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**JOHOR
INNOVATION
INVENTION
COMPETITION
AND
SYMPOSIUM
2023**



"Innovation Inspires a Society
to be Critical and Creative"

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**AHMAD KHUDZAIRI KHALID
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Preface

In the name of Allah, the Almighty who gives us the enlightenment, the truth, the knowledge and with regards to Prophet Muhammad (peace be upon him) for guiding us to the straight path. We thank to Allah for giving us guidance and strength to write this e-book.

This e-book compiles the extended abstracts that submitted to Johor Innovation Invention Competition and Symposium 2023 (JIICaS2023), where JIICaS2023 is a virtual platform for all creative minds to share and present their invention and innovation. The extended abstracts are divided into two categories, which are Category A (Higher Educational Student/ Any Recognized Institutional Students in Malaysia) and Category B (Primary/ Secondary School Students / Special Education School Students in Johor). Each abstract gives a brief background on the innovation or project.

We hope that this e-book will help the readers to get to know the innovation done by the students from both categories and get some ideas to develop future innovation products.



SITESPECTRUM: A MULTI-CRITERIA DECISION SUPPORT SYSTEM FOR REAL ESTATE SITE EVALUATION USING AHP

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ABSTRACT

Prior to the development of certain real estate projects, developers will search for a quality site that is suitable for their proposed project. This project is aimed at developing an assessment model that can identify the quality level of a development site, and therefore assists in decision making process. Through a combination of literature review, expert opinions, and statistical analysis, the research develops a framework for prioritizing these components based on their relative importance. To develop the assessment model, firstly, a list of factors that contribute to the quality of site were identified from the literatures. Secondly, the factors were arranged in the hierarchy form suitable for AHP analysis. Thirdly, the final hierarchy was developed and validated by two (2) real estate experts. The AHP analysis will prioritize the factors that contribute to the site quality, subsequently developing the assessment model that can be used to measure the site quality in index form. The final AHP model consists of three (3) levels; Criteria level 1 (three (3) components, Sub-criteria level 2 (eleven (11) components) and Factors level 3 (thirty-eight (38) components). The findings of this study provide valuable insights for real estate developers, investors, and policymakers in making informed decisions regarding site selection and development.

Keywords: Real Estate Development, Analytic Hierarchy Process (AHP), Physical and Locational Quality.

1.0 INTRODUCTION

In the field of real estate development, choosing the best location is a key factor in determining project success. A development site's potential for successful and sustainable development is largely influenced by its physical and geographic characteristics. Since these aspects directly affect market demand, feasibility, and overall project viability, developers and investors carefully assess a variety of criteria that contribute to a site's physical and geographic qualities. Making educated judgements and maximising the worth and potential of a development site require an understanding of and evaluation of these elements.

A site's physical and geographic characteristics work together to influence its marketability and desirability. Real estate stakeholders can analyse and choose development sites that are in line with their goals, maximise return on investment, and improve the built environment by comprehending these factors and how they affect site quality. Therefore, SITESpectrum assists in making a viable decision in determining the quality of the site for residential real estate development.

2.0 OBJECTIVES

The principal objectives of this innovation idea are as follows; -

1. To identify the key features that contribute to the quality of a site for residential development.
2. To develop a multi-criteria decision support system for real estate site evaluation, namely the SITESpectrum system.

3.0 DESCRIPTION OF INNOVATION/METHODOLOGY

Our vision is to develop a user-friendly, yet powerful decision support system that considers a diverse range of criteria and helps stakeholders make informed, objective choices. By harnessing the power of Analytcs Hierarchy Process (AHP), this system could provide a robust solution that balances quantitative and qualitative factors in the site evaluation process.

The process of developing the SITESpectrum model started from identifying the factors from literatures and arranging the factors in Hierarchical Structure. It consists of Goal, Criteria Level 1, Sub-criteria Level 2, and Factors Level 3. The final hierarchy mode was further validated by two experts. Figure 1 below shows the final hierarchical model for SITESpectrum system.

