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APPLICABILITY OF ARTIFICIAL INTELLIGENCE MODELS FOR SELECTION OF ADR METHODS TO THE SETTLEMENT OF CONTRACTOR-RELATED VARIATION DISPUTES IN BUILDING CONSTRUCTION PROJECTS IN SRI LANKA

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ABSTRACT

Construction disputes in Sri Lanka are highly technical in nature and differ significantly from general commercial disputes, necessitating fast and cost-effective resolution methods. Due to the drawbacks of litigation such as high cost, delays, and complexity, Alternative Dispute Resolution (ADR) methods have become increasingly important, offering advantages like speed, affordability, fairness, simplicity, flexibility, confidentiality, and minimal delays. In building construction projects, variations are common and often lead to disputes, with contractor-related variation disputes being particularly prevalent and impactful. Effective resolution of these disputes is essential for successful project completion. This research aims to propose a guideline that utilizes Artificial Intelligence (AI), including machine learning and deep learning techniques, to select the most suitable ADR method for settling contractor-related variation disputes in building construction projects in Sri Lanka. The study adopted a qualitative approach, conducting expert interviews with ten professionals selected through purposive sampling, all of whom had experience in ADR and construction variations. Data were analysed using code-based content analysis to identify appropriate ADR methods. The research findings led to the development of a guideline integrating AI tools to support decision-making in ADR method selection. This guideline provides valuable insights for industry practitioners, enabling more efficient and effective resolution of contractor-related variation disputes within Sri Lanka's building construction sector.

Keywords: *ADR Methods, Artificial Intelligence, Construction Industry, Contractor-Related Variation Dispute*

1. INTRODUCTION

The construction industry is one of the major industries which plays a vital role in the economy of any country (Illankoon et al., 2019). It has become more competitive and

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complex due to the increasing demands of employers and the global economic downturn (Farooqui et al., 2022). Consequently, variations are inevitable in those building construction projects, and it may escalate up to variation disputes (Perera et al., 2019). Cakmak and Cakmak (2014) described that contractor-related variation disputes are distinctive among variation disputes and, consequently, effective settlement procedures of contractor-related variation disputes are valuable to the successful completion of the building construction project. If the resolution of contractor-related variation raised disputes not focused properly, the proper sequence of the project may often be lost (Cheung et al., 2002) Various types of ADR methods can be used to resolve various building construction related disputes. The previous researchers have highlighted only the common disputes in building construction. According to this research, endeavour to establish a strategic guideline to settlement of contractor related variation raised disputes by using ADR methods. A detailed study to investigate the contractor-related variation disputes and how Alternative Dispute Resolution methods can apply for those disputes in the context of Sri Lankan building construction projects has not been done yet. Since the contractor-related variation disputes in the Sri Lankan building construction projects are different from other countries, carrying out a study to provide guideline to settlement of contractor related variation disputes by using ADR in building construction industry in Sri Lanka will be very important to the success of future construction industry in Sri Lanka.

Today, more than ever, it is clear that claims and disputes in the construction industry have become endemic, particularly those resulting from variations. Furthermore, Latham (1994) revealed that, one of the key issues in the building construction industry was variation and its impact on productivity. Similarly, variations are a key source of delays and cost overruns in building projects, and they are the source of many conflicts in construction contracts. In practice, the time and cost impact on the project is a contested topic when valuing a variation (Mustapha et al., 2018). According to Asamaoh and Offei-Nyako (2013), variations in the construction process at all stages have an impact on project administration. Time overrun and cost overrun are revealed as the leading effects of variation order (Asamaoh & Offei-Nyako, 2013). Furthermore Keane et al. (2010) also identified cost overrun, time overrun and contract disagreements between parties in contract are major impacts of variation. Arain and Pheng (2006) summarized the impacts of variations to building construction projects as follows: rising the project cost, need of hiring new professionals, procurement delay, increase in overhead expenses, and payment delays, quality reduction, productivity reduction, demolition and reworks, logistics delays, additional payments for contractor, conflicts among professionals and delay in the completion schedule.

