PLANNING MALAYSIA:
Journal of the Malaysian Institute of Planners
VOLUME 24 ISSUE 1 (2026), Page 335 – 349

CRITICAL ANALYSIS OF PAYMENT DELAYS, UNDER-PAYMENTS AND NON-PAYMENTS ENCUMBERING ENGINEERING CONSULTANCY PRACTICES IN CONSTRUCTION PROJECTS

Ting Sim Nee[1], Lee Yee Yong[2], Gui Hun Chuen[3], Chong Wan Siang[4], Ng Chee Khoon[5]

[1, 2, 5] *Department of Civil Engineering, Faculty of Engineering*,
[3,4] *Department of Quantity Surveying, Faculty of Built Environment,*
UNIVERSITI MALAYSIA SARAWAK

Abstract

Engineering Consultancy Practice (ECP) plays a crucial role in Malaysia's construction industry, supporting the nation development and progress. Engineering consultants through their professional practices provide essential technical services and expert advice to clients throughout construction projects. In Malaysia, consultants are typically reimbursed based on the Board of Engineers Malaysia (BEM) Scale of Fees, which serves as the primary revenue source sustaining ECP operations. However, despite the adherence to BEM's Scale of Fees, engineering consultants in Malaysia continuously encounter payment issues, namely payment delays, under-payment and even non-payment, posing a concerning scenario within the nation's construction industry. To determine the extent and significance of payment issues affecting engineering consultants, this study employed a structured questionnaires survey targeting engineering consultants in Malaysia. A total of 174 responses were collected through online questionnaires, telephone interviews, face-to-face engagement and email correspondence. The findings show that late payment, underpayment and non-payment are prevalent across government, GLC and private projects, with the private sector recording the greatest incidence, delays averaging one to three months, and typical payment deficits of 10–30%. The study contributes empirical benchmarks that support more effective contractual, regulatory and payment management frameworks to strengthen financial sustainability within engineering consultancy practice.

***Keywords*:** Payment, Delays, Non-Payment, Engineering, Consultants

[1] Corresponding author. Email: snting@unimas.my

INTRODUCTION

Engineering Consultancy Practices (ECP) refers to a specialised professional service within the engineering industry, in which chartered engineers, who are also known as engineering consultants, offer expert advices, technical solutions, and comprehensive engineering services to an array of private as well as public clients through their authorised consulting firms recognised in each of their respective countries (du Preez, 2018). The primary purpose of an engineering consultancy practice is to assist individuals, businesses, governments, and organizations in making informed decisions, solving complex engineering challenges, and successfully executing projects within the field of engineering (Hoffman et al., 2023). Engineering consultants utilise their technical expertise, knowledge of industry standards, and innovative problem-solving skills in a variety of engineering disciplines to develop designs that meet their clients' needs while considering safety, sustainability, cost-effectiveness, and regulatory compliance (Wan Zukifli et al., 2008; Ying and Wang, 2020). Their contribution plays a vital role in shaping the built environment and thus, advancing multiple upstream and downstream industries along its path.

ECP provide essential engineering services and expert advice to clients, enabling informed decisions in construction projects. Their technical responsibilities encompass various tasks, including designing and producing drawings for tender and construction stages, supervising construction work, offering specialized technical guidance, and providing project management support, including contract administration (Lai et al., 2016). Their design scope encompasses a wide range of items, which includes but is not limited to significant infrastructure projects, residential and commercial buildings, mechanical and electrical systems, and communication networks (Lai et al., 2014). The comprehensive expertise of engineering consultants across these diverse domains contributes significantly to the advancement of engineering practices and fosters sustainable development within various sector.

For any businesses, a steady and seamless monetary flow is essential for survival and performance (Mohd Badroldin et al., 2016). Engineering Consultants, for the large part, operates as a project-based organisation, encapsulating the execution of projects from design to construction (Chitongo and Pretorius, 2017). Thus, the Engineering Consultant seeks to benefit financially (good financial performance, and thus good business performance) during project execution. In Malaysia, ECP typically receive reimbursement based on the Board of Engineers Malaysia's (BEM) Scale of Fees, commonly known as professional fees. These fees serve as the primary revenue source, sustaining ECP operations. In order to maintain ethical conduct and safeguard clients from potential fraud, the Board of Engineers, Malaysia (BEM), strictly

regulates and registers ECP in adherence to relevant acts under Registration of Engineers Act 1967 (Lai et al., 2016).

