

Assessment of a Holistic Approach to Managing Contractor Claims for Building Projects in Two Selected Local Authorities in Botswana

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Abstract—This article discusses findings of a study that investigated the effectiveness of seven strategies that were identified for holistically managing contractor claims for building projects. Previous findings had indicated that almost half of the contractor claims were due to the clients' behavioral aspects which were within their control. The study was premised on a notion that a holistic approach in managing contractor claims avoids or prevents their occurrence and may reduce their impact on projects. Two local authorities in Botswana were used in the study in which three methods were used. A questionnaire survey, focus group discussion and interview were used to collect data and triangulate the results. Results indicated that the studied local authorities did not fully utilize the seven strategies for holistically managing contractor claims and average score 43% was achieved, which was below the 50% mark that had been set for effectiveness. Specifically, lack of effective management of events leading to claims arose due to lack of institutionalizing post-completion project evaluations; lack of employer's restraint in making significant changes during construction, client delays during the construction period; client lack of an adequate and versatile project team to deal with activities and processes in the pre-contract, post-contract and contract phases. Despite the limitation of selecting two local authorities out of a total 16 local authorities, the results provide an insight into the claim management regime of these entities namely that improvement is needed for strategies to reduce avoidable claims that increase project completion periods and costs.

Keywords—contractor claims, construction industry, contract, building projects, employer, project evaluation

I. INTRODUCTION

Construction projects are generally unique, complex and take a longer period to complete. They are often procured in an uncertain and highly competitive tendering environment, punctuated by significant safety, cost and schedule pressures. The variability arising from this environment causes a variety of construction claims. Construction claims may originate from a contractor or employer, as an assertion of a right by one of the parties, based on a rightly or wrongly placed belief, that there was a damage caused by failure of the other party to fulfil an obligation specified in the contract [1, 2]. The compensation for the contractual damage normally takes the form of additional payments, extension of time or both [3]. This impact of claims on projects is what bothers employers because either they will increase the cost, delay completion or both. One study, for example, found that claims averaged around 17% of the total infrastructure development budget in Portugal [4].

Construction projects are implemented by both, the private

and public sectors. In Botswana, the latter consists of government departments, parastatals and local authorities. These entities implement various types of projects aimed at developing the national infrastructure and provision of services. Projects include buildings, power, roads, aerodromes, rail, water, sanitation and others. Contractor claims are a common feature to all these types of projects.

Various studies [5, 6] have identified sources, causes and types (or typologies) of claims. Others [7] have studied how claim events can be prevented and how they may be handled efficiently to mitigate their effects including methods of resolving disputes arising thereof. Professional institutions around the world have also provided standardized contracts that can be adapted to cater for events that give rise to claims. These include, for example, JBCC Contracts (Joint Building Contracts Committee), FIDIC (Federation Internationale des Ingenieurs-Conseils) and NEC (New Engineering Contract) aimed at managing events which give rise to claims. These standard contracts aim at capturing possible conditions that may occur prior and during the execution of a construction project. In so doing, they identify rights and responsibilities associated with parties to a construction project and attempt to allocate risks in a fair manner to the parties.

However, despite a myriad of studies, the claim phenomenon has not been tamed, it still occurs on all projects and worst of all, it is still not fully comprehended. This article, discusses findings of a study that aimed at providing insights into issues of claims but focusing on those originated by the contractor against the client (or employer) in building projects. The objective of the study was to assess the effectiveness of the strategies used in managing contractor claims in two local authorities in Botswana. The study was premised on the notion that a holistic approach is needed to pro-actively seize opportunities that reduce the occurrence of majority of claims while mitigating those which are unavoidable from causing damage to a project. The rest of article is divided into four parts namely literature review, methodology, results and discussion and conclusions.

II. LITERATURE REVIEW

A review of literature [2, 5, 8–10] indicated that effective management of claims requires a holistic approach of managing claims that includes prevention, efficient handling of claims and mitigating their effect on the project (in terms of work disruption, delays and cost increases) and the amicable settlement of disputes should they occur. This claim management regime occurs in three phases namely pre-contract, contract and post-contract. The pre-contract and

post-contract phases are pro-active phases while the contract phase is a reactive one, where contractor claims are handled as they occur during construction.

