



THE CHALLENGES OF FACILITIES MANAGEMENT AND MAINTENANCE CONTRACT DOCUMENT IMPLEMENTATION FOR OFFICE BUILDINGS IN MALAYSIA

**Syarifah Nur Shaqina Syed Shabahr¹, Haryati Mohd Isa^{2*},
Nor Suzila Lop³, Hussain Ismail⁴**

^{1,2,3}*Faculty of Built Environment,*
UNIVERSITI TEKNOLOGI MARA, PERAK BRANCH
⁴*Cawangan Senggara Fasiliti Bangunan,*
JABATAN KERJA RAYA (JKR) MALAYSIA

Abstract

Facilities Management and Maintenance Contract Documents (FMMCD) play an important role in regulating facilities management and maintenance (FMM) service delivery, contract administration and maintenance responsibilities. In Malaysia, the Public Works Department (PWD) introduced the PWD FMM 2016 to standardise FMM procurement and implementation for public facilities. However, the implementation of PWD FMM 2016 in office building projects continues to face several contractual and operational challenges. This study aims to identify the implementation challenges associated with FMM 2016 in Malaysian office building projects. A qualitative approach was adopted through document analysis of the PWD FMM 2016 and semi structured interviews with six industry practitioners representing public clients and FMM service providers. The interview data were analysed using thematic analysis. The findings identified several implementation challenges related to the Instruction to Tenderers (ITT), Conditions of Contract (CoC), and Appendices sections. Key issues include unclear tender requirements, unclear technical specifications, inconsistent SLA and KPI implementation and poor CMMS and asset data management are identified. The findings demonstrate that many implementation problems originate from inconsistencies between contractual clauses, technical documentation, and operational practices. The study recommends clearer contract drafting, improved technical documentation and stronger digital asset data governance to improve implementation consistency and reduce disputes.

Keywords: Challenges, Facilities Management and Maintenance, Contract Document, Office Building

¹ Corresponding author. Email: qinaa76@gmail.com

INTRODUCTION

Facilities Management and Maintenance (FMM) has become increasingly significant in Malaysia, especially with the ongoing urban development and aging infrastructures. FMM refers to the integration of multidisciplinary activities designed to ensure the functionality, comfort and efficiency of the built environment (Ling & Husain, 2024). FMM practices are implemented across both public and private sectors, using either in-house teams or outsourcing arrangements. In Malaysia, the government oversees the maintenance of buildings and facilities by appointing the Public Works Department (Jabatan Kerja Raya or JKR) to handle FMM (Facilities Management and Maintenance) tasks for each of their departments. One of the standard forms used for government facilities management projects is the Facilities Management and Maintenance Contract Document (FMMCD) PWD FMM 2016. The contract document outlines tendering procedures, contractual obligations, technical specifications, performance requirements, and operational appendices for facilities management implementation. In the private sector, companies have the option to either manage maintenance internally or outsource the work (Zulkifly et al., 2021).

Facilities Management and Maintenance Contract Document (FMMCD) is an essential tool that regulates the legal and business rapport between the clients and service providers. It outlines the scope of work, roles and responsibilities, performance expectations and payment terms. FMMCD is generally used in the post-construction stage, especially following the handover and commissioning of the construction projects whereby the focus is on the operational maintenance (Challender & Challender, 2024). Nevertheless, some organizations have begun considering FMMCD implications at earlier phases of design and development of constructions to incorporate maintainability and lifecycle cost-efficiency into project continuation (Hassanain et al., 2025). In Malaysia, the implementation of FMMCD can be observed across several different projects. In government sector, it is primarily used for government office building, hospitals, institutional offices and residential quarters operated by the PWD or other government agencies (Hashim et al., 2019). The contracts used for government projects are usually following standardized formats that prioritise on accountability and procedural transparency, which are in line with the public procurement policy (Saperi et al., 2025). The adoption of the FMMCD supports structured maintenance practices and promotes greater consistency in performance delivery across government facilities. Conversely, in private sectors, the FMMCD are also adopted in various types of building such as commercial buildings, corporates offices and concession-based projects such as Private Finance Initiatives (PFI) projects or Public-Private Partnerships (PPP), where FMM is often governed by performance-based contract (Hamid et al., 2023). In

contrast to the public sector, FMMCD application in private sector are more flexible, where the content of the contract is tailored to meet the needs of the projects (Zabidi, 2023).