Integrating Artificial Intelligence (AI) into the ADR process can improve the selection and application of resolution methods by providing data-driven insights, reducing time and costs, and enhancing decision-making. AI can analyse project data like contracts and designs to identify potential disputes early on. Using machine learning, AI can recommend the most suitable ADR method based on the nature of the dispute and its financial impact. AI can also streamline communication by automating document exchanges, speeding up negotiations, and ensuring transparency. Additionally, AI platforms can provide real-time insights, helping make better decisions during dispute resolution (Goh & Zhang, 2020). By using AI, the dispute resolution process becomes

faster, more accurate, and cost-effective, improving overall efficiency in Sri Lanka's construction sector.

2. METHODOLOGY

This study employed a qualitative research methodology combined with the development of Artificial Intelligence (AI) models to explore the applicability of AI in selecting appropriate Alternative Dispute Resolution (ADR) methods for contractor-related variation disputes in building construction projects in Sri Lanka. The research began with an in-depth literature review was conducted to critically examine existing ADR practices in the Sri Lankan construction context. This was essential to understand the local legal, procedural, and cultural aspects of dispute resolution, identify limitations in current methods, and ensure that any proposed AI application would be contextually relevant and practically viable. Moreover, the review helped define the research problem, identify knowledge gaps, and design the data collection framework. This review helped define the research problem and design the data collection framework.

To gather context-specific insights, semi-structured interviews were conducted with a purposively selected group of industry professionals, including project managers, contract administrators, dispute resolution experts, and consultants. The experts were selected based on their substantial professional experience, each having a minimum of 10 years in the Sri Lankan construction industry with direct involvement in managing contractor-related variations and dispute resolution. Inclusion criteria required that participants had (1) practical experience handling building construction projects under standard forms of contract, (2) prior involvement in variation-related disputes as a contracting party, consultant, or neutral third party, and (3) familiarity with at least one form of ADR method (e.g., adjudication, mediation, or arbitration). This ensured that their perspectives were grounded in both contractual and dispute resolution practice. A total of 10 experts, comprising 3 project managers, 2 contract administrators, 3 dispute resolution practitioners (including arbitrators and adjudicators), and 2 senior consultants, were interviewed. The sample size was determined based on the principle of data saturation, where additional interviews no longer yielded new themes or insights, and was considered sufficient to capture diverse yet deeply informed professional perspectives. The interviews focused on collecting qualitative data regarding the common causes and impacts of contractor-related variations, existing ADR practices, challenges in current dispute resolution processes, and key factors influencing the selection of ADR methods. Furthermore, participants were asked to reflect on the potential role of AI in enhancing ADR decision-making. While it was evident from the interviews that AI is not currently applied in real-world ADR processes within the local context, the insights obtained were systematically analysed and later used to identify relevant decision variables, which formed the basis for developing and training AI models for ADR method selection.

Following data collection, the interview responses were transcribed and analysed manually using thematic analysis. Key variables, decision factors, and common patterns were extracted and structured. These refined data points were then used as input to develop and train AI models aimed at predicting or recommending suitable ADR methods for specific dispute scenarios. Thus, although the study is grounded in qualitative research, it also incorporates a data-driven component by utilizing expert-derived knowledge to simulate the potential of AI-assisted decision-making tools.

This integrated methodological approach combining qualitative inquiry with AI model training allowed for both a deep understanding of industry challenges and a forward-looking evaluation of how AI could enhance dispute resolution processes in Sri Lanka's construction sector, despite its current lack of practical adoption.

3. DATA ANALYSIS

3.1 CAUSES OF DISPUTES ON VARIATIONS IN BUILDING CONSTRUCTION PROJECTS IN SRI LANKA

Various research have been conducted by the researchers along the different types of variation disputes (Bello & Saka, 2017). However, according to Keane et al. (2010), the most effective way to classify variation disputes is to classify them according to the cause. The following Table 1 presents the classification and related causes of variation disputes.

Table 1: Classification of variation disputes and causes

Client-related	Consultant-related
Change of plans or scope	Change in design
Insufficient planning at the project definition stage	Errors and omissions
Owners' financial problems	Poor coordination
Inadequate project objectives	Technology change
Replacement of materials/procedures	Value engineering
Impediment of prompt decision-making process	Conflicts among contract documents
Change in specifications by owner	Design complexity
Lack of involvement of the owner in design phase	Poor working drawing details
	Change in specifications

Cakmak and Cakmak (2014) described that contractor-related variation disputes are distinctive among variation disputes and consequently, effective settlement procedures of contractor-related variations disputes are valuable to the successful completion of the building construction project.

