CONSTRUCTION

Extent of Value Management Practice and Integration of Flood Resilience Considerations in Building Projects in Coastal Lagos, Nigeria

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Abstract

Managing the challenge of flooding is an important aspect to consider when developing buildings in coastal areas of Lagos. Value Management can be used to provide structure when considering the functions associated with a project. It also considers the different options available to achieve value through efficient use of resources. There are concerns regarding how much flood resilience is being considered during Value Management activities on building projects in coastal Lagos. This study looked at how Value Management is currently being practiced and how much flood resilience is being considered in relation to Value Management activities on buildings projects in Lagos, Nigeria. A convergent mixed-methods approach was used during the research phase. Data was gathered by completing a structured questionnaire targeting built environment professionals and other relevant project stakeholders. A total of 325 valid responses were received out of a total of 348 questionnaires (93.4%). 20 experienced practitioners were also interviewed. Statistical analysis was completed by calculating the mean score and standard deviation of quantitative responses. Qualitative responses were analysed using thematic analysis. Results showed that there is a moderate amount of Value Management activities being implemented (overall mean score 2.88). Systematic consideration of alternative solutions in design and construction had the highest mean score (3.29). Functional analysis had the next highest mean score (3.21). Incorporating flood risk and resilience requirements was ranked lower with a mean score of 2.49. Considering the life cycle performance of flood resilience had a mean score of 2.51. Findings show that whilst traditional Value Management activities are being practised to a moderate extent, flood resilience is not being considered to a great extent. It should be explicitly considered during Value Management activities throughout the planning, design evaluation and life cycle stages.

Keywords: Value Management; flood resilience; building projects; lifecycle performance; coastal Lagos; construction industry

1 Introduction

The construction industry plays a vital role in economic growth through providing residential, commercial, industrial and public infrastructure. However, development of buildings in coastal areas is becoming increasingly challenging due to environmental issues, such as flooding. Flooding can cause damage to structures, affect economic activity, and negatively impact infrastructure and functionality of developed buildings. Coastal areas are especially vulnerable to flooding due to high building pressure, low levels of elevation, poor drainage systems and changing climatic conditions (McClymont et al., 2019; Rözer et al., 2022; Wang et al., 2022).

Coastal cities are highly vulnerable to flooding due to rainfall intensity, tidal, storm surge, rising sea levels and poor drainage. To overcome these challenges there needs to be a focus on creating flood

resilient buildings, so planning, designing and constructing buildings with consideration to their resilience (Almutairi et al., 2020; French et al., 2020; Gijsman et al., 2021). As a result flood resilience is becoming a key factor to consider in building projects located in vulnerable environments.

Lagos State is an important area to look into this topic as many coastal areas are vulnerable to regular flooding. Studies have shown that coastal areas are vulnerable within Lagos and flooding is causing damage to buildings, infrastructure, livelihoods and property (Adegun, 2023; Ndimele et al., 2024). Therefore flood risk should be considered during decision making of building projects.

Value Management (VM) is a process that can be used to improve the value of a project. A process is created to understand what functions are needed, what alternatives could be considered, and the effective use of resources. Within construction VM is used to analyse functions, involve multiple disciplines, and consider alternatives to ensure that the functions and standards of the project are being met with the correct resources (Alshehri, 2020; Lin et al., 2023).

VM can be used to ensure that the right balance is reached between the functions, performance, quality, cost, and stakeholder requirements of the project. Modern thinking has also evolved to consider sustainable, adaptable, customer satisfaction and long term performance of a project (Ccama Condori & Panca Humpiri, 2024; Gaur & Tawalare, 2024; Malek & Mat Isa, 2024). This is important to consider for buildings in flood prone areas as a focus only on initial costs may be considered, however this may not take into consideration future costs of repair, disruption and loss of functionality.

It is important to incorporate flood resilience into VM to ensure that the resilience options are considered. Decisions can be made around the site, elevation, drainage, materials and protection of the building to ensure that the functions are being met and the project will perform well in the long term. Considering these requirements in early stages of planning may provide opportunities to consider alternatives (Doornkamp et al., 2024; González-Dueñas & Padgett, 2021; Ilesanmi et al., 2025).

