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RISK MANAGEMENT IN SRI LANKAN SME CONSTRUCTION SECTOR: IDENTIFYING BARRIERS AND ENABLERS

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ABSTRACT

This study investigates risk management practices in the SME construction sector in Sri Lanka, aiming to identify critical issues, enablers, and barriers. Through a mixed-method approach comprising expert interviews and a questionnaire survey, the research highlights significant risk management (RM) challenges unique to the Sri Lankan context. Key findings indicate that economic instability, lack of education in organisational management, and reliance on experience-based practices are major obstacles to effective RM. The study identifies "unawareness of available practices" and "keeping outdated procedures" as the most severe barriers to RM implementation. Unlike global literature, which often emphasizes financial constraints and time limitations, this research underscores the critical role of awareness and procedural updates in Sri Lanka's small and medium enterprise (SME) sector. The findings have implications for industry practitioners, academics, and policymakers, emphasising the need for targeted RM training, supportive regulations, and localised RM strategies. Limitations of the study include a small sample size and a focus on SME contractors in Sri Lanka, suggesting the need for further research in different contexts.

Keywords: *Construction Risk; Risk Management; Small and Medium Enterprises (SME); SME Construction.*

1. INTRODUCTION

The construction industry faces inherent complexities due to numerous random processes and external factors, necessitating effective risk management (RM) strategies (Abourizk & Mohamed, 2002). The Project Management Institute's Project Management Body of Knowledge (PMBOK) highlights RM as crucial for mitigating hazards and reducing losses (Raz & Michael, 2001). Ineffective RM can significantly impede project outcomes, particularly in an industry marked by unpredictability (Bajo et al., 2012; Serpell et al., 2015).

Small and medium enterprises (SMEs) in the construction sector are pivotal for job creation and economic growth but face unique challenges like skills shortages and limited delivery capability (Ranadewa et al., 2018). These challenges are amplified in developing countries where SMEs handle less profitable projects in remote areas (Eyiah & Cook,

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2010). While RM's importance is well-documented, the literature mainly focuses on large organizations, leaving a gap in understanding RM practices in SMEs (Ferreira de Araújo Lima et al., 2021). SMEs often lack the resources to implement sophisticated RM tools used by larger companies (Perera et al., 2014; Virglerova et al., 2016).

Thus, addressing RM effectively is crucial for SMEs to thrive in the construction industry and ensure project success. This research aims to explore the feasibility of implementing RM practices among SME contractors in Sri Lanka. It will identify issues related to SME contractors, identify factors enabling the adoption of RM practices, and review barriers to implementing these practices. Understanding these elements will help bridge the gap in the literature and provide actionable insights for improving RM in the SME construction sector.

2. LITERATURE REVIEW

2.1 CONSTRUCTION INDUSTRY AND RISK MANAGEMENT

RM in the construction industry is essential for identifying, analysing, and responding to project risks, ensuring project objectives like cost, time, and quality are met (Bahamid et al., 2019; Perera et al., 2014). Key risk factors include technical, construction, physical, organizational, financial, socio-political, and environmental risks (Mok et al., 2015). For example, technical risks involve not meeting specifications, and financial risks involve budget overruns.

Effective RM increases the likelihood of project success by proactively addressing risks, involving activities like risk identification, analysis, response planning, and monitoring (Wang & Yuan, 2011). This approach minimises the impact of negative events and maximises opportunities, reducing the chances of project failures and saving time and money (Xia et al., 2018). The construction sector's inherent complexities and uncertainties make RM crucial for ensuring projects achieve their goals despite unpredictable conditions (Zou et al., 2007).

A comprehensive RM strategy, tailored to the specific risk thresholds and tolerance levels of the organization and stakeholders, significantly enhances project performance and success (Lyons & Skitmore, 2004). This proactive RM approach not only prevents costly delays and rework but also contributes to overall project efficiency and effectiveness.

