

An Investigation of Effective Document Management Strategies for Post-Contract Period Used by Consultant Quantity Surveyors in Sri Lanka

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ABSTRACT

In the construction industry, efficient document management is crucial for ensuring the successful completion of projects, compliance with regulations, and the delivery of high-quality results. The importance of proper document management becomes even more apparent during the post-contract period, as it governs essential processes such as project handover, maintenance, and future reference. Most studies have examined document management issues from the contractor's perspective, leaving a gap in understanding how consultant Quantity Surveyors, who manage extensive documentation during the post-contract period, handle these challenges. This gap is critical, as poor practices cause disputes, delays, and weak claim administration, yet little research addresses it. This research aims to explore effective strategies for managing construction documents during the post-contract period by consultant quantity surveyors in Sri Lanka. An extensive literature review was conducted to identify existing document management strategies and assess their effectiveness. Mixed-methodology approach was adopted in this study. Data were collected through preliminary interviews, a comprehensive questionnaire survey, and semi-structured interviews with professionals in the construction industry. The questionnaire survey yielded 50 responses from industry professionals, which were analyzed using the Relative Importance Index (RII) analysis. Qualitative data were obtained from preliminary interviews with five industry experts and semi-structured interviews with an additional five experts, which were evaluated using thematic analysis. The research proposes current best practices for implementing document management systems (DMS) to support construction projects. Key aspects such as the evaluation of existing DMSs, identification of writing strategies, strategy implementation, challenges encountered, recommended solutions, and the effectiveness of document management strategies and standards are highlighted. The findings reveal a strong preference for physical records, driven by concerns over digital durability, security, and familiarity. The study identified for integrate digital DMS to enhance efficiency, security, and long-term accessibility, encouraging a gradual shift towards more sustainable, technology-driven practices in the industry.

KEYWORDS: *Construction industry, digital methods, document management, physical methods, post-contract, Sri Lanka*

INTRODUCTION

The construction industry is highly information-dependent, with project success significantly relying on effective data access and document management (Sun et al., 2020; Ahmad et al., 2017). The complexity of construction projects arises from multiple stakeholders and the diverse nature of information involved (Chen & Kamara, 2011; Gamage et al., 2025). Key issues in current document management practices include delays in document flow, incomplete records, and inefficient communication (Zarebidaki et al., 2012). Although electronic document management systems (EDMS) offer solutions, challenges such as high costs, software usability, and interoperability issues persist (Forcada et al., 2007; Zarebidaki et al., 2012). Poor record-keeping has been linked to delays in claims, increased rework, and general inefficiencies (Kumaraswamy & Yogeswaran, 2003). Despite the availability of digital tools, traditional manual systems like Microsoft Excel are still widely used due to convenience, though they are ineffective for complex project needs (Nycyk, 2008). Effective document management is thus essential

to improving communication, reducing costs, and enhancing the overall success of construction projects (Ahmad et al., 2015).

While EDMS usage is growing, a significant portion of construction data remains unstructured and hard to retrieve (Caldas et al., 2002; Martínez-Rojas et al., 2016). Effective and efficient management of documents is essential to ensure the successful completion of a construction project (Rathnayaka et al., 2023).

Ghosh and Karmakar (2024) demonstrate that the escalating complexity of conventional construction claims document management systems (CDMSs) results in improper documentation, ineffective claim generation processes, and inadequate resources. This undeniably heightens the risk of disputes and conflicting interpretations within the industry. Construction projects with multi-stakeholder interactions need decentralized management to reduce disputes (Mahmudnia et al., 2022). Also, the Ekanayake et al. (2025) study indicated that while many ISO 9001:2015 elements meet the documentation requirements of quantity surveyors in construction projects, some fall short.

A Quantity Surveyor ensures accurate organization and management of project documents, facilitating clear communication and preventing disputes. Their role in document management enhances transparency, efficiency, and smooth project execution in heavy engineering projects (Akorah et al., 2025). Many studies have explored document management issues, challenges, and tools from the contractor's perspective (Ahmad et al., 2017; Bakhary et al., 2015; Senaratne & Mayuran, 2015), yet limited research focuses on consultant Quantity Surveyors, especially regarding the post-contract period. Effective documentation management by consultant Quantity Surveyors is essential to ensure traceability, accuracy, and compliance with contract requirements, minimizing disputes and delays during the post-contract stage (Karmakar, 2024; Senaratne & Mayuran, 2015).