However, in the Nigerian construction industry challenges have been faced when implementing VM. Previous studies have shown that improvements are needed within the industry to increase the implementation of VM (Ikediashi & Bassey, 2021; Ilenikhena & Adindu, 2021; Jiya et al., 2023; Oke et al., 2019).

When considering VM for building projects in flood prone areas consideration needs to be given to how flood risk and future resilience performance can be incorporated into decision making. If these factors are not being considered then resilience will not be implemented until issues are discovered.

Current research has been carried out on VM within construction and flood resilience within the built environment. However, further empirical research is needed to understand how much flood resilience is being incorporated into VM activities within coastal building projects. This study aims to understand the extent that VM is being practiced and how much flood resilience is being incorporated within building projects in coastal Lagos, Nigeria.

1.1 Aim and objective of the study

Aim: To understand the extent of Value Management being practiced and how much flood resilience is being considered within building projects in coastal Lagos, Nigeria.

Objective: To determine the extent of Value Management being practiced and how much flood resilience is being considered within building projects in coastal Lagos.

1.2 Research question

To what extent is Value Management being practised and how much flood resilience is being considered within building projects in coastal Lagos?

2 Literature review

2.1 Value Management

Value Management is a structured method of decision making to ensure that the functions and performance of a project are being met whilst using the correct amount of resources. The main idea behind Value Management is to understand what value the project has based on the functions and benefits rather than just how much money is being spent. This concept came from Value Analysis and has since been used in construction and other project industries (Alshehri, 2020).

Value Management in construction is a structured process that is used to understand what requirements are needed, analyse functions, create and review alternatives. This encourages project teams to consider if the intended project objectives are achievable through alternative options, without affecting the essential functions (Lin et al., 2023; Maragara et al., 2024).

Value Management is an important aspect to consider when completing construction projects as there are multiple decisions to be made regarding design, cost, material, construction methods, quality and functionality of the building. This can have long term effects on the performance of the building. By using a structured approach Value Management can be used to understand what requirements are needed and choose the best alternatives to provide value (Lin et al., 2023).

Value Management should not be seen as a way to reduce costs. If the focus is purely on reducing initial costs this can cause issues with the functionality, durability and long term performance of the building. Modern thinking has evolved to consider sustainability, stakeholder satisfaction, and adaptability and life cycle benefits within projects (Ccama Condori & Panca Humpiri, 2024; Gaur & Tawalare, 2024; Malek & Mat Isa, 2024).

2.2 Value Management practices in building projects

Value Management can be implemented in building projects. This includes implementing structured Value Management processes, functional analysis, alternatives and involving multiple disciplines.

Functional analysis is an important part of Value Management. This helps project teams to understand what functions the building or elements need to perform. Different approaches can be considered to meet the requirements. This can also help to identify what the essential requirements of the project are and what features are not going to contribute greatly to the intended performance (Alshehri, 2020; Lin et al., 2023).

Considering alternatives systematically can help project teams to understand what options are available to them. This can help to encourage innovation and make decisions based on cost, functionality, buildability, quality and other performance factors (Rostiyanti et al., 2024).

Structured Value Management processes can help to provide a systematic approach to Value Management. This can help to ensure that during planning and design phases of the project the requirements are being considered. However, the use of structured Value Management processes may vary between organisations and projects depending on the professional capabilities, organisation and awareness.

Research has been carried out in Nigeria to show the potential benefits of Value Management however challenges have also been faced. Ikediashi and Bassey (2021) looked into Value Management practices within construction projects in the South-South of Nigeria. Ilenikhena and Adindu (2021) looked into the adoption of Value Management within construction development projects in the North-Central of Nigeria. Oke et al. (2019) looked into the critical drivers of Value Management adoption in the Nigerian construction industry. This provides a foundation to understand the need to look into how Value Management activities are currently being implemented.