3.1.1 Settlement of Disputes through ADR Methods

According to the above mechanism both parties were responsible for resolving their own problems due to its voluntary character (Wimalachndra, 2007). This old system of ADR procedures encouraged peace and harmony, facilitated economic growth at the village level, and promoted social stability by bringing people together (Abeynayake, 2015). According to Abeynayake (2015) different ADR methods have been identified and utilized by stakeholders in the construction and commercial sectors in Sri Lanka at the modern era. In the construction industry, negotiation, mediation, conciliation, adjudication, and arbitration are known as widely used ADR methods (Abeynayake & Weddikkara, 2012).

3.1.2 Negotiation

Negotiation occurs whenever people discuss or share ideas in order to define or redefine the terms and conditions of their relationship. Further negotiation is a voluntary and usually informal procedure in which participants highlight areas of concern, examine options for resolving the problems, and seek a mutually acceptable solution to the issues (Abeynayake, 2015).

3.1.3 Mediation

Mediation is a collaborative, cooperative dispute resolution method in which the parties maintain influence over the outcome. Moreover, a systematic settlement of negotiation assisted by a neutral third party with no decision-making power is known as mediation (Kiridana et al., 2024). Mediation is a confidential process in which a neutral third party known as a mediator assists the parties in discussing and attempting to settle their disputes and consequently, the mediator has no authority to make a decision on behalf of the parties.

3.1.4 Conciliation

Conciliation is a procedure in which the parties to a dispute identify the disputed issues, develop options, consider alternatives, and attempt to achieve an agreement with the help of a neutral third party selected by the parties (Soorige & Abeynayake, 2015). Moreover, identified that, conciliation is a method of resolving disputes in which both parties agree to deploy a conciliator to help them resolve their issues and a third person successfully brings opponents together in conciliation.

3.1.5 Adjudication

Adjudication is a means of referring issues to a neutral third party for a decision that is only binding on the parties until the dispute is settled through arbitration or litigation). Abeynayake and Wedikkara (2013) revealed that, parties agree to nominate an adjudicator known as the Dispute Adjudication Board (DAB) or a single adjudicator at the start of the contract and the adjudicator is supposed to perform as an independent expert rather than an arbitrator. As a result, it is critical that the adjudicator be a person who is competent to interpret technical and contractual problems Abeynayake and Wedikkara (2013) revealed that, there is no such statutory recognition for adjudication methods in Sri Lanka, therefore the adjudicator's award has no legal standing. It is carried out in accordance with the CIDA Federation Internationale Des Ingenieurs-Counseils (FIDIC) conditions of contract, and consequently, unless the parties agree to enforce the award, the adjudicator's decision is not legally enforceable (Abeynayake & Weddikkara, 2013).

3.1.6 Arbitration

If a dispute cannot be settled amicably through mediation or adjudication, the case will be referred to an arbitrator for a binding decision (Kiridana et al., 2024). This is generally the forward methodology, and it incorporates the formal recognition of opposing viewpoints and issues. Moreover, according to Cheung et al. (2002), the most popular way for resolving construction disputes is arbitration, and most construction contracts have arbitration clauses that require the parties to refer any disagreements to arbitration. Abeynayake and Weddikkara (2013) identified that, an arbitral tribunal is supposed to act reasonably and impartially, as well as to follow procedures that minimize unnecessary

delays and costs. Moreover, arbitration, according to the American Institute of Architects, has been firmly established as a preferred way of private construction dispute resolution for many years. According to Stephenson (2018), arbitration is a legally binding process in which two or more parties agree that a dispute or potential dispute between them will be resolved by one or more unbiased persons in a judicial manner based on evidence presented before such person or group of people for a decision, and the decision is referred to as the award (Stephenson, 2018).

