

Principal Components of Final Accounts Closing Disputes in the Malaysian Construction Industry

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Abstract

Disputes in the closing of the final accounts have long been an issue in the Malaysian construction industry, leading to negative impacts on the reputation of construction projects and financial strains on contracting parties. This study aims to identify the critical factors that establish the principal component for disputes in closing final accounts. A comprehensive literature review identified various related factors contributing to disputes in the closing of the final accounts. Consequently, quantitative data were collected through a questionnaire survey to include the perspectives of construction industry professionals on the identified factors. A total of 257 responses were collected. Subsequently, Exploratory Factor Analysis (EFA) was utilised for dimension reduction, and five principal components were revealed and discussed. These components include the evaluation process, contractual management, project team incompetencies, professional ethics, and unforeseen events. Notably, identifying these critical factors and principal components provides valuable insights for construction stakeholders to understand the root causes of disputes and take proactive measures to prevent them before disputes occur. This study's findings contribute to the existing knowledge on final accounts closing disputes in the Malaysian construction industry. They can serve as a reference for stakeholders to improve the closing process of final accounts and to reduce disputes.

1.0 INTRODUCTION

The construction industry plays a vital role in Malaysia's economy, contributing 22.9% to the country's gross domestic product (GDP) in the third quarter of 2024 (DOSM, 2024), by providing infrastructure, employment, and stimulating the economy of other sectors (Qabaja & Tenekeci, 2024). Despite its economic significance, the construction industry is often plagued by disputes related to payment issues, particularly concerning late or non-payments and delays in closing final accounts (Judi & Mustaffa, 2023; Ssegawa et al., 2020; Zulkhairi et al., 2022). Research highlights the pervasiveness of this problem, with (Ramachandra & Rotimi, 2015) revealing that payment disputes occur in up to 80% of construction projects. There are two common types of payments that are made in the construction industry, namely, progress payment and final payment, with the latter made through the formal closing of final accounts (Nor et al., 2023). The final accounts closing refers to the process of reconciling and settling all financial matters related to a construction project, including payments for all work done, variations of works, provisional quantities, and any additional costs incurred (Hisham & Othman, 2021). According to Majid (2017), the final accounts closing is conclusive evidence that the contractor has properly conducted and completed the work and that the employer has made all the necessary payments required by the contract. Thus, the timely and fair settlement of final accounts is crucial for successfully completing the construction project. It signifies the fulfilment of contractual obligations of all parties and determines the financial position and overall success of the construction project (Othman et al., 2023). If the process is handled smoothly, it can help to build trust and strengthen good relationships, build a positive reputation, and lead to future business opportunities (Rosli et al., 2022; Saberi et al., 2015; Yong, 2018). The final account also represents the financial position and determines the profitability and losses of the project. Ramli (2021) claimed that project success could be appropriately measured by successfully closing the final accounts at the end of a construction project and completing them within the contractually prescribed timescale. On the other hand, Offei-Nyako et al. (2016) asserted that closing the final accounts is vital to project success as it helps ensure that all financial matters are settled fairly and transparently. Meanwhile, Khang & Moe (2008) and Zakaria (2015) emphasised that even though the project has been completed, it is still deemed partially successful if the final accounts cannot be closed. In addition, Zakaria et al. (2022) added that failure to close the final accounts demonstrates the organisation's failure to manage the project well as specified in the contract. On this basis, it can be deduced that project success can be determined by the successful completion of the final accounts closing, without any disputes that sour relations between all stakeholders.

However, the process of final accounts closing remains a source of disputes within the Malaysian construction industry, leading to financial strains, damaging good relationships, and causing a bad reputation for the parties involved (Zakaria et al., 2014). Correspondingly, Ilmi & Yip (2014) claimed that preparing and settling final accounts for a construction project can be complex and demanding. If the closing of final accounts is unsuccessful and results in disputes, the industry's development may stagnate (Khangale et al., 2022). The extensive costs of dispute resolution impact a construction company's cash flow, thus lowering its productivity (Kong & Yeow, 2016). Furthermore, delays in final payments due to final account disputes also significantly impact contractors' cash flow and undermine other companies throughout the supply chain (Badroldin et al., 2016). Disputes and delays in the final accounts closing are often inevitable due to the unique nature and design of each construction project (Muhammuddin et al., 2022). Nonetheless, there is a possibility of reducing or minimising the occurrence of disputes by taking preventive measures before the disputes happen at the final stage of the project (Danuri et al., 2016; Othman et al., 2023). Therefore, understanding the root causes of such disputes and taking preventive strategies can help identify or resolve potential problems earlier, ensuring the successful closure of the final accounts.