However, ECP incur significant operational costs, including salaries and benefits for engineers, technical, support, and administrative staff involved in project delivery and business management (Salehin, 2007); office space and utilities; and investments in software, hardware and engineering equipment necessary for design, analysis, and project management (Lee et al., 2022; Syed Jamaludin et al., 2022). Regular maintenance and upgrades further add to these expenses. ECP must also maintain professional and general liability insurance, obtain and renew licences and certifications required by professional bodies and regulators, and bear the associated compliance costs to meet prescribed standards. In addition, consultancy practices allocate resources to marketing and professional development (Jaafar et al., 2008), including continuous training, workshops, seminars, online courses, and certifications to ensure staff competency and service quality. Collectively, these expenditures place considerable financial pressure on consultancy operations, necessitating prudent financial management. Despite adherence to the BEM Scale of Fees, ECP in Sarawak and other parts of Malaysia continue to encounter payment issues, posing concerns for financial sustainability within the construction industry.

Payment issues in engineering and construction refer to challenges and problems related to the financial transactions and compensation processes within the industry (Hasmori et al., 2012). Payment concerns have been an old age issue that have undoubtedly occurred the Malaysian construction industry over the years. Some common payment issues in ECP can be widely divided into three (3) categories. According to Judi and Rashid (2010) and Mohd Badroldin et al., (2016) late payments where there are delays in receiving payments for completed work which resulted in cash flow problems for engineering consultants to meet their financial obligations. In some cases, clients may fail to make payments for completed work or may dispute the payment owed, leading to the second issue of non-payment for engineering consultants (Maritz and Robertson, 2012). Thirdly, under-payment is another common problem faced by engineering consultants in ECP. Under-payment to a situation where the engineering consultant receives a payment that is less than the agreed-upon or expected amount for completed work or services rendered. It is a type of payment issue that can arise due to various reasons and can have adverse effects on the affected party and the overall project.

This study analyses prevailing payment practices and the associated challenges faced by ECP in Malaysia, focusing on the occurrences of late payment, underpayment and non-payment for ECP. The study seeks to provide empirical evidence on current payment conditions and their implications for consultancy operations within the construction industry. The findings will be used to form informed data on the dynamics of ECP payment practice. It hopes

to support practical improvements in contractual compliance, payment management and regulatory practices, contributing to enhanced financial sustainability and operational stability within the engineering consultancy sector.

RESEARCH METHODOLOGY

The study encompasses four main phases, starting with an in-depth literature review, followed by the design of a structured questionnaire, data collection and data analysis. Employing a quantitative approach, the research seeks to achieve its objectives by gathering crucial feedback from practicing engineering consultants in Malaysia. The survey duration spanned three months, during which approximately 300 questionnaires were distributed, out of which 174 respondents actively participated, representing a 58% return rate. The questionnaire was designed with a number of four sections as follows.

Section A: Respondent Information
Section B: Awareness of Respondent's on Existing Payment Conditions
Section C: Current Payment Practices
Section D: Satisfaction Level and Improvement Required on Current Practice

The results obtained were then analysed statistically by computing the Cronbach's Alpha coefficient to determine its reliability. The analysis was performed using IBM Statistical Package for the Social Sciences (SPSS) software. Table 1 below shows a commonly accepted rule of thumb for describing internal consistency that ranges between zero and one. Reliability testing only applies to questions using Likert scale only, therefore the following results were analysed using Cronbach's Alpha for Section C and Section D of the questionnaires.

Table 1: Reliability Coefficients

Reliabililty Coefficients	Description
Reliability Coefficient > 0.9	Highly reliable
Reliability Coefficient > 0.8	Good
Reliability Coefficient > 0.7	Acceptable
Reliability Coefficient > 0.6	Questionable
Reliability Coefficient > 0.5	Poor
Reliability Coefficient < 0.5	Unacceptable

Subsequently, analysis of Relative Importance Index (RII) provided insights on the priority of each criterion by using a value of 0.2 to 1.0, in which 1.0 reflects 100% of the respondents strongly agreed to the statement presented, while on the other end of the scale, 0.2 reflects 100% of the respondents strongly

disagreed to the proposed statement. Mohammad Badroldin et al. (2016) explained that relative index is based on a formula stated in Equation 1:

$$RII_1 = \frac{\sum \quad x_c}{A\ X\ N} \qquad (1)$$

Where,
RII = Relative Importance Index
W = Weight given to each factor by the respondents (scale 1 to 5)
A = Highest weight (scale 5)
N = Total number of respondents

The classification of RII in this study is described in Table 2 as follows:

Table 2: Classification of RII

RII	Description
0.00 ≤ relative important index < 0.25	Strongly Disagreed
0.25 ≤ relative important index < 0.50	Disagreed but have to accept to a certain extent
0.50 ≤ relative important index < 0.75	Agreed but it can be better
0.75 ≤ relative important index < 1.00	Strongly Agreed

The following section presents the findings of the structured questionnaire survey, providing an empirical assessment of the prevalence, frequency, and characteristics of payment delays, underpayments, and non-payments of ECP fees.