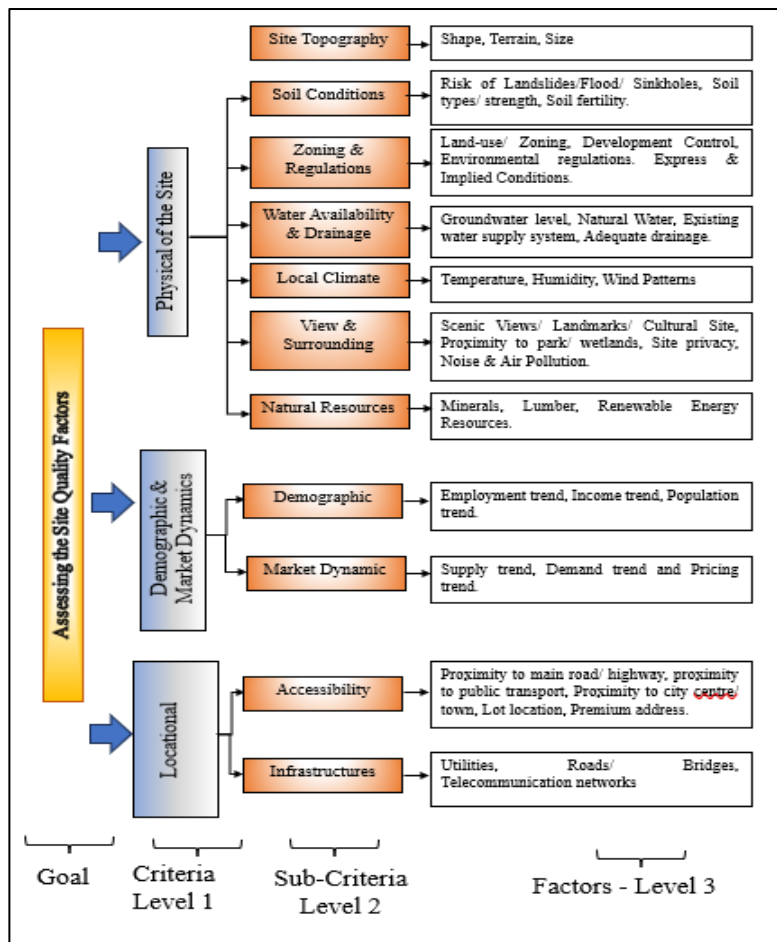


Figure 1. SITESpectrum Hierarchical Model

Second step focuses on obtaining the data from ten (10) expert panels in real estate development using AHP structured pair-wise comparison questionnaire survey. The panels are required to key-in their preferences in the Expert Choice Software.

In final step, the data is analysed to obtain the weights for each factor, that can be used to develop the Site Evaluation Index (SEI). This index summarises the relative importance and performance of all site evaluation factors. Higher SEI denotes high quality development site and vice versa. Figure 2 below depicts the initial Global Weight results for the development of the SITESpectrum system.

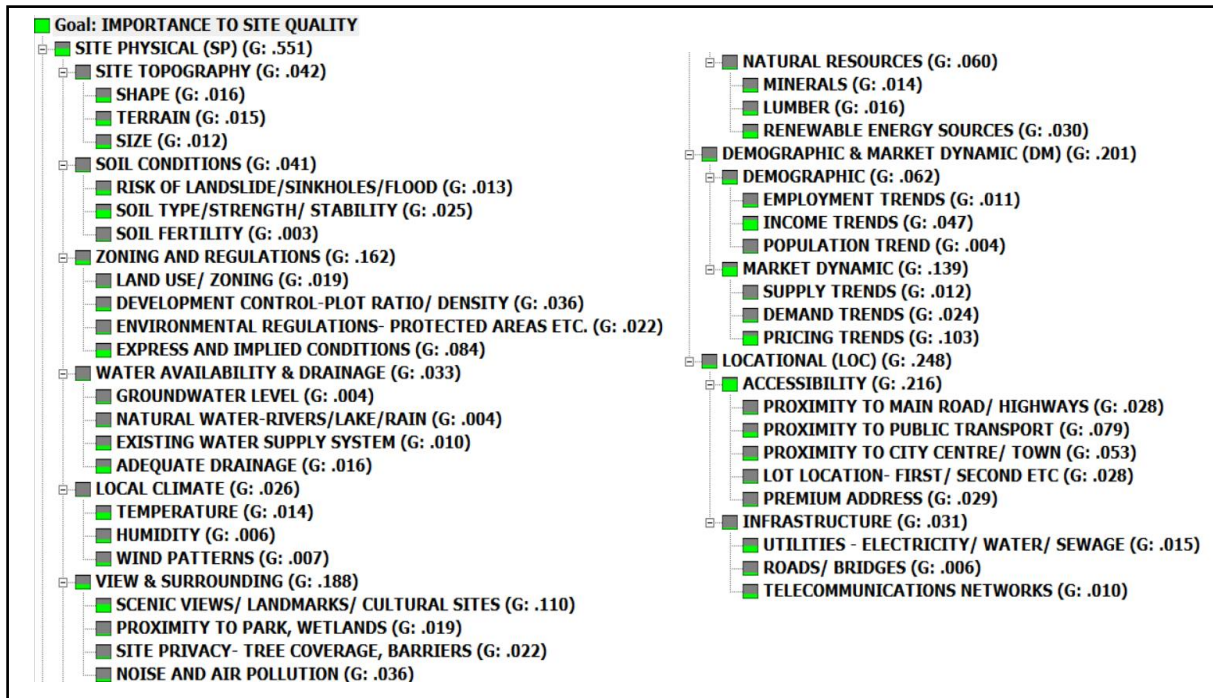


Figure 2: Initial Global Weight Results for SITESpectrum

4.0 ADVANTAGES

SITESpectrum brings advantages to user in the context of; -

- i. **Improved Decision-Making:** SITESpectrum helps users make more informed, objective site selection decisions, reducing the risk of costly mistakes.
- ii. **Time and Cost Saving;** SITESpectrum streamlines the process, enabling faster evaluations and optimising resource allocation.
- iii. **Sustainability and Environmental Focus;** The system’s consideration of environmental factors encourages the selection of sites with lower ecological impact, contributing to sustainable development practices.

5.0 CONCLUSIONS

SITESpectrum represents a paradigm shifts in real estate site evaluation. By leveraging the power of AHP, this decision support system offers a data driven, comprehensive, and user-friendly approach to selecting the most suitable residential development sites. With SITESpectrum, we envision a future where real estate projects are strategically planned, environmentally conscious and economically successful.