

A Systematic Review on Contractual Challenges in Construction Industry During a Pandemic Situation (COVID 19)

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Abstract

This paper aims to develop a systematic review on the contractual challenges faced by the construction industry in a pandemic situation. The construction industry and its stakeholders had never experienced a pandemic such as COVID 19 after the Spanish flu in the 1920s. Hence, many disputes are evolving within the construction industry based on contractual provisions. For the Systematic Literature Review (SLR), the Preferred Reporting Items for Systematic Reviews (PRISMA) statement was used as a formal systematic review guideline. Data were obtained through articles from the year 2020 to 2022. The analysis includes 20 articles filtered using 328 articles from Emerald, Science Direct, and Scopus databases. The study only reviewed the contractual challenges and indicated 15 contractual challenges strongly connected with project cost and time escalation. Disruption in project works, issues in the supply chain, labour shortage and productivity loss, delay payments, and nine others were recognised via Systematic Literature Review as the main contractual challenges the industry encounters during a pandemic. Furthermore, future researchers are encouraged to investigate proper solutions to minimise the destructive impacts of the respective issues to the construction stakeholders.

Key Words

Contractual, Challenges, Pandemic, Construction Industry, COVID

1. Introduction

The construction industry plays a leading role as a fundamental pillar in any country's economy (Famiyeh et al. 2017). According to Mokhtariani et al. (2017), time, cost, and quality represent the main attributes of a construction project, which cannot be accurately determined or evaluated before contracting and ceasing the project. The success of construction projects is one of the frequently discussed subject matter in project management (Thomas and Fernández 2008). This success refers to the project completion within expected time and cost and achieving scope objectives (Ika 2008). Frimpong et al. (2003) stated that project success accomplishes project objectives and goals as planned-it means successful technical performance and performing within budgeted cost and scheduled time.

The construction industry is unique and continuously facing rapid changes (Enshassi et al. 2009). In addition, construction projects involve numerous risks, and management of these risks also comes under project management (Ali and Kamaruzzaman 2012). Memon et al. (2011) stated that due to the nature of the construction industry, it perpetually faces serious problems, including low productivity, low quality, delays, and cost overrun. According to Mills (2001), the construction industry is an excellent example of a more dynamic, risky, and challenging business. Tarawneh (2014) identified that the construction environment is characterised by a high level of competition, complex operations, high-risk conditions, and stressful and knowledgeable clients. Coronavirus/ COVID 19 pandemic is the current serious problem the construction industry faces like other world industries (Bailey et al. 2020).

Due to the continuity of COVID 19, governments and the private sectors of many countries view this pandemic may drastically impacting the economy of any country (Franzese 2020). Therefore, most countries have decided to limit people's movements and encouraged them to adhere to the Work from Home (WFH) concept. However, the inability to accomplish the WFH concept in the construction sector is an issue due to project members' high involvement in onsite activities (Gamil and Alhagar 2020). In this context, several challenges and constraints are directly set upon the construction industry, including project time and cost increment due to disruptions in site works and material supply (Jreidini 2020).

Mansoor et al. (2021) revealed that the project cost and the labour cost are considerably higher after the pandemic situation in construction projects than before the pandemic.

Contractual challenges have arisen when a party or parties seek their entitlement for any damages or specific performance from the other party (Chong and Phuah 2013). The authors have summarised the potential contractual challenges the construction stakeholders face during the pre-contract, construction, and post-construction stages. Contractual challenges during construction phases in general are presented in Figure 1.

<p>Pre Contract Stage</p>	<ul style="list-style-type: none"> • Estimating and pricing • Design information • Insurances • Performance bond submission 	<ul style="list-style-type: none"> • Site possession • Work program • Tender documentation and requirements
<p>Construction Stage</p>	<ul style="list-style-type: none"> • Accessing to site • Compensation/loss and expenses • Default on notice • Delay and extension of time • Discrepancy and inconsistency of information • Fluctuation of price • Interference/problem by subcontractors and suppliers • Interference/problem by professionals • Interim payment • Partial possession • Period of honouring certificates 	<ul style="list-style-type: none"> • Postponement or suspension of work • Practical completion • Quality of workmanship • Set off by the employer • Site and nature of work • Standard and quality of material • Statutory obligations • Supply difficulties • Testing and inspection • Valuation and measurement • Contractual variations • Weather
<p>Post Contract Stage</p>	<ul style="list-style-type: none"> • Defect liability period • Defects • Determination • Dispute resolution • Final account and certificate 	<ul style="list-style-type: none"> • Liquidated damages • Outstanding claim and set off • Retention monies or fund • Unresolved variations