RESULTS AND DISCUSSION

Background of Respondents

The summary of the ECP's background participating in the survey is shown in Figure 1.

From the results, among 174 respondents that had participated in this study, majority of the respondents are Director/Partner/Sole Proprietorship which represents 66.09% (115), followed by 18.39% (32) are Professional Engineer with Practising Certificate, 12.07% (21) are Senior Engineer and remaining 1.72% (3) are 'Others' comprises of Chief Operating Officer and Engineers.

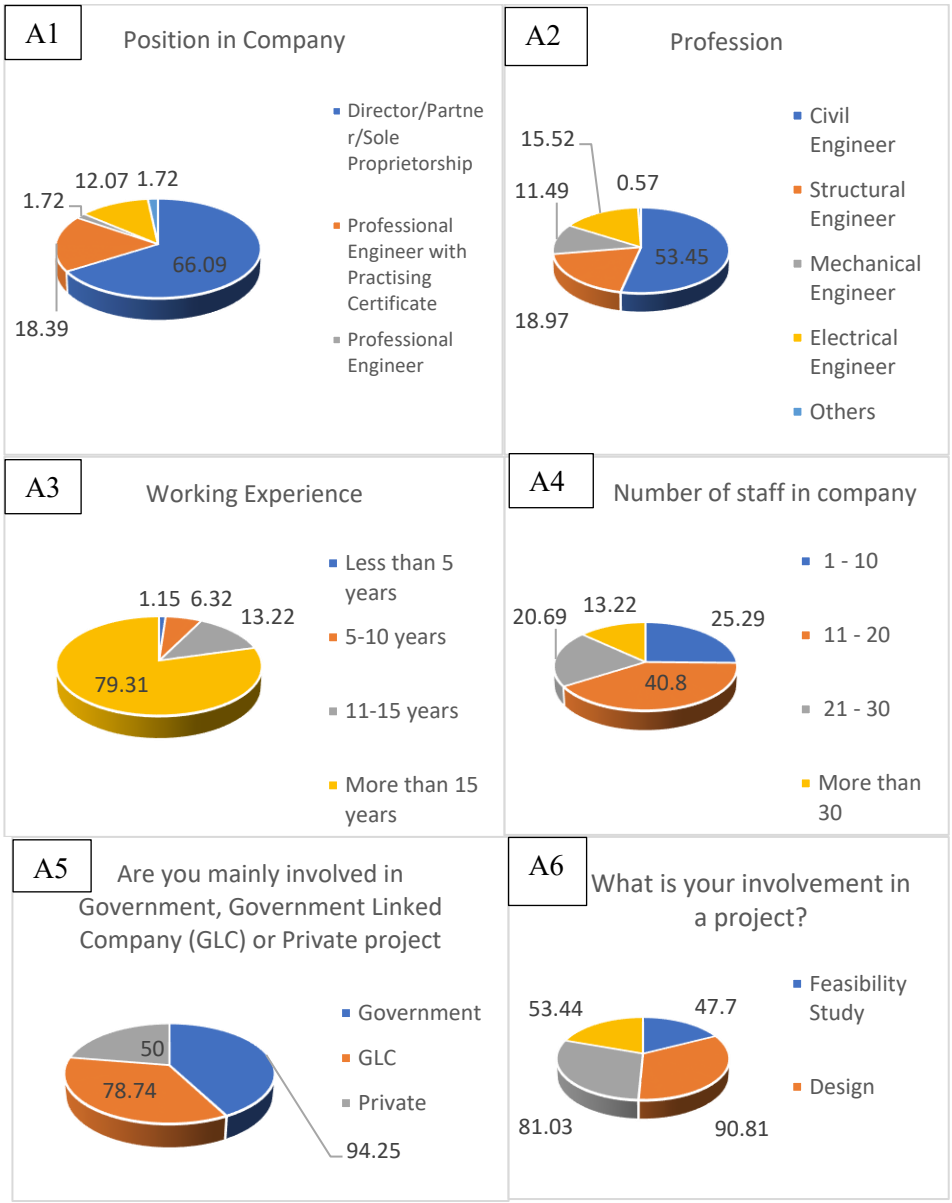

Figure 1: Summary of Respondents Background

Most of the respondents' profession are Civil Engineer represents 53.45% (93) and 18.97% (33) are Structural Engineer. Moreover, there are 15.52% (27) respondents are Electrical Engineer, 11.49% (20) respondents are Mechanical Engineer and Others 0.57% (1). The study categorized the total years of work

experience of the respondents into five categories. Among 174 respondents' background, more than half represents 79.31% (138) respondents have working experience of more than 15 years followed by 13.22% (23) respondents having 11 to 15 years work experience. Meanwhile, 6.32% (11) of them have 5 to 10 years' experience and the remaining 1.15% (2) was working less than 5 years in the industry.