However, it is reported that the implementation of FMMCD in Malaysia faces several challenges such as the lack of standardized contract forms and poor understanding of the contract, which often results in inconsistencies in defining the responsibilities and expectations between parties (Tamošaitienė et al., 2021). Koc & Gurgun (2022) highlight that without uniformity, contracts become open to interpretations and ambiguity, leading to disputes and inefficiencies. Additionally, the scope of services in many FMMCD is often vague and performance indicators are not clearly defined, making it difficult to assess service quality or hold parties accountable (Demirdöğen et al., 2022). Other challenges reported including vague specifications, unclear performance indicators, inconsistent documentation and lack of expertise in contract documentation (Zabidi, 2023; Edirisinghe et al., 2020). This leads to communication breakdown and disputes (Edirisinghe et al., 2020; Zou et al., 2019). To mitigate these challenges, Haron et al. (2020) suggest that contract documents should be drafted with clarity, precision and awareness of practical realities.

This study addresses this gap by examining implementation challenges according to the three main components of the FMM 2016 contract structure, namely Instruction to Tenderers (ITT), Conditions of Contract (CoC), and Appendices. The study aims to identify the implementation challenges associated with FMM 2016 in Malaysian office building projects and to understand how contractual structure contributes to operational issues during implementation. This study contributes to the existing literature by analysing implementation challenges based on the three main components of the FMM 2016 contract document. The study links the identified challenges directly to specific components of the contract document rather than discussing FMM issues in general.

LITERATURE REVIEW

FMM and FMMCD in Malaysia

FMM in Malaysia has undergone significant evolution since its inception in the 1990s, particularly gaining momentum in the early 2010s (Kamaruzzaman et al., 2018). The importance of effective FMM was further underscored by incidents in government offices, highlighting the critical role of maintenance in ensuring safety and functionality (Awasho & Alemu, 2023). Despite transitioning from reactive to preventive maintenance strategies, Malaysia's FMM sector still faces challenges such as lack of standardized practices, insufficient awareness and limited professional development compared to countries like United States and

United Kingdom (Rahmat & Nawawi, 2017). In response to these challenges, the Malaysian government has initiated policies like the National Infrastructure Asset Management Policy, set to be implemented in 2025, aiming to cultivate efficient maintenance practices and enhance public and private sector's comfort (Bernama, 2025). Furthermore, Hamid et al. (2021) reported that the Construction Industry Development Board (CIDB) also supports the FMM through various initiatives, encouraging professionals to improve their capacity and adopt technologies. These initiatives reflect the growing institutional recognition of FMM as a key pillar of national development and long-term asset sustainability.

As FMM practices advance, the supporting documents must also be updated to align with evolving industry needs. Central to this is the FMMCD, which serves as the foundation for aligning expectations, responsibilities and service delivery standards between clients and service providers. However, studies have shown that the implementation of FMMCDs often faces challenges such as unclear scope definitions, outdated technical specifications and insufficient performance standards (Hauashdh et al., 2022). In Malaysia, the use of FMMCD remains inconsistent, particularly between the public and private sectors. While government projects may utilize standardized documentation, such as those issued by the PWD, there is currently no standardized documentation for private sector (Zabidi, 2023; Zain 2022). As a result, the private sector tends to rely on bespoke contracts that are individually modified for each project (Che Mat, personal communication, 2024). This led to the inconsistencies of the contract terms and scope definitions across different projects. These inconsistencies increase the likelihood of contractual disputes. Haron and Arazmi (2020) emphasized that ambiguities in contract clause, inaccurate interpretation and unclear risk allocation are among the most common causes of conflict. These contractual challenges can significantly affect the execution of FMM projects, especially when the obligations of each party are not clearly stated.

