighborhood variables. This model could serve as a starting guidance tool for valuers, brokers, property agents, planners, researchers and other parties involved in the real estate & infrastructure sector to estimate property value that is highly based on transport variables.

**Keywords:** Transport variables; Valuation model; Property assessed value

## 1. INTRODUCTION

In Surveys done in developing countries and developed countries regarding the current property valuation methods in use, it’s highlighted that many are still in use of traditional methods and still advanced techniques are not in high practice in either developing countries or developed in spite of their application in theoretical models (Abidoeye et al., 2019). These traditional property valuation methods which considers the calculations of Comparative method, Residual method, Contractor’s method etc. (Pagourtzi et al., 2003) ignore a major element; the “spatial” character of a property. According to literature, these traditional techniques are primarily biased on physical and economic factors of an individual property, but not so much on this “spatial” factor. The spatial factor can be considered in two major sets of variables. (1) Transport variables (Accessibility) and (2) Neighborhood variables (physical & social environment) of a property. With the background knowledge of these methods, the research highlights the need of modern valuation approaches as, Valuation models as it’s not highly in practice in Sri Lankan context.

As a result, the purpose of this study is to investigate the gap in practice in advanced valuation approaches that can grasp the impact of these transport & neighborhood variables on a property's value. So, the main objective is to **identify what variables can impact on property value and to what extent in terms of transport access & neighborhood of a property.**