Analysis of the interview data revealed a consistent theme across all participants: the selection of the most suitable ADR method for a given dispute depends heavily on the dispute's nature, complexity, and characteristics. This conclusion was reached through thematic coding of the qualitative responses, where all 10 respondents independently highlighted that no single ADR method is universally applicable to every situation. For example, six experts emphasised that negotiation or mediation is often more effective for less complex disputes involving relationship-sensitive issues, while four experts stressed that adjudication or arbitration becomes necessary in technically complex disputes or where contractual interpretation is contested. Several respondents further noted that disputes involving high monetary values, multiple stakeholders, or cross-contractual claims often require more formal ADR mechanisms due to evidentiary and enforcement considerations. This recurring observation was coded under themes such as "ADR method selection factors," "complexity-based approach," and "dispute-specific tailoring," all of which appeared in every transcript. The universal occurrence of these themes across the sample provided the basis for the conclusion in Topic 6 that *all respondents agreed* on the situational nature of ADR method selection.

4. IMPORTANCE OF ADR METHODS FOR SETTLEMENT OF CONTRACTOR-RELATED VARIATION DISPUTES IN BUILDING CONSTRUCTION PROJECTS

When planning a construction project, the cost from start to finish seems to be of great importance, but variations have a significant impact on project cost overruns (Ranasinghe, 2014). In a construction project, the need to make changes is a practical reality (Keane et al., 2020). Even the most planned projects may necessitate changes due to various factors (Arain & Pheng, 2006). Variations orders are mostly responsible for cost and time overruns in building projects, with variation orders accounting for 6-17 % of cost overruns in building projects. Assaf et al. (2019) have revealed that the most significant contributors to claims and disputes were variation orders related to new requirements from clients and injustices to the contractor in variation evaluation.

Gillie et al. (1991) revealed that the main objective of alternative dispute resolution (ADR) is to resolve disputes by having the support of a neutral third party. Abeynayake and Wedikkara (2013) stated that there are two ADR groups such as formal – binding and informal – non-binding methods, and also stated that, most predominant requirement to achieve successful ADR is to aspiration for the parties to inspect the possibility for settlement. Different ADR methods consist of different characteristics, and those ADR methods have various times and cost factors, hence, choosing the precious method is important for a better outcome (Illankoon et al., 2019). Gunasena (2010) stated that arbitration, adjudication, mediation, conciliation and negotiation are widely used, basic ADR methods which can be used to the resolution of variations related disputes. As a

result, ADR methods are appropriate for resolving contractor-related variation disputes in the building construction sector, and they can be a component in a successful project (Kumaraswamy, 1997). The potential of maintaining business relationships is high when using the ADR method and this feature is critical to the building construction industry (Jannadia et al., 2000).

Table 1 illustrates the classification of variation disputes based on their underlying causes, as outlined by Keane et al. (2010). This cause-based categorisation is useful in the Sri Lankan construction context because it allows disputes to be traced directly to the responsible party either the client or the consultant thereby enabling a more targeted resolution strategy. Client-related causes typically stem from changes in project scope, inadequate planning during the project definition stage, or financial constraints affecting the owner's ability to proceed with the work. In contrast, consultant-related causes often involve technical aspects such as design changes, errors or omissions in design documentation, or poor coordination between design disciplines. By understanding these specific causal categories, stakeholders can more effectively assess the risk of variations leading to disputes and select appropriate dispute resolution mechanisms tailored to the dispute's origin.

4.1 REVIEW THE USAGE OF ADR IN THE BUILDING CONSTRUCTION INDUSTRY IN SRI LANKA

The conclusion that the appropriate ADR method depends on the nature, complexity, and characteristics of the dispute was based on expert survey results. Respondents rated factors such as dispute complexity, nature, and contractor's financial stability as highly influential in ADR selection. Over 80% identified these as key considerations.

Additionally, open-ended responses emphasized that ADR should be chosen based on the specifics of each case.

4.2 ISSUES TOWARDS MEDIATION

Table 2: Issues towards mediation

Issue	Sources	References
Mediator's lack of technical competence	8	11
Issue regard to the enforceability, because of non-binding	7	10
Mediator is only facilitator and not giving any opinions or decisions	5	6
Mediation provision is not included in SBDs in Sri Lanka	3	3
No guarantee that settlement will be reached	3	3
Reluctance of government stakeholders to take responsibility for the problem	2	2