Structure and Components of FMMCD

In Malaysia, the PWD FMM 2016 form of contract structures the FMMCD into three key parts which are the Instruction to Tenderers (ITT), Condition of Contract (CoC) and Appendices. The ITT provides a detail on the instructions regarding how the tenderers shall prepare their tender for the submission including how the tender evaluation procedures are done. The CoC defines the obligations of the contractor throughout the contract periods and appendices act as additional information containing all specifications and information for the contractor and are used to bind the contract. Each of these components plays a crucial role in defining the contractual obligations, procedural requirements and technical details necessary for effective FMM.

Instruction to Tenderers (ITT)

The ITT component provides guidance to tenderers regarding tender participation requirements, submission procedures and evaluation processes. This section plays an important role in supporting transparency and consistency during the procurement stage. Previous studies highlighted that inadequate tender information, unclear instructions and limited project details may contribute to misunderstanding among tenderers and reduce the quality of submitted proposals (Albtoush et al., 2022). Ambiguities in tender requirements may also create inconsistencies in interpreting contractual expectations and eligibility conditions during tender preparation.

Several studies further reported that tender preparation constraints such as limited advertisement periods and insufficient project information may affect contractors' ability to conduct comprehensive project assessments before submission (Indah Kusumarukmi & Adi, 2019). This situation may subsequently influence cost estimation accuracy and increase the likelihood of future contractual disputes. In addition, transparency and fairness during tender evaluation remain important concerns within procurement practices. According to Alwis et al. (2022), unclear tender instructions and evaluation criteria may create uncertainty among tenderers regarding compliance expectations and assessment procedures. Therefore, clear tender specifications and transparent evaluation procedures are essential to improve procurement effectiveness and reduce ambiguities during the tendering process (Khoso et al., 2021; Laryea, 2011).

Condition of Contract (CoC)

The CoC component establishes the contractual framework governing the implementation of FMM projects. It outlines the rights, responsibilities and obligations of contracting parties including matters related to payment procedures, variation orders, dispute resolution and contract administration. Existing literature indicates that contractual clarity is essential in minimizing disputes and ensuring effective contract execution. However, ambiguities and incomplete contractual provisions remain recurring issues within FMM and construction related contracts (Alghamdi et al., 2024; Haron & Arazmi, 2020).

Studies from Rao et al. (2024) and Chen et al. (2018) reported that rigid contractual structures and limited flexibility in contract modification procedures may affect project adaptability, particularly when unexpected operational requirements or technology related changes occur during implementation. Ineffective variation management procedures may further contribute to disputes, delays and cost overruns when contractual changes are not clearly regulated (Koc & Gurgun, 2021). In addition, procurement related limitations and administrative delays may affect maintenance responsiveness, especially for smaller

maintenance works that require immediate implementation (Alghamdi et al., 2024). These issues suggest that weaknesses within contractual provisions may significantly influence the efficiency and practicality of FMM implementation.

Appendices

Appendices is one of the sections in the FMMCD that serves as a supplementary component that provides detail technical and operational information to support contract execution. Among the subcomponents of appendices included in the FMMCD are forms of tender, acceptance letter, technical specification, schedule of prices and others. This section is critical for operationalizing the broader terms of the contract, offering a measurable parameter that guide day-to-day performance and compliance.

Previous studies identified several issues associated with technical documentation and information management within appendices. Lai et al. (2022) reported that incomplete information and insufficient documentation may create difficulties during project planning and implementation. Similarly, Mikulík and Hanák (2024) highlighted that vague or outdated technical specifications may affect contractors' ability to accurately assess project requirements and prepare reliable cost estimations during tendering and project execution stages.

In addition, weakly defined performance indicators and inconsistencies in technical documentation may reduce monitoring effectiveness and contribute to disputes regarding service quality and contractual expectations (Mahowa et al., 2025). The lack of standardized guidelines and reliable asset information further complicates maintenance planning and operational coordination. These issues demonstrate the importance of accurate, standardized and updated appendices in supporting effective FMM contract implementation and reducing technical ambiguities throughout the contract lifecycle.