2.3 Flood resilience in building project delivery

Flood resilience is the ability for a building and its systems to anticipate, withstand, adapt and recover from disturbances caused by flooding. This means that the building is not just focusing on avoiding flooding but also considering how it can avoid being vulnerable, reduce damage and recover effectively (McClymont et al., 2019; Rözer et al., 2022).

Within coastal areas there are many factors that can affect flood resilience. This includes site, elevation, drainage, materials, structure and environment. These factors should be considered during planning and design (Cal & Ciravoğlu, 2024; French et al., 2020).

Flood resilience also needs to consider the long term performance of the building. If flood resilience is not properly incorporated then the building may be vulnerable to future floods even though it meets the immediate requirements for construction. Decisions should be made around the long term performance of the building including future exposure, maintenance, damage and functionality (Doornkamp et al., 2024; Wang et al., 2022).

Research has been carried out in Lagos to understand that coastal areas are vulnerable. Adegun (2023) looked into challenges associated with flooding within coastal informal settlements in Lagos. Ndimele et al. (2024) looked into the vulnerability, resilience and adaptation of Lagos coastal communities to flooding. This shows how important it is to incorporate flood resilience within decisions that affect building development in coastal areas.

2.4 Incorporating flood resilience into Value Management

Flood resilience can be incorporated into Value Management by considering the flood requirements when deciding the functions, alternatives and value of the project. This means that the resilience can be considered along with the usual requirements for the project.

Considering flood risk early can help to ensure that the resilience options available are considered. Site, orientation, elevation, drainage and materials may be difficult or costly to change during construction. By considering these factors early the alternatives can be considered.

Considering the life cycle is also important. The value of the building should not just be based on initial costs and performance. This should also consider future maintenance, damage caused by flooding, costs of repair, disruption and maintaining functionality. Even if a resilience option is increasing initial costs it may provide long term benefits by providing reduced vulnerability and potential losses (González-Dueñas & Padgett, 2021; Doornkamp et al., 2024).

To incorporate resilience into Value Management the understanding of what value means should be expanded. Lin et al. (2023) identified that developing Value Management studies within construction projects is an important area of research. Malek and Mat Isa (2024) discussed integrated value based

project management. This supports the idea that the requirements should not just be focused on optimising costs.

However, this may not always be considered in everyday decision making. If structured Value Management processes are not being consistently implemented and flood risk and life cycle performance are not being considered in the criteria then the potential benefits of Value Management may be limited.

2.5 Empirical review and research gap

Previous research has looked at Value Management practices, adoption and implementation within construction. Ikediashi and Bassey (2021) looked at Value Management practices in construction projects in South-South Nigeria. Ilenikhena and Adindu (2021) looked at the adoption of Value Management in construction development projects in North-Central Nigeria. Oke et al. (2019) looked at the critical drivers of Value Management adoption in the Nigerian construction industry.

Research has also been carried out into flood resilience. McClymont et al. (2019) looked at flood resilience research. Rözer et al. (2022) looked at the development and evaluation of urban flood resilience and the implications for decision making. Within Nigeria Ebekozien et al. (2023) looked at the readiness of professional stakeholders to adopt flood resilience technologies. This showed that the professional and organisational factors are important.

Research has been carried out within Lagos to show that coastal areas are vulnerable. Adegun (2023) looked at challenges and impacts of flooding in coastal informal settlements. Ndimele et al. (2024) looked at the vulnerability, resilience and adaptation of Lagos coastal communities to flooding.

This research has provided some insight into Value Management and flood resilience however there is a need for empirical evidence to understand how much flood resilience is being incorporated into Value Management activities within coastal building projects. This includes understanding how much traditional Value Management activities such as functional analysis and evaluation of alternatives are being implemented and how much early flood risk and life cycle resilience are being considered.

This study looks at five aspects of Value Management practices and flood resilience consideration by professionals involved in building projects in coastal Lagos. This provides evidence to understand how much traditional Value Management activities are being implemented and if flood resilience is being considered within decision making.

3 Research methodology

3.1 Research design

A convergent mixed methods approach was used for this research. This was considered to be the best option as quantitative data was needed to understand how much Value Management is being practised and qualitative data to understand how flood resilience is being incorporated.