Figure 1: Contractual challenges during construction phases in general
Adapted From : Chong and Phuah (2013)

Kiraz and Ustun (2020) reported that COVID 19 has similar behaviour to outbreaks such as SARS or Ebola. The authors stated that the world had faced a vast baneful situation where none could foresee its impact. The contractual provisions, stakeholders' obligations, and contractual challenges and constraints may differ from the general situation in pandemics like COVID 19 (Andres et al. 2020).

The dispute resolution process has been unpredictable due to the COVID 19 pandemic, and parties have failed to perform their duties successfully with this unexpected phenomenon (Kiraz and Ustun 2020). With the COVID 19 situation, construction stakeholders seek contractual provisions under force majeure events for the crisis and are aware of relevant contractual obligations during a pandemic (Tan 2020).

As per Andres et al. (2020), there are stipulated concerns to be fulfilled when contractual parties deal with the force majeure clause:

- The event must be an unforeseeable situation at the moment of signing the contract
- The unforeseeable event must prevent contractual performance
- The event must be an extraneous cause not attributable to the non-performing party
- A direct causal link must exist between the event and non-compliance
- The event must happen after parties entered the contract

COVID 19 has been a massive threat to the contractual performance in many industries, including the construction sector. Proper contract administration is one of the main challenges the construction stakeholders face along with this crisis (Niraula et al. 2008). If any crisis happens, the responsible parties have significant primary obligations to find appropriate solutions for the situation and to hold it back (Gates 2020). COVID 19 outbreak also reminds the researchers about the need for creative responses to contractual challenges arising with pandemics (Pedamon and Assileva 2021). Hence, it is a current requirement to pay attention to contractual challenges and constraints on the construction industry based on the prevailing situation to find appropriate solutions (Gamil and Alhagar 2020).

The construction organisations have been daunted with COVID 19 due to the uncertainties and less awareness on contractual challenges resolution (Andres et al. 2020). Therefore, this paper aims systematically review contractual challenges and constraints related to the construction industry in a pandemic situation such as the COVID 19 outbreak. The paper is structured as follows: First, a brief introduction and the background of the paper, followed by the research methodology adopted for the study, is presented. Next, details of the SLR and results and findings are provided, and finally, the conclusion is given based on the key findings of the systematic literature review.

2. Research Methodology

2.1 Process of Systematic Literature Review (SLR)

A researcher can review existing literature using several methods such as critical literature review, meta-analysis, and systematic literature review (Grant and Booth 2009). Systematic Literature Review (SLR) was the selected methodology to conduct this research. Biolchini et al. (2005) defined a systematic review as a "specific scientific methodology of research, developed to gather and evaluate the available evidence pertaining to a focused topic". In addition, the systematic review's worth depends on what the researchers have done, what was found, and the comprehensibility of the review (Moher et al. 2009).

A comprehensive SLR can address the current state of the respective topic in the field, the further research priorities, and what questions the researcher should answer in the respective area (Page et al. 2021).

When selecting articles in an SLR, a researcher should focus on the search terms, inclusion and exclusion criteria, and the appropriate keywords when searching articles to review. The keywords considered for the SLR in this research have presented in Table 1.

Table 1: Key words for the SLR

Key Words	Limitations
COVID, Corona, Construction, Contractual Challenges, Contractor	Language: English Time: 2020-2022 Topic: Construction Industry

Subsequently, the reporting guideline for quality review, Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA), was adopted to improve the quality of articles reviewed in the research. According to Selcuk (2019), the PRISMA guideline consists of a four-phased flow diagram and the phases are;

- Phase 1: Identification
- Phase 2: Screening
- Phase 3: Eligibility
- Phase 4: Inclusions.

Within the four stages, eight stages were incorporated to get the maximum outcome from the review and the steps have presented in Table 2.

