

Framework for the Classification of COVID-19 Force Majeure Delay Events

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Abstract

Time is always of the essence in the construction industry, and all projects depend on timely execution for their success. All stakeholders aim to achieve a project's goals within the time constraints set during the planning stage. However, delays do occur, and often some could be due to foreseen or unforeseen risks or an act of God. Moreover, the current outbreak of COVID-19 has meant that the construction industry suffered even more delays. Most of the delays are labelled as force majeure which are events that cannot be foreseen by any party due to the outbreak; however, significant consideration of an event's material circumstances and the forecast-ability of the specific reasons for the delay are required before this labelling is considered in its legal sense. Thus, this study aimed to develop a framework for the identification of delay events during the outbreak of COVID-19 via a logistic regression model, and assessed if such events could be labelled as force majeure. The study examined the literature to identify the factors that lead to the delay event and the force majeure conditions. Moreover, data was collected from industry experts in semi-structured interviews to identify and confirm the factors that are usually considered when a claim of force majeure is evaluated. Finally, the study developed a framework and a Claims Scoring Metric (CSM). The CSM saves contractors the cost of preparing ineligible claims and saves the project owner the cost of reviewing such claims. It assists in the initial identification of delays caused by the COVID-19 pandemic before a thorough evaluation is needed. The framework was validated via a case study with results matching the outcome of the delay analysis.

Keywords

Project Delays, COVID-19, Force Majeure, EOT, Claims Scoring Metric.

1. Introduction

Time is considered the most valuable asset in a construction project, much more important than the actual money value. In his paper Fawzy et al. (2018) stated that any delay in the project's duration has adverse effects on the client as it will delay the start of the earning cycle of the project in terms of project completion and handover to the end-user. Even though the project timeline or program of works is usually insufficient to finish all activities, the delayed parties will still be held responsible for the delays they cause in the project.

There are numerous reasons for project delays or time overrun. They could be ascribed to any of the parties in the project (González,2013). However, as per Birgonul et al. (2015), these variables have started another study field, called delay analysis.

Rules and regulations govern the relationship between the parties in a project, but issues and conflicts are bound to occur. Many issues can arise in a construction project that can cause distress and conflict between the parties, and the predominant ones can delay a project. As such, contractors opt to submit an extension of time claims to reduce or eliminate the liquidated damages that project owners might apply to recover damages that result from the delay of the project being handed over.

While some delays result from a contractor's fault, other delays might be out of the contractor's control, and, in principle, the contractor should not be held responsible for such delays. The latter was manifested during the current outbreak of the COVID-19 pandemic. Although some contractors claimed their projects' delays resulted from the pandemic as a force majeure event, clients were hesitant and without the means of verification to announce the claims as valid.

This paper will build on the previous literature on the application of force majeure and apply the same concept to the recent outbreak of COVID-19 to build a framework for the identification of COVID-19 force majeure events and a logistic regression model to determine the likelihood of an award of such claims using the proposed framework. The developed framework is a result of literature review to develop an understanding of the elements considered while evaluating a claim that has force majeure events, as well the impacts of such delays on the project performance. Afterwards, interviews with industry experts were conducted to highlight the most important aspects of claim evaluation and judgment. Finally, the framework is developed along with a mathematical representation to facilitate the calculation of an index that will assist stakeholders in evaluating the merit of claim on a high level. As a result, the framework will also serve as guidelines of claim preparation to contractors in order for them to fortify the claim and increase the likelihood of award.

2. Literature Review

Construction Projects Delays and Claims

These delays can occur for different reasons and range from an excusable delay to one that could terminate the contract. As Gonzalez et al. (2013) discuss in their paper, there is always a compelling need to study the delays, causes, impacts, causing party, and the fair compensation owed to the affected party. Gonzalez et al. (2013) also classify the types of project delays as excusable and non-excusable, in addition to four further subcategories in the construction industry.

The excusable compensable delays. This type of delay is usually the fault of the owner, owner representatives, or the consultant. This means that the cause of the delay is out of the contractor's hands. Moreover, the owner must compensate the contractor with more time or money or depending on the delay's size and extent. Shamsavand et al. (2018) clarified how configuration changes, end-client adjustment, civil guideline changes, and various requests could be viewed as the most prominent causes of such a delay. For this situation, the owner must then increase the project's duration by granting the contractor an Extension of Time (EOT) as the contractor will require additional time than what was initially planned for the project's execution. Another aftereffect of this deferral could be the proprietor's commitment to making up for the prolongation expense due to time augmentation over the original duration.

The excusable but non-compensable delay. For this type, the project owner must grant the contractor an EOT without granting him any cost associated with the delay, as per Shamsavand et al. (2018). This type of delay is almost always attributed to force majeure, which are out of the contractor's hand, while also not being caused by the owner, such as weather conditions, terrorist attacks, chemical or biological spills, etc., the existence of archaeological remains on site.