Respondents were also required to indicate the number of staffs in their company. According to the results collected from the respondents, most of the them have 40.80% (71) 10-20 staffs in their company, followed by 25.29% (44) respondents which have 1-10 staffs, 20.69% (36) of them have 21-30 staffs and the remaining 13.22% (23) have more than 30 staffs in their company.

Further, the respondents were then asked on their involvement in Government, Government Linked Company (GLC) and Private project with respect to the payment issues. The respondents can select more than one answer based on their experience in the industry. 94.25% (164) respondents involved in Government Projects, 78.74% (137) of them are involved in Government Linked Company projects and 50.00% (70) respondents involved in Private Projects.

The respondents were required to indicate their involvement in a project and their selection can be more than one answer. The majority of respondent which is 90.81% (158) involved in Design, followed by 81.03% (141) in Project Management, 53.44% (93) in Supervision and last but not least 47.70% (83) in Feasibility Study.

Overall, most of the respondents were Director/Partner/Sole Proprietorship with more than 15 years' experience and majority of them involved in Government project. The Government in this study including Federal and State Sarawak related projects. Their esteemed background will assist in getting more accurate result through their experience which enables them to answer based on their real-life experiences and practices in the industry.

Payment Issue: Late Payment

This section sought to elicit responses from respondents on issues solely pertaining to late payment for the professional services rendered by ECP. Other that payment issues such as supervision claims and reimbursable will be discussed in later section. The respondents were questioned on whether their clients made payment according to the stipulated time in the consultancy agreement. The results obtained can be summarized in the Figure 2.

Out of the 164 respondents who were involved in Government projects, 62.80% (103) claimed that their clients failed to make payment based on the agreed time frame in the consultancy agreement, while 37.20% (61) of respondents faced no such issue. On top of that, from the 137 responses received from ECP who were involved in government linked company (GLC) projects,

findings uncovered that 65.69% (90) of respondents mentioned their clients did not pay their fees on time and only 34.31% (47) of respondents stated their clients did. Additionally, the study also discovered that from the 87 respondents who were involved in private projects, 82.76% (72) specified that their private clients did not pay them on time and the remaining 17.24% (15) declared the contrary.

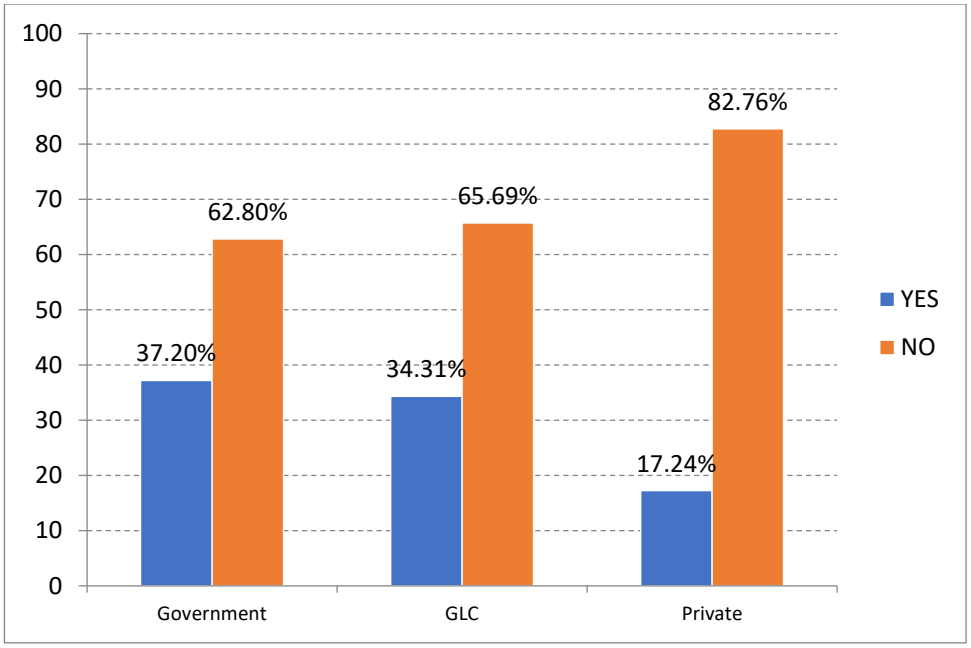

Figure 2: Experience of on time payment to ECP by Clients

Based on the results, it can be concluded that the majority of clients failed to make payments within the time as stipulated in the consultancy agreement, implying that payment delays are a major concern among the ECP in the construction industry in Sarawak.