4.3 ISSUES TOWARDS CONCILIATION

Table 3: Issues towards conciliation

Issue	Sources	References
Issue regard to the enforceability, because of non-binding	8	10
No guarantee that settlement will be reached	5	6
Lack of adequate skills of the conciliator regarding construction issues	4	5
Conciliation provision is not included in SBDs in Sri Lanka	3	3
Strong-willed conciliator can exercise much control	2	2

Although the issues identified in Tables 2 and 3 such as the mediator's or conciliator's lack of technical competence, enforceability concerns, and absence of statutory provisions could indeed arise in other types of construction disputes, their inclusion in this study is specifically linked to variation-related disputes for two main reasons. First, during the interviews, participants were explicitly asked to reflect on their experiences with *contractor-related variation disputes* and to identify mediation- or conciliation-related challenges they had encountered in resolving such disputes. Therefore, while the nature of these issues is not unique to variation disputes, the context in which they were reported was exclusively variation-related cases. Second, variation disputes often involve complex technical evaluations, contract interpretation, and valuation matters; these characteristics make issues such as a mediator's or conciliator's technical competence, enforceability of agreements, and procedural limitations particularly critical. As a result, even though similar challenges could affect other disputes, the frequency and impact of these issues were found to be especially pronounced in the context of variation disputes in this study's dataset.

According to both literature and expert survey findings, several drawbacks of mediation and conciliation in the construction industry of Sri Lanka. Findings of the expert survey also proved that the construction industry in Sri Lanka always attempts to present their disputes to a third party who has a broad understanding of a field. That is the immediate reason why those are not popular in construction industry in Sri Lanka.

4.4 EFFECTIVE ADR METHODS FOR IDENTIFIED CONTRACTOR RELATED VARIATION DISPUTES

According to the literature review findings, ten causes of contractor-related variation disputes are identified. In the expert interview, respondents suggested their views and the most appropriate ADR method for identified disputes. Further, findings of the expert survey proved that many of the above causes are practical issues and common in the construction industry. However, for practical reasons, some of the facts identified in the literature were excluded by the experts. As an example, unavailability of equipment and unavailability of skills were excluded by the experts by citing reasons. Moreover, experts were explained that contractor have responsibility to use technically appropriate equipment to relevant works and contractor should have skilled personnel and all required workers to perform the tasks according to contract. Therefore, the findings of expert interview proved that the contractor is ultimately responsible for the variation disputes caused by unavailability of skills and unavailability of equipment. Therefore, finding

solutions by ADR methods is a waste of time for such issues. Table 4 illustrates the given appropriate ADR methods by respondents.

Table 4: Contractor related variation disputes and ADR solutions

Contractor related variation dispute	ADR solution
Lack of involvement in design	Negotiation
Contractor's financial difficulties	Adjudication
Desired profitability	Adjudication
Differing site conditions	Adjudication
Fast-track construction	Negotiation
Poor procurement process	Adjudication
Lack of communication	Adjudication
Consultant's lack of experience	Adjudication

5. ARTIFICIAL INTELLIGENCE MODELS FOR SELECTION OF ADR METHOD

AI techniques can significantly support the development of intelligent systems for selecting appropriate Alternative Dispute Resolution (ADR) methods in construction-related disputes. While the following algorithms are general-purpose in nature, they can be integrated into comprehensive decision-making models to enhance the accuracy and effectiveness of ADR selection. These techniques analyse factors such as dispute type, financial impact, project complexity, and historical outcomes to support data-driven decisions.

5.1 SUPPORT VECTOR MACHINES (SVM)

SVMs are effective in handling complex and nonlinear data relationships. When incorporated into a broader decision-support system, they can classify disputes based on key features and predict the most suitable ADR method (e.g., mediation, adjudication) by learning from historical dispute data.

5.2 ARTIFICIAL NEURAL NETWORKS (ANNS)

ANNs can process large volumes of structured data to identify patterns and correlations among dispute characteristics. Within an integrated model, ANNs can support ADR recommendation by analyzing inputs such as dispute causes, contract type, and financial scale.

5.3 K-NEAREST NEIGHBOURS (K-NN)

K-NN algorithms are useful for identifying past disputes similar to the current case. As part of a larger ADR recommendation framework, K-NN can suggest methods that were effective in similar historical cases (Goh & Zhang, 2020).