2.2 CHALLENGES FACED BY SMES IN THE CONSTRUCTION SECTOR

SMEs are vital to the construction industry, significantly contributing to employment and economic growth (Ranadewa et al., 2018). In Sri Lanka, a substantial number of construction firms are SMEs, highlighting their economic importance (Senevirathna et al., 2015). However, these businesses face unique challenges, such as difficulty securing financing from banks, intense competition from larger firms, and a shortage of skilled workers (Eyiah & Cook, 2010).

Cash flow management and compliance with regulations are also significant concerns, as SMEs often lack the resources to hire specialised staff (Rahman & Omar, 2006). Limited access to the latest technology further hampers their competitiveness and efficiency (Egbu, 2000). For instance, Ranadewa et al. (2018) found that Sri Lankan SMEs struggle with funding, affecting their ability to upgrade machinery and maintain project timelines and quality. Similarly, Eyiah and Cook (2010) highlight Ghanaian SMEs' challenges in

competing with larger firms, leading to market share loss and financial difficulties. These challenges underscore the need for targeted support and policies to enhance SME growth and sustainability in the construction sector.

2.3 RISK MANAGEMENT PRACTICES IN CONSTRUCTION

RM in the construction industry involves systematic identification, assessment, and response to risks to achieve project objectives (Bahamid et al., 2019). Common RM practices include risk identification, assessment, mitigation, and continuous monitoring (Nieto-Morote & Ruz-Vila, 2011). Large organisations typically use sophisticated RM frameworks and tools, like quantitative risk analysis and specialised software, to manage complex projects (Kamau & Mohamed, 2015). They also have dedicated RM teams and resources, enabling comprehensive strategies and contingency plans (Szymański, 2017).

In contrast, SMEs face distinct RM challenges due to limited resources and capacity (Falkner & Hiebl, 2015). SME RM practices are often informal and reactive, relying more on managers' experience and intuition than structured processes (Ranadewa et al., 2018). The lack of access to advanced RM tools and expertise makes SMEs more vulnerable to project disruptions and financial instability compared to larger organisations (Ranadewa et al., 2018).

2.4 ENABLERS FOR RISK MANAGEMENT ADOPTION IN SMES

Adopting RM practices is vital for SME contractors, aiding in loss reduction, employee safety, and risk mitigation (Kishan et al., 2014). Key enablers include leadership commitment, employee involvement, training, and access to resources (Carr & Tah, 2001). Leadership must emphasize RM's importance, and employees should be engaged and educated about risk mitigation (Bahamid et al., 2019). Comprehensive training in hazard recognition and risk analysis is essential (Makwana & Pitroda, 2017), along with providing necessary tools like risk assessment software and safety manuals (Philemon et al., 2018).

Technology, such as advanced risk analysis tools, enhances SMEs' RM capabilities. Policy support from governments and industry bodies, including guidelines and incentives, further encourages RM adoption (Philemon et al., 2018). Globally, collaborations with stakeholders like suppliers and industry associations provide SMEs with additional resources and knowledge (Makwana & Pitroda, 2017). Examples from the UK and Australia highlight how government initiatives and industry partnerships have improved RM practices and safety standards among SMEs (Philemon et al., 2018).

2.5 BARRIERS TO IMPLEMENTING RISK MANAGEMENT IN SMES

Adopting RM practices in SMEs is often inconsistent due to various barriers that hinder their competitiveness and ability to mitigate risks (de Araújo Lima et al., 2020). One primary barrier is the lack of expertise, resources, and reliable tools for RM, which are often financially out of reach for SMEs (Bajo et al., 2012). The principles used for larger companies are often impractical for SMEs due to their unique characteristics, such as limited management capacity and less formalized RM approaches (Marcelino-Sádaba et al., 2014).

There are no standardised RM frameworks tailored to SMEs, which leads to inconsistencies in implementation (de Araújo Lima et al., 2020). Additionally, SMEs

often lack the necessary knowledge to make informed decisions about risk hedging and the managerial skills to effectively utilise RM tools (Olson & Wu, 2010). This knowledge gap can expose SMEs to significant business risks (Leopoulos et al., 2007).