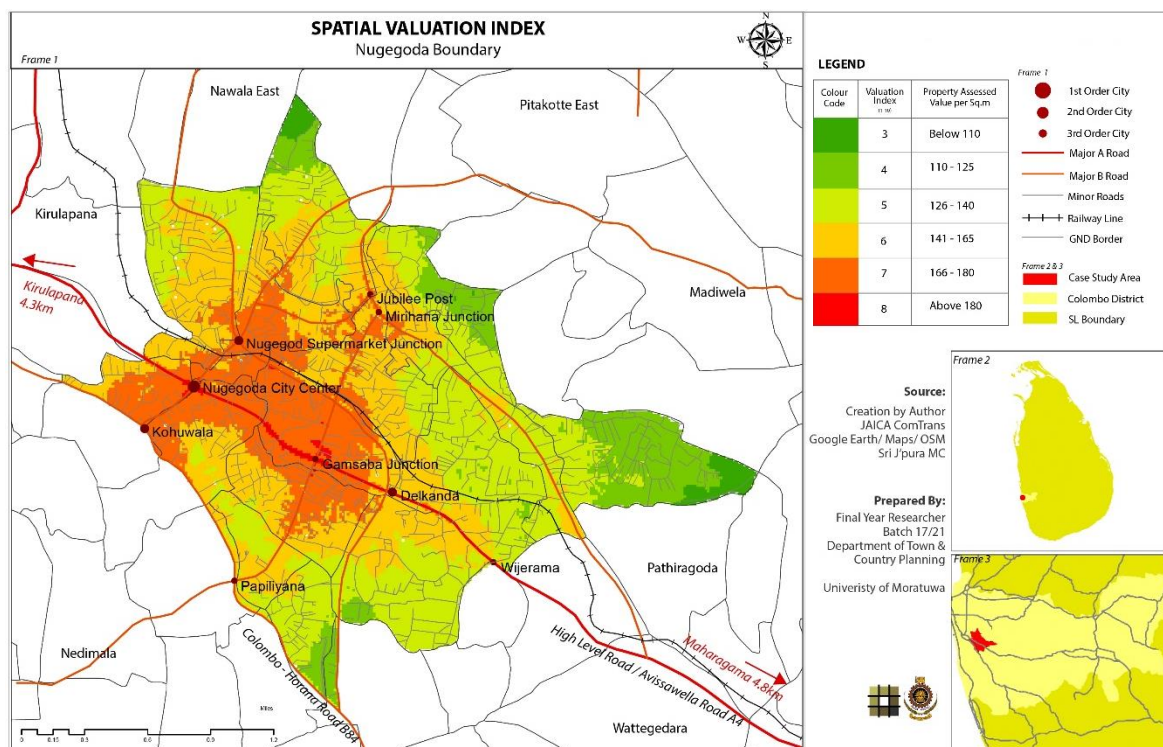
## 2. MATERIALS AND METHODS

Methodology of the study follows a three staged analysis. **(1) Analysis Stage I:** A set of transport & neighborhood variables are shortlisted by cross referencing variables found through literature & real estate stakeholders’ judgment collect through semi structure interviews. **(2) Analysis Stage II:** Creation of a Geographic Information System (GIS) Model for valuation using the previously identified transport & neighborhood variables. A Multi Criteria Analysis using the weighted overlay tool is used since it enables to rank the different variables in terms of their influential percentage on property value. **(3) Analysis Stage III:** The final analysis using SPSS, is generating the outcome of the Pearson’s correlation between each variable and property values in local case study area. At this stage it prominently displays how each transport

factor’s impact is higher than the rest of the variables. Also a multi linear regression model (SPSS) is created using the highest significant transport variables so that, an individual plot’s property value can be estimated once the plot’s distance to each transport & infrastructure facility is substituted to the equation.

The model is run for an urban local case study area; Nugegoda. An area within 2km buffer from the main city center is selected as it’s an area that has been showing high fluctuation in property values due to the changes in transport & infrastructure developments in the recent past years. 17 variables’ data (Distance to Main City, Distance to Major roads, Road Breadth, Distance to Educational, Health Institute etc.) are collected through primary sources as Municipal & Urban Councils and secondary data as JICA (Japan International Cooperation Agency) CoMTrans (Urban Transport System Development Project for Colombo Metropolitan Region and Suburbs) & digitized layers from satellite images of Google Earth, Open Street Map etc.

### 3. RESULTS AND DISCUSSION



**Figure 1.** GIS Model Outcome: Spatial Variation Index (SVI)

The Spatial Variation Index depicted in Figure 1 indicates the property value changes in Nugegoda in terms of transport & neighborhood variables. The outcome mimics the real ground and it eases to understand patterns and trends on where the upcoming potential areas for high values are situated.

Table 1 exhibits the transport & variables’ and physical infrastructure variables’ correlation to the property values in Nugegoda in order. A Geo Information System-created Spatial Valuation model serves as a foundation for more advanced valuation models such as AVMs. (Automated Valuation Models).

**Table 1.** Key Findings of the impact of each transport & physical neighborhood variables

Variable	Coefficient
Distance to Main City	-0.739**
Distance to “A” Road	-0.713**
Distance to Educational Institutes	-0.711**
Breadth of Main Access road	0.691**

Distance to Railway Stations	-0.636**
Distance to Bus Halts	-0.632
Distance to Sub City	-0.627**
Distance to 1 <sup>st</sup> Order grocery shopping	-0.621**
Distance to “B” Road	-0.564**
Distance to 2 <sup>nd</sup> Order grocery shopping	-0.544**
Distance to Health Institutes	-0.533**
Distance to Recreational Spaces	0.160

Note: \*\* Variables with higher significance level (significant at 0.01 level)

#### 4. CONCLUSION

In conclusion, this study reflects what transport variables can impact on property value to what extent, and deliver a configuration in graphics, on potential trends in future. (It comprises the main transport variables even though it is limited by nontangible & qualitative variables that aren't captured by a model). The results of the analysis also contribute a set of common variables and their impact levels to a default urban and local area (specifically ideal to any Colombo suburban,) that could be used to generate a unique valuation model individually. With appropriate customizable choices for different urban, local case study areas, such models can be improved.

These models serve as a basis for a business pitch to advising firms, demonstrating as an initial guide in creating property market valuations for buyers and sellers depending on “location”. Furthermore, software and applications (Apps) can be developed in such a way that any party involved in the process can generate their own property prices utilizing such timely automated valuation models.

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