Table 2: Steps of SLR

Key Words	Limitations
Initial review	How the construction industry affected by the pandemics
Objective	Find the contractual challenges and constraints faced by the construction industry
Criteria for considering studies	Papers that addressed pandemic situations along with the impact of the construction industry
Strategy to obtain the studies	Research articles in three databases (Emerald Insight, Science Direct, Scopus)
Eligibility	Articles from the year 2020 to 2022; peer-reviewed and proceedings
Data collection	Exclusion of repeated articles; read of abstracts, and read of the full article
Quality assessment	Articles analysed by the authors
Synthesise results	Results are presented under suitable topics

Source: Benachio et al. (2020)

2.2 Search Strategy

The three databases selected to conduct SLR were Emerald Insight, Science Direct, and Scopus. When following the SLR steps, 328 articles were initially identified, and 44 articles suitable to answer the research problem were selected. The article search was performed using the search query “Contractual Challenges” AND “Pandemic” AND “COVID” OR “Corona” AND “Construction” AND “Contractor” AND “Issue” OR “Problem” (the Boolean operators “AND” is used to link the two fields, and “OR” is to combine the two fields). Articles from subject areas such as Medicine, Biochemistry, Earth and Planetary Sciences, Environmental Science, Nursing, Immunology and Microbiology, Psychology, Agricultural and Biological Sciences, Neuroscience, and Veterinary were eliminated during the search to get the best results.

One main search criterion was the published year of articles. Only the articles published in the years 2020 and 2021 were considered to incorporate the most novel articles into the review.

According to the *Cochrane Handbook for Systematic Reviews of Interventions* (2019), an SLR should formulate the research question. Therefore, the research boundaries should be properly identified. Accordingly, the search strategy included Journal articles, Conference papers, Book Chapters, and Books in the “construction” field. The articles were limited to the ones that contained the terms “Contractual Challenges” with the “COVID or Corona” in the title, abstract, keywords, or the full text.

2.3 Data Extraction from Data Bases

Keywords are one of the major elements in research studies that help discover information quickly before reviewing the papers (Norouzi et al. 2021). The keywords within this study were analysed using a co-occurrence network using the software called VOS viewer and presented in Figure 2.

The network was created using articles identified through three databases. The frequency of each keyword is presented by nod size, and the relationship among keywords are presented through links. Three colours represent the three clusters.

Cluster 1 consisted of five keywords (COVID 19, Corona Virus, Construction, Force Majeure, and Pandemic), Cluster 2 consisted of three keywords (COVID 19 Pandemic, Supply Chain Management, and Sustainability), and Cluster 3 consisted of three keywords.