Quantitative data was gathered by using a structured questionnaire to collect data from built environment professionals and relevant stakeholders involved in building projects within selected coastal areas of Lagos. Qualitative data was gathered by conducting in depth interviews with experienced professionals.

The data was analysed separately before being considered together.

3.2 Research location

The research was carried out in five coastal Local Government Areas of Lagos State: Eti-Osa, Lagos Island, Ibeju-Lekki, Apapa and Badagry.

These areas were chosen due to coastal characteristics, building development and exposure to flooding issues.

3.3 Population and sample

The population consisted of built environment professionals and relevant stakeholders involved with building projects in the selected coastal areas. The built environment professionals included; architects, builders, civil and structural engineers, quantity surveyors, project managers, estate surveyors and valuers, developers, regulatory officers and environmental/flood risk specialists.

An operational estimate of 1,500 professionals was identified. Using the Taro Yamane formula for sampling at 5% precision the minimum sample size was 316. To allow for non-response, a total of 348 questionnaires were distributed.

A proportional stratified sampling approach was used to gather data via the questionnaire. 20 experienced professionals and institutional stakeholders were purposefully sampled for in depth interviews.

3.4 Research instrument and data collection

A structured questionnaire and semi-structured interview guide were used. The questionnaire had multiple sections including personal details, Value Management practices, flood resilience considerations, stakeholder involvement, barriers/enablers, current frameworks and priority for the proposed framework.

Within this article only the Value Management practices and flood resilience considerations questions were analysed. Respondents were asked to score how much they agreed with 5 statements on a 5 point scale from Very Low Extent (1), Low Extent (2), Moderate Extent (3), High Extent (4) and Very High Extent (5).

The relevant questions were;

1. Formal Value Management processes are being used in planning and designing building projects.
2. Functional analysis is being used to determine what Value Management requirements are needed.
3. Alternatives are being systematically evaluated.
4. Flood risk and resilience requirements are being incorporated into early Value Management decisions.
5. Life cycle flood performance and future resilience benefits are being considered when determining the value of the project.

A total of 325 questionnaires were returned and valid for analysis (approximately 93.4%). 20 in depth interviews were carried out with experienced professionals and institutional stakeholders.

3.5 Validity and reliability

The research instruments were validated by 5 experts with relevant academic and professional backgrounds. They checked that the questions were clear, relevant to the research objectives and that the answer options were suitable. Any unclear or repetitive questions were amended or removed.

A pilot study was carried out with 30 built environment professionals not included in the main survey. Cronbach's alpha was used to check the reliability of the multi-item scales. A coefficient of 0.70 or above was considered acceptable.

3.6 Data analysis

The relevant quantitative data was analysed using descriptive statistics. This included mean scores and standard deviations. The mean score was used to understand how much each Value Management activity and flood resilience consideration was being used.

The mean score was interpreted using the five-point response scale adopted for the study: 1.00–1.49, very low extent; 1.50–2.49, low extent; 2.50–3.49, moderate extent; 3.50–4.49, high extent; and 4.50–5.00, very high extent.

The qualitative interview data were analysed thematically. Relevant interview responses were used to explain the quantitative findings and provide further insight into the application of VM and flood resilience considerations in building projects.

4 Results and discussion

4.1 Value Management practice and flood resilience considerations

The research question examined the extent to which VM was currently practised in building projects within coastal Lagos and the degree to which its application incorporated flood resilience considerations. Respondents rated five statements using a five-point scale ranging from Very Low Extent (1) to Very High Extent (5). The results are presented in Table 1. The results are summarised in Table 1.

Table 1. Extent of Value Management practice and flood resilience considerations (n = 325).