Key barriers identified by El-Sayegh (2014) include a lack of understanding of RM techniques, difficulty in selecting appropriate RM methods, and challenges in estimating probabilities. Human and organisational resistance, coupled with insufficient top management support and the perceived high cost and effort of RM processes, further complicate RM adoption. Specific to small projects, barriers such as competition, complex analytical tools, limited budgets, and lack of government support are prevalent (Hwang et al., 2014).

2.6 IMPORTANCE OF CONDUCTING THE STUDY

The primary goal of construction project planning and management is to determine project objectives considering time, cost, and quality (Brown & Adams, 2000). Key challenges impacting construction performance include lack of finance, payment interruptions, design changes, low confidence, and poor planning (Asiedu & Adaku, 2019). These issues are particularly acute for SME contractors in Sri Lanka, who face unique risks and resource constraints compared to larger firms (Perera et al., 2014). Despite the high-risk nature of the construction industry globally, effective RM practices are often lacking, especially in developing countries (Serpell et al., 2015). SMEs face challenges in implementing RM due to high costs and complexity (Virglerova et al., 2016; Ferreira de Araújo Lima et al., 2021). The literature has largely focused on large organizations, leaving a gap in understanding RM in SMEs (Ferreira de Araújo Lima et al., 2021). This study aims to fill this gap by identifying issues specific to SME contractors in Sri Lanka, factors enabling RM adoption, and barriers to implementation, aiding in developing strategies for their sustainability and resilience.

3. RESEARCH METHODOLOGY

This research adopts a mixed-method approach to analyse the feasibility of implementing RM practices for SME contractors in Sri Lanka. The study combines qualitative and quantitative methods, as this approach is effective in exploring complex issues (Bazeley, 2002). A questionnaire survey was conducted to gather quantitative data from SME contractors, using Likert scale questions to assess RM awareness and application. The data were statistically analysed to determine the prevalence of RM practices. Additionally, semi-structured interviews with industry experts were conducted to validate and expand on the findings. Purposive sampling ensured the selection of knowledgeable experts, and interviews were recorded with consent. Content analysis, including manual coding, was used to evaluate both interview data, following Burla et al. (2008) and Basit (2010). This mixed-method approach provides a comprehensive understanding of RM challenges and opportunities for SME contractors in Sri Lanka, addressing a significant gap in the literature.

The interviews were conducted with six (6) experts selected according to the following criteria, and Table 1 elaborates on the interviewee's profile.

Table 1: Interviewees profile

Code	The profession of the interviewee	Additional criteria				
		CQ1	AQ1	AQ2	AQ3	AQ4
IV1	Quantity Surveying (Managing Director)	✓	✓	✓	✓	✓
IV2	Engineer (Project Manager)	✓	✓	✓		✓
IV3	Engineer (MEP Engineer)	✓		✓	✓	✓
IV4	Quantity Surveying (Managing Director)	✓	✓	✓	✓	✓
IV5	Quantity Surveying (Project Manager)	✓	✓	✓	✓	✓
IV6	Engineer (Director)	✓	✓	✓		✓

Compulsory qualification:

- **CQ1** - At least 10 years of experience in construction.

Additional qualification:

- **AQ1** - Knowledge in risk management practices
- **AQ2** - Knowledge and experience in working with SME contractors in Sri Lanka.
- **AQ3** - Knowledge in project management and planning concepts.
- **AQ4** - Current engagement with SME sector projects.

Purposive sampling was employed for a questionnaire survey, distributing it among 52 professionals, including Quantity Surveyors, Engineers, Project Managers, and researchers in academia related to the construction industry. Thirty-five responses were collected, resulting in a 67% response rate. Respondents had experience ranging from one to twenty years in the construction industry and small to medium-scale projects. Summary of the respondents are presented in Table 2.