Then, the respondents were required to specify the average duration of payment delay from their clients. Majority of the respondents claimed that they encountered payment delay, with the average duration for payment delay are shown in Figure 3. From the results acquired, almost half of the respondents 46.11% (77) claimed that the average delay ranges from 4 to 6 months, followed by 41.32% (69) of respondents specifying that the average delay was more than 6 months while the remaining 12.57% (21) stated the average payment delay was 1 to 3 months.

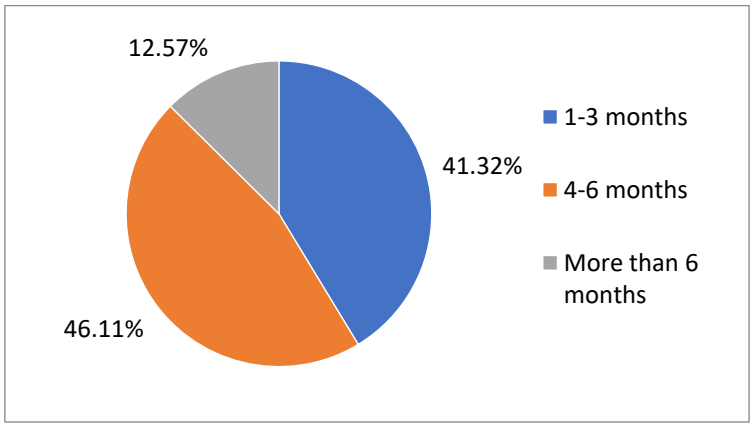

Figure 3: Average Duration of Payment Delay from Client

Payment Issue: Under-Payment

This section sought to obtain responses from respondents on issues related to under-payment for the ECP. Under-payment is depicted as the final amount received to be under the agreed the amount. The final amount will include design fees, supervision and reimbursable. The respondents were requested to specify if they have experienced under-payment by their clients as well as the magnitude of underpayment if they had. Results are shown in Figure 4 and Figure 5 respectively

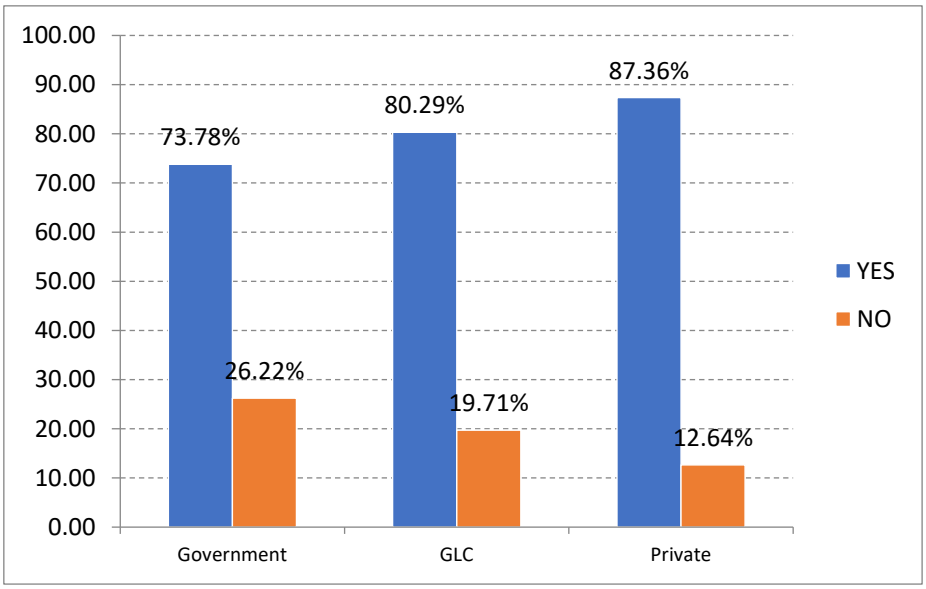

Figure 4: Experience of underpayment to ECP by Clients

Figure 4 referred, 164 respondents who were involved in Government project, 73.78% (121) of them claimed that they had experienced underpayment from their Government clients as the final amount being less than in the agreed amount, while 26.22% (43) of respondents were paid accordingly to the actual payment claims made. Moreover, from the 137 responses received from ECP who were involved with government linked company (GLC) project, the findings revealed that 80.29% (110) of respondents claimed that they had encountered underpayment from their GLC clients and the remaining 19.71% (27) of respondents stated the opposite. The study also ascertained that from the 87 respondents who were involved in Private projects, 87.36% (76) of them specified that their private clients paid them lower than the actual payment and another 12.64% (11) of respondents declared otherwise.