Despite growing concern about the problem, there remains a limited understanding of the critical factors contributing to final accounts closing disputes in the Malaysian context and the potential mitigation strategies. Previous research has identified various factors associated with disputes in construction projects, such as communication issues, contractual ambiguities, and inadequate project management (Muhammuddin et al., 2023; Naji et al., 2020; Ssegawa et al., 2020). However, there is a need for an in-depth investigation into the specific challenges and complexities of final accounts closing in the Malaysian construction industry to develop appropriate and effective preventive strategies. Therefore, this research aims to address this knowledge gap by investigating the critical factors and developing their principal components for the factors that contribute to disputes in the final account closing process within the Malaysian construction industry.

Specifically, the objectives of this study are to identify the major problems that lead to disputes in final account closing and determine proactive and preventive solutions that can be taken to address these issues before they lead to disputes. This study will contribute to the existing body of knowledge and provide valuable insights for practitioners and decision-makers in the construction industry, aimed at improving the efficiency and effectiveness of final account management in the Malaysian construction industry.

2.0 LITERATURE REVIEW

The final account in a construction project can be defined as an appropriate amount received either by the contractor or the client at the end of the contract, and shall include any necessary adjustments agreed upon by the parties after all work under the main contract has been completed (Othman et al., 2023). Final accounts closing in the construction projects is critical, marking the conclusion of contractual obligations and financial settlements between parties involved (Majid, 2017). Generally, the process of closing the final accounts is fraught with challenges. It involves lengthy and complex procedures for parties to the contract, often leading to disputes and delays that can significantly impact project success (Abidoeye et al., 2018; Yahaya et al., 2019). Notably, the final accounts closing issue has existed in the construction industry worldwide for several decades. Past research across the United States, the United Kingdom, and Hong Kong (Arditi & Chotibhongs, 2005; Kwok, 2009; Odeyinka & Kaka, 2005) consistently highlights payment delays and dissatisfaction with final account settlement as global issues.

Disputes over final accounts have been a persistent issue in the Malaysian construction industry for several decades, involving government and private funded projects (Hassan, 2019; Othman et al., 2023; Zakaria et al., 2022). According to Kong & Yeow (2016), many construction projects in Malaysia have faced unreasonable delays in settling final accounts and have been recorded as unsatisfactory for many years. As such, there are several criticisms regarding the final accounts settlement process, including the impractical timeframe within which it is conducted, often beyond the originally agreed-upon contractual period (Hassan, 2019; Nor, 2024; Ramli, 2021; Zakaria et al., 2013). The significance of successfully closing the final accounts within a reasonable timeframe in a construction project should not be neglected. This critical phase ensures that all financial matters related to the project are resolved and all parties' contractual obligations are fulfilled. However, delays and disputes in preparing and settling final accounts can lead to several detrimental outcomes for all stakeholders involved, impacting their financial stability and cost escalation. Hisham & Othman (2021) emphasised that the final accounts should be prepared immediately after the completion of the project. Despite that, in practice, the final accounts are often dealt with in the less urgent and less resourced post-completion stage. As a result, it is frequently neglected or treated simplistically as just a matter of time or decisions to be made (Ismail et al., 2014; Tarmizi, 2018). Consequently, the delay in final accounts settlement has become a common problem in the construction industry in Malaysia. Therefore, addressing the common issues and concerns of final accounts closing in construction projects should be a priority for project management teams and policymakers to improve the efficiency and effectiveness of project delivery in the sector.

3.0 METHODOLOGY

A structured questionnaire survey was developed to collect primary data based on a comprehensive literature review of relevant studies pertaining to final account closing management in the construction industry. The targeted respondents were construction professionals from client organisations, contractor companies (Grade 7), and consulting quantity surveying firms, which refer to the three main parties involved in the final accounts closing phase of the construction project. While the respondents are associated with organisations (clients, contractors, and consultants), the study focuses on gathering data from individual professionals within these organisations rather than treating the organisations themselves as respondents.