Overall, previous studies suggest that implementation challenges in FMMCD are frequently linked to issues within tender procedures, contractual clauses and technical documentation. Table 1 summarises the key implementation issues reported in the literature according to the three main components of the FMMCD and their relevance to the present study.

Table 1: Summary of Previous FMMCD Issues Identified

FMMCD Component	Issues Identified	Authors	Related Focus in this Study
Instruction to Tenderers (ITT)	Unclear tender instructions, inadequate project information, limited advertisement period, ambiguities in evaluation criteria and tender compliance issues	Albtoush et al. (2022); Indah Kusumarukmi & Adi (2019); Alwis et al. (2022); Khoso et al. (2021)	Tender transparency, tender compliance, tender evaluation practices and procurement related challenges
Condition of Contract (CoC)	Misinterpretation of clauses, rigid contractual provisions, ineffective variation management, procurement delays and incomplete contractual clauses	Rao et al. (2024); Chen et al. (2018); Koc & Gurgun (2021); Alghamdi et al. (2024); Haron & Arazmi (2020)	Contractual clarity, variation order management, procurement efficiency and contractual adequacy
Appendices	Incomplete technical documentation, outdated specifications, weak performance indicators, inconsistent asset information and lack of standardized guidelines	Lai et al. (2022); Mikulík & Hanák (2024); Mahowa et al. (2025)	Technical specification issues, cost assessment challenges, asset information gaps and documentation standardisation

Source: Author's Own Data

RESEARCH METHODOLOGY

This study presents findings from a preliminary qualitative survey using document analysis and semi structured interviews to identify challenges in implementing FMMCD in Malaysia. The document analysis focused on the PWD FMM 2016 contract document to examine its structure and key components and to identify relevant issues reported in the literature. The results were used to guide the interview protocol and support the analytical framework. Purposive sampling was used to select participants based on their experience in FMM projects and involvement with FMMCD implementation. The study targeted two stakeholder groups, namely public clients and FM contractors. Although ten participants were initially identified, only six agreed to participate. This number was considered sufficient as data saturation was achieved during data collection. The interview protocol was developed based on themes from the literature review and document analysis and was reviewed by two experts for clarity and relevance (Shoozan & Mohamad, 2024). Each interview lasted 45 to 60 minutes and included demographic questions and open-ended questions on FMMCD challenges. Interviews were conducted face to face or online, recorded with consent and transcribed verbatim. Data saturation occurred after the fifth interview, with the sixth confirming consistency in the findings (Guest et al., 2020). The data were analysed using thematic analysis supported by ATLAS.ti Version 24, which

assisted in coding and organising qualitative data (Herbst et al., 2024). Findings were grouped based on the FMMCD structure identified from the document analysis, namely Instruction to Tenderers (ITT), Conditions of Contract (CoC) and Appendices.

FINDINGS

Demographic Background

The demographic data gathered from the Section A were compiled from the participants which consists of their represented organisations, working experience and positions in the organisations. Table 2 presents the summary of the participant's demographic profile.

Table 2: Demographic profile (n=6)

Items	Sub-items	Frequency (n)	Percentage (%)
Stakeholders/Organisations	Public Client	1	16.7
	FM Contractor	5	83.3
Years of Experience	10-20 years	4	66.7
	20-30 years	2	33.3
Designation	Directors	3	50.0
	Quantity Surveyor	2	33.3
	Manager	1	16.7

Source: Author's Calculation

Table 2 presents the demographic background of the participants involved in the paper. The majority were FM contractors (83.3%), while only one participant represented a public client (16.7%). Four participants had between 10 to 20 years of experience (66.7%) with the remaining two having 20 to 30 years of experience (33.3%). In terms of designation, half of the participants were directors (50.0%) followed by two quantity surveyors (33.3%) and one manager (16.7%).

Challenges of FMMCD

The findings from the interviews revealed a range of issues identified from the FMMCD which are challenges of ITT, challenges of CoC and lastly challenges of Appendices. The following sub-sections will discuss the challenges identified under each main component.