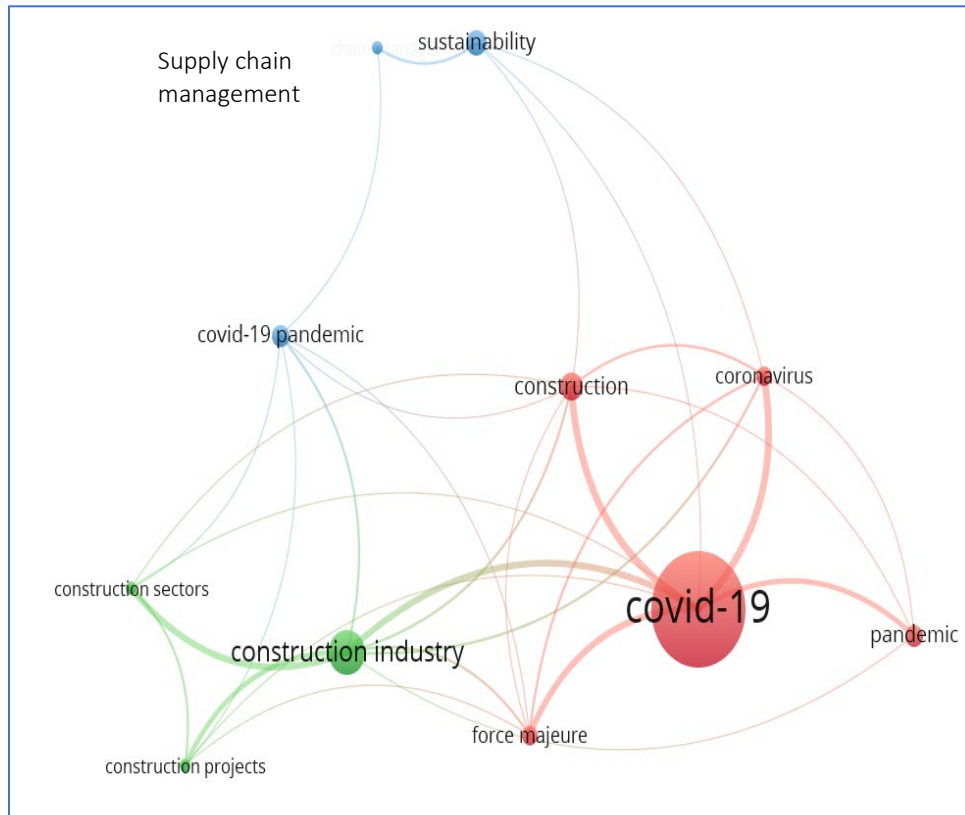


Figure 2: Co-occurrence of authors key words

The flow diagram was used to present the process that adapted to extract data from databases. Figure 3 illustrates the article selected for the SLR through the PRISMA method.

First, the article search was performed using the search query and duplicated articles were removed from the list (328-5-2=321). Simultaneously, articles not relevant to the study were removed. Then the title, keywords, abstract, year, source title and access type, and authors were exported to an excel document. The document screening began by analysing the title, keywords, and abstract. The inputs not relevant to the study were removed from the list directly, while doubtful and important articles were noted for further screening (321-220=101).

As the next step, the filtered articles were assessed through reviewing the full text, and the articles not available to refer to full text and the irrelevant to the study were excluded from the list (101-81=20). Finally, the list of articles was concluded, including the articles with the most significant contents and findings to the study

The selected articles for the review addressed the general challenges faced by the construction industry during a pandemic situation and contractual challenges during a pandemic situation.