The minimum sample size for this study was determined using the G*Power software (Faul et al., 2009), which is commonly used in social science research (Cheah et al., 2019; Giebelhausen et al., 2021; Memon et al., 2020). The present study used the F-test for one-way ANOVA to compare mean ratings across the three respondent groups. An effect size, alpha value, and power were set at 0.25, 0.05 and 0.80, respectively, as recommended for social science research (Hair et al., 2019; Memon et al., 2020), with three groups to be compared. Based on these input parameters, the software calculated a total sample size requirement of 159 samples. This total sample should be evenly distributed among the three respondent groups, requiring at least 53 complete responses from clients, 53 from G7 contractors, and 53 from QS consultants. However, the

estimated sample size was increased to ensure that the collection of usable responses achieved the minimum target. Consequently, the final target for the questionnaire survey distribution was set at 600 samples, with an allocation of 200 questionnaires distributed to each group. To expedite the data collection, the questionnaires were distributed and self-administered using electronic mediums such as email and WhatsApp. The questionnaire was provided in online formats using a web-based platform (i.e., Google Forms) and hard copy. The email reminder was sent to those who had not replied to ensure a good response rate.

This study utilised purposive sampling techniques by selecting respondents who had experience managing final accounts closing to complete the questionnaire. This ensured the reliability of the data, as they had prior knowledge and judgement of the subject matter (Hisham & Othman, 2021). According to Bougie & Sekaran (2020), purposive sampling allowed the researcher to choose samples that meet the required characteristics or criteria crucial for the present study. Furthermore, this research employed a convenience sampling approach, as there is no comprehensive database to identify an updated sampling frame of the current population for construction professionals in Malaysia. Hence, it is impossible to identify all the members of the population. Any member of the target population who is easily accessible is approached and asked to participate in the research survey. This approach is easy, inexpensive, and consumes less time (Ahzami, 2017; Alvi, 2016). Although the approach is open to potential bias (Zahrizan et al., 2023), this sampling method can be considered appropriate when researchers have a specific target respondents that meet specific criteria to fulfil research purposes (Zia et al., 2022). According to Thatcher & Drane (2003), convenience sampling can be treated as simple random sampling and sometimes can yield results that are similar to those obtained from more rigorous sampling methods (Mullinix et al., 2015; Peterson & Merunka, 2014).

The data collected based on a questionnaire survey is analysed using IBM's Statistical Product and Service Solutions (SPSS) software. Frequency analysis is suitable for analysing data collected for the demographic profile of the respondents. In contrast, descriptive analysis was performed to calculate the mean score and rank the various factors contributing to disputes in the final accounts closing. Furthermore, Exploratory Factor Analysis (EFA) was adopted in this analysis primarily to reduce the large number of identified variables or factors that influenced final accounts closing disputes and to consolidate or regroup the factors into a number of components or constructs that are meaningful for further discussions. By regrouping the observed factors in a limited set, this study can focus on a smaller set of variables that explain the structure instead of considering all variables that may be unimportant (Muhammuddin et al., 2023; Sürücü et al., 2022). In this stage, a Principal Component Analysis (PCA) extraction was utilised with Varimax rotation to reduce the data and derive meaningful factors and variables.

4.0 RESULT AND DISCUSSION

4.1 Response Rate

A total of 600 questionnaires were sent to different target groups of respondents in Malaysian construction organisations, as illustrated in Table 1. Accordingly, 257 respondents completed and returned the questionnaires within three months of the questionnaire being sent, which accounted for a 43% response rate. All the questions were satisfactorily completed and fulfilled the criteria. As such, 69 (35%) respondents were from private clients, followed by 107 (54%) from G7 contractors and 81 (41%) from quantity surveying consultants. The response rate of 43% is acceptable and exceeds the minimum requirement of survey response in the construction-related research. According to Fateh & Nijar (2019) and Fellows & Liu (2015), a 25% to 35% response rate is acceptable for a self-administered questionnaire for construction research. Some previous researchers also highlighted that the usual response rate for questionnaire surveys in the construction industry is around 20-30% (Akintoye, 2000; Dulaimi et al., 2003; Takim et al., 2004).

