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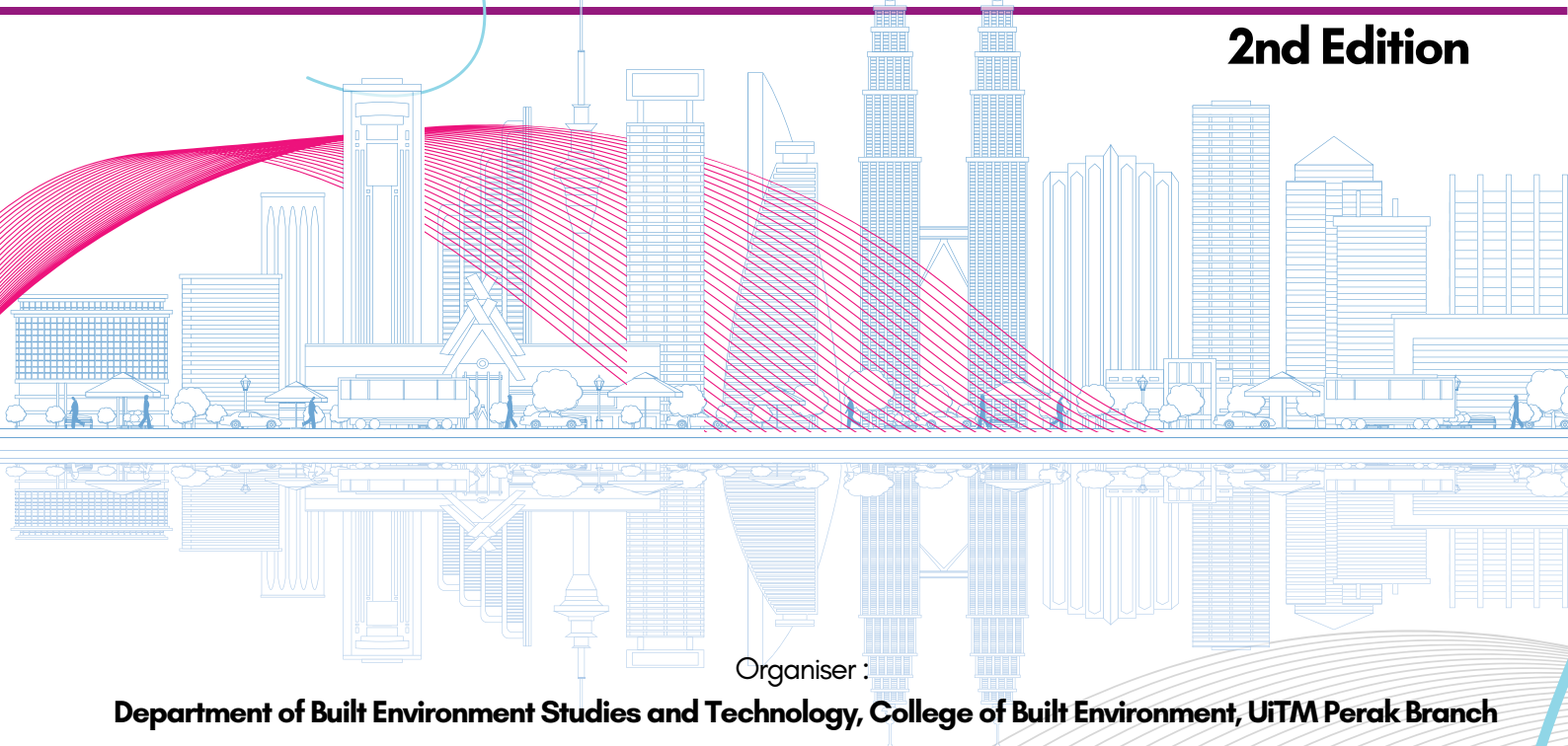
Cawangan Perak

e - Proceedings



Proceeding for International Undergraduates Get Together 2024 (IUGeT 2024)
"Undergraduates' Digital Engagement Towards Global Ingenuity"

2nd Edition



Organiser :

Department of Built Environment Studies and Technology, College of Built Environment, UiTM Perak Branch

Co-organiser :

INSPIRED 2024. Office of Research, Industrial Linkages, Community & Alumni (PJIMA), UiTM Perak Branch