The non-excusable and non-compensable delay. The leading cause of this delay is the incompetence of the contractor to execute such a project. This could be due to the contractor's limited financial ability, limited knowledge and expertise, and poor planning and execution. This type of delay entitles the owner to apply the contractor's pre-agreed penalties for delay damages, as Fawzy et al. (2015) explained.

The concurrent delay. As outlined above, delays could be the responsibility of either the contractor or the client in any construction project, but when there is a delay, and the responsible parties of this delay are both the contractor and the client, it is called the concurrent delay. This type of delay could be easily explained when the contractor causes a delay by underperforming in their construction activities, and the client also causes a delay in changing the design or missing payments to the contractor, or even failing to provide information to the contractor. However, this type of delay does not entitle any party to recover damages from the other party. Moreover, both parties must work collectively to put an action plan to mitigate the extent and the impact of the delay (Emam et al., 2014).

There are measures in the construction industry to extend a project's duration, but the contractor's main pretence is that the contractor must not have directly or indirectly caused the delay. When the contractor executes the project on time and an event outside their control occurs, the contractor shall be entitled to submit a claim for the extension of time. The leading causes of such type of delays are strikes, weather conditions, change of specification, change in the design, delay of a nominated subcontractor, delays in receiving information or payments, and Force Majeure (Emam et al., 2014).

When it becomes known to the contractor that a delay is potentially happening, the contractor shall give written notice to the client describing the delay's nature, the extent of the delay, and the possible measures to mitigate the delay. The owner must then evaluate the contractor's eligibility to get this claim and either grant or reject the claim. Claims assessment is a tedious process, and it usually is referred back to the actual progress on-site and considers the measures that the contractor has implemented to avoid this delay and the period of the notification given to the owner before the actual results of the delay.

COVID-19 as Force Majeure and Construction Delay and Modelling

Force majeure in construction contract terms is defined as an exceptional event that is not in the control of either party, and neither party could foresee before entering into the contractual agreement (Alshammari et al., 2017). Therefore, these events are considered an act of God which neither party controls, and, in good faith, all parties in the contractual agreement have exerted their best efforts to mitigate these events' impact. Therefore, with the recent outbreak of COVID-19 and the several warnings of the pandemic by the World Health Organization (WHO) when the virus outbreak started in Wuhan, China, the world economy has been impacted severely (WHO, 2020).

Many sectors of the economy have taken a significant hit, including the construction industry. Since the construction industry is largely dependent on manpower, the laws of social distancing and reduction of capacities were significantly disruptive. On the other hand, Alenezi (2020) indicated that the most devastating delay factor to construction project was the hyperinflation of materials prices during the pandemic. On the other hand, some of the major reasons for delays in the construction industry have been regarded to the project owners and consultant due to their vast power on the course of the project.

There are several ways the pandemic impacted the performance of construction projects. Gamil, and Alhagar (2020) indicated that other than the shortage of the materials that occurred due to the suspension of world-wide freight during the peaks of the pandemic, there are several impacts that did greater harm to projects. Some of these impacts are the cost overruns due to the limitation of the labour availability, time over runs due to the reduce capacities, suspension of projects due to the uncertainty of survival, and finally the lack of job security which impacted the motivation of the labors severely.

Kabiru and Yahaya (2020) indicated that the very definition of force majeure is related to the ability to foresee the delay event and its impact on the project performance. While in some contract clauses of epidemic are included, other contracts generalize the events that are due to nature as acts of God. Thus, serious consideration by all stakeholders is required to determine the applicability of the force majeure clause in the contract of the project to the COVID-19 pandemic. However, the existence of a force majeure clause in the contract does not relieve the contractor from incurring liquidated damages for the delays caused by the non-performance that are attributed to the impacts of COVID-19 outbreak. Sometimes a careful consideration of the actual language of the clause can contribute largely to its interpretation. Furthermore, the authors believe that there are many conditions and prerequisites for a force majeure claim during the pandemic to be admissible such as the timely submission of the claim and efforts of mitigation that are taken to reduce the impact of the outbreak on the performance of the project.

Additionally, Hansen (2020) illustrated that the pandemic had shown the importance of including a well written force majeure clause in construction contracts to avoid any disputes in case such events reoccur in the future. Moreover, the author indicated that COVID-19 outbreak can be labelled as a trigger for the use of the force majeure clause in construction contract since it is unforeseeable, unavoidable, uncontrollable, impracticable, and beyond the responsibility of either party. Furthermore, Hansen indicated that some standard contract forms such as FIDIC, NEC, and the JCT include provisions of pandemic outbreak, however, they differ in the definition and the application of the clauses.