Table 2: Summary of questionnaire respondents

Profession	Experience in construction						Experience in SME					
	0 - 5	5 - 10	10 - 15	15 - 20	Over 20	Total	0 - 5	5 - 10	10 - 15	15 - 20	Over 20	Total
Quantity Surveyor	5	7	3	3	0	18	8	6	4	0	0	18
Engineer	3	2	2	0	0	7	4	3	0	0	0	7
Project Manager	0	1	2	2	0	5	4	1	0	0	0	5
Academic Researcher	3	2	0	0	0	5	5	0	0	0	0	5
Total						35						35

4. DATA ANALYSIS AND FINDINGS

4.1 CONSTRUCTION RISKS IN SME SECTOR

The interviews with industry experts revealed several common risks for SME construction projects. These included challenges in winning new projects, receiving timely payments, maintaining continuous labour and material supply, handling price uncertainties, and managing documentation delays. Specific risks highlighted by experts also encompassed potential changes in government regulations, design errors, maintaining cash flow, clients abandoning projects due to bankruptcy, equipment theft, neighbour disturbances, and unpredictable weather conditions. Notably, experts emphasized that the financial instability of clients significantly disrupts cash flow, leading to project delays or termination.

The questionnaire survey sought to categorise the impact of these common uncertainties using a Likert scale from 1 to 5. The findings are illustrated in Table 3.

Table 3: Impact of common uncertainties faced by SME contractors

Code	Description	Negligible	Minor	Moderate	Significant	Severe	Weighted Total	WA	Rank
Weighted marks		**0.1**	**0.2**	**0.3**	**0.4**	**0.5**			
ECU1	Receiving money on time for the work done	0	0	0	4	31	17.1	11.40	**1**
ECU2	Maintaining the cash flow of the project.	0	0	0	5	30	17	11.33	**2**
ECU3	Continuously providing labour, material, and other required resources.	0	0	2	16	17	15.5	10.33	**4**
ECU4	Winning new projects to continue company workflow.	0	2	9	11	13	14	9.33	**5**
ECU5	Providing uninterrupted facilities for the labour requirement.	0	0	18	17	0	12.2	8.13	**13**
ECU6	Possibility of new taxes and changes in legislation.	0	0	11	18	6	13.5	9.00	**7**
ECU7	Changing and unpredictable weather conditions.	0	0	15	13	7	13.2	8.80	**10**
ECU8	Pricing for fixed-price projects with price fluctuations.	0	0	12	17	6	13.4	8.93	**9**
ECU9	Delays in documentation.	0	0	15	19	1	12.6	8.40	**12**
ECU10	Clients abandoning projects due to bankruptcy.	0	0	2	8	25	16.3	10.87	**3**
ECU11	Design Errors	0	0	13	18	4	13.1	8.73	**11**
ECU12	Theft issues	0	0	10	18	7	13.7	9.13	**6**
ECU13	Disturbance by neighbours and other parties due to sound, pollution, and other similar events.	0	0	6	29	0	13.4	8.93	**8**

The weighted analysis revealed that "receiving money on time for the work done" was the most critical risk, with a Weighted Average (WA) of 11.40, indicating its severe impact as noted by 88.5% of respondents. Closely following was "maintaining cash flow," with a WA of 11.33 and 85.71% of respondents rating it as severe. Other significant risks included "clients abandoning projects due to bankruptcy," "continuously providing labour, material, and other resources," and "winning new projects to continue company workflow."

Several unique risks to the Sri Lankan context emerged from the expert interviews. Experts indicated that sudden changes in government regulations and the introduction of new taxes significantly impact material and labour prices, which is particularly disruptive for SME contractors. The financial instability of clients, often resulting in delayed or halted payments, was highlighted as a critical risk, leading to substantial cash flow issues and project delays. Additionally, the high incidence of equipment theft on construction sites was identified as a unique challenge, exacerbated by insufficient security measures.