Bauchemic (Malaysia) Sdn Bhd

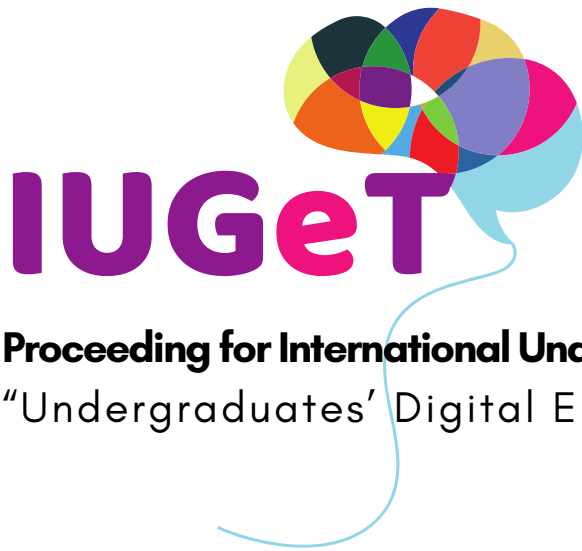
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CONCEPTUAL FRAMEWORK FOR FACTORS AFFECTING CONSTRUCTION QUALITY IN JOHOR, MALAYSIA

Woo Yu Ting^{1*}, Nor Haslinda Abas^{2*}, and Noor Helmie Shahreen
Mohd Ali³

^{1,2}Faculty of Civil Engineering and Built Environment, Universiti Tun Hussein Onn
Malaysia, 86400 Batu Pahat, Johor

³Nusajaya Rise Sdn Bhd, Imperia Office Tower, Jalan Laksamana 1, Puteri Harbour,
79000 Iskandar Puteri, Johor

*nhaslin@uthm.edu.my

ABSTRACT

Maintaining high construction quality is a constant challenge as quality problems affect building safety, increase maintenance costs, and reduce user satisfaction. This study investigates the factors influencing construction quality in Malaysia, with a particular focus on Johor, in the context of rapid urbanisation and growing infrastructure demands. A total of 33 factors were extracted and categorised from the literature and organised into a questionnaire with 12 major groups. This survey was completed by 125 construction professionals who returned their responses. Cronbach Alpha was used to examine the reliability of the collected data before proceeding to the Relative Importance Index (RII) in determining the relative ranks of identified factors. Based on the analysis, it is identified that the most significant factors are lack of expertise, followed by inconsistent design documents, insufficient cooperation between contractors, resource availability, weather conditions, and management skills. The findings offer practical recommendations for authorities and stakeholders to improve building quality. They provide an overview of high and low ranks of factors and raise awareness of quality issues that must be addressed.

Keywords: *Quality, Construction Industry, Factors affecting quality, Questionnaire survey, Malaysia*

1. INTRODUCTION

The construction industry is vital to a nation's economy, contributing significantly to GDP through infrastructure and facilities development. Ensuring quality construction is crucial to prevent issues on overspending. Poor quality can result in increased costs and delays (Olanrewaju, 2021), influenced by factors such as material costs, communication issues, and insufficient supervision (Khodeir, 2019). This study aims to categorise and analyse these factors to improve construction quality in Malaysia. Challenges in maintaining high standards are evident in Malaysia. For instance, the building sector commonly faces quality, safety, and cost overrun issues (Nguyen, 2013). Previous studies have highlighted factors affecting construction quality, but there's a need for focused research in regions like Johor to develop targeted interventions (Gan, 2017; Olanrewaju, 2021).

2. RESEARCH METHODOLOGY

In the present study, a questionnaire was developed to assess factors affecting construction quality in Malaysia. The questionnaire that incorporates 12 major factors was developed based on a comprehensive literature review. The questionnaire includes two main parts. The first part comprises respondent demographics while the second part comprises the respondents'

level of agreement on the factors affecting construction quality. The level of respondents' agreement is rated based on Likert scales from 1 (strongly disagree) to 5 (strongly agree). To determine the instrument's validity, the questionnaire was validated by an academic and an industry expert, both with over ten years of experience.

A pilot study involving 20 respondents resulted in a high Cronbach's Alpha of 0.976, indicating strong reliability. The final questionnaire was distributed to 125 construction stakeholders in Johor using convenience sampling due to the unknown population size. The overall reliability was confirmed with a Cronbach's Alpha of 0.966.