The global pandemic had taught the construction industry many lessons, none of the least is the use of new innovative materials and building systems that have less dependency on labors on site can be regarded as a significant measure to allow for social distancing which in turn allows for the industry to proceed during such outbreaks. Furthermore, it is important for project owners to support contractors through the pandemic by expediting their payments and instructing consultants to facilitate information transfer (Alenezi, 2020). Furthermore, as the pandemic had an adverse impact on construction projects Iqbal et al (2021) indicate that a crisis management approach is required for the promotion of the productivity during the outbreak while maintain the safety of the labors.

There are many different approaches to determine the contractor's eligibility for an extension of time in the construction industry, as explained by Vasilyeva et al. (2015). Nevertheless, these approaches do not consider the actual functionality of a construction project, i.e., they do not consider the sequence and properties of the construction processes. As a result, Zaho and Ding (2009) suggest more realistic approaches via the field of data analysis. However, the research still shows a gap in data analysis to assess contractor eligibility before submitting an extension of time claims. The data collected from actual projects can build entire databases rather than building assumptions and developing utopian mathematical models.

Nevertheless, in project management and planning and forensic delay analysis, data mining is appropriate as the practices depend on data accumulation. Delay analysis examination can be contemplated and investigated, discovering patterns and connections between factors to distinguish every factor's importance. As shown by Alena et al. (2015), numerous numerical models can be applied to distinguish and gauge the completion date for a specific

project holding every other variable constant. Parvaneh et al. (2018) also distinguish those other mathematical models track the project and find the project's likelihood to follow the original plan. However, all these models are based on an ideal situation with no regard to the construction industry's actual complexity and sequence.

The literature has also indicated a need for a framework to classify delay events related to the COVID-19 outbreak and the force majeure clauses' applicability on these events. As such, this study will develop a framework that can assess project owners in classifying delay events during the outbreak of COVID-19 as force majeure results or the shortcomings of contractors.

Therefore, there is a need for exploring the nature of the events that lead to force majeure, as many aspects have to be considered before labelling the COVID-19 outbreak as a force majeure (Glover, 2007). Nevertheless, the actual circumstances of the event have to be analysed before their qualification as a force majeure mainly the existence of a force majeure clause in the contract, the efforts of forecasting the event, and the mitigation efforts of the event (Alshammari et al., 2017).

The study also examined the applicability of force majeure clauses on the COVID-19 outbreak to identify the delay, its reasons, and its implications on construction projects. Furthermore, the literature review aided the study in exploring the use of data analytics in project delay analysis and highlighted the use of binary logistic models in construction contracts.

Therefore, there is a need for thorough consideration of the event claimed to be force majeure caused by the COVID-19 outbreak on a case-by-case basis. There is a need for an identification framework of COVID-19 force majeure events in construction projects. All research and current practices have been based on theoretical approaches, and there are no available tools to aid the contractor in this area. Hence, this research can provide new insights to learn from experience and refine the current practice of project planning. As a result, the authors have identified a gap in the literature regarding practical tools that could be used to assess and classify delay events of projects impacted by the COVID-19 outbreak. Furthermore, the study also aimed to build a logistic model that practitioners can use to validate different claims. Finally, the study will also provide recommendations to the contractors to ensure that their claims meet the clients' stratification and would most likely be granted.

3. Methodology

To meet the objectives, the study collected qualitative and quantitative data. The qualitative data was collected to explore force majeure due to the COVID-19 outbreak and develop the framework. On the other hand, quantitative data was used to build the model, examine the model's variables and eventually test its validity. Moreover, the collected data was used to build the framework, and the CSM was built from the framework to enable a more straightforward application. Finally, a case study application was used to demonstrate the validity of the model and the applicability of the parameters.

Data Nature and Collection

Frameworks Factors Data Collection

The data required for developing the framework of identifying events as COVID-19 force majeure is qualitative data related to the collection of factors that are usually considered when evaluating such claims. All the data was collected via an electronic survey that allowed for the recording of the data. Table 1 below identifies the participants in this study.

Table 1. Study Participants.

Participant	Background
PDCP	Delay Analyst licensed with the local courts and has more than 20 years of experience in the field.
SDCP	Consultant with an engineering background with more than 20 years of experience and an extensive profile in completed projects.
DCP1	Construction director with more than 15 years of experience in the construction industry.
DCP2	Projects manager with more than 12 years of experience in the construction industry.

The choice of the study participants was based on the need to capture a wide range of opinions from different stakeholders as well as the impartial opinion of the delay analyst. The expert panel formed represents participants from the consultant side as well as the contractor side allowing for a larger prospect of expanding the important aspects of both sides of the construction industry.