Table 1. Total Number and Percentage of Overall Responses

Type of Organisation	Sample	No. of response	(%)
Private Client (Developer)	200	69	35
G7 Contractor	200	107	54
Quantity Surveying Consultant	200	81	41
Total	600	257	43

4.2 Demographic Background

Data on the demographic background were collated to gather personal information on the samples. Table 2 presents the demographic profile distributions of the construction professionals involved in this study. The most significant proportion of the participants was quantity surveyors, with 61%, followed by contract managers at 16%, while 10% and 7% were the company's director and engineer, respectively. The least among the respondents were project managers, with 6%. Pertaining to professional experience, 71% of the respondents had more than ten years of experience in the construction industry. Meanwhile, 9% of the respondents had five years or less of experience, while 20% had six to ten years of experience. In terms of the type of projects undertaken, 43% were involved in residential projects, 29% were involved in infrastructure projects, and 14% were engaged in commercial projects. Additionally, 10% of the respondents were involved in institutional projects, and 4% were in other projects.

Table 2. Demographic Profile of Respondents.

Demographic Information		Number	Percentage (%)
Respondent's Designation	Director	25	10
	Project Manager	15	6
	Contracts Manager	42	16
	Engineer	17	7
	Quantity Surveyor	158	61
Years of experience	1 – 5 years	24	9
	6 – 10	50	20
	More than 10 years	183	71
Type of projects undertaken	Residential	111	43
	Institutional	27	10
	Commercial	35	14
	Infrastructure	75	29
	Others	9	4

4.3 Exploratory Factor Analysis (EFA)

This study adopted an appropriate EFA method to reduce factors and determine meaningful components for the dispute in final accounts closing. This procedure was performed based on the best practices suggested by Osborne (2014) and Hoyle & Duvall (2016). Initially, the procedure determined the sample size to gather sufficient respondents since it is related to the communalities value, factor saturation, and factor loading criteria. In this case, different researchers have suggested different methods. Comrey & Lee (1992) and Mcneish (2016), suggested that a sample size of 300 should be sufficient for factorial analyses, while a sample of 200 is considered fair. This current research achieved 257 responses for the questionnaire survey. Thus, this sample range between 200 and 300 is sufficient to run the EFA.

Secondly, the study examined the factorability using Kaiser-Mayer-Olkin (KMO) and Bartlett's Test of Sphericity. Table 3 summarises the results of these two tests performed on the data used. The KMO test measures the appropriateness of using factor analysis on the data set, and the results were 0.843, above the acceptable limit of 0.5 (Field, 2009). An index of 0.8 falls within the "meritorious" range of sampling adequacy (Beavers et al., 2013). Furthermore, Bartlett's test for sphericity for this analysis was largely significant ($\chi^2 = 7081.25$, p -value < 0.00). This confirms that the data is suitable for factor analysis and that there are likely underlying factors that can explain the patterns of correlation among the observed variables.

Table 3. KMO and Bartlett's Test Results

Statistical Tests		Result
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.843
Bartlett's Test of Sphericity	Approx. Chi-Square	7081.249
	df	780
	Sig.	.000

The communality for each factor was analysed to explore the amount of variance conducted. The results are presented in Table 4. The communality values range from 0 to 1, with higher values (closer to 1) indicating that a larger proportion of the variance in the observed variable can be explained by the factors identified through EFA. In addition, the factor loading above 0.50 indicates that the extracted factors are highly reliable (Costello & Osborne, 2005; Field, 2009). In this research, all variables have an initial communalities value of 1.000, which indicates that each variable is perfectly correlated with itself and implies no measurement error or unexplained variance in the variables at the initial analysis stage. Meanwhile, the communalities values range from 0.534 to 0.828, suggesting that the variables are strongly related to the underlying factors and can be considered reliable construct indicators.