A. Pre-Contract Phase

The pre-contract phase culminates in producing a robust invitation to tender (ITT) document which is used for soliciting, evaluating, awarding and later forms a major part of the contract signed with a contractor. Several aspects are required to effectively achieve this outcome. First, a competent and experienced project team must be in place to carry out the various tasks in the pre-contract phase and the other two phases [11]. The team may comprise of employer’s staff and consultants. Second, to produce an ITT, the project team needs to carry out pre-construction planning work whose outcomes directly affect the contract phase. This among others includes, for example, formulating a needs statement and turning it into a solid scope statement; translating a scope statement into project requirements that address the conceptualised need; preparation of a project site for prompt handing over to the contractor after signing the contract [12]. Third, an agile project team is required in developing a robust ITT which normally consist of several interlinked documents, containing all required information with no mistakes, contradictions or omissions [13]. A typical suite of documentation may include a construction agreement; general and special conditions; scope of work; drawings; specifications; bill of quantities; construction schedule; site data; and list of required insurances and bonds [14]. The latter will ultimately metamorphose into a project contract. Fourth, the project team must efficiently carry out the solicitation of bids, including receiving and evaluating them. In this process, relevant issues to claims include, for example, producing addendums arising from contractor queries, organizing site visits and arranging bidder’s conferences to clarify project issues [12].

B. Post-Contract Phase

Jumping to the post-contract phase and in relation to claim prevention, the key aspects of this phase include executing tasks relating to contractual and administrative closure. Contractual closure aims at verifying that work has been delivered, is acceptable and hence must be paid for. Deviations to this will be identified and listed as outstanding project contractual issues including contractor claims. Analysis of outstanding claims yields reasons why they were not resolved, which in turn helps in improving the claim management regime during subsequent project implementation.

On the other hand, administrative closure involves many tasks, such as, releasing internal resources, archiving documents, accepting, commissioning and integrating project deliverables. In addition, post-completion project evaluation needs to be conducted to objectively assess the extent to which project management success and project success have been achieved [15]. Essentially, the former involves identifying “what went right and what went wrong and what caused it?” [16, 17]. This effort is further cascaded to an organisational level where project teams meet periodically (e.g. bi-annually) to share experiences from various projects. Recurrent themes that are generalizable then form an

organisational knowledge base [18]. Good practices, for example, are identified, documented and used in subsequent projects. On the other hand, bad practices in contract documentation and administration, deficiencies in the competencies of the project teams and organisation systems are also documented with a view to become focus areas for improvement.

C. Contract Phase

The contract phase is the coal face of contractor claims. A recent study [10] that focused on contractor claims and how they impacted on project delays, provided some insights in the phenomenon. For the projects studied, on average were delayed by 104% as illustrated in Fig. 1. Further analysis indicated clients accepted on average 49.8% of the claims while rejecting 21.3% (while contractors never bothered to claim 29.9% of the delays). Further scrutiny showed that client behavior resulting in delays, changes, schedule disruptions and contract deficiencies contributed 38.8% of the claims accepted (see Fig. 1) while the rest of the claims were due to force majeure events (7.0%), third-party actions (4.0%). Literature also indicated that even if a claim is not within the control of the client, there is room to mitigate its impact, if a client is endowed with a versatile project team and an efficient and effective claim handling system.

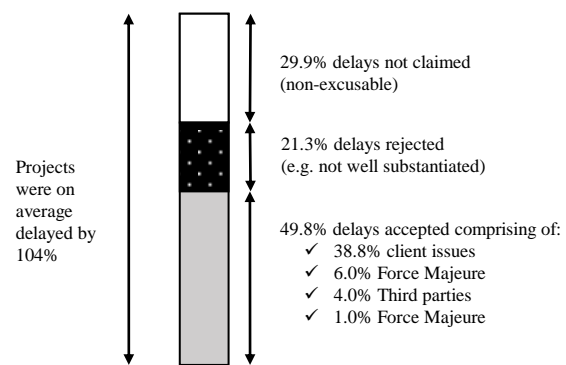


Fig. 1. Effect of contract claims on project delays [11].