5.4 NATURAL LANGUAGE PROCESSING (NLP)

NLP techniques allow for the processing of unstructured textual data—such as emails, reports, and contracts—to extract relevant dispute indicators. These indicators can then serve as input features for machine learning models used in ADR method prediction

Random Forest Algorithm and Reinforcement Learning (RL). Random Forests enhance prediction reliability by aggregating the output of multiple decision trees. In combination with RL, which optimizes decisions through iterative feedback, these algorithms can form part of adaptive systems that improve ADR recommendations over time.

5.5 FUZZY LOGIC SYSTEMS

Fuzzy Logic systems are particularly suited for handling ambiguity and subjectivity in dispute characteristics. When used within hybrid decision models, they offer flexibility by applying fuzzy rules to determine the most appropriate ADR pathway (Goh & Zhang, 2020).

In summary, while these algorithms are not standalone ADR selection models, they provide critical computational capabilities that can be combined with domain expertise and structured methodologies to develop robust, intelligent ADR decision-support systems tailored to the construction industry.

6. GUIDELINE TO SETTLEMENT OF CONTRACTOR RELATED VARIATION DISPUTES BY USING ADR METHODS IN BUILDING SRI LANKA

Guideline to settlement of contractor related variation disputes by using ADR methods in building construction industry in Sri Lanka can be mentioned as follows.

Figure 1 presents a structured guideline for resolving contractor-related variation disputes in the Sri Lankan building construction industry. It integrates Alternative Dispute Resolution (ADR) mechanisms with a novel application of Artificial Intelligence (AI) to support informed, efficient decision-making. At the center of this guideline is a pretrained AI model designed to assist in the early assessment of the dispute.

The AI model is trained on historical dispute data, incorporating features such as dispute type, financial impact, project complexity, and behavioral patterns of involved parties. When a new dispute arises, the model analyzes these inputs to determine whether negotiation is likely to be effective as a first-line ADR method. This ensures that the decision to negotiate is not made solely based on subjective judgment but is supported by evidence from past cases with similar profiles.

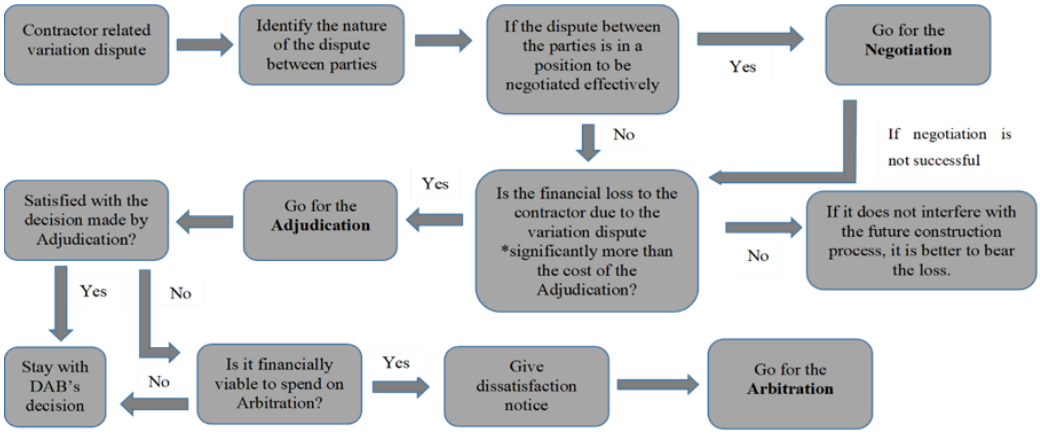

Figure 1: Guideline to settlement of contractor related variation disputes by using ADR in building construction industry in Sri Lanka

If the model predicts a high likelihood of successful negotiation, the process proceeds accordingly. However, if negotiation is deemed inappropriate or fails, the guideline shifts to a cost-benefit analysis stage, where the parties evaluate whether the potential financial loss warrants escalation to adjudication. If the loss justifies it, the dispute progresses to adjudication, and if the outcome remains unsatisfactory, it moves on to arbitration—ensuring that more formal and costly ADR methods are employed only when necessary.

This integration of a pretrained AI model with the ADR pathway ensures consistency, objectivity, and efficiency in the dispute resolution process. By aligning AI predictions with decision points in the guideline, the model functions as a decision-support tool, promoting faster, less adversarial outcomes and reflecting a proactive adoption of intelligent technologies in the construction dispute management framework.

