

Assessment of Impact of COVID-19 on Selected Construction Projects of Nepal (Comparative Study)

Ambar Kaji Jonchhen ^a, Mahendra Raj Dhital ^b, Nagendra Bahadur Amatya ^c

^{a, b, c} Pulchowk Campus, Institute of Engineering, Tribhuvan University, Nepal

✉ ^a ambarkaji@gmail.com, ^b mrdhital1@gmail.com, ^c nagendraamatya@gmail.com

Abstract

The World Health Organisation (WHO) reports that Wuhan, China saw the first coronavirus infection outbreak of 2019 COVID-19 in December 2019. The World Health Organisation (WHO) deemed COVID-19 to be a pandemic on March 11, 2020. The government of Nepal imposed a nationwide lockdown for the first wave of the COVID-19 pandemic on March 24, 2020, and it lasted until July 21, 2020. A second lockdown was imposed for the second wave of the pandemic on May 20, 2021, in the Kathmandu Valley and other important locations. It was lifted on July 6, 2021. The purpose of this study was to evaluate how the COVID-19 lockdown affected a few different categories of building projects in Nepal. In order to achieve this, a study of five distinct sector projects was selected, and responsible officials (the project's client, consultant, and contractor) were given questionnaire surveys. The goal of the study was to determine how the COVID-19 lockdown would affect projects' costs and timeliness as well as any contractual claims or problems. The study revealed that the cost and time impact differ with the scale and type of construction projects mainly due to the uncertainty regarding the lack of availability of labors and materials. Similarly, there is significant difference in the response of client, contractor, and consultant. But there is no significant difference between the impact of COVID-19 on different types of projects from the response from different types of projects.

Keywords

Construction Projects, COVID-19, ANOVA Analysis

1. Introduction

Severe Acute Respiratory Coronavirus 2 (SARS-CoV-2) was identified at the close of 2019 in Wuhan, Hubei Province, China. [1]. This new coronavirus is the source of COVID-19, or coronavirus disease 2019 [1], an infectious respiratory illness. Since February, there has been an increase in COVID-19 cases. As of right now, the novel coronavirus has killed 4,020,830 people and infected 186,029,245 others, wreaking havoc on daily life. Up to August 3, 2021, there were 699,649 cases, 9,898 deaths, and 658,122 recovered cases in Nepal [2]. One of the few industries that has continued to some degree while COVID-19's effects are being felt globally is construction. Projects are ready to continue completing contracts because the lockdown in some areas hasn't been fully implemented in order to prevent liquidation damages. But as supply chains are thrown off balance by a lack of materials and subcontractors, and government departments and administrations start to sever ties to save money, production is expected to stop shortly [3].

Approximately 10% of Nepal's GDP is derived from the construction sector. Approximately 35% of the government's total budget and 60% of the nation's development budget are allocated to the construction industry. The construction industry made up 7.2% of the GDP in 2019–20. [4].

All enterprises, factories and building projects in Nepal were compelled to immediately cease operations during the imposed lockdown. [5]. The Nepali government enforced a first-wave lockdown across the country from March 24 to July 21, 2020. The lockdown included travel restrictions, border closures, and the suspension of non-essential services. On

June 11, 2020, the restrictions were lifted. [6]. On April 29, 2021, the second wave lockdown was announced after the daily infection rate surged from more than 300 to approximately 10,000 in less than a month. On July 5, 2021, it was subsequently eased [7].

2. Literature Review

2.1 COVID-19 Introduction

An infectious disease known as coronavirus disease (COVID-19) is brought on by a recently identified coronavirus. Most COVID-19 virus infections result in mild to moderate respiratory symptoms, but most patients recover without the need for special care. Serious illnesses are more common in people over 65 and in people with underlying medical conditions like cancer, diabetes, cardiovascular disease, and chronic respiratory diseases [8].

In response to COVID-19, nations all over the world have put in place a range of public health and social measures, such as movement restrictions, full or partial closures of businesses and schools, quarantine in specific areas, and prohibitions on international travel [8].

2.2 WHO Guidelines

The World Health Organisation (WHO) has released guidelines for workplace public health and social measures in the context of COVID-19, along with an annexe that discusses how to modify public health and social measures in the same context (10 May 2020).

"Countries all over the world have responded to COVID-19 by enacting a variety of public health and social measures, such as movement limitations, the partial or complete closure of businesses and schools, quarantine in particular regions, and restrictions on international travel. Countries will modify or reintroduce these measures in accordance with changes in the disease's local epidemiology. Some nations will start to progressively reopen workplaces in order to sustain economic activity as transmission intensity decreases. This calls for the implementation of preventative measures, such as guidelines and the ability to support and facilitate standard COVID-19 prevention practises, such as physical separation, hand washing, respiratory etiquette, and possibly thermal monitoring, as well as the monitoring of adherence to these practises" [8].