D. Conceptual Framework

From the afore going review and synthesis of literature, a conceptual framework was constructed in which seven strategies were identified as key to facilitating a holistic management regime of contractor claims spanning the three contract phases. These are illustrated in Fig. 2.

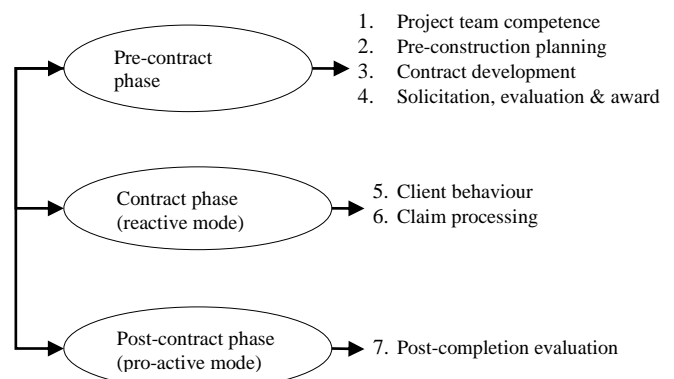


Fig. 2. Seven holistic strategies to manage contractor claims.

Fig. 1 also indicates for a holistic approach to claim management to occur, the three project contract phases are interlinked as information flows from each to the other to facilitate the operation and improvement of seven strategies. The seven strategies were then used as yard stick to measure the extent to which contractor claims are managed in the two selected local authorities

III. METHODOLOGY

The case study approach was considered the most appropriate research strategy as it allowed an in-depth investigation of contractor claims phenomenon using multi-data collecting methods [19] namely questionnaire survey, focus group discussions and interviews. The three methods were used to triangulate results. Triangulation is a research technique that validates data through cross verification of various sources to increase the credibility of findings [20].

In total, 18 and 19 participants were drawn from two of the largest local authorities, code named LA1 and LA2, respectively. They were requested to rate the identified seven strategies using a questionnaire. As already noted, these themes were assumed to provide a holistic and effective claim management approach spanning the three contract phases (see Fig. 2). The participants were purposely selected from a list provided by each local authority based on willingness to participate in the study and in addition to have representation of various departments associated with projects such as those of the built environment, legal, finance, procurement and health and safety, as indicated in Table 1(a). Collectively, participants deal with the supervision of consultants' design work; develop contracts; solicit, manage and evaluate bids; supervise/oversee construction work; and process and recommend (or reject) payment of contractor claims as depicted in Fig. 3.

Table 1(b) indicates that majority of participants (56% and 53% for LA1 and LA2, respectively) had a working experience of above 10 years. The collective experience of the participants was assumed to provide a degree of a fair assessment.

Table 1. Participant in the questionnaire

(a) Profession	LA1 (No.)	LA2 (No.)	(b) Experience (years)	LA1 (No.)	LA2 (No.)
Architect	4	5	<5	5	4
Engineer	4	3	5-9	3	5
Quantity Surveyor	5	4	10-19	5	5
Procurement	1	1	20-29	3	3
Legal	1	2	>=30	2	2
Finance	2	2	Total	18	19
SHE	1	2			
Total	18	19			

The questionnaire required participants to rate the effectiveness of the seven identified strategies on a scale 4-point scale (4: *Highly effective...* 1: *Not effective at all*) as it relates to their local authority. The items were tested for internal consistency. A Cronbach's Alpha value of 0.79 was obtained which was considered as an acceptable correlation among the themes [21]. Data analysis involved computing an average score for each item and for each local authority. A composite score was also computed as product of the two

averages for each item and then ranked.