Table 4. Communalities of the factors causing disputes in the final accounts closing

Communalities	Initial	Extraction
Delay in submitting the final accounts claim	1.000	0.726
Disagreement over the final accounts valuation	1.000	0.766
Poor record-keeping and insufficient documentation	1.000	0.700
Complexity in variation work and claims process	1.000	0.669
Delay in evaluation and preparation of the final accounts	1.000	0.664
Disagreement over the valuation of variation works	1.000	0.534
Delay in approval and finalisation of variation works	1.000	0.667
Delay in certification and issuance of the final certificate	1.000	0.816
The contractual provision for the final accounts is not comprehensive	1.000	0.781
The contract terms are too complicated to comprehend	1.000	0.788
Mistakes and discrepancies in the contract documents	1.000	0.716
Cost overrun due to variations and provisional quantities	1.000	0.616
The ambiguity of the final accounts procedure in the contract terms	1.000	0.651
Allocation of funds for risk and contingency events is insufficient	1.000	0.652
Misunderstanding of final accounts condition in the contract	1.000	0.793
Lack of experience in estimating the cost of the project	1.000	0.760
Lack of experience in handling the final accounts process	1.000	0.791
Non-compliance with final accounts claim procedures	1.000	0.644
Inadequate staff to handle the final accounts process	1.000	0.701
Inefficient planning and management of the project	1.000	0.682
Verbal instructions regarding variation works are not documented	1.000	0.747
Intentionally withholding or refusing to make the final payment	1.000	0.704
Poor communication and cooperation between project teams	1.000	0.793
Imposition of additional works during the defect liability period	1.000	0.739
Delay in issuance of the Certificate of Completion Making Good Defects	1.000	0.651
Lack of commitment to promptly settling the final accounts	1.000	0.776
Force majeure events caused delay in the work progress	1.000	0.828
Inclement weather disrupted the construction process	1.000	0.785
Regulatory and policy changes increased project costs	1.000	0.670
Price fluctuations in construction materials caused cost overrun	1.000	0.606

As provided in Table 5 and elaborated by the scree plot in Figure 1, the analysis summarises multiple criteria used to determine the number of factors that could be extracted. This study retained factors with Eigenvalues greater than 1.0, as suggested by Tabachnick & Fidell (2019). This includes the percentage of the variance over 60%, which determines the number of factors or variables that should be extracted (Hair et al., 2019). This aligns with the Kaiser Criterion and is supported by several studies that argued this was most appropriate for factor retention (Field, 2009). The analysis suggests that the EFA analysis could extract five components from a group of 30 factors since the first five Eigenvalues under Kaiser’s criteria (i.e., between 7.722 and 1.074) exceeded the value of 1.00. Note that the components that appear after the elbow shape in the scree plot diagram can be disregarded (Osborne, 2014). The extracted factors are 65.08%, which exceeds 60% of the cumulative percentage of variance explained. Hence, this research confirms the extraction of five components as the result of the Eigenvalue test and the scree plot test.

Table 5: Total variance explained (eigenvalue test)

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cum (%)	Total	% of Variance	Cum (%)	Total	% of Variance	Cum (%)
1	7.722	27.579	27.579	7.722	27.579	27.579	4.327	15.453	15.453
2	1.717	13.561	41.141	2.817	13.561	41.141	2.436	15.129	30.582
3	1.406	10.380	51.521	2.706	10.380	51.521	2.330	13.678	44.260
4	1.124	7.227	58.748	2.024	7.227	58.748	2.020	10.427	54.687
5	1.074	6.336	65.084	1.774	6.336	65.084	1.931	10.397	65.084