The Relative Importance Index (RII) was used to determine the factor that yields the weight of agreement in the perceptions of respondents. Khodeir (2019) mentioned that the RII method is commonly implemented by researchers to ensure the perceived significance of respondents of different factors. The following formulae is the formulae for the Relative Importance Index (RII):

$$\text{Relative Importance Index (RII)} = \frac{\sum W}{A \times N} \quad [1]$$

Where,

W = the given weight by the respondents to the factor which is 1–5
on the Likert Scale
N = the total number of respondents
A = the height weight on a particular factor among all
respondents (could be maximum of 5 and minimum of 1, as a
five-point scale is used

3. RESULTS AND DISCUSSION

3.1 Background of respondents

The survey involved a diverse group of construction professionals in Johor, with 57% male and 43% female, ensuring representation of both genders. Most respondents are young, with 46% aged between 21-30 and 42% aged between 31-40, indicating that younger professionals will likely shape Johor's future building industry. A smaller portion (13%) are over 40, suggesting a potential experience gap that could benefit from mentoring initiatives. The respondents are highly educated, with 66% holding bachelor's degrees. Engineers make up 45% of the group, highlighting their critical role in construction projects. The survey includes professionals from structural, civil, and quantity surveying fields, ensuring a comprehensive view of factors affecting construction quality. The participants also include consultants (42%), contractors (42%), and owners (16%), providing insights into both strategy and implementation. Experience levels are varied, with 43% having less than three years of experience and 8% having over ten years, ensuring a mix of fresh perspectives and seasoned expertise. Most respondents specialise in buildings and structures (60%), reflecting Johor's focus on these types of projects, while others work in electrical and mechanical (16%), infrastructure (23%), and geotechnical (1%) engineering, showcasing the diversity of projects in the region. In conclusion, the survey participants represent a well-diversified group of construction professionals in Johor. This variety strengthens the validity of the findings and offers a comprehensive picture of the factors influencing construction quality in the region.

3.2 Factors affecting construction quality in Malaysia

Figure 1 illustrates the conceptual framework of factors affecting the construction quality in Johor, Malaysia.

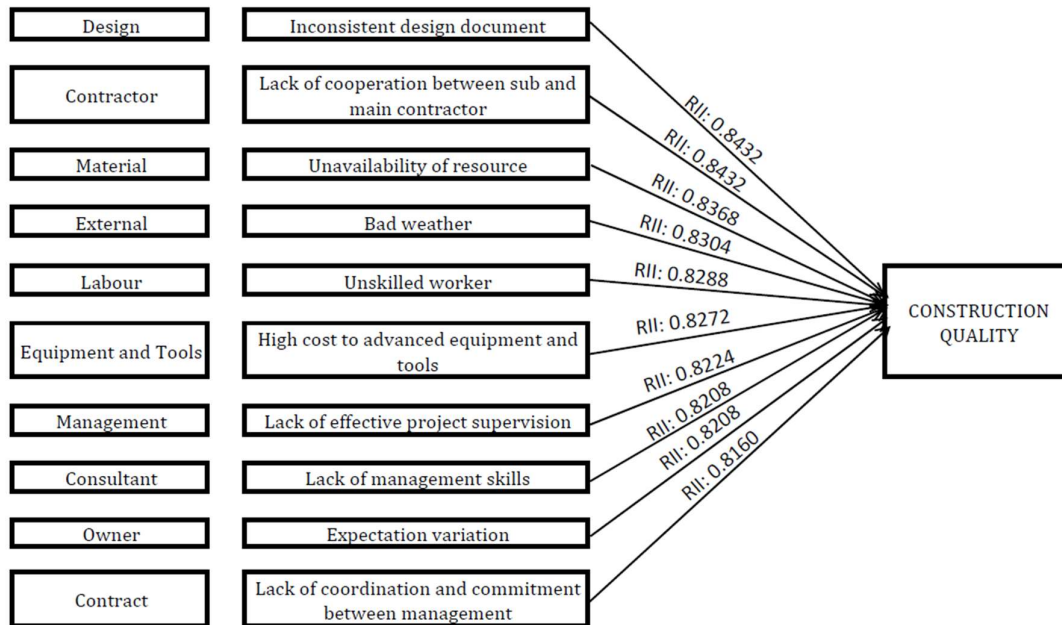


Figure 1. Conceptual framework of factors affecting the construction quality in Johor, Malaysia

Table 1 shows the respondents' perceptions of the factors affecting construction quality in Malaysia. The RII is used to identify the key contributing factors that affect construction quality. In addition, the RII method offers a quantitative approach to identify the most critical factors for improvement strategies.