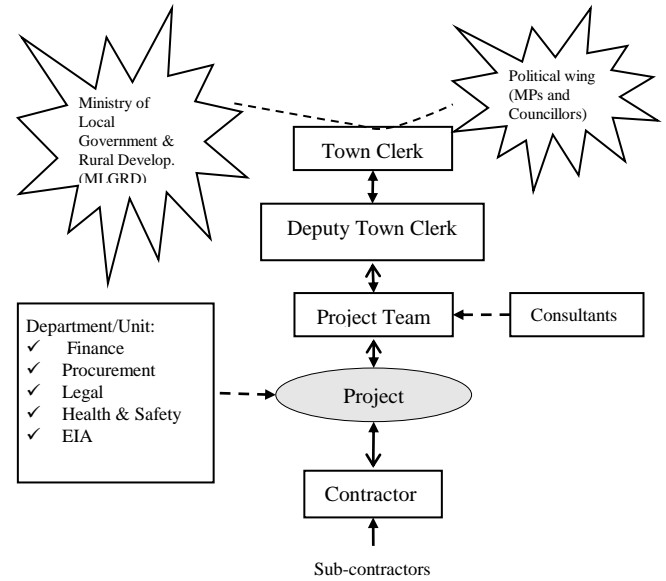


Fig. 3. Key stakeholders to a project some of which were study participants.

After analyzing the data from the questionnaire, two focus group discussions (FGD1 and FGD2) were held comprising of seven persons purposely selected from those who had completed the questionnaire. The same criteria were used for the selection namely willingness to participate and a representation of the relevant departments as shown in Table 2. Each focus group discussion lasted one and half hours.

Table 2. Focus discussion Participants

Profession	LA1 (No.)	LA2 (No.)	Experience (years)	LA1 (No.)	LA2 (No.)
Architect	1	2	<9	2	2
Engineer	1	1	10-19	2	2
Quantity Surveyor	2	1	20-29	2	3
Procurement	1	1	>=30	1	1
Legal	1	1		7	7
Finance	-	1			
SHE	1	1			
Total	7	7			

Lastly, two interviews were held with two deputy town clerks (code named DTC1 and DTC2) who oversee the entire project life-cycle activities but most importantly who, approve or reject contractor claims. Content analysis was used as the main data analysis technique for data collected from both the focus group discussion and interviews to provide further insights to the quantitative results obtained from the questionnaire.

IV. RESULTS AND DISCUSSION OF FINDINGS

The result of a self-assessment on the seven strategies is given in Table 3. First two columns indicate the mean (μ_1 and μ_2) score of participants from each local authority for each item, followed by a product ($\mu_1 * \mu_2$) of the means for each item for the two groups of participants.

A paired sample t-test was conducted to test the hypothesis that: H_0 : there is no difference in the level of rating the items among the two local authorities. The results indicated that the rating is not statistically different in the two local authorities

(LA1 $\mu_1 = 2.58$, $\alpha_1 = 0.66$; LA2 $\mu_2 = 2.671$, $\alpha_2 = 0.28$; $t = 0.64$, $p > 0.05$). Perhaps this is due to the fact that even though the two local authorities studied, are 450 km apart, they have the same mandate, operate under the same rules and are regulated by the same government ministry, the Ministry of Local Government and Rural Development (MLGRD).

The last column of Table 3 is the resultant ranking of each item and a percentage of score against the maximum of 16 (at 100%). The item ranked 1 was perceived as one both local authorities consider most effectively practiced and one ranked 7 as the least. The average score of the two local authorities was 43%, which was below the 50% mark that had been set. This indicated room for improvement for the claim management regime in the two councils with some strategies requiring more effort as discussed in the sections which present insights from the focus group discussion and interviews.

Table 3. Assessment of the seven strategies

Level of effectiveness of	μ_1	μ_2	$\mu_1 * \mu_2$	Rank
A. Solicitation, evaluation & award	3.5	3.4	11.9	1(74%)
B. Claim handling & processing	3.0	2.9	8.7	2 (54%)
C. Pre-construction planning	2.8	2.9	8.1	3 (51%)
D. Contract Development	2.9	2.7	7.8	4 (49%)
E. Project team	2.2	2.3	5.1	5 (32%)
F. Client behavior	2.1	2.0	4.2	6(26%)
G. Post-completion evaluation	1.2	2.1	2.5	7 (16%)
Average			6.9	(43%)