Therefore, this research aims to identify and assess effective document management strategies for handling construction documents during the post-contract period by consultant Quantity Surveyors in Sri Lankan construction projects. To achieve this, the study will identify current strategies used in managing post-contract documents in Sri Lanka and analyze and compare their effectiveness in local context. Ultimately, the research will develop practical recommendations and guidelines for implementing the most effective document management strategies during the post-contract period in Sri Lanka.

LITERATURE REVIEW

Document management in construction refers to organizing, regulating, storing, sharing, and editing drawings, specifications, estimates, and other construction-related documents. (Kulatunga, 2023) DMS refers to the repository that stores documents and allows end-users to retrieve required information (Ahmad et al., 2017). A DMS makes it easy to have access to the information at any time and from any place (Akakandelwa, 2020).

Existing Document Management Strategies in the Post-Contract Phase

Traditional Paper-Based Methods

Historically, Sri Lankan construction consultants, particularly Quantity Surveyors, have relied on conventional document handling methods such as physical filing systems, printed drawings, handwritten logbooks, and hardcopy bills of quantities. These paper-based systems, while once effective, are increasingly criticized for their inefficiencies. Akakandelwa (2020) and Ahmad et al. (2017) emphasize that these systems require substantial physical storage, are vulnerable to damage, and are labor-intensive when it comes to searching and retrieving information. In addition, Löwnertz (1998) notes that the lack of metadata, search capabilities, and structured indexing in paper systems makes long-term storage and version control nearly impossible.

Emergence of Digital DMS

In response to the limitations, the industry has witnessed a shift toward digital platforms. DMS, such as EDMS cloud-based repositories and web-based project platforms, are now used to improve document

accessibility and control. These systems store electronic versions of construction documents, including CAD files, spreadsheets, BOQs, and technical reports, while enabling features like version control, user authentication, and structured retrieval (Rathnayaka et al, 2023; Löwnertz, 1998; Abdulkadir, 2020). The EDMS also allows project participants to upload, track, and access documents in real time through a centralized server, ensuring improved communication and collaboration.

Effectiveness of Current Strategies

The transition to digital systems has brought several improvements. EDMS platforms have enabled better document control, increased transparency, and reduced project delays due to faster information access (Rathnayaka et al., 2023). The EDMS is more appropriate for mega projects than traditional documentation methods due to its functionality, neutrality, interoperability, space efficiency, reversibility, and delivery speed (Rathnayaka et al., 2024). According to Ahmad et al. (2017), electronic systems improve operational efficiency by reducing paper usage, storage costs, and the time required for document sharing. Web-based systems also support remote collaboration, cutting down the need for physical meetings and transportation of files (Abdulkadir, 2020). Despite these benefits, Löwnertz (1998) highlights that only 20–40% of construction documentation is currently exchanged digitally, indicating that traditional systems still dominate in many firms.

Current Needs and Gaps in Practice

Despite increased awareness and availability of technology, many small and medium-sized construction firms in Sri Lanka continue to rely on manual documentation methods. This is largely due to limited technical infrastructure, a lack of formal training, resistance to change, and insufficient government support for digital transformation (Rathnayaka et al, 2023; Ahmad et al., 2017). Fernando et al. (2019) also observed that the absence of clearly defined document management responsibilities within teams leads to inconsistent implementation of digital systems. Experts suggest that effective transition requires strong leadership, formal guidelines, and ongoing training programs to build confidence among users and ensure widespread adoption. Ghosh and Karmakar (2024) study revealed that the manual nature of inputting, retrieving, analyzing, and disseminating claim results consumes valuable time and resources. Many claim requests are disapproved due to insufficient evidence. Additionally, manual and improper approaches to CDMSs result in cost overruns, conflicts, and disputes, which are common in construction projects. This highlights the urgent need for a streamlined and efficient CDMS to address the industry's challenges.