Challenges related to ITT

The analysis indicates several challenges within the ITT component, including limited advertisement scope, unfair tender bond requirements, non-compliance with tender conditions and ethical concerns during tender evaluation. These issues were consistently highlighted by participants across procurement experiences.

Ethical concerns were reported during the evaluation stage, where participants noted instances of post submission price adjustments that raise questions on fairness and transparency (P4:Q27). Similar concerns have been identified in previous studies, where lack of transparency in procurement processes may weaken trust and procedural integrity (Abul Hassan et al., 2021; Mohamad Azmi & Ismail, 2023). From a document perspective, the FMMCD evaluation structure provides general procedures but limited detailed safeguards on post submission adjustments, which may contribute to inconsistent interpretation during evaluation.

Non-compliance with tender conditions was also highlighted, where contractors without sufficient experience were allowed to participate or awarded contracts (P3:Q5). This reflects weaknesses in pre-qualification enforcement discussed in prior studies (Olanrewaju et al., 2022). The document analysis shows that eligibility criteria are stated in ITT, but enforcement mechanisms are not clearly operationalised, which may contribute to inconsistent application.

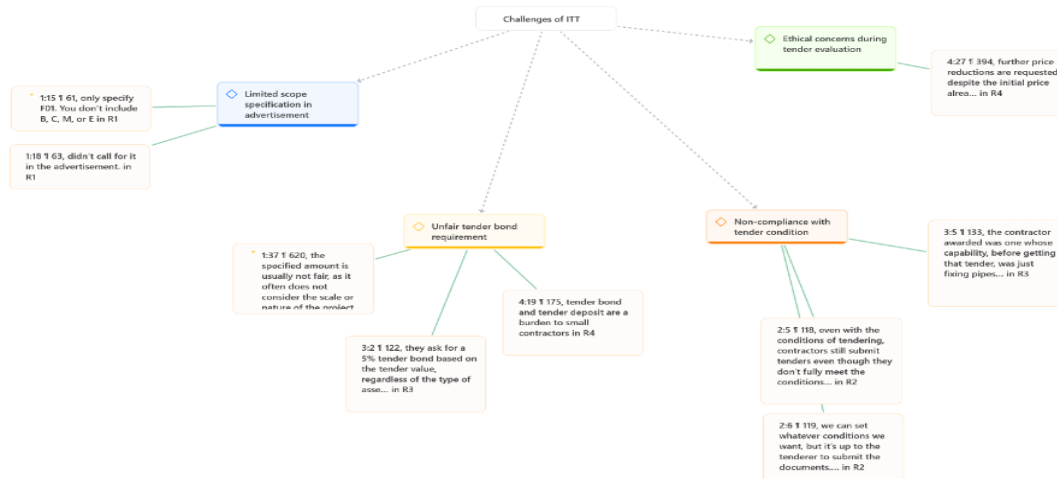


Figure 1: Network relationship for the challenges of ITT

Source: Author's Own Data (2024)

Unfair tender bond requirements were frequently mentioned as a barrier to participation, particularly for smaller contractors (P4:Q19; P1:Q37; P3:Q2). Literature suggests that high financial requirements may reduce competition and limit contractor participation (Lee et al., 2020). The document structure specifies bond requirements but does not differentiate contractor capacity, which may affect inclusivity.

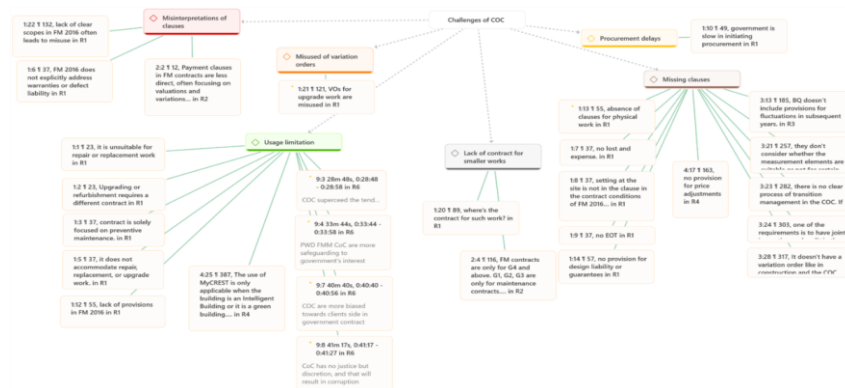
Limited advertisement scope was also identified where project information is insufficient for accurate bidding decisions (P1:Q15; P1:Q18). This aligns with findings that incomplete tender information reduces bid accuracy and

increases mismatch between contractor capability and project requirements (Ayettey & Danso, 2018). The ITT section provides general scope information, but lacks detailed operational breakdown, which affects bid clarity.