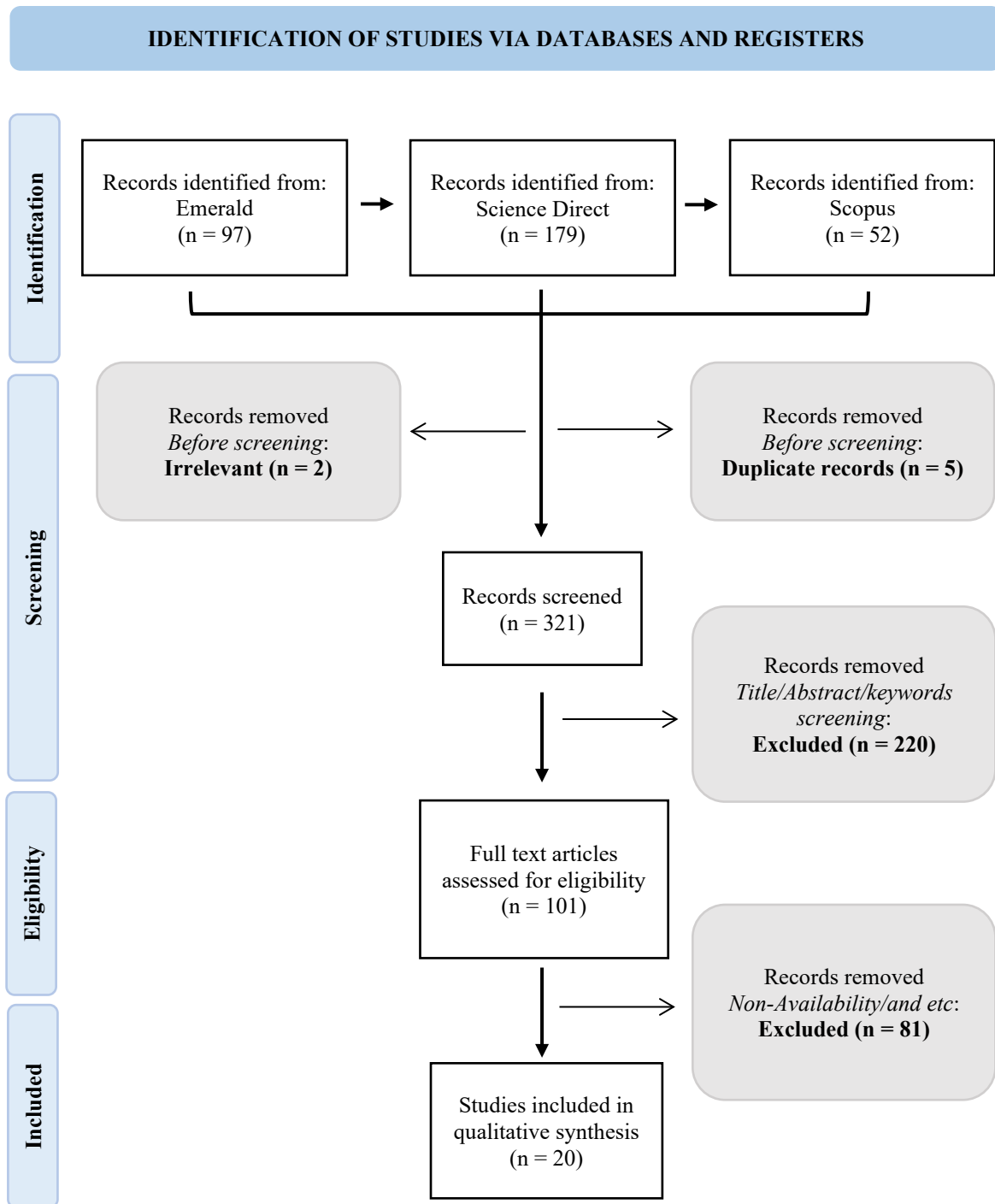


Figure 3: Flow diagram of SLR

2. Results and Discussion

3.1 Contractual Challenges Faced by the Construction Industry due to COVID 19

Twenty articles were chosen after reviewing full articles to synthesise in the paper, from which 15 contractual challenges were identified. Most authors do not directly address the contractual challenges by giving the term 'contractual' but indirectly identify contractual challenges within their studies. Table 3 presents the key findings of the systematic literature review.

Table 3: Contractual challenges due to a pandemic situation in construction industry

Contractual Challenges due to COVID 19 (CCC)	Source of References																				Frequency (F)
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
CCC 1: Escalation of project cost	√	√	√	√	√		√	√	√			√			√		√	√	√	√	14/20
CCC 2: Escalation of project time	√		√		√		√	√	√				√		√		√		√	√	11/20
CCC 3: Disruption in project works	√	√				√	√		√	√	√			√		√		√			10/20
CCC 4: Issues in supply chain	√			√				√		√			√	√	√	√		√	√		10/20
CCC 5: Labour shortage and productivity loss	√		√						√					√	√	√			√	√	8/20
CCC 6: Delay payments	√	√	√								√	√	√		√				√		8/20
CCC 7: Cash flow issues	√											√			√		√		√		5/20
CCC 8: Suspension of work					√				√					√	√						4/20
CCC 9: Project termination					√	√									√						3/20
CCC 10: Uncertainty in new projects execution								√	√					√							3/20
CCC 11: Failure in claim notifications of contractors within the relevant period			√																√		2/20
CCC 12: Cannot secure site efficiency	√																				1/20
CCC 13: Failure in implementing quality monitoring and control processes			√																		1/20
CCC 14: Interpretation of the contract language				√																	1/20
CCC 15: Liquidated damages					√																1/20

1) Amoah et al. (2021); 2) Agyekum et al. (2021); 3) Aladag et al. (2021); 4) Al-Mhdawi et al. (2022); 5) Assaad and El-Adaway (2021); 6) Casady and Baxter (2020); 7) Ebekoziem and Aigbavboa (2021); 8) Ephrem and Appaadorai (2020); 9) Hussain et al. (2021); 10) Israhadi (2020); 11) Januarita and Sumiyati (2021); 12) Mohamed & Elhegazy (2021); 13) Pamidimukkala and Kermanshachi (2021); 14) Pedamon and Assileva (2021); 15) Rehman, Muhammad, Sami et al. (2021); 16) Salami et al. (2021); 17) Sierra (2021); 18) Simpeh et al. (2021); 19) Singh and Leo (2021); 20) Wendy et al. (2021)

Further, the frequency of the contractual challenges stated by the researchers has presented in Figure 4.