A. Bid Solicitation, Evaluation and Award

Participants perceived local authorities as good in the process of bid solicitation, evaluation and award (ranked 1/7 at 74%). This may be due to the strict bidding rules established in public institutions, governed by well publicized regulations and documentation for increasing transparency and fairness in order to reduce any malfeasances in the procurement processes. Though ranked first in order of effectiveness, participants noted some important issues relating to this strategic practice. First, they noted they often solicit bids without internal estimates as one participant in FGD1 noted “though the importance of an internal estimate on which to compare contractors’ bids and hence avoid simply awarding the lowest bidder who has passed the technical evaluation is recognized, we sometime do not go that route...”. Another respondent in FGD2 noted that “...without an internal estimate we award the lowest tender and in our experience the lowest tenderers are like landmines, they explode any time with claims... they tender low knowing they will recover from claims...”. Second, noted was as one respondent put it that “it is useful to expediate the awarding of the tender in order to comply with the clause ‘prices should hold firm for 90 days.... We have had contractors claiming for price increases because tenders were awarded beyond the stipulated time frame.”

B. Claim Handling and Processing System

Claim handling and processing was ranked (2/7 at 54%) and hence marginally good. If not well managed, this process can turn a simple claim into a protracted dispute that may disrupt a project’s schedule. Assuming a contractor plays her part by giving the required notices and submits a well-substantiated claim within the stipulated time frame, then

it is expected that the engineer, representing the employer, promptly makes a determination whether to accept or reject the claim. One interviewee, DTC2 noted “... we come across instances where our team were are not efficient in handling contractors’ claims and this has led to the payment of interest for delayed payments, straining our relationship with contractors and in some instances claims turning into serious disputes”. Another participant from FGD1 noted that “... during construction it is important to be vigilant and professional, for example, following up oral with written instructions; insisting on a detailed network programme which must be updated whenever extension of time is given; meticulous record keeping; and promptly attending to submitted claims.... from my experience these actions assist in mitigating the effects of claims once they have occurred...” It worth noting that the delay in processing contractor claims is not only the preserve of the project (technical) team but includes the finance department which actually disburses the money to contractors’ accounts as one participant noted “... finance department plays an important role in the efficient payment of the contractor claims...issues of backlogs due shortage of staff or unavailability of the electronic payment system have occurred in the past.

C. Pre-Construction Planning

Ranked 3/7 (at 51%), participants emphasized the need to effectively carry out pre-construction activities as one participant in FGD2 noted “...the activity provides information that feeds into the contract, such as, ground conditions, complying with legal requirements, early requests for services from third parties e.g. utility companies... however these aspects are often not carried out in a satisfactory manner... they then resurface causing construction disruptions, leading to claims...” Another participant (DTC1) noted “...once we awarded a tender to a contractor and at the time of site handover we realized that the compensation process to a landowner with an adjoining piece of land had not been completed...he made a court injunction which delayed the works leading to a huge contractor claim”. She further added that “we fully appreciate that there are instances where we have not been very effective in preparing ground for the commencement of construction phase at site handover... and it has had various impacts on projects”.

D. Contract Development

Participants felt that contract development was a great challenge and ranked it 4/7 (at 49%) in the entire contract claim management chain as one from FGD2 noted “...the number of documents involved and the peculiarities of each project requires bespoke and meticulously prepared information to ensure the terms are clear and capture the statement of work without any mistakes, omissions or contradictions... However, during the contract phase many issues crop up which indicates deficiencies in our contract documentation...We still encounter incomplete designs, missing information, contradictory measurements or specifications in the bill of quantities or wrong coordinates.”

E. Project Team Competence

As already noted, contract development and administration

depend on a versatile project team. Participants noted that they do not fair very well (ranked 5/7 at 32%) on this aspect because first, they are understaffed yet they are over-loaded with many jobs to supervise in disparate locations which require travel to and from head office to site. Second, as DTC1 observed “our staff are young and inexperienced... this has arisen due to a lot of movements among staff arising, for example, from transfers to other local authorities and staff joining the private sector ...we have no control of staff movement as their transfers are managed by MLGRD and by their own choices... in addition, since the advent of Covid-19, the frequency of training has decreased because of lack of funds and time availability for training as we have a backlog of projects...” Another interesting comment by DTC2 was that “...the contractor’s representatives seem to be more conversant with the ‘claim world’ such that our project teams find it difficult to make well-reasoned determinations to reject their claims... so in many instances we seem to be paying claims that we should not be paying...” From the comments of the participants, it appears the two local authorities are struggling to build sustained project teams that have institutional memory to effectively deal with contract management issues.