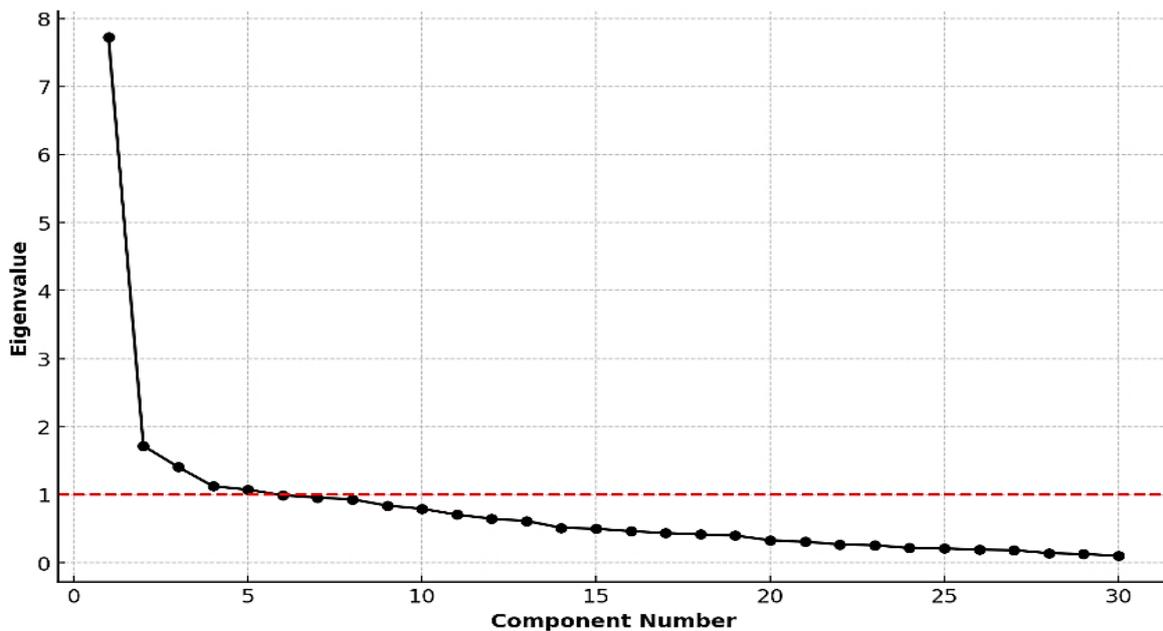


Figure 1. Scree plot test results

Table 6 indicates the rotated component matrix as a summary of the EFA results that employed factor with the varimax rotation method. The rotated component matrix also provides the factor loading of each factor in the component to make it easier to comprehend what each principal component represents. In this research, the cut-off threshold of factor loading is set at 0.50 (≥ 0.50) to ensure that the extracted factors are highly reliable (Costello & Osborne, 2005). Note that the choice of cut-off point may vary depending on the ease of interpretation, including how complex variables are handled (Karji et al., 2020).

Each component was labelled based on its interrelated characteristics and combination of variables. Thus, assigning appropriate labels or names to components extracted is a subjective, theoretical, and inductive process that requires both quantitative outputs and qualitative insights (Pett et al., 2003). In this stage, the existing theoretical knowledge was referred to establish a basis for interpreting the factors and naming the components. Subsequently, expert validation in related fields was conducted to provide additional insights, which could assist in accurately naming the components (Costello & Osborne, 2005).

The reliability test of Cronbach's alpha (α) is also introduced to ensure the internal validity of the variables within each component, where the value of all components is above the recommended cut-off point of 0.7 (Nunnally & Bernstein, 1994). Accordingly, ranges from 0.755 to 0.867 demonstrate high internal consistency and validity within each component or construct (Treacy et al., 2016). In light of these validity and reliability assessments, it was confirmed that the variables used to represent the causes or factors contributing to disputes in final accounts closing are appropriate.

Component 1, associated with the final account evaluation process, has the highest variance of 27.58% (Table 6), which inferred that all factors under this component were the critical causes of dispute in closing the final accounts. In particular, factors such as delays in submitting final accounts claims (74%), disagreements over the final accounts valuation (71.9%), poor record-keeping and insufficient documentation (71.1%), and the complexity in variation work and claims process (65.4%) often lead to disputes and delays in final accounts closing. These findings aligned with several studies which emphasised that the claim and evaluation process in construction projects is complex and can lead to disputes if not managed effectively (Matarneh, 2024; Mustaffa et al., 2023; Umar & Ochigbo, 2024). Furthermore, delays and misunderstandings in evaluating the claim process may contribute to disputes related to payment and final accounts in construction projects (Aibinu, 2009). In addition, the complexity of the works and evaluation process due to misinterpretation of contractual clauses and subjectivity in assessment may lead to inconsistencies in evaluating the final works (Wang et al., 2023). Moreover, contractors may disagree with the valuation of the works or the certified amount determined by the quantity surveyor, leading to conflicts due to incomplete or unavailable documents required to prepare the final accounts (Othman et al., 2023). Therefore, effective management of the claim and evaluation process for the final accounts is crucial, as it affects the timely resolution of financial matters and overall project closure.