These unique findings are particularly significant when compared to existing literature. While studies by Eyiah and Cook (2010), Virglerova et al. (2016), and Siraj and Fayek (2019) emphasize financial management, particularly cash flow, as a critical challenge for SMEs globally, the issues of sudden regulatory changes and high equipment theft rates are more specific to the Sri Lankan context. This highlights the need for localised RM practices that address these specific challenges, emphasising the importance of adaptability and security measures in improving project outcomes for SME contractors in Sri Lanka.

4.2 FACTORS INFLUENCING RISK MANAGEMENT IN SME SECTOR

The interviews revealed several key factors influencing risk management in SME construction projects in Sri Lanka. Economic stability and government policies, including taxes and regulatory changes, were highlighted as significant risk influencers. Additionally, factors such as changing weather conditions, unexpected local or global catastrophes, management style, and lack of formal education among management were noted. Issues related to the lack of permanent staff and inadequate allocation for preliminary items in bills of quantities were also identified.

A total of nine factors were summarized from the above interviews and ranked using the weighted average based on a Likert scale. The survey results with analysed findings are demonstrated below in table 4.

Table 4: Impact of factors influencing risk in SME contractors in Sri Lanka.

No	Item Code	Description	Negligible	Minor	Moderate	Significant	Severe	Weighted Average (WA)	Rank
	Weighted marks		**0.1**	**0.2**	**0.3**	**0.4**	**0.5**		
01	EFI1	Economic instability of the country.	0	0	2	11	22	10.67	**3**
02	EFI2	Government policies on taxes	0	0	4	12	19	10.33	**5**

No	Item Code	Description	Negligible	Minor	Moderate	Significant	Severe	Weighted Average (WA)	Rank
	Weighted marks		0.1	0.2	0.3	0.4	0.5		
		and other changes in legislation.							
03	EFI3	Changing weather conditions.	0	0	15	18	2	8.47	**9**
04	EFI4	Unexpected local and global catastrophes.	0	0	15	8	12	9.13	**7**
05	EFI5	Management style and policy decision taken by organisation.	0	0	15	15	5	8.67	**8**
06	EFI6	Lack of education in organisation management.	0	0	0	10	25	11	**2**
07	EFI7	Most of the contractors are only experienced based.	0	0	0	6	29	11.27	**1**
08	EFI8	Not having permanent staff to carry out work of the organisation.	0	0	0	19	16	10.40	**4**
09	EFI9	Not allocating sufficient preliminary items to maintain head offices.	0	0	3	20	12	9.93	**6**

The subsequent questionnaire survey supported interview findings. The survey revealed that "integration of experience with formal risk management training" emerged as the most influential factor, with a weighted average (WA) of 11.27. This was followed by "lack of education in organisational management" (WA 11.00) and "economic instability" (WA 10.67). Factors such as "changing weather conditions" and "unexpected catastrophes" were less impactful, reflected in their lower WA scores.

Unique to the Sri Lankan context, the prominence of experience over formal education in managing construction risks stands out, contrasting with global literature. While Virglerova et al. (2016) highlighted financial issues as a primary risk factor for SMEs, the survey results indicate that experience and gaps in education were more critical in Sri Lanka. This underscores the need for targeted risk management practices that address local educational deficiencies and emphasise the integration of practical experience with formal risk management training in SME construction projects.

4.3 BARRIERS TO IMPLEMENT RISK MANAGEMENT AMONG SME CONTRACTORS

The data analysis of barriers to implementing RM practices among SME contractors in Sri Lanka reveals several critical insights. From the expert interviews, key barriers identified include a strong resistance to change due to outdated procedures, a lack of awareness regarding RM practices, and insufficient budget allocations for RM.

Interviewees noted that limited time and financial constraints significantly hinder RM implementation, with one expert emphasising that many SMEs lack the resources to maintain permanent staff or invest in effective RM practices.

When it comes to barrier of implementing RM practices among SME contractors in Sri Lanka, fifteen different factors were identified throughout the expert interview findings and literature review findings. All the respondents were asked to rate their opinion on these identified barriers considering the impact of these barriers to implement RM practices considering the Sri Lanka context. The findings with regard to barriers are presented in table 5 below.