F. Client Behavior

All participants acceded to the fact that the main source of claims is the employer’s behavior (ranked 6/7 at 26%) during construction period. They grouped the behaviors into two, externally and internally driven. Local authorities provide services to local communities whose needs are communicated by their political representatives. Most often the representatives put pressure on the local authority administration to make changes to the projects’ parameters, especially the project scope and schedule. One of the participants, DTC1 emphasized “... community needs are dynamic, and this may be reflected in the pressures from the external stakeholders to change e.g. scope or location and other aspects which may lead to numerous claims... this aspect is exacerbated by the fact that projects take a long period to implement with respect to when they were conceptualised...” In another instance, added another participant ‘...in a project which was under my supervision we requested a contractor to accelerate project work because the city was hosting dignitaries from other countries in the immediate future...the request led to a huge claim for additional money...’ Another participant from FGD1 added that since our local authority is in the city “...interruptions and disruptions, whether unavoidable or avoidable, are a common feature in our project work for which contractors, rightly raise claims”. However, a number of internal client behavior issues emanate from the deficiency in planning, failure to ascertain information which goes into the ITT (and later into the contract). All these give rise to claims when the client wishes to make changes to, for example, drawings, specifications, quantities and in the worst scenario the project scope. In a discussion with FGD2, one participant summed the gist of deficiency of this strategy “...we as clients cause various unnecessary changes and delays but with careful planning these claim events are preventable or even avoidable...”

G. Post-Completion Evaluation

Participants noted that there is no deliberate effort to evaluate a project on completion or to conduct a project lesson learned conference (ranked 7/7 at 16%). As one participant noted “ ...the closest we come to project evaluation are the monthly meetings we hold with the contractor... the major aim of these meetings is to resolve issues, report on cost and progress... although many issues crop-up which may be identified as lesson learned they are never formerly documented and shared among teams”. Another participant from FGD2 noted “... though I appreciate the practice is useful, it is not institutionalized and hence supported from the top... moreover when we complete a project , the focus is on the new or non-completed projects ... there is hardly any incentive to do ‘post-mortems’... and in fact some colleagues call it ‘resurrecting project project skeletons’...”.

V. CONCLUSIONS

Before a concluding remark is made, it is noteworthy to highlight some of the limitations of the study. First of all, the nature of the case study research strategy is such that the results are not generalizable to the rest of 14 local authorities in Botswana. Second and flowing from this, is the possible structural biasness that may have arisen from the from self-rating of the participants, though this was minimized by have two groups whose rating was not statistically significant. Third, perhaps contractors and consultants should have participated in the study. However, since the focus was on management of contractor claims, it was felt that the assessment would primarily focus on the client. However, in view of these limitations, the subsequent research can be extended to the rest of the local authorities, and further include other sub-sector of the construction industry (e.g. roads, water and other civil works) and more importantly invite consultants and contractors to participate.

Despite these limitations, it is the belief of the researcher, that the findings provide insights to contractor claim management for organisation in similar situations. In conclusion, it appears that the two local authorities have not effectively carried out a number of strategies as the average assessment score (43%) indicated. Most significant is first, the institutionalization of post-completion project evaluations is often overlooked. The evaluations would not only assess the achievement of the project goal but would facilitate learning from completed projects on project management issues that frequently cause claim events. In turn strengths in the other six strategies would be sustained while gaps would be identified and improved upon in form of lesson learned. Second, employers need to develop and compile meticulous information to feed into the contract documentation to avoid changes and delays in providing missing information. This includes succinctly capturing the need, translating into a project scope and required statement of work. In this way changes would be avoided. Lastly, since project teams are in charge of various project activities in the pre-contract, post contract and contract phases, it is incumbent on employers to ensure they are well trained and their competencies and professionalism sustained; their numbers are commensurate

with the projects load; and there is good mix of experienced and up-coming project managers to ensure a sustainable and versatile project team.

CONFLICT OF INTEREST

The authors have no conflict of interest.