Challenges related to Condition of Contract (CoC)

Figure 2 show that challenges in CoC relate to missing contractual clauses, unclear provisions, usage limitations, misinterpretation of clauses, variation order practices and procurement delays. Missing contractual clauses were frequently identified across participants, including absence of price adjustment mechanisms, extension of time provisions, variation order clauses and defect liability provisions (P4:Q17; P3:Q28; P1:Q7). Literature confirms that incomplete contract provisions may lead to ambiguity and operational inefficiency (Ahmad & Marri, 2023; Mohammad et al., 2022). The document analysis indicates that while CoC defines obligations, several operational clauses are not explicitly detailed, creating gaps during execution.

Unclear clauses and misinterpretation were reported where payment and scope provisions were interpreted differently by stakeholders (P2:Q2; P1:Q22). This aligns with studies highlighting that ambiguous wording increases dispute potential (Haron & Arazmi, 2020). The CoC document contains contractual terms but lacks operational guidance notes, which may contribute to interpretation differences. Variation order misuse was also identified, where VOs were applied beyond intended maintenance purposes (P1:Q21). Literature shows similar issues where VO mechanisms are often misapplied in practice (Koc & Gurgun, 2021). The CoC defines VO processes but does not clearly restrict application boundaries, which may lead to misuse.



Contract limitations for smaller works were also highlighted, where maintenance contracts mainly focus on large scale works (P1:Q12). This is consistent with findings that standard contracts are not always suitable for minor works (Olanrewaju et al., 2023). The document analysis confirms limited coverage for small scale maintenance activities. Procurement delays were reported as affecting maintenance responsiveness (P1:Q10), consistent with literature on procurement inefficiency (He et al., 2023). This issue is linked more to implementation systems rather than contract wording itself.

Challenges related to Appendices

The last main component in the FMMCD is present in figure 3 which present the network relationship for challenges of appendices. The key challenges identified are the disputes over technical specification, historical data gaps, inadequate cost assessment, discrepancies in work order, lack of digital asset data at contract start and the lack of standardised guidelines.

Cost estimation difficulties were commonly reported due to insufficient asset information (P4:Q12; P7:Q1). Literature supports that incomplete data reduces cost accuracy and increases uncertainty in tender pricing (Olanrewaju et al., 2023). Document analysis shows that appendices rely heavily on provided data without ensuring completeness or verification mechanisms. Historical data gaps and lack of digital asset information were also identified (P1:Q28; P4:Q11). Studies highlight that poor data management affects maintenance planning and decision making (Razali et al., 2021). The appendices do not clearly enforce data updating standards, which contributes to inconsistency. Work order discrepancies were reported where interpretation varies between headquarters and site offices (P3:Q17; P1:Q34). This aligns with findings that lack of standard operating procedures leads to inconsistencies in execution (Ensafi et al., 2023). The document structure does not fully standardise work order procedures.