Technical Aspects of Document Management During Post-Contract Period

During the post-contract phase, which spans from the commencement of construction to final handover, documentation plays a vital role in verifying progress, processing payments, managing variations, preparing claims, and generating final accounts (Abobakr, 2017.; Gunarathna & Fernando, 2013). The need for accurate, timely, and secure document handling is especially critical at this stage. Hassan and Le (2020) emphasize that contract documents act as legal references for all stakeholders, making it essential that they are well-maintained and easily retrievable. Tools like cloud storage, BIM-integrated document systems, and encryption-enhanced digital files have therefore become increasingly relevant. Technologies such as blockchain and digital signatures are also being explored to ensure traceability, prevent unauthorized access, and maintain document integrity (Kulatunga, 2023).

Barriers to Implementation and Suggested Solutions

A major challenge in adopting EDMS solutions is the initial cost, security, and complexity of implementation. Security concerns in DMSs, particularly regarding data integrity, can severely impact a project's finances and the reputations of its participants (Das et al., 2022). However, Rathnayaka et al. (2024) emphasized that developing low-cost Sri Lankan software for document management is the most viable solution. Ahmad et al. (2017) and Fernando et al. (2019) report that many construction companies are hesitant to invest due to uncertain returns and a lack of immediate visible benefits. Furthermore, staff may resist transitioning to digital systems due to unfamiliarity with the technology. To address these

challenges, Hernad and Gaya (2013) recommend clearly defining document management roles, setting up feedback mechanisms, following ISO-based quality standards, and motivating staff through recognition and incentives. Additional training and departmental support are also essential to overcome technical and psychological barriers to adoption.

The evolving nature of construction technology suggests that the future of document management will be highly integrated, intelligent, and secure. Emerging tools such as BIM, cloud computing, AI-based document search, and real-time collaboration platforms are reshaping how data is created, accessed, and used. As noted by Kulatunga (2023), the effective implementation of digital document management can significantly reduce errors, cut costs, enhance project transparency, and improve legal compliance. Akakandelwa (2020) adds that advanced DMS platforms also contribute to sustainability by minimizing paper consumption and waste. However, achieving this future state requires a clear national strategy, standardization of systems, and coordinated efforts among public and private sector stakeholders.

RESEARCH METHODOLOGY

This study adopted a mixed-method approach combining quantitative and qualitative data. Mixed methods research involves collecting and integrating quantitative and qualitative data; therefore, may result in a more comprehensive understanding of the phenomenon under investigation. Mixed methods design value both quantitative and qualitative approaches to research (Leavy, 2022). The interpretivism paradigm and inductive reasoning supported the research framework.

Data Analysis Process

A preliminary interview was conducted with five professionals from the local construction industry to explore the existing document management strategies employed during the post-contract period in Sri Lanka. The objective of this initial stage was to gain foundational insights and identify common themes related to documentation practices. The collected qualitative data were analyzed using thematic analysis, and the key themes identified were used to design a structured questionnaire.

The questionnaire survey responses were obtained from a total of 50 participants. The RII method was used to evaluate and compare the effectiveness of various document management strategies. RII is a statistical measure often used in construction research to determine the relative ranking of the factors. In addition, qualitative data were gathered to triangulate the analyzed results (Senaratne and Mayuran, 2015). Kinemo (2024) studies have stated that RII is a statistical tool used to rank different factors based on their level of importance or impact. Researchers commonly use it to prioritize items according to respondents' ratings. To further develop practical recommendations and guidelines for implementing the most effective practices, a semi-structured interview was conducted with another five industry experts. The data from these interviews were also subjected to thematic analysis to enrich and validate the findings.

The questionnaire survey used a non-probability sampling method. Non-probability sampling suits exploratory studies and hard-to-reach groups where full population access is impractical (Ahmed, 2024). To select participants for the interviews, the data saturation method was used. Data saturation is a key concept in qualitative research, marking the point at which no new information or themes emerge from the data. Achieving this indicates that the researcher has thoroughly explored the phenomenon, allowing data collection to stop without missing important insights (Ahmed, 2025)

Expertise Core Data Analysis

Table 1 represents the demographic data analysis of the preliminary interviews, questionnaire survey, and semi-structured interviews.