This data was collected via an open-ended questionnaire sent to PDCP to collect factors that are usually considered when evaluating the extension of time claims relating to events due to force majeure events, after which the resulting factors were sent to SDCP for confirmation. Finally, the factors were also presented to DCP1 and DCP2 to examine the applicability of such factors when submitting a claim for extension of time concerning events that directly resulted from the outbreak of COVID-19.

PDCP has indicated that a routine evaluation of an extension of time claim involves the analysis of the six factors which are adequate notice of claim, the reason for the delay, the contractual basis of the claim, the duration of the delay, the impact of the delay, and the mitigation efforts.

PDCP also indicated that the investigator's judgmental objective mentality also plays a significant role in analysing the claim to assess the degree to which the contractor displayed the "goodwill" or effort to mitigate the delays and impacts. Moreover, PDCP also indicated that knowledge of contracts and proper contract administration usually leads to fewer conflicts between the client's best interest and the contractor.

Moreover, the same factors were sent to SDCP for validation, to which the factors were deemed relevant and essential. However, SDCP also indicated that the client's intention in any project usually sets different contractual events, especially in disputes and claims.

On the other hand, both DCP1 and DCP2 have agreed that these factors and the success to which the contractor can capture the efforts to achieve them in the claim can be a significant reason for approving or rejecting a claim. DCP1 also added that COVID-19 had caused delays in all construction projects worldwide; however, some contractors have used this reason to cover their delays, which is deemed unfair towards clients and their interests.

Taking the above results in mind, the conclusion can be drawn that there is a need for tools that can be used to identify events caused by COVID-19 and events resulting from contractors' faults. Therefore, Figure 1 displays the developed framework which was built from the extracted factors to help clients evaluate claims and the force majeure clause's applicability.

This framework will help the owners classify delay events during the COVID-19 outbreak as force majeure that deserves EOT consideration or as shortcomings from contractors that deserve penalty and liquidated damages for delay. Therefore, such a framework can reduce assessment and consideration times that go into EOT evaluations and guide future force majeure events to be considered.

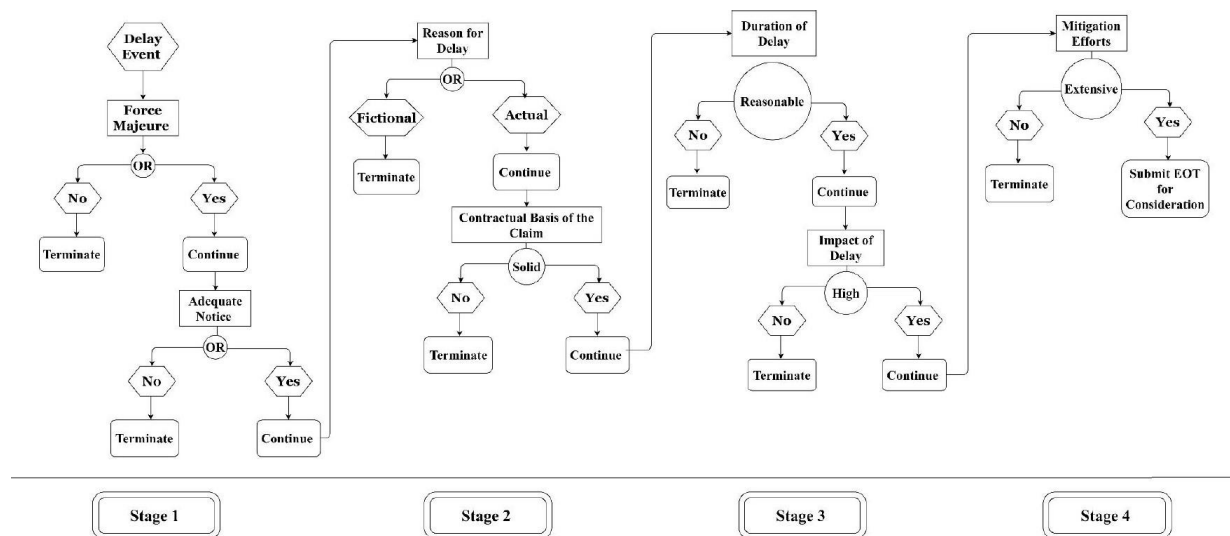


Figure 1: COVID-19 Framework.

Claims Scoring Metric (CSM) Development

After building the framework, the authors decided to build a relative measurement tool that could provide a quantitative representation of the framework to allow for interpretation. Furthermore, as the models and factors presented in the models could entail a subjective opinion in representation, the authors deem applying a linguistic-based numerical model is necessary—table 2 below provides the linguistic scale and the corresponding numerical values. The scale spans from 0 to 6 to represent the linguistic scale ranging from very low to very high.

Table 2. Linguistic Scale.