S/N	Item	Very low extent (1)	Low extent (2)	Moderate extent (3)	High extent (4)	Very high extent (5)	Total	Mean	SD	Rank
B1	Formal Value Management procedures are applied during the planning and design of building projects.	11 (3.4%)	93 (28.6%)	139 (42.8%)	79 (24.3%)	3 (0.9%)	325	2.91	0.83	3rd
B2	Functional analysis is used to determine project value requirements before major design decisions are made.	9 (2.8%)	55 (16.9%)	141 (43.4%)	100 (30.8%)	20 (6.2%)	325	3.21	0.89	2nd

S/N	Item	Very low extent (1)	Low extent (2)	Moderate extent (3)	High extent (4)	Very high extent (5)	Total	Mean	SD	Rank
B3	Alternative design and construction solutions are systematically evaluated during Value Management exercises.	11 (3.4%)	56 (17.2%)	107 (32.9%)	129 (39.7%)	22 (6.8%)	325	3.29	0.94	1st
B4	Flood risk and resilience requirements are incorporated into Value Management decisions at the early stages of building delivery.	37 (11.4%)	128 (39.4%)	124 (38.2%)	36 (11.1%)	0 (0.0%)	325	2.49	0.84	5th
B5	Lifecycle flood performance and future resilience benefits are considered when evaluating project value.	32 (9.8%)	135 (41.5%)	122 (37.5%)	31 (9.5%)	5 (1.5%)	325	2.51	0.86	4th
	Grand Mean							2.88		

Source: Study data, 2026.

Table 1 presents the extent of VM practice and the integration of flood resilience considerations in building projects within coastal Lagos. The results produced a grand mean score of 2.88, indicating a moderate extent of VM practice overall. However, the individual mean scores reveal a difference between conventional VM activities and the incorporation of flood resilience requirements.

The systematic evaluation of alternative design and construction solutions ranked first, with a mean score of 3.29 and a standard deviation of 0.94. A total of 129 respondents (39.7%) rated this practice as being carried out to a high extent, while 22 respondents (6.8%) indicated a very high extent. This result suggests that the comparison and evaluation of alternative project solutions constituted the most prominent VM-related activity among the practices examined.

Functional analysis ranked second, recording a mean score of 3.21 and a standard deviation of 0.89. A considerable proportion of respondents, 141 (43.4%), indicated that functional analysis was practised to a moderate extent, while 100 (30.8%) rated it high and 20 (6.2%) rated it very high. This suggests that practitioners make use of functional analysis to identify project value requirements, although its application is not consistently rated at a high level.

The application of formal VM procedures during the planning and design of building projects ranked third, with a mean score of 2.91 and a standard deviation of 0.83. The largest proportion of respondents, 139 (42.8%), rated this practice as moderate, while 93 (28.6%) rated it low. Only three respondents (0.9%) indicated a very high extent of application. This finding indicates that although VM-related activities are present in building project delivery, the formal application of VM procedures is not strongly established across the projects represented by the respondents.

In contrast, the two statements relating directly to flood resilience recorded lower mean scores. The incorporation of flood risk and resilience requirements into VM decisions at the early stages of building delivery ranked fifth, with a mean score of 2.49 and a standard deviation of 0.84. A total of 128 respondents (39.4%) rated this practice as low, while 37 (11.4%) rated it very low. Although 124 respondents (38.2%) indicated a moderate extent, only 36 (11.1%) rated it high, and none rated it very high. This result suggests that early consideration of flood risk and resilience is not yet a strongly established component of VM decision-making in the surveyed building projects.

Similarly, the consideration of lifecycle flood performance and future resilience benefits when evaluating project value recorded a mean score of 2.51 and a standard deviation of 0.86, ranking fourth. A total of 135 respondents (41.5%) rated this practice as low, while 32 (9.8%) rated it very low. Only 31 respondents (9.5%) indicated a high extent, and five (1.5%) indicated a very high extent. The finding suggests that future flood performance and resilience benefits receive limited attention when project value is assessed.

Overall, the results demonstrate that conventional VM activities, particularly the evaluation of alternative solutions and functional analysis, were more established than the integration of flood resilience considerations. The difference between the highest mean score of 3.29 and the lowest mean score of 2.49 indicates a gap between the application of general VM activities and the consideration of flood resilience during early project decisions. The grand mean of 2.88 should therefore be interpreted alongside the individual item scores rather than as evidence that all aspects of VM and flood resilience are practised to the same extent.