Table 1. RII based ranked of major groups of factors

Major groups	Rank				
	RII	Overall	Consultant	Contractor	Owner
Design	0.8432	1	12	6	1
Contractor	0.8432	2	4	10	2
Material	0.8368	3	1	2	5
External	0.8304	4	3	3	6
Labour	0.8288	5	7	11	11
Equipment and Tools	0.8272	6	9	1	3
Management	0.8224	7	10	7	12
Consultant	0.8208	8	5	8	7
Owner	0.8208	9	8	12	8
Contract	0.8160	10	6	5	9
Project	0.7968	11	2	9	10
Cost and Time	0.7872	12	11	4	4

As shown in Table 4.1, the Relative Importance Index (RII) analysis highlights the critical factors influencing construction quality in Malaysia, such as faulty design, resource availability, and effective subcontractor-main contractor collaboration. Alhazmi (2023) emphasises that design flaws, particularly in structural elements, significantly impact project quality, aligning with the high ranking of "Inconsistent design documents (F9)" in the RII data. This finding is consistent with industry observations in which design integrity directly correlates with structural safety and durability. Similarly, Rahman (2020) highlights the challenges posed by the unavailability of key resources, noting that delays and shortages can disrupt projects and degrade quality, underscoring the importance of "Unavailability of Resource (F11)." Given recent global supply chain disruptions, better resource management strategies are crucial. Martin (2021) stresses the importance of fostering cooperation and communication between subcontractors and main contractors for project success, which aligns with the high ranking of "Lack of Cooperation (F19)." Effective collaboration is essential for mitigating project risks and ensuring quality completion.

Comparatively, research in Bangladesh reveals both similar and distinct challenges. Rahman (2020) identifies resource availability and effective project management as major factors affecting construction quality, mirroring Malaysia's resource issues. However, while inconsistent design documents are a significant concern in Malaysia, they are less frequently cited in Bangladesh. Instead, project management practices and supervision quality are more emphasised, as noted by Shakil Ahmed (2020). This is also a notable concern in Malaysia, with "Lack of Effective Project Supervision (F30)" being significant, though ranked lower than design flaws and resource availability. Additionally, issues related to contractor and subcontractor relationships in Bangladesh highlight that poor cooperation and communication significantly hinder project performance and quality. This resonates with findings in Malaysia and underscores the universal importance of effective stakeholder collaboration in the construction industry. Overall, improving design accuracy, ensuring resource availability, and fostering effective collaboration are essential strategies for enhancing construction quality in both countries amidst rapid urbanisation and infrastructure demands.

In addition, the Relative Importance Index (RII) analysis reveals differing priorities among consultants, contractors, and owners regarding construction quality. Consultants prioritise material availability, project planning, and external conditions, reflecting their focus on smooth project execution and risk management. Contractors emphasise factors like equipment, tools, and material availability, which directly impact construction efficiency. Owners, concerned with the outcome, prioritise design quality, contractor reliability, and equipment availability to ensure the project meets their expectations. These varied priorities highlight the unique perspectives of each group and highlight the importance of coordination and communication among stakeholders throughout the project lifecycle.

4. CONCLUSION

Based on the findings from this study, it is evident that certain factors significantly influence construction quality in Malaysia more than others. The analysis of the top three factors influencing construction quality in Malaysia are faulty design, resource availability, and effective collaboration between subcontractors and main contractors highlights key areas for improvement whereas the least affected factor was type and nature of construction project indicated that both scale and type of project would not affect the construction quality. However, the study has limitations, such as potential bias from convenience sampling and a regional focus on Johor, which may not fully represent Malaysia's construction industry. The reliance on self-reported data introduces subjective bias, which could affect the accuracy of the

findings. To address these limitations, future research should use more representative sampling methods, expand geographically, and incorporate qualitative methods like interviews and focus groups. By doing so, the construction industry can better align project plans with practical execution, enhance collaboration, and consistently meet quality expectations, contributing to more sustainable and resilient infrastructure development.

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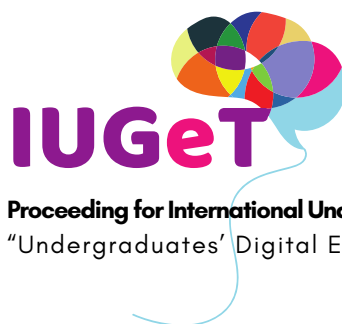
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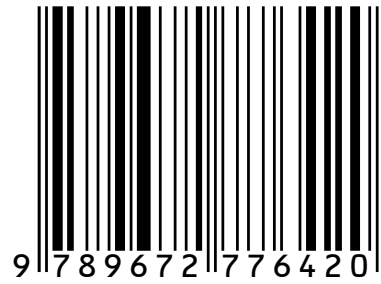
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