Linguistic Scale	Numerical Scale
Very low (VL)	0
Low (L)	1
Medium-low (ML)	2
Medium (M)	3
Medium-high (MH)	4
High (H)	5
Very high (VH)	6

The proposed mathematical model entails that the evaluator of the claim or the client shall score the adequacy of achievement of all the six factors based on the event submitted in the extension of time claim and that will provide a reasonable indication about the Force Majeure Occurrence (FMO), based on Scoring Factor (SF) of the six identified factors as presented in Equation one below:

$$FMO = SF1 + SF2 + SF3 + SF4 + SF5 + SF6 \quad (1)$$

Where:

- FMO: Force Majeure Occurrence
- SF1: Linguistic Scoring for Factor 1 (Adequate notice of claim)
- SF2: Linguistic Scoring for Factor 2 (The reason for the delay)
- SF3: Linguistic Scoring for Factor 3 (The contractual basis of the claim)
- SF4: Linguistic Scoring for Factor 4 (The duration of the delay)
- SF5: Linguistic Scoring for Factor 5 (The impact of the delay)
- SF6: Linguistic Scoring for Factor 6 (The mitigation efforts)

The highest score attainable in this model is 36, while the lowest score is 0, thresholds of claim acceptance under this model depending on the attitude and the direction that the client is heading. The threshold of accepting claim or moving forward with claims can be agreed amongst stakeholders on a project-by-project case.

The above model and CSM can significantly benefit the industry as they will streamline the claim assessment's subjective nature, which is the usual practice in the industry. Moreover, the introduced framework and metric will enhance project managers' efficiency, reducing the time required for claim assessment and award. On the other hand, the overall conflicts between contractors and project owners can be reduced if such tools are presented to eliminate bias.

3. Results

To demonstrate the concept application, the authors sought to apply the framework on an actual project in which the contractor submitted a claim for extension of time referring to the force majeure clause in his contract due to COVID-19 impact. The project is an infrastructure project with a value of 37,398,129.00 AED with a total duration of 387 days. The project is located in Dubai, United Arab Emirates, and the scope of the project is to construct a fire fighting and irrigation pumping station that will service two districts. The start date of the project was 17/07/2019, and the planned finish date was 07/08/2020. The equipment required for the construction was to be procured locally. However, the pipes and fittings were to be imported from abroad (China). The pipes for the pumping stations were ductile iron pipes imported from China, and the delivery of materials was planned to be delivered late in the project on (10/05/2020) due to the availability of work fronts and the readiness of the structure to receive the materials. However, the materials arrived on 21/07/2020, and the contractor sought to submit an extension of time claim to recover the delay of the shipping due to the outbreak of the COVID-19 pandemic, and the below chronology was provided:

1. The order for the material of the DI pipes has been placed on 26/02/2020.
2. On 16/03/2020, the supplier sent a notification of delay for the delivery due to the COVID-19 outbreak, which will lead to late delivery of the pipes with a projected delivery date of 09/07/2020.
3. After which, the contractor had gone through extensive deliberation with the supplier and the concerned authorities to mitigate the delay but without benefit.
4. On 21/07/2020, the material was received at the site, and the installation has commenced immediately to mitigate some of the delays.
5. On 22/07/2020, the contractor informed the Engineer of the delay caused by the late delivery via a letter correspondence indicating the contractor's intention to submit a claim.
6. On 18/08/2020, the contractor submitted an extension of time claim to extend the project duration by 72 days due to the late delivery of materials. In his claim, the contractor mentions: "Therefore, the imposed delay was out of the control of the contractor was not possibly foreseen or its effected mitigated. Hence, a total time entitlement as a result of this event was calculated to be 72 days according to the attached extension of time program."
7. On 28/09/2020, the Engineer sent a reply on the contractor's claim, which indicates the rejection of the claim due to the failure of the contractor to submit timely notices in accordance with the contract and the non-availability of factual mitigation measures.
8. The contractor on 11/10/2020 rejected the Engineer's evaluation and requested the determination of a third-party expert on the claim in order to resolve the dispute amicably.

9. Upon approval of the contractor's request, the employer engaged a court expert third party to conclude the determination that confirmed the Engineer's opinion.

The same project will be used as a case study to validate the model throughout the different stages of the framework application. Starting at stage 1 to determine the nature of the event and the at of notice by the contractor, going to stage 2 to identify the reason for the delay and the contractual basis of the claim, moving to stage 3 to assess the duration of the delay and its impact on the critical path of the project, finally concluding with stage 4 to identify the mitigation measures taken by the contractor to mitigate the delay.

Case Study Analysis Stage 1:

The analysis of the delay event in stage 1 as illustrated in Figure 2 below indicates that the delay of shipment and procurement of the ductile iron pipes for the project is due to the pandemic outbreak, which is considered as a force majeure, therefore moving to the next step, one can refer to the contract of the project where the below is specified with regards to notices: "The Contractor shall give notice to the Engineer, with a copy to the Employer, wherever planning or execution of the Works is likely to be delayed or disrupted unless any further drawing, specification, or instruction is issued by the Engineer within 28 days after the event giving rise to the claim has first arisen."