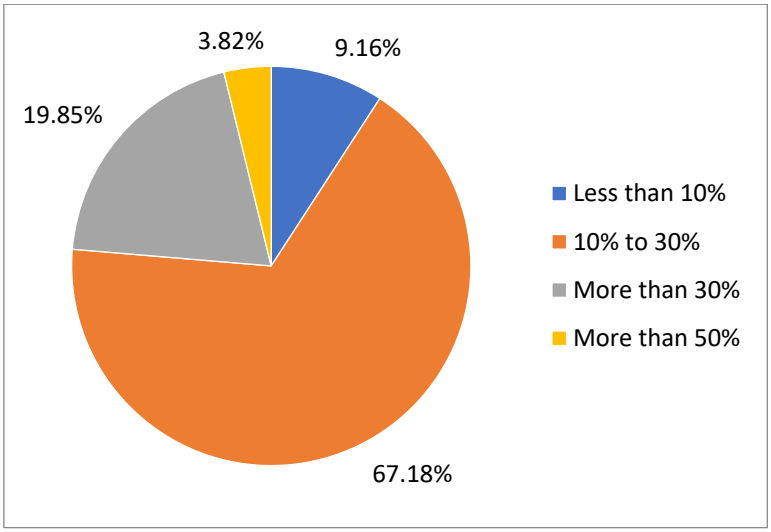

Figure 5: Average amount of underpayment compared with agreed amount

As shown in Figure 5, most of the respondents, 67.18% (88), specified that they received 10% to 30% lower payment than the agreed value, 19.85% (26) of respondents reported to have received a payment that was more than 30% less than the agreed-upon amount, 9.16% (12) of respondents claimed that they received less than 10% of actual payment, while the remaining 3.82% (5) of respondents reported receiving payments that were more than 50% lower than the agreed sum.

Payment Issue: Non-payment

This section aims to investigate on non-payment issues, where the respondents were questioned whether they experienced non-payment in any of their projects. Non-payment is depicted by not receiving payment at all after a year of project completion or after a specific claim is made, and the results are depicted in Figure 6.

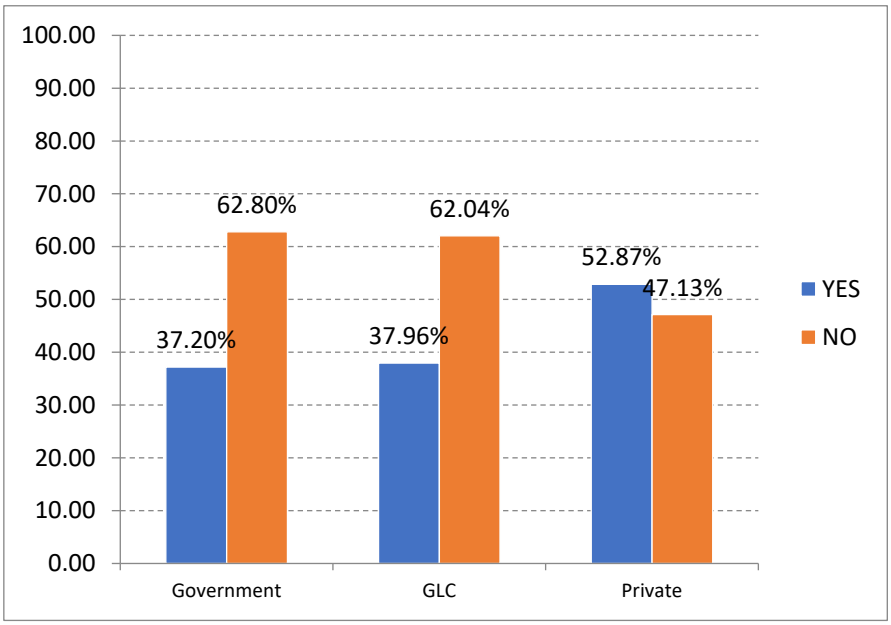

Figure 6: Experience of non-payment after a year of project completion

From a total number of 164 respondents who were involved in Government project, 62.80% (103) of them stated that they had never encountered non-payment issues from their Government clients while 37.20% (61) respondents claimed that they have yet to receive any payment after a year of project completion. Additionally, from the 137 responses received from ECP who were involved in government linked company (GLC) projects, findings discovered that 62.04% (85) of respondents had never encountered non-payment issues from their GLC clients and the remaining 37.96% (52) of respondents stated they had. The study also ascertained that 52.87% of the 87 respondents who were involved in Private projects that did not receive any payment from a year of project completion and the only 47.13% (41) of respondents declared in contradiction.

DISCUSSION

The findings above provide empirical and factual evidences that late payment, underpayment and non-payment is happening and remain prevalent incidences, affecting ECP in Malaysia. Payment irregularities were observed across all client categories, including private, Government and Government-Linked Company (GLC) projects, indicating that the problem is systemic rather than sector-specific. Survey results show that 62.80% of consultants involved in Government projects and 65.69% in GLC projects experienced late payments, while the proportion increased substantially to 82.76% for private projects, demonstrating a higher exposure to payment risk in the private sector. In terms of duration, 46.11% of respondents reported average delays of four to six months and 41.32% experienced delays exceeding six months, suggesting that payment delays are prolonged rather than short-term administrative lapses. Collectively, these findings confirm that payment challenges are widespread and consistent with trends reported in previous studies.