2.3 Construction Scenario in Nepal

Building physical infrastructure now accounts for a sizeable portion of the country's GDP. With the use of contractors, the Nepalese construction sector uses between 10% and 11% of the GDP, 35% of the government budget, and 60% of the country's development budget [9].

With the construction sector accounting for over 70% of gross capital formation, it is widely acknowledged as the backbone of nation-building. This sector grows at a faster rate than the national average and accounts for more than 8% of Nepal's GDP [10].

2.4 Contractual Disputes

Among the many consequences of the shutdown that will exacerbate the industry's issues are supply chain disruption and reverse migration. When the present restrictions are lifted, the industry will face a number of legal challenges as a result of all of these circumstances combined, making it challenging to fulfil the obligations under engineering and construction contracts [11]. Nearly every building contract in the nation currently in effect will be up for negotiation regarding a time extension. Cost-escalation talks are also necessary for the majority of contracts. Claims may give rise to disagreements. The six-month Extension of Time (EOT) has been announced by the government. [12].

2.5 Claims in Contract

Due to the complexity, risk, multiparty involvement, and dynamic nature of the construction industry, it is almost impossible to finish a project without going outside of the original contract. Thus, it is inevitable that there will be changes and claims, particularly in large projects. It is well known that processing construction claims accurately requires a significant amount of human labour and money, as well as time [13]. It is interpreted as an assertion of the entitlement to more funds and longer performance time. [14].

2.6 Results from Previous Studies

The border closure's primary consequences are a decline in output, postponed payments, and higher material costs. Construction companies are fighting the pandemic by

educating their staff about the virus, providing personal protective equipment (PPEs), and conducting frequent and efficient site checks. [15]. The authorities' restrictions caused a number of businesses, including the construction industry, to close, which had an effect on everyone's socioeconomic situation by causing the loss of jobs and essential supplies like food and medicine [16]. Most construction projects took longer to finish because contractors were unable to resume work because of the government's enforced lockdown [17]. They assert that due to worries about contracting the coronavirus, over 30% of construction workers have avoided working at construction sites, and many of them have either returned or intend to return to their hometowns [18]. Social distancing will lead to slower work, but any work is better than none at all. It is incumbent upon all members of the industry to exert every effort towards promoting social distancing on construction sites [15]. The main way that the virus spreads among people is through human interaction. In the construction industry, worker interaction is essential to the success of any project. Regrettably, these relationships might be harmed by the social distancing programme that groups like the WHO and OSHA advise, which would limit the number of employees allowed on the building site. The limitations might affect how employees carry out their tasks and how project managers estimate a project's timeline [19]. Additionally, as construction companies close (some temporarily, others permanently), they might pay particular attention to making sure that the sites have the right security measures in place and that protocols are followed for maintaining vital infrastructure, minimising short-term health and safety risks, and so forth [20]. The pandemic is likely to harm the revenue trajectory of the construction industry because a complete or partial lockdown will affect ongoing overheads and financing charges and have a negative impact on the likelihood of completing projects on schedule [21].

The acute lack of labour and building supplies during total lockdowns essentially put an end to rehabilitation efforts. Workers' apprehensions regarding the spread of Covid-19 also prevented them from taking part in construction projects. Just a small percentage of workers (roughly 16.67%) were from Nepal, while the majority (roughly 31% of data collected) were from India and were transporting cash from Nepal to India [22].

3. Research Method/ Strategy

There are two primary methods of conducting research: qualitative and quantitative approaches. Collecting quantitative data that can be subjected to methodical statistical analysis is necessary for the quantitative approach. This study employed a quantitative methodology. A quantitative/correlation method and a case study were used in this investigation. Five active construction projects were the subject of a case study to determine the COVID-19 lockdown's effects. Data such as project type, contract amount, contract agreement, basic project details, project status regarding planned completion date and budget, etc. were taken into consideration. Most notably, claim documents that the contractor provided because of the COVID-19 lockdown were taken into account for this study. A thorough analysis of

the literature was conducted to identify the variables that would be included in the questionnaire. The variables were then correlated and turned into the questionnaire. Following a quantitative analysis of the questionnaire responses, a ranking was determined. Additionally, using SPSS, a One Way ANOVA test was conducted to test the hypothesis.

3.1 Study Area

The study covers 5 construction projects impacted by COVID-19 based on the different natures of the project each representing different sectors of construction.

1. RCIP (Rural Connectivity Improvement Project) Sindupalchok (Package 7)
2. Itahari Regional Center of Nepal Television
3. Construction of Hotel Mountain Monastery (Lakuri Vanjyang)
4. Construction of different work of Lekhnath II co/financing watersupply and sanitation project
5. Air transport capacity enhancement project (Tribhuvan International Airport)

4. Results and Discussion

4.1 From Questionnaire Survey

43 people completed the questionnaire survey: 20 contractors, 12 consultants, and 11 clients. Separately, the mean score for the client, consultant, and contractor was determined. After calculating a weighted average based on the three parties' mean scores and ranking the results, it was discovered that the project's completion time