From the above, it is clear that the contractor had surpassed the contractual duration of raising notices of delay for the event, given the fact that the contractor should have raised the notice of delay to the Engineer and the Employer within 28 days from 16/03/2020. However, the contractor raised the notice on 22/07/2020, which is 100 days after the contractual duration. Therefore, the analysis should be terminated with no grounds for extension of time award due to the non-compliance with the contractual notice duration. However, for analysis purposes, the analysis shall continue to identify other grounds of rejection, if any.

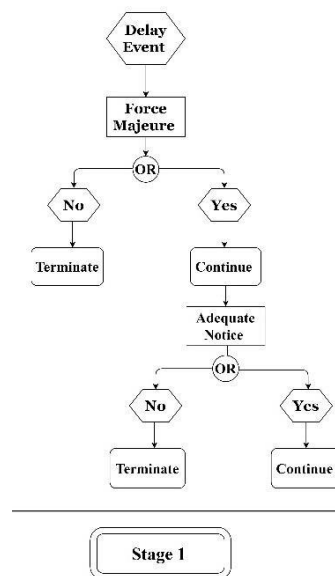


Figure 2: Case Study Stage 1 Analysis.

Case Study Analysis Stage 2:

Analysing the reason for the delay event, which is an actual reason supported by back up document from the manufacturer indicating that the shipment delay from China to Dubai due to the impact of the pandemic on China at the beginning of 2020. Therefore, verifying the actuality of the delay reason and moving on to the contractual basis of the claim, it was evident that the contractor had the right to claim the extension of time based on the impact of the COVID-19 pandemic on the supply chain, considering it as an unforeseen event as per the contract extract below: "Clause 8.4 "Extension of Time for Completion" is of particular relevance and states the following;

In the event of;

- i. A Variation,
- ii. Any cause of delay referred to in the General Conditions, or

iii. Any delay, impediment, or prevention by the employer, the employer's personal."

Therefore, it is evident that the contractor has grounds for entitlement for an Extension of Time for Completion under the Conditions and the Conditions of Particular Application. As seen in Figure 3 below, the analysis shall continue to stage 3.

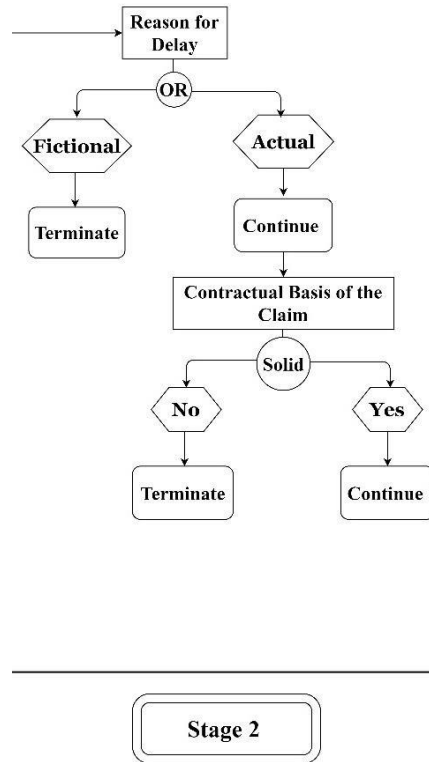


Figure 3: Case Study Stage 2 Analysis.

Case Study Analysis Stage 3:

The delay duration of the ductile iron pipes delivery was found to be 72 days; given the fact that global shipping and especially the shipping from China was impacted severely, the analysis of the duration of delay is found to be reasonable. On the other hand, checking the delay impact on the project's critical path, the mechanical installation of the equipment, including the ductile iron pipes, was found to be on the project's critical path. Therefore, the delay in the delivery impacted the project completion by 72 days. As illustrated in Figure 4 below, this event is considered to be on the critical path and would significantly impact the overall project delivery, which warrants the continuation of the analysis to stage 4.

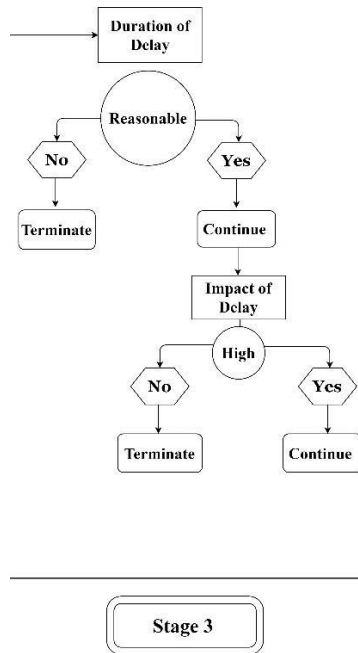


Figure 4: Case Study Stage 3 Analysis.