Table 8.Demographic Data Analysis

Data Collection Method	Profession	Years of experience	No. of Experts
Preliminary Interview	Assistant Quantity Surveyor	Less than 5 years	1
	Quantity Surveyor	5-10 years	1

Data Collection Method	Profession	Years of experience	No. of Experts
Questionnaire Survey	Senior Quantity Surveyor	10-15 years	3
	Assistant Quantity Surveyor	Less than 5 years	17
	Quantity Surveyor		17
	Senior Quantity Surveyor	5-10 years	9
	Lead Quantity Surveyor	10-15 years	4
	Managing Quantity Surveyor	More than 15 years	3
Semi-structured interview	Senior Quantity Surveyor	10-15 years	2
		15-20 years	2
		Above 20 years	1

RESULTS AND DISCUSSION

Existing document management methods

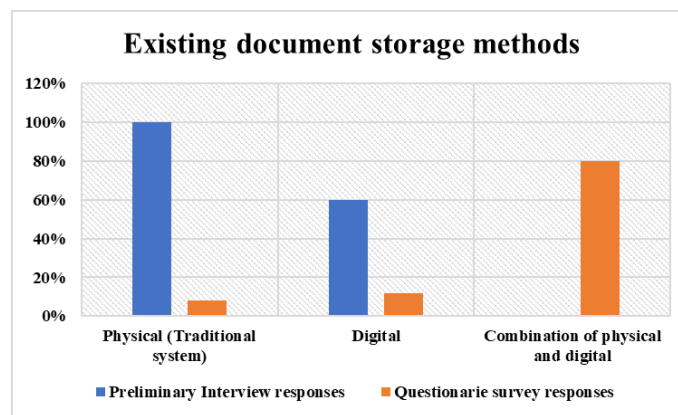


Figure 15. Existing document management methods

Figure 1 shows the distribution of document storage methods based on preliminary interviews and a questionnaire survey. All interview respondents noted that traditional physical systems are still dominant. However, few survey respondents use physical systems exclusively, indicating a shift in industry practices. While some interviewees recognized digital methods, about 80% of survey respondents reported using a mix of physical and digital storage. This reflects a trend towards hybrid solutions that combine traditional and modern approaches for better efficiency, accessibility, and security in document management.

Existing document management maintenance

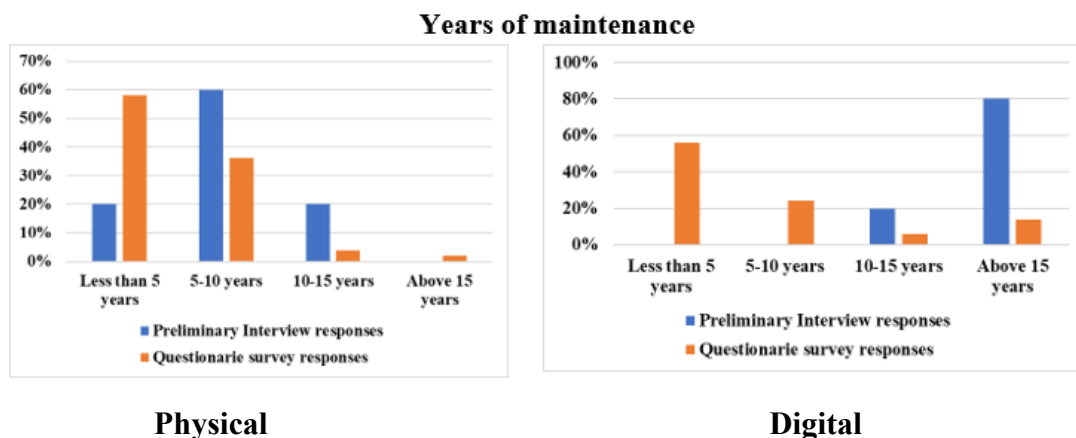


Figure 16. Document management maintenance

For physical document storage, the majority of questionnaire respondents prefer short-term maintenance, typically less than five years, mainly due to storage limitations, cost, and the deterioration of physical records over time. However, experienced professionals interviewed in the study indicated a tendency to retain physical documents for a longer period, particularly five to ten years, suggesting a deeper awareness of contractual obligations and potential dispute resolutions that may arise post-completion.

In contrast, digital document storage reflects a growing recognition of its long-term value. The interviewees strongly favored maintaining digital records for more than fifteen years, demonstrating confidence in the durability, retrievability, and security of digital systems. Encouraging long-term digital document retention would ultimately enhance record accessibility, legal protection, and operational continuity in quantity surveying practices.