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REFERENCES

- [1] C. R. Seppala, "Contractor's claims under the FIDIC contracts for major works," *Construction Law Journal*, vol. 21, no. 4, 2005.
- [2] H. H. Shaikh, N. Y. Zainun, and S. H. Khahro, "Claims in construction projects: A comprehensive, literature review," *Earth and Environmental Science*, vol. 498, no. 1, pp. 23–33, Dec. 2019.
- [3] K. Bu-Bshait and I. Manzanera, "Claim management," *Project Management*, vol. 8, no. 4, 1990, pp. 222–228.
- [4] H. Moura and J. C. Teixeira, "Types of construction claims: A Portuguese survey," in: Boyd, D (Ed) *Procs 23rd Annual ARCOM Conference*, Belfast, UK, Association of Researchers in Construction Management, pp. 129–135, Sept. 2007.
- [5] E. K. Zaneldin, "Construction claims in United Arab Emirates: Types, causes and Frequency," *International Journal of Project Management*, vol. 24, pp. 453–459, Sept. 2005.
- [6] C. Semple, F. T. Hartman, and G. Jergeas, "Construction claims and disputes causes and cost/time overruns," *Journal of Construction Engineering and Management*, vol. 120, no. 4, pp. 785–795, Dec. 1994.
- [7] G. D. Castri, "Appraisal of contractual claims," *AACE International transactions*, pp. CDR.05.1–CDR.05.9, 2000.
- [8] I. S. M. Chenen and G. Kazar, "Proactive prevention model to manage construction time delays in developing countries," *Dicle University Journal of Engineering*, vol. 13, no. 2, pp. 379–391, June 2022.
- [9] Y. M. Malki and M. S. Alam, "Construction claims, their types and causes in the private construction industry in the Kingdom of Bahrain," *Asian Journal of Civil Engineering*, vol. 22, pp. 477–484, Nov. 2020.
- [10] J. K. Ssegawa and S. Keakile, "Analyzing the nature of contractor claims and strategies for their effective management," *Procedia Computer Science*, vol. 219, pp. 1814–1822, March 2023.
- [11] A. A. Gasemagha and T. O. Kowang, "Project manager role in project management success," *International Journal of Academic Research in Business and Social Sciences*, vol. 11, no. 3, pp. 1345–1355, March 2021.
- [12] M. M. Kumaraswamy, "Conflicts, claims and disputes in construction," *Engineering, Construction and Architectural Management*, vol. 4, no. 2, 1997, pp. 95–111.
- [13] G. A. Bartsiotas, "Contract management and administration in the United Nations system," *Joint Inspection Unit, JIU/REP/2014/9, United Nations*, Geneva, 2014.
- [14] E. I. Kusumarukmi and T. J. W. Adi, "Public tendering process for construction projects: problem identifications, analysis, and proposed solutions," *MATEC Web of Conferences*, p. 258, 2019.
- [15] O. Haass, and O. Guzman, "Understanding project evaluation—a review and reconceptualization," *International Journal of Managing Projects in Business*, vol. 13 no. 3, pp. 573–599, Sept. 2019.
- [16] CII, "Effective management practices and technologies for lessons learned programs (best practice)" *Construction Industry Institute (CII)*, May 2007.
- [17] F. Anbari, E. Carayannis, and R. Vetch, "Post-project reviews as a key project management competence," *Technovation*, vol. 28, no.10, pp. 633–643. 2008.
- [18] M. S. Chaves, L. R. Teixeira, D. V. Rosa, I. G. Júnior, and C. D. Nogueira, "A new approach to managing lessons learned in PMBoK process groups: The ballistic 2.0 model," *International Journal of Information Systems and Project Management*, vol. 4, no. 1, pp. 27–45, March 2016.
- [19] R. K. Yin, *Case Study Research and Applications: Design and Methods*, Thousand Oaks: Sage, 2018.
- [20] M. Q. Patton, "Enhancing the quality and credibility of qualitative analysis," *Health Services Research*, vol. 34, pp. 1189–1208, Dec. 1999.
- [21] J. Gliem and R. R. Gliem, "Calculating, interpreting, and reporting Cronbach's alpha reliability coefficient for Likert-type scales," *Midwest Research to Practice Conference in Adult, Continuing, and Community Education*, Columbus, pp. 82–88, Jan. 2003.

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