Case Study Analysis Stage 4:

Stage 4 of the framework investigates the contractor's mitigation efforts to alleviate the damage that would occur to the employer's best interest in case of delays. Although the contractor, in this case, indicated that they were in negotiations with the manufacturer to expedite the delivery of the pipes, not proof or evidence was provided on actual mitigation efforts that were employed. The contractor even failed to provide evidence of pressure applied on the manufacturer to expedite the shipment of the materials. Therefore, the mitigation efforts were deemed not extensive. As indicated in Figure 5 below, the analysis should be terminated to conclude that no extension of time should be awarded.

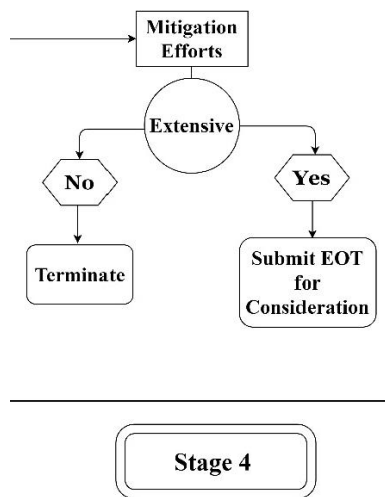


Figure 5: Case Study Stage 4 Analysis.

Applying the CSM equation as per the contractor assessment of the scoring of each of the six factors results in a total score of 21, as indicated in table 3 below:

Table 3. Interviewees Response on Current Practices.

Factor	Adequate notice of claim	The reason for the delay	The contractual basis of the claim	The duration of the delay	The impact of the delay	The mitigation efforts	Total
Factor Score	0	6	3	6	6	0	21

4. Discussion

The study sets out to build a framework that can aid in the evaluation of delay events that could be labelled as force majeure due to the COVID-19 outbreak. Throughout its four stages, the framework evaluates six factors deemed essential to label a delay event as a force majeure. First, noting that time is one of the most critical resources in a construction project, the preservation and conversation of it becomes necessary for the advancement of the construction industry.

For the case study applied, a score of 21 results in the dismissal of the claim as per the developed CSM. The analysis of the delay event via the developed framework and the CSM application and the fact that both confirmed that the contractor has no right to claim for extension of time, which was also the actual outcome of the claim following the rejection from the Engineer and the independent third party, further validated the model applicability in determining the contractor's right in submitting and winning a claim for extension of time amid the COVID-19 outbreak due to force majeure reasons.

Therefore, the applied case study can benchmark the importance of developing such a framework that could reduce the resources required to evaluate an extension of time claims. Furthermore, a further investigation to validate the model with more project data could enhance the model and increase its validity and reliability.

The limitations of the study are the availability of data and the quantity of data availability which limited the ability of the researchers to apply the proposed framework to multiple projects and different scenarios.

5. Conclusions

Time is a fundamental resource in the construction industry. Both the contractor and the development owner are greatly affected by time delays in a construction project. While no party is interested in delaying a project, sometimes events that are out of the control of both parties occur and cause delays in a construction project. For example, during the COVID-19 pandemic, some delays could arise in the construction industry for many reasons, such as the required social distancing or the delay in materials supply. These delays could be attributed to force majeure clauses, but a thorough investigation and analysis must accurately classify those events. This investigation is critical to ensure that the rights of both parties are preserved.

Therefore, this paper aimed to build a framework to assist the project manager and project owners in classifying delay events during the outbreak, if they can be labelled as force majeure or not, and if they deserve EOT consideration or liquidated delay damages. To satisfy this aim, a careful investigation of the literature to identify the factors that constitute force majeure delays in the construction industry followed by a collection of data with the means of semi-structured interviews with industry professionals to identify the factors that are considered when analysing a claim for force majeure was conducted. After which, the authors developed a Claim Scoring Metric that will also enhance and increase the applicability of such a model in the industry to reduce the time required for assessing claims, streamlining claim assessment to eliminate bias, and reducing conflicts in the construction industry overall. Nevertheless, such a model can also enhance contract administration and ease conflicts, and enhance the process of alternative conflict resolution. Moreover, further investigation of the actual project's program and the inclusion of a performance index in the project before the claim can be investigated might impact the project owner's risk attitude.

As such, it can be concluded that COVID-19 induced delay events on the construction industry that impacted the performance of projects, however, not all projects can write off the non-performance during the pandemic as a force majeure event since there are many considerations that need to be taken into account before that is done. One of the most important aspects to consider while labelling a delay event as a force majeure is the existence of a force

majeure clause in the contract the prerequisites for its implementation. Therefore, a lesson learnt from the pandemic could be the importance of including well written force majeure clauses in construction contracts to avoid dispute in case such events reoccurred.