Challenges and solutions for existing document management methods

Table 2. Existing Challenges

No	Challenges	Preliminary interview						Questionnaire Survey	
		I ₁	I ₂	I ₃	I ₄	I ₅	%	Responses	%
1	Technical Challenges	✓	✓	✓	✓	✓	100%	42	84%
2	Budget Constraints	✓		✓			40%	39	78%
3	Storage Or Space Constraint	✓	✓	✓	✓	✓	100%	38	76%
4	Compliance and Regulatory Issues		✓	✓	✓		60%	34	68%
5	Cultural Resistance	✓		✓		✓	60%	26	52%
6	Paper Sheet may be discolored.	✓	✓	✓	✓	✓	100%		
7	Lack of Knowledge strategies.	✓	✓	✓	✓	✓	100%		
8	Searching Issues	✓	✓			✓	60%		
9	Transfer information	✓	✓		✓		60%		
10	Damage can be caused by rodents.	✓		✓		✓	60%		
11	Access Control Issues	✓	✓				40%		
12	Communication Challenges	✓				✓	40%		

Table 2 reveals the challenges faced in existing document management practices. The data indicate that technical issues were universally acknowledged by all interviewees and were confirmed by 84% of survey participants. Similarly, storage and space constraints, along with a lack of awareness about digital documentation methods, were also highlighted by 100% of the preliminary interviewees. Budget constraints, compliance and regulatory issues, cultural resistance, and difficulties in accessing and transferring information also emerged as significant concerns. These findings highlight that the barriers are both technological and organizational, underscoring the complexity of implementing effective DMSs in the Sri Lankan construction industry.

Table 3. Solutions Implemented

No	Solutions	Preliminary interview					
		I ₁	I ₂	I ₃	I ₄	I ₅	%
1	Proper maintenance of a file system and log notes.	✓	✓	✓	✓	✓	100%
2	Storing files properly	✓	✓	✓	✓	✓	100%
3	Improving the digital system.	✓	✓	✓	✓	✓	100%
4	Introducing the paperless concept	✓	✓	✓		✓	80%

5	Reducing the Cultural Resistance	✓		✓		✓	60%
6	Regulatory Compliance		✓	✓	✓		60%
7	Managing and operating a proper search system	✓	✓		✓		60%
8	Maintaining systems to reduce the use of paper.	✓	✓				40%
9	Using budget control methods	✓				✓	40%
10	Proper management of access control system	✓			✓		40%
11	Using a one platform to transfer information related to documents	✓		✓			40%
12	Improving communication knowledge	✓					20%

In response to these challenges, Table 3 outlines a range of practical solutions during the preliminary interviews. All five interviewees emphasized the importance of maintaining proper file systems and log notes, storing files securely, and improving the existing digital systems. The introduction of a paperless concept also received strong support, along with strategies to overcome cultural resistance and improve search systems. These solutions suggest a strong awareness of the potential for digital transformation, although implementation varies across organizations.

Effectiveness of existing document management methods

Physical document management method

Table 6 presents the RII analysis of physical document strategies.

Table 4. Effectiveness of strategies (Physical method)

No	Strategies	Current Implementation		Effectiveness	
		RII	Ranks	RII	Ranks
1	Keep File as Videos	0.556	6	0.588	6
2	Keep File as Images	0.676	5	0.624	5
3	Keep Text documents	0.724	4	0.696	4
4	Keep Spreadsheets	0.796	1	0.744	3
5	Keep as Drawings	0.792	2	0.748	2
6	Keep document according to 5's Method	0.732	3	0.78	1

Among the methods analyzed, maintaining documents according to the 5S methodology was ranked as the most effective strategy, with an RII score of 0.78. However, spreadsheets were the most commonly implemented, scoring the highest in current usage with an RII of 0.796. Drawings and text documents were also commonly used, though perceived as less effective. This suggests that while traditional physical documentation methods remain widespread, there is recognition of the greater efficiency offered by systematic approaches like the 5S method.

Digital document management method

Below table 5 presents a similar analysis for digital documentation strategies.