4.2 Discussion of findings

The findings indicate that VM was practised to a moderate extent in building projects within coastal Lagos. The highest-rated activities were the systematic evaluation of alternative design and construction solutions and the use of functional analysis. This suggests that practitioners recognise and apply some of the central activities associated with VM, particularly those concerned with examining project requirements and comparing alternative solutions.

The finding is consistent with the conceptual position of VM as a structured approach for identifying project functions and evaluating alternative means of achieving the required performance (Alshehri, 2020; Lin et al., 2023). The relatively high mean scores for alternative evaluation and functional analysis indicate that these activities have a presence in the project decision-making practices reported by respondents.

However, the moderate mean score for formal VM procedures suggests that the application of individual VM-related activities does not necessarily indicate that a fully formalised VM process is consistently undertaken. This distinction is important because project teams may compare alternatives or review functions as part of normal design and cost-management activities without necessarily applying a structured VM procedure. The finding is consistent with previous studies in Nigeria that have examined VM practices and adoption challenges within the construction industry (Ikediashi & Bassey, 2021; Ilenikhena & Adindu, 2021; Oke et al., 2019).

The most important finding, however, concerns the comparatively low scores for the integration of flood resilience into VM decisions. The incorporation of flood risk and resilience requirements at the early stages of building delivery recorded the lowest mean score of 2.49. This indicates that early flood resilience consideration was less established than conventional VM activities. The result is

significant because decisions made during project planning and early design stages can influence the availability and suitability of alternative resilience measures.

When flood risk is considered only after major design decisions have been made, opportunities to examine alternative site arrangements, building configurations and resilience interventions may become restricted. This supports the argument that flood resilience should be incorporated into project requirements before the design process becomes too advanced. Doornkamp et al. (2024) emphasised the relationship between flood risk management, functional resilience and adaptive capacity, while González-Dueñas and Padgett (2021) discussed the importance of performance-based approaches in coastal engineering.

The result for lifecycle flood performance also indicates that future resilience benefits are not consistently incorporated into project value assessment. Its mean score of 2.51 suggests that respondents generally perceived this activity as being carried out to a moderate extent, but with a considerable proportion rating it low. This may indicate that project decisions continue to place greater emphasis on immediate construction requirements than on the long-term performance of buildings under flood conditions.

This finding is relevant to the wider understanding of VM, which recognises that project value should extend beyond initial expenditure to include functionality, performance and lifecycle benefits (Ccama Condori & Panca Humpiri, 2024; Malek & Mat Isa, 2024). For buildings in coastal locations, the consideration of future flood performance is particularly important because the consequences of flooding may extend beyond the construction period and affect maintenance, repair costs and continued building use.

The qualitative findings further support the quantitative results. An experienced project manager explained that VM was recognised on many major projects but was not always undertaken as a formal process. The participant observed that project discussions were often centred on cost control, specification review and comparison of design alternatives, while flood resilience did not normally form part of the initial project discussion. According to the participant, flood resilience often became important only when a site presented an obvious drainage or flooding problem, by which time several major project decisions might already have been made (IDI05, Project Manager).

An environmental and flood specialist also emphasised the importance of considering flood information before the design becomes fixed. The participant explained that late consideration of drainage behaviour, site elevation and future flood exposure could restrict the available options, making it more difficult to select resilient solutions from the beginning (IDI16, Environmental/Flood Specialist).

In addition, a quantity surveyor linked the limited consideration of lifecycle resilience to the way project value was understood. The participant observed that some clients continued to assess value mainly in terms of initial project expenditure, while the longer-term benefits of reduced damage, repairs and disruption were not always quantified (IDI12, Quantity Surveyor).

These interview observations provide further explanation for the lower mean scores recorded for early flood resilience integration and lifecycle performance assessment. They suggest that the challenge is not limited to the technical availability of resilience measures but also concerns the criteria used to assess project value and the stage at which flood-related information enters project decisions.