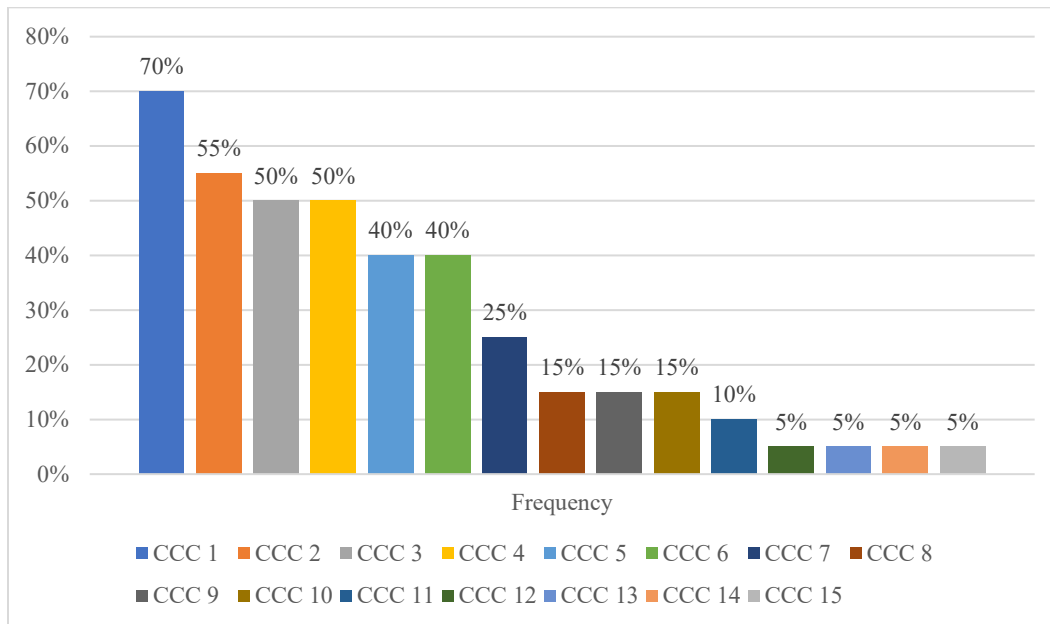


Figure 4: The frequency of contractual challenges mentioned by the researchers

Escalation of the project cost has been identified in 70% of research articles as a contractual challenge with a pandemic. The research articles identified Escalation of project time, Disruption in project works, and Issues in the supply chain as the prominent contractual challenges of the construction industry. Altogether, this study identified 15 contractual challenges.

3. Conclusions

The success of construction projects is a frequently discussed subject matter in project management. This success refers not only to the project completion within expected time and cost but also to the achievement of scope objectives. Coronavirus/ COVID 19 pandemic is a severe current problem facing the construction industry and other industries worldwide.

Construction projects were substantially affected by COVID 19, and it could slow down the construction process and cause delays and disruptions. The contractual provisions, stakeholders' obligations, and contractual challenges and constraints may differ from the general situation in pandemics like COVID 19. Contractual challenges have arisen when a party or parties seek their entitlement for any damages or specific performance from the other party.

Apart from delay and disruption, this SLR identified another 13 contractual challenges related to a pandemic situation in construction projects: Cash flow issues, Delay payments, Cannot secure site efficiency, Escalation of project cost, Issues in the supply chain, Labour shortage and productivity loss, Failure in claim notifications of contractors within the relevant period, Failure in implementing quality monitoring and control processes, Interpretation of the contract language, Suspension of work, Project termination, Liquidated damages, and Uncertainty in new projects execution. Most of the identified contractual challenges are explicitly set upon the project time and cost. Nevertheless, standard forms of construction contracts ordinarily provide provisions for expanding time and compensations for the costs under several sub-clauses. The construction stakeholders seek their entitlements for time extensions and additional costs to survive within the industry by overcoming delays and disruptions due to the current pandemic situation. Besides, it is prudent to address the pandemic's impact at the beginning and end of the crisis to prepare for future potential and learn lessons for future preparations. That should include the strategies to overcome the destructive impact of contractual challenges due to any pandemic.

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