Table 5: Barriers to implementing risk management among SME contractors.

Code	Description	Negligible	Minor	Moderate	Significant	Severe	Weighted Average (WA)	Rank
	Weighted marks	**0.1**	**0.2**	**0.3**	**0.4**	**0.5**		
EBI1	Competition among SMEs	0	0	8	19	8	9.33	**10**
EBI2	Complexity of analytical tools	0	5	12	18	0	7.87	**14**
EBI3	Lack of potential benefits	0	3	22	8	2	7.60	**15**
EBI4	Lack of budget	0	0	2	13	20	10.53	**6**
EBI5	Lack of government legislation	0	0	9	18	8	9.27	**12**
EBI6	Lack of manpower	0	0	2	9	24	10.80	**5**
EBI7	Lack of time	0	0	0	10	25	11.00	**4**
EBI8	Low profit margin	0	0	6	11	18	10.13	**9**
EBI9	Not economical to implement	0	0	22	11	2	8.00	**13**
EBI10	Unawareness of available practices	0	0	0	0	35	11.67	**1**
EBI11	Not adding cost requirement needed for implement RM	0	0	0	8	27	11.13	**3**
EBI12	Not maintaining permanent staff	0	0	3	16	16	10.20	**7**
EBI13	Not keeping records on past projects	0	0	4	27	4	9.33	**10**
EBI14	Keeping the same outdated procedures	0	0	0	3	32	11.47	**2**
EBI15	Resistance for change to new systems	0	0	8	6	21	10.20	**7**

The questionnaire survey reinforced these findings, highlighting that "unawareness of available practices" emerged as the most severe barrier, with a weighted average (WA) of 11.67. This was followed by "keeping same outdated procedures" (WA 11.47) and "not adding cost requirements needed to implement RM" (WA 11.13). Notably, the survey revealed that "unawareness of available practices" was more critical in the Sri Lankan context than in existing literature, which often emphasizes financial constraints and time

limitations. For instance, while El-Sayegh (2014) and Hwang et al. (2014) identify low managerial understanding and lack of time as significant barriers, the Sri Lankan data suggests that the lack of awareness and resistance to updating outdated practices are more pressing issues.

These findings indicate that RM implementation challenges in Sri Lanka are uniquely influenced by a lack of awareness and outdated procedures, suggesting the need for targeted educational initiatives and cultural shifts within SMEs to overcome these barriers.

5. CONCLUSIONS

This research investigates RM practices in Sri Lanka's SME construction sector, focusing on key issues, enablers, and barriers. The study's objectives were to identify challenges facing SME contractors, factors facilitating RM adoption, and obstacles to implementing these practices. Using a mixed-method approach, including expert interviews and a questionnaire survey, the study found that economic instability, lack of management education, and reliance on experience-based practices significantly impact RM.

The survey identified "unawareness of available practices" and "adherence to outdated procedures" as critical barriers, with weighted averages of 11.67 and 11.47, respectively. Unique to the Sri Lankan context, the study found that sudden regulatory changes and high rates of equipment theft pose significant risks, contrasting with global studies that often emphasise financial constraints and time limitations as primary challenges. This research underscores the importance of awareness and procedural updates, particularly in a sector where experience often outweighs formal education in managing construction risks.

The study's implications are broad: for practitioners, it underscores the necessity of targeted RM training and awareness initiatives to bridge knowledge gaps; for academics, it offers a foundation for further exploration of the unique challenges faced by SMEs in developing countries; and for policymakers, it highlights the need for stable regulations and incentives to encourage RM adoption. The study's limitations include a relatively small sample size and a focus on Sri Lankan SMEs, limiting broader applicability. Future research should consider RM practices in diverse contexts, including larger firms and other developing nations, to provide a more comprehensive understanding of global RM challenges and solutions. Overall, this research offers critical insights into the RM practices of Sri Lanka's SME construction sector, emphasising the need for tailored strategies to enhance RM adoption and resilience.

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