Table 5. Effectiveness of strategies (Digital method)

No	Strategies	Current Implementation		Effectiveness	
		RII	Ranks	RII	Ranks
1	Maintain workflow automation	0.684	6	0.716	6
2	Maintain document version control	0.716	4	0.724	5
3	Maintain a records management system	0.732	3	0.744	4
4	Maintain as BIM files	0.656	7	0.744	4
5	Maintain document scanning and digitization	0.752	2	0.748	3
6	Maintain a cloud-based document storage	0.708	5	0.756	2
7	Maintaining digital documents as repositories	0.78	1	0.76	1

The highest effectiveness ratings were attributed to maintaining digital document repositories and using cloud-based storage, with RII scores of 0.76 and 0.756, respectively. Document scanning and digitization also ranked highly, reflecting a growing preference for digital storage solutions. Although strategies like workflow automation and the use of BIM files were implemented to a lesser extent, their perceived effectiveness indicates potential for broader future adoption. Overall, the data reflect a shift towards digital platforms and underscore the importance of infrastructure and training in facilitating this transition.

Document access and security are managed within the organization

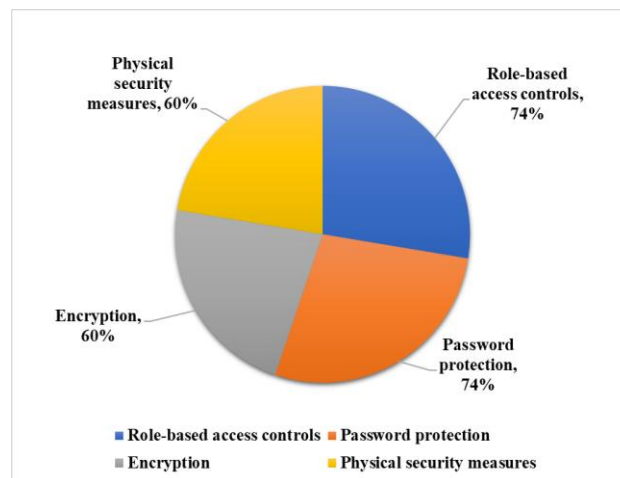


Figure 3. Document Security

Table 9 explores how document access and security are managed within organizations. All 50 participants in the questionnaire survey agreed on the importance of maintaining cloud-based backups, while a majority supported using encryption, password protection, and access control systems. The responses demonstrate growing awareness of the need for data security in document management. However, the relatively lower endorsement of advanced security features such as selective access systems and physical document lockers points to inconsistencies in current practices and the need for more standardized approaches across the industry.

Proposed recommendations and guidelines for implementing the most effective document management strategies

Table 6. Proposed guidelines

No	Proposed guidelines	Semi-structured Interviewers					%
		I ₁	I ₂	I ₃	I ₄	I ₅	
1	The method adopted should be practicable	ü	ü	ü			60%
2	Maintaining a secure digital store			ü	ü		40%
3	It should be practical to do it through the cloud-based system		ü			ü	40%
4	Refer to using cloud backup		ü		ü		40%
5	Limiting Access and Control for Important Documents			ü	ü		40%
6	Maintaining a check and balance System	ü					20%
7	Entry for the syllabus of the Quantity Surveying degree	ü					20%
8	Generate and store physical documents as a digital version, and maintain					ü	20%
9	Maintaining correct and properly standardized document management strategies			ü			20%
10	Awareness about the cybersecurity of document management and how to manage					ü	20%

Table 6 outlines proposed guidelines from expert interviews aimed at enhancing document management during the post-contract phase. Of the five industry professionals interviewed, 60% stressed the need for practical and usable document management methods for daily operations. Furthermore, 40% recommended secure digital storage and favored cloud-based platforms for centralized access. Another 40% highlighted the importance of cloud backups for data preservation and continuity. Access restrictions for sensitive documents were also emphasized by 40% of respondents. Additional, albeit less common, suggestions (20%) included implementing a check-and-balance system, integrating document management practices into quantity surveying education, and digitizing physical documents for efficiency. The guidelines underscore the importance of modernizing DMSs with secure and effective strategies.