Beyond delays, underpayment and non-payment were also prevalent. A majority of respondents (67.18%) reported receiving payments 10–30% below the agreed value, while nearly one-fifth experienced reductions exceeding 30%, indicating substantial deviations from contracted professional fees. Non-payment after one year of project completion was reported by 37.20% of Government project respondents, 37.96% of GLC respondents and 52.87% of those involved in private projects, further highlighting the heightened financial risk associated with private sector engagements. These patterns demonstrate that payment deficiencies extend beyond timing issues and frequently involve incomplete or absent settlement of fees.

Contractual and procedural shortcomings were evident across the industry and contributed to persistent payment irregularities. Delays in formalising consultancy agreements, particularly in Government and Government-Linked Company (GLC) projects, limit consultants' contractual protection and hinder their ability to claim progress payments despite completed work. In addition, limited enforceability of the Board of Engineers Malaysia (BEM) Scale of Fees further contributes to payment uncertainty. While the Scale of Fees is mandatory for ECP, it is not legally binding on clients, creating a regulatory gap that allows the adoption of alternative fee structures and post-agreement fee reductions. This lack of client obligation, coupled with the absence of contractual penalties for late payment, underpayment, or non-payment, increases ECP's exposure to financial risks. The issue is particularly pronounced in private projects, where clients are completely not subject to fee controls, although public sector projects are similarly affected by delays and reduced payments. In addition, existing legislative protections such as the Construction Industry Payment and Adjudication Act (CIPAA) provide limited recourse for

ECP fee claims, further constraining effective payment enforcement. Collectively, unreliable payment practices disrupt cash flow, constrain resource planning, and threaten business continuity for ECP Given the dependence of infrastructure delivery on consultancy services, persistent payment deficiencies may also affect project timelines, industry productivity and broader economic development.

In response, several practical and regulatory measures are warranted to improve payment reliability to ECP. These include stricter enforcement of the BEM Scale of Fees; clearer specification of payment terms and schedules within consultancy agreements; and timely certification and processing of claims to minimise administrative delays. Greater contractual compliance by both public and private clients, supported by strengthened regulatory oversight and standardised payment frameworks for ECP, is necessary to reduce ambiguity and deter arbitrary fee reductions or prolonged settlement periods. As existing legislative protections provide limited recourse for consultancy fee claims, extending the Construction Industry Payment and Adjudication Act (CIPAA) to ECP would offer formal avenues for payment recovery. In addition, enhanced regulatory provisions and expanded statutory payment security mechanisms are required to ensure effective legal protection for professional engineering services. Enforceable provisions, including contractual penalties, interest on late payments and formal dispute resolution mechanisms, together with defined milestones and mandatory timelines for claim evaluation, can improve accountability and transparency in payment administration. Digital submission and tracking systems may further streamline certification and reduce delays, while measures such as staged or secured payments can protect consultants' cash flow. Collectively, these operational, contractual and regulatory improvements provide a practical framework for strengthening payment discipline across the industry.

CONCLUSION

The findings confirm that late payment, underpayment, and non-payment remain prevalent across Government, Government-Linked Company (GLC) and private sector projects, indicating that payment irregularities are systemic within Malaysia's engineering consultancy environment. Delayed settlements, deviations from agreed professional fees and inconsistent adherence to the Board of Engineers Malaysia (BEM) Scale of Fees collectively undermine the financial stability of ECP. These challenges are most pronounced in private projects but are also evident in public sector engagements, demonstrating that payment risks persist regardless of client type. Overall, unreliable payment practices continue to disrupt cash flow, constrain operational planning and affect the sustainability of consultancy services within the construction industry.

Addressing these issues requires stronger contractual compliance, clearer payment procedures and more consistent enforcement of regulatory frameworks. Timely certification and processing of claims; well-defined payment terms within consultancy agreements; and enhanced oversight by relevant authorities are essential to promote fair and reliable payment practices. The findings provide practical direction for ECP, clients and regulators to strengthen payment governance, improve contractual discipline and reduce financial risks associated with delayed, reduced, or unpaid fees, thereby supporting the operational stability and sustainability of engineering consultancy services.

Beyond individual firms, reliable payment practices are critical to the broader performance of Malaysia's construction sector, where engineering consultants play a key role in delivering public and private infrastructure. Persistent payment deficiencies can undermine project continuity, industry productivity and stakeholders', including public's confidence. By establishing empirical benchmarks on the prevalence and characteristics of payment issues, this study offers an evidence-based foundation for policy and regulatory improvements that enhance financial resilience within the consultancy profession and contribute to the long-term development and competitiveness of the national construction industry.