The findings also relate to the wider flood resilience literature, which recognises that effective resilience requires the consideration of vulnerability, adaptation and long-term functionality rather than relying exclusively on immediate physical interventions (McClymont et al., 2019; Rözer et al., 2022; Wang et al., 2022). In the context of Lagos, previous studies have also established the relevance of flood vulnerability and adaptation to coastal settlements and communities (Adegun, 2023; Ndimele et al., 2024).

The implication is that VM provides an existing decision-making process through which flood resilience can be incorporated more systematically into building projects. Functional analysis and alternative evaluation can be extended to include flood exposure, resilience requirements, lifecycle performance and future adaptation. This would allow practitioners to assess alternatives not only according to initial cost and conventional project functions but also according to their ability to maintain building performance under flood conditions.

5 Conclusion and recommendations

5.1 Conclusion

This study examined the extent of current VM practice and its coverage of flood resilience considerations in building projects within coastal Lagos, Nigeria. The findings revealed an overall mean score of 2.88, indicating a moderate extent of VM practice. Among the activities examined, the systematic evaluation of alternative design and construction solutions recorded the highest mean score of 3.29, followed by functional analysis with a mean score of 3.21. The application of formal VM procedures during planning and design recorded a mean score of 2.91.

However, the incorporation of flood resilience considerations was comparatively weak. The integration of flood risk and resilience requirements into early VM decisions recorded the lowest mean score of 2.49, while the consideration of lifecycle flood performance and future resilience benefits recorded a mean score of 2.51. These findings indicate that conventional VM activities are more established than the integration of flood resilience into project decision-making.

The study therefore concludes that although VM is practised to a moderate extent in building projects within coastal Lagos, its application does not sufficiently incorporate flood resilience considerations, particularly during early project planning and lifecycle value assessment. This reveals the need to strengthen the relationship between conventional VM activities and the long-term resilience requirements of buildings in flood-prone coastal environments.

5.2 Recommendations

Based on the findings, the following recommendations are proposed:

1. **Formalise Value Management procedures:** Construction organisations and project teams should strengthen the formal application of VM during the planning and design stages of building projects. This will provide a more structured basis for identifying project functions, evaluating alternatives and considering relevant performance requirements.
2. **Integrate flood risk assessment into early project decisions:** Flood risk and resilience requirements should be considered from the initial stages of building delivery. This will allow project teams to assess site conditions, drainage requirements, building elevation and other relevant resilience measures before major design decisions are finalised.

3. **Incorporate lifecycle resilience into project value assessment:** Practitioners should assess the long-term implications of flood-related decisions, including potential damage, maintenance requirements, repair costs and continued building functionality. Project value should not be determined solely by initial construction expenditure.

4. **Strengthen professional capacity:** Training and professional development should be provided for built environment practitioners to improve their understanding of how flood resilience requirements can be incorporated into VM activities and project evaluation.

5. **Expand the criteria used to evaluate project alternatives:** Alternative design and construction solutions should be assessed using criteria that include functionality, cost, environmental performance, flood vulnerability and long-term resilience benefits. This will encourage a broader assessment of project value in coastal building environments.

5.3 Contribution to knowledge

The study contributes empirical evidence on the relationship between conventional VM activities and flood resilience considerations in building projects within coastal Lagos. It identifies a distinction between the moderate application of general VM activities and the comparatively weaker integration of flood resilience into early project decisions and lifecycle value assessment.

The findings provide a basis for improving the application of VM in flood-prone building environments by demonstrating the need to extend project evaluation beyond immediate cost and conventional functional requirements to include long-term flood performance and resilience considerations.

5.4 Limitations of the study

The study was geographically limited to selected coastal areas of Lagos State, namely Eti Osa, Lagos Island, Ibeju-Lekki, Apapa and Badagry. The findings therefore reflect the professional assessments obtained from the selected study areas and should be interpreted within that geographical context.

In addition, the assessment was based on practitioners' reported experiences and perceptions of VM practice and flood resilience considerations. It did not independently measure the physical flood performance of completed buildings. Further studies could combine practitioner assessments with project-level evaluations of actual building resilience performance.

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