The variables that make up the second component represent the contractual management issues inherent in construction projects that affected the closing of the final accounts. Factors such as non-comprehensive contractual provisions (85.2%), complicated and ambiguity of contract terms (84%), mistakes and discrepancies in contract documents (67.6%), the ambiguity of contract terms pertaining to the final accounts procedure (64.2%), and misunderstanding of final accounts condition in the contract (52.1%) can lead to disputes. This impedes the prompt settlement of the final accounts. Meanwhile, cost overruns due to variations and provisional quantities (67.4%) and insufficient allocation of funds for risk and contingency events (54.3%) further worsen these issues. These findings are also consistent with the results of other studies (Amoah & Nkosazana, 2022; Elziny et al., 2016; Hanák & Vítková, 2022). These studies stated that contract management issues are the most significant source of disputes, with ambiguities in contract terms and a lack of clarity on scope and obligations leading to conflicts. Additionally, inadequate and inaccurate contract documentation, including errors in the Bill of Quantities and unclear measurement standards, can lead to disputes over final accounts settlements (Kong & Yeow, 2016; Ogbu & Ebimino, 2020). Furthermore, contractual changes, such as work variations and contract document adjustments, frequently result in disputes due to their impact on project costs and timelines (Cakmak, 2016; Kalyan et al., 2022). Moreover, allocating adequate funds for risk

and contingency events is also essential to accommodate the effects of unforeseen circumstances (Uremadu, 2018). In addition, if not adequately addressed, contractual management issues can become contentious, causing financial losses and disputes between parties (Khangale et al., 2022). Therefore, ensuring effective contractual management practices is crucial to avoid potential issues during final account closure.

The five factors extracted in the third component highlight the competencies and capabilities of the professionals, such as the contractor and consultant, in handling and managing the project and final accounts process. This component is labelled “Incompetencies of the project team” and accounted for 10.38% of the variance (see Table 6). At the same time, factors such as lack of experience in cost estimation (78%), lack of experience in handling the final accounts process (77.2%), non-compliance with final accounts claim procedures (74.9%), inadequate staff to handle final accounts (70.7%), and inefficient planning and management of the project (69.2%) can lead to disputes in final accounts settlements. This is also supported by (Othman et al., 2023) who claimed that the lack of competencies within the project team, particularly among contractors, can result in poor decision-making, inaccurate cost estimations, inefficient planning and management, errors in claim submissions, and inadequate record keeping. Accordingly, these can contribute to disputes in final accounts closing. Hence, project teams’ competencies, knowledge, and abilities of team members, particularly the project manager and project management team, play a crucial role in effective project and financial management, directly influencing the success of project delivery (Avença et al., 2024; Gasemagha & Kowang, 2021). Moreover, addressing competency gaps through training and development, integrating information and technology, effective communication, as well as fostering trust and collaboration within the project team are essential in mitigating disputes. This, ultimately, leads to the successful closing of the final accounts in construction projects.

The fourth component represents “Professional Ethics,” particularly in communication, documentation, and work compliance practices. The six (6) factors extracted for Component 4 include undocumented verbal instruction for variation orders (82.9%), withholding and refusing final payment (70.2%), poor communication and cooperation (67.9%), additional works imposed during the defect liability period (66.9%), delay in issuance of Certificate of Completion Making Good Defects (CCMGD) (54.7%) and lack of commitment by the parties to settle the final accounts promptly (52.7%) indicate the risks associated with professionalism and ethical issues that affect construction projects and final accounts management. Thus, professional ethics in construction projects are crucial to successfully closing the final accounts. These factors contribute to the timely and accurate completion of the final accounts, which is essential for the financial success of the project and the satisfaction of all parties involved (Kuoribo et al., 2023). Furthermore, maintaining professionalism and ethics throughout the construction project ensures that all parties comply and understand their duties and obligations under the contract, thus preventing disputes (Oluwatosin, 2024; A. Ramli et al., 2023). In particular, professionalism and ethical conduct can help build trust and strengthen contractual relationships, establish effective communication and coordination, and lead to future business opportunities (Al Nahyan et al., 2019; F. Ismail et al., 2017). Additionally, strong adherence to professional ethics is considered crucial for maintaining organisational goals, leading to a smoother closing process for the final accounts

Lastly, Component 5 was assigned the theme “Unforeseen Events,” which significantly impacted project delivery and delayed the final accounts settlement. This component includes force majeure events (88.9%), weather disruptions (84.1%), regulatory and policy changes (66.2%), and material price fluctuations (63.4%). Consequently, these uncontrollable factors can cause delays, additional costs, legal claims, and economic losses, ultimately affecting the successful closing of final accounts in construction projects (Hansen, 2024; Kisi & Sulbaran, 2022; Nesarnobari et al., 2024). Developing comprehensive risk management strategies, including proper planning and sufficient budget allocation for risk management, is essential for minimising the impacts of unforeseen events in construction projects (Fadhil & Burhan, 2022; Zhang, 2024).