ACKNOWLEDGEMENTS

Acknowledgement is generously extended to GBU Consultants who initiated the study and support for data collection as well as to UNIMAS who provided the resources through the Faculty of Engineering and the Faculty of Built Environment for the completion of the study.

REFERENCES

Abdellatif, M., & Othman, A. (2006). Improving the sustainability of low-income housing projects: The case of residential buildings in Musaffah Commercial City in Abu Dhabi. *Emirates Journal for Engineering Research, 11*, 47–58.

Azman, M. N. A., Dzulkalnine, N., Hamid, Z., & Beng, K. (2014). Payment issue in Malaysian construction industry: Contractors' perspective. *Jurnal Teknologi, 70*. https://doi.org/10.11113/jt70.2804

BEM Form A (Revised 1/83). *Memorandum of agreement between client and consulting engineer for professional services*.

Chitongo, A. M., & Pretorius, L. (2017). Engineering consultant project cash flow controls: An empirically-supported system dynamic conceptual model. In *Proceedings of PICMET '17: Technology management for interconnected world* (pp. 1–10). Oregon, USA.

du Preez, M. (2018). The consulting industry as an information behaviour context: Consulting engineering as an example. In *Proceedings of ISIC: The information behaviour conference, 2018: Part 2* (pp. 1–20). Krakow, Poland.

Hasmori, M., Ismail, I., & Said, I. (2012). Issues of late and non-payment among contractors in Malaysia. In *Proceedings of 3rd International Conference on Business and Economic Research (3rd ICBER 2012)*. Golden Flower Hotel, Bandung, Indonesia.

Hoffmann, J., Steiner, A., & Jarren, O. (2001). The inimitable outsider: Contracting out public affairs from a consultant's perspective. *Journal of Communication Management, 15*(1), 23–40.

Jaafar, M., Abdul Aziz, A. R., & Lian, A. S. W. (2008). Marketing practices of professional engineering consulting firms: Implement or not to implement?. *Journal of Civil Engineering and Management, 14*(3), 199–206.

Judi, S., & Rashid, R. (2010). Contractor's right of action for late or non-payment by the employer. *Journal of Surveying, Construction & Property, 1*, 1–31. https://doi.org/10.22452/jscp.vol1no1.4

Lai, J., Mohamad Zin, R., & Yahya, K. (2014). A conceptual review of engineering consultancy practice (ECP) business model. *Archives of Business Research, 2*, 161–173. https://doi.org/10.14738/abr.24.398

Lai, J., Zin, R., Yahya, K., & Saar, C. C. (2016). Engineering consultancy practice (ECP) business model in Malaysia: A structural equation modeling (SEM) approach. *International Journal of Business and Management, 11*(3).

Lee, Y. Y., Law, A. K. H., Ting, S. N., Gui, H. C., & Ahmad Zaini, A. (2022). BIM implementation in Sarawak construction industry: Awareness, readiness and challenges. *E2S Web of Conferences, 347*, 01010.

Maritz, M. J., & Robertson, D. C. (2012). What are the legal remedies available to contractor and consultants to enforce payment?. *Journal of the South African Institution of Civil Engineering, 54*(2).

Mohd Badroldin, M. K. A., Abdul Hamid, A. R., Abdul Raman, S., Zakaria, R., & Mohandes, S. R. (2016). Late payment practices in the Malaysia construction industry. *Malaysia Journal of Civil Engineering, 28*(3), 149–162.

Rahman, H. A., & Ye, K. M. (2010). Risk of late payment in the Malaysian construction industry. *World Academy of Science, Engineering & Technology, 41*, 538–546.

Salehin, S. (2007). *Reviewing the current practice of professional fees for civil and structural engineering consultancy services* [Doctoral dissertation, Universiti Teknologi Malaysia].

Syed Jamaludin, S. Z. H., Ismail, N. A. A., Ibrahim, I. H., & Japlun, N. (2022). The emerging challenges of adopting BIM in the construction industry: Evidence from Sabah, Malaysia. *Journal of Smart Science and Technology, 2*(1), 1–14.

Wan Zulkifli, W. Y., Singh, B., Abdul Rahim, A. H., & Ngang, S. M. (2008). The role of consulting engineers in project development. In *Issues in construction industry* (Book Chapter 8). UTM Publisher.

Ying, D. L., & Wang, L. B. (2020). Research on the whole process engineering consulting service of risk sharing based on CIM reward model. *IOP Conference Series: Materials Science and Engineering, 750*, 012047.

Received: 4th February 2025. Accepted: 14th March 2025