7. CONCLUSION

Due to the industry's complexity, completing the project without making changes and adjustments to the construction process is practically impossible. Therefore, variations are inevitable in construction projects. According to the literature, Variation in construction refers to changes in design, quality, and quantity of work, as well as changes in the standard of materials or goods to be used in the work and the removal from site of any material that does not comply with the contract (Asamaoh & Offei-Nyako, 2013). Moreover, the literature has proven that variations can escalate into disputes, and then it can highly be influenced project cost, delays, conflicts, project quality, and issues in construction cost management in building construction projects. Accordingly, it is important to use a good settlement method to drive a project to successful completion. Consequently, in literature, variation disputes have been grouped into three categories for the contracting parties: client-related variations disputes, consultant-related variations disputes, and contractor-related variations disputes. In addition, a new group called "other variations disputes" has been created to represent non-party-related issues.

According to the classification derived from the literature survey, there are four main types of variation dispute categories. Among them, taking into account the specifics of contractor-related variation disputes as proven in the literature, it was taken to an expert interview. The purpose of these expert interviews was to discuss each of the above contractor-related variation disputes and select the ADR method that would lead to the most effective settlement for each type. However, in order to bring this work to a successful level, firstly got a basic understanding of the ADR methods used in Sri Lanka and their drawbacks from experts. As per the expert interviews, many of the facts mentioned in the literature were discussed, up to the point of proposing an effective ADR method, although some of the facts identified in the literature were excluded by the experts because of practical reasons. As an example, unavailability of equipment and unavailability of skills were excluded by the experts by giving reasons. However, with the exception of the two exclusions mentioned above, all the causes of contractor related variation disputes such as lack of involvement in design, Contractor’s financial difficulties, Desired profitability, differing site conditions, fast-track construction, Poor procurement process, Lack of communication and Consultant’s lack of experience have been accepted by experts and the most suitable ADR methods have been introduced for settle them. In developing this guideline, it was considered the expert reviews and according to that much attention was paid to selecting the ADR method with the most suitable cost range, depending on the financial value of the variation problem. Since

construction is an industry that must always be balanced with money, hence, every decision must be made in a way that does not lead to financial risk. Furthermore, considering the complexity and nature of the problem, attempts have been made to list ADR methods in an easy-to-use sequence, resolving issues that can be resolved through negotiations at an early stage and moving on to further methods only if they fail. Establishment of Negotiation and Mediation methods are suitable for settlement of disputes in the construction industry. Finally, to deviate this research to modern and smart Artificial Intelligence application is checked to select the most appropriate ADR method settlement of Dispute. It shows that the Artificial Intelligence concept can be applied where the AI models are trained using past project experience.

8. RECOMMENDATIONS

To further enhance the effectiveness and efficiency of the ADR methods in resolving contractor-related variation disputes, Artificial Intelligence (AI) can be employed as a highly effective tool. AI can be employed to examine large volumes of project data like contracts, designs, and communication records to identify trends and predict potential areas of dispute at an early stage of the project. AI can also provide real-time recommendations on the most appropriate ADR process with regard to the specifics of the controversy, such as economic considerations, nature of deviation, and parties involved. With the integration of AI into the ADR process, mediators and negotiators can obtain data-driven insights, which enable decision-making, minimize biases, and increase the likelihood of a successful resolution. Further, AI-based systems can automate bureaucratic tasks, such as document management and scheduling, so that the parties can focus on resolving the key issues properly. The adoption of AI into the ADR system can hence make the resolution of disputes more proactive, accurate, and inexpensive, ultimately paving the way to the smoother project completion of Sri Lankan constructions. Finally, as a whole, it can be concluded that the settlement of contractor-related variation disputes by using ADR in the building construction industry is not yet largely prevalent in the context of Sri Lanka. Though most Sri Lankan building contractors and construction sector possess the necessary basic knowledge and capacity to use ADR, an intercession from all related people and the government is necessary to effectively use and have faith and good practice ADR in the Sri Lankan context. The proposed guideline can be helpful to any level of the contractor to a better settlement of variation dispute by choosing the most appropriate ADR method by concerning the nature of the dispute.

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