Table 6: Summary of EFA result (rotated component matrix).

Factors of disputes in the final accounts closing	Component					
	1	2	3	4	5	α
1. Evaluation Process						0.792
Delay in submitting the final accounts claim	0.740					
Disagreement over the final accounts valuation	0.719					
Poor record-keeping and insufficient documentation	0.711					
Complexity in variation works and claims process	0.654					
Delay in evaluation and preparation of the final accounts	0.637					
Disagreement over the valuation of variation works	0.574					
Delay in approval and finalisation of variation works	0.535					
Delay in certification and issuance of the final certificate	0.509					
2. Contractual Management						0.867
The contractual provision for the final accounts is not comprehensive		0.852				
The contract terms are too complicated to comprehend		0.840				
Mistakes and discrepancies in the contract documents		0.676				
Cost overrun due to variation and provisional quantities		0.674				
The ambiguity of the final accounts procedure in the contract terms		0.642				
Allocation of funds for risk and contingency events is insufficient		0.543				
Misunderstanding of final accounts condition in the contract		0.521				
3. Incompetencies of the project team						0.781
Lack of experience in estimating the cost of the project			0.780			
Lack of experience in handling the final accounts process			0.772			
Non-compliance with final accounts claim procedures			0.749			
Inadequate staff to handle the final accounts process			0.707			
Inefficient planning and management of the project			0.692			
4. Professional Ethics						0.755
Verbal instructions regarding variation works are not documented				0.829		
Intentionally withholding or refusing to make the final payment				0.702		
Poor communication and cooperation among project teams				0.679		
Imposition of additional works during the defect liability period				0.669		
Delay in issuance of the Certificate of Completion Making Good Defects				0.547		
Lack of commitment to promptly settling the final accounts				0.527		
5. Unforeseen Events						0.838
Force majeure events caused delay in the work progress					0.889	
Inclement weather disrupted the construction process					0.841	
Regulatory and policy changes increased project costs					0.662	
Price fluctuations in construction materials caused cost overrun					0.634	

Rotation converged in seven iterations. Extraction Method: principal component analysis.

Rotation Method: varimax with Kaiser normalisation

5.0 CONCLUSIONS

This research has systematically identified and analysed the critical factors influencing final account closing disputes in the Malaysian construction industry through rigorous quantitative analysis involving diverse construction professional stakeholders. Utilising exploratory factor analysis (EFA), five principal components were extracted: evaluation processes, contractual management, competencies of the project team, professional ethics, and unforeseen events. Among these, the evaluation processes emerged as the most significant contributor, highlighting the complexity and procedural ambiguities inherent in final account closing settlements. Contractual management, encompassing ambiguous provisions and misunderstandings related to contract terms, also significantly affects the occurrence of disputes, highlighting the urgent necessity for clearer and more precise contractual documentation. Furthermore, the project team's incompetencies have been identified as significant, indicating that insufficient experience and ineffective management strategies exacerbate the likelihood of disputes. Additionally, a lack of professional ethics, including undocumented instructions and withholding final payments, significantly contributed to conflict among project stakeholders. Lastly, unforeseen events, including force majeure and regulatory changes, further complicate the timely closure of final accounts. Collectively, these findings offer a comprehensive theoretical framework that provides a thorough understanding of dispute causation, thereby offering practical insights for stakeholders to implement proactive and strategic measures aimed at mitigating disputes in the final account phase. While the study employs a comprehensive approach, the use of convenience sampling may restrict the generalisability of these findings. Future research should adopt qualitative methodologies to gain a deeper understanding of stakeholders' experience and identify emerging issues related to final account closing, thereby informing the development of appropriate solutions for improving final accounts closing management in the Malaysian construction industry. Overall, this research paper enriches the existing academic body of knowledge, delivers practical value to construction management professionals, and sets a foundation for future studies focused on improving final account closure practices within the Malaysian construction context.

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