Table 7. Proposed practical methods

No	Proposed methods	Semi-structured Interviewers					%
		I ₁	I ₂	I ₃	I ₄	I ₅	
1	Maintain as soft copy.	ü	ü	ü	ü	ü	100%
2	Complying with local construction rules and regulations	ü	ü	ü		ü	80%
3	Using a system like Aconex.	ü	ü				40%
4	Using a cloud-based system.	ü			ü	ü	40%
5	Using the 5's system.	ü					20%
6	Drivers, maintaining the server properly		ü				20%
7	Maintaining important or sensitive documents properly			ü			20%
8	Using digital signatures				ü		20%
9	Using a system like master build.	ü					20%
10	Using spreadsheets				ü		20%

In Table 7, the participants proposed various methods currently in use or recommended for adoption. All five experts emphasized maintaining soft copies of documents and complying with Sri Lankan

construction regulations. Systems like Aconex and Master Build were mentioned as beneficial tools for document tracking and control. The use of spreadsheets, digital signatures, and server maintenance were also discussed, though these were less commonly implemented. These insights reinforce the direction of digital transformation and highlight areas where practical application can be improved.

Table 8. Proposed document security systems

No	Proposed document security and confidentiality systems	Interviewers					%
		I ₁	I ₂	I ₃	I ₄	I ₅	
1	Maintaining Cloud base backup	ü	ü	ü	ü	ü	100%
2	Use encryption	ü		ü		ü	60%
3	Using Password System	ü		ü	ü		60%
4	Access limited		ü	ü		ü	60%
5	A digital security system should be used	ü		ü			40%
6	Providing access control		ü		ü		40%
7	Level of authorities should be given for paper-based system	ü					20%
8	Traditional system is not practical		ü				20%
9	Providing a separate locker or a separate key		ü				20%
10	Using a selective access system		ü				20%
11	Internet threats are difficult to avoid		ü				20%
12	Deleting access control		ü				20%

The research highlights the critical need for secure DMSs among consultant quantity surveyors in Sri Lanka. All five interviewed experts emphasized the importance of cloud-based backups for data preservation and remote access. They also noted the necessity of encryption and password protection to safeguard sensitive information. Access control mechanisms, which limit user privileges, were recommended to prevent unauthorized access to critical documents. Although advanced security measures like selective access and hierarchical permissions were discussed, their implementation is limited. Traditional security methods, such as locked cabinets, are seen as impractical in today's digital landscape, underscoring the need for technology-driven solutions. Additionally, the research reveals a lack of systematic procedures to combat internet threats, suggesting that a standardized security framework with encrypted storage, layered access rights, and cloud redundancy could significantly improve the security of post-contract documentation in the construction industry.

Table 9. Proposed technologies

No	Proposed emerging technologies & how organizations should prepare	Interviewers					%
		I ₁	I ₂	I ₃	I ₄	I ₅	
1	Using Cloud based DMS			ü	ü	ü	60%
2	Using block chain technology and can ensuring the details security.	ü		ü			40%
3	Using BIM Technology		ü			ü	40%
4	AI technology		ü	ü			40%
5	Introduction of smart contract	ü					20%
6	Retyping and printing the format made by CIDA	ü					20%
7	Taking photos and videos with the help of drone technology and processing them with the date	ü					20%
8	Using digital Signature system				ü		20%

Emerging technologies are set to transform document management practices in the construction industry. Expert interviews highlighted cloud-based systems as the most practical solution, offering easy

access and improved collaboration. Blockchain was identified for its potential to enhance document security and transparency, while BIM technology supports centralized digital coordination. Artificial intelligence was also noted for its ability to automate and optimize document workflows. Despite these benefits, adoption remains low due to limited resources and resistance to change. To prepare, organizations should invest in digital tools, train staff, and integrate flexible systems that support these technologies. Embracing these advancements will ensure more efficient, secure, and future-ready document management practices.

Developed Framework for Proposed Guidelines to Implement Effective Document Management Strategies in the Post-Contract Period in Sri Lanka

Figure 4 outlines a framework for effective document management in the post-contract phase of construction projects in Sri Lanka. The framework defines six key guidelines (1–6) for effective document management. Guidelines 1.1–1.9 outline practical methods, supported by technological integration with eight proposed technologies (1A.1–1A.8). Guidelines 1, 2, and 3 emphasize the need to combine these methods with security system plans, detailed in twelve proposed security systems (6.1–6.12). The strategies are categorized into two main areas: managing physical documents (3.1) and managing digital documents (3.2), ensuring a comprehensive and secure approach to document management.