Similarly, the findings of this study do not only apply to delays incurred by the COVID-19 pandemic since it tackles any delay event that meets the five requirements of being unforeseeable, unavoidable, uncontrollable, impracticable, and beyond the responsibility of either party. Therefore, future research recommendation could be to tailor the proposed model to other types of delays events to test the applicability of force majeure on them.

One of the study's main limitations was the availability of data and data collection amid the outbreak of the COVID-19 pandemic. However, to overcome this limitation, the authors adopted remote meeting techniques to have access to data and the feedback of the industry professionals.

References

- Alenezi, T.A.N., 2020. "Covid-19 Causes of Delays on Construction Projects in Kuwait." *IJERGS*, 8, pp.6-9.
- Alshammari, S., Al-Gahtani, K., Alhammad, I. and Braimah, N., 2017. "A Systematic Method to Analyze Force Majeure in Construction Claims." *Buildings*, 7(4), p.115-119.
- Birgonul M., Dikmen I., and Bektas S. 2015. "Integrated Approach to Overcome Shortcomings in Current Delay Analysis Practices," *Journal of Construction Engineering and Management*, 141(4):04014088.
- Emam H., Abdelaal M., and Farrell P. 2014. "Causes of delay in GCC construction projects: A Critical Review," in 1st International Conference on Smart, Sustainable and Healthy Cities, 1(1), pp. 607–621.
- Fawzy S., and El-Adaway I. 2013. "Contract Administration Guidelines for Effectively and Efficiently Applying Different Delay Analysis Techniques under World Bank–Funded Projects," *Journal of Legal Affairs and Dispute Resolution in Engineering and Construction*, 5(1), pp. 35–44.
- Fawzy S., El-Adaway I., Perreau-Saussine L., Wahab M., and Hamed T. 2018. "Claims for Extension of Time and Additional Payment under Common Law FIDIC: Civil Law Analysis," *Journal of Legal Affairs and Dispute Resolution in Engineering and Construction*, 10(4): 06518002.
- Gamil, Y. and Alhagar, A., 2020. "The impact of pandemic crisis on the survival of construction industry: a case of COVID-19." *Mediterranean Journal of Social Sciences*, 11(4), pp.122-122.
- Glover, J., 2007. "FIDIC: An Overview. The latest developments, comparisons, claims and force majeure." *Construction Law Summer School, Fenwick Elliott, London, England*, 26.
- González P., González V., Molenaar K., and Orozco F. 2013. "Analysis of Causes of Delay and Time Performance in Construction Projects," *Journal of Construction Engineering and Management*, 140(1): 04013027.
- Hansen, S., 2020, May. "Does the COVID-19 outbreak constitute a force majeure event? A pandemic impact on construction contracts." *Journal of the Civil Engineering Forum*, 6(1), pp. 201-214.
- Iqbal, M., Ahmad, N., Waqas, M. and Abrar, M., 2021. "COVID-19 pandemic and construction industry: Impacts, emerging construction safety practices, and proposed crisis management." *Brazilian Journal of Operations & Production Management*, 18(2), pp.1-17.
- Kabiru, J.M. and Yahaya, B.H., 2020. "Can Covid-19 Considered as Force Majeure Event in the Nigeria Construction Industry." *International Journal of Scientific Engineering and Science*, 4(6), pp.34-39.
- Shahsavand P., Marefat A., and Parchamijalal M. 2018. "Causes of delays in construction industry and comparative delay analysis techniques with SCL protocol," *Engineering, Construction and Architectural Management*, 25(4), pp. 497–533.
- Shahsavand P., Marefat A., and Parchamijalal M. 2018. "Causes of delays in construction industry and comparative delay analysis techniques with SCL protocol," *Engineering, Construction and Architectural Management*, 25(4), pp. 497–533.
- Vasilyeva-Lyulina A., Onishi M., and Kobayashi K. 2015. "Delay Analysis Methods for Construction Projects: Mathematical Modelling," *International Journal of Transportation*, 3(1), pp. 27–36.
- Vasilyeva-Lyulina A., Onishi M., and Kobayashi K. 2015. "Delay Analysis Methods for Construction Projects: Mathematical Modelling," *International Journal of Transportation*, 3(1), pp. 27–36.
- WHO.int, 2020."Coronavirus Disease (COVID-19) - events as they happen", [Online]. Available: <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/events-as-they-happen>. [Accessed: 09- May- 2020].

Zhao, L. and Ding, L., 2009. "Project cost control system based on data mining." In *2009 International Forum on Information Technology and Applications*, Vol. 2, pp. 535-538.