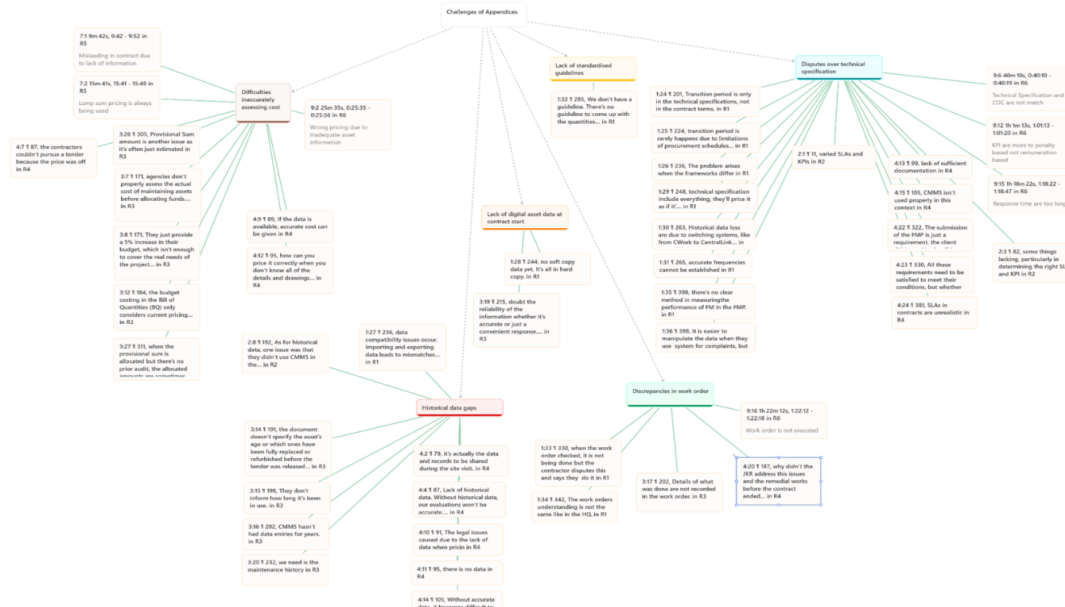


Figure 3: Network relationship on challenges of Appendices
Source: Author's Own Data (2024)

Technical specification disputes were also observed, particularly relating to SLAs and KPIs (P4:Q24; P9:Q12). Literature supports that poorly defined KPIs reduce performance clarity (Lai et al., 2022). Appendices include specifications but lack integration with operational performance systems.

DISCUSSION

The findings of this study are largely consistent with previous literature on FMM and procurement related contract management issues. Challenges related to ITT, CoC and Appendices reflect recurring problems such as unclear documentation, weak standardisation and limited operational clarity (Haron & Arazmi, 2020; Lai et al., 2022). However, this study extends the discussion by mapping these issues directly to the structural components of the PWD FMM 2016 contract document. The persistence of these challenges in Malaysia may be linked to the hybrid nature of FMM implementation, where standardized government contracts coexist with flexible operational practices. This creates variation in interpretation, particularly at the implementation level. In addition, limited integration between contract documentation and operational data systems such as CMMS may contribute to recurring inconsistencies in cost estimation, performance monitoring and maintenance execution.

The sample of this study represents both public clients and FM contractors, which provides cross stakeholder perspectives but does not represent all sectors of FMM practice in Malaysia. Therefore, the findings should be interpreted as indicative rather than generalisable across the entire industry. The main contribution of this study is not the identification of entirely new issues, but the structured alignment of implementation challenges with specific components of the FMMCD. This provides a clearer contract-based lens for understanding where operational breakdowns occur and how contractual structure influences implementation outcomes.

CONCLUSION

This research examined the key challenges in implementing the FMMCD in Malaysia, focusing on three main components: Instruction to Tenderers (ITT), Conditions of Contract (CoC), and Appendices. Semi structured interviews with FMM stakeholders revealed recurring issues including unclear and limited tender information, inconsistent application of tender requirements, ethical concerns during tender evaluation, missing and unclear contractual clauses, rigid contract provisions, misuse of variation orders, procurement delays, incomplete technical documentation, data gaps, and inconsistencies in work order and specification details. The study shows that these challenges are interconnected across the contractual structure. Issues in ITT affect tender preparation and evaluation, gaps in CoC influence contract interpretation and implementation, while deficiencies in Appendices impact cost estimation, asset information reliability and technical execution. These findings indicate that implementation problems are not isolated but arise from structural weaknesses across the FMMCD components. The study contributes by examining the FMMCD through its three core components and linking interview findings directly to each section of the contract. This approach provides a clearer understanding of how specific contractual areas contribute to implementation challenges within Malaysian FMM practice.

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