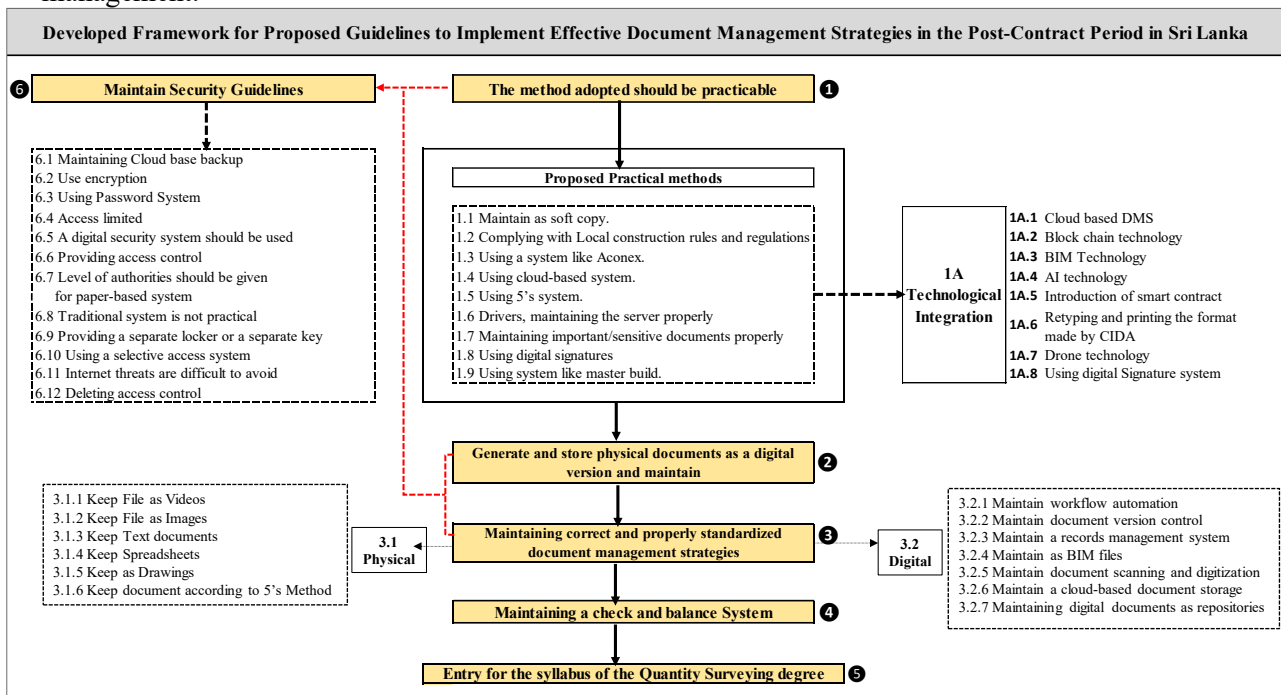


Figure 4. Developed Framework

Together, these elements form a comprehensive framework that balances practicality, security, and technology to enhance post-contract document management used by consultant quantity surveyors in Sri Lanka.

CONCLUSION

The research underscores the significance of adopting effective document management strategies during the post-contract phase in Sri Lanka's construction industry. While traditional manual methods remain prevalent due to familiarity and resource limitations, the emergence of digital systems such as cloud-based platforms and electronic tracking tools offers notable advantages in security, accessibility, and operational efficiency. Challenges such as space constraints, high costs, and resistance to change impede progress; however, with targeted training, organizational commitment, and regulatory support, these

barriers can be mitigated. The study advocates for a hybrid approach that combines the strengths of manual and digital practices, emphasizing the need for organizations to invest in staff training, develop standardized procedures, and prioritize secure storage solutions. Implementing these strategies can lead to improved document control, reduced project delays, and enhanced collaboration among stakeholders. Future research should focus on quantifying the benefits of digital adoption and exploring industry-specific customization of management practices. The findings highlight that maintaining documents according to the 5S methodology emerged as the most effective strategy for physical document management, while maintaining digital repositories and adopting cloud-based storage ranked highest in digital document management practices. Furthermore, the results underscored the universal agreement among participants on the importance of cloud-based backups, alongside strong support for encryption, password protection, and access control systems to ensure secure and reliable document access. Ultimately, a systematic and well-managed post-contract documentation process is essential for driving project success and sustaining growth in Sri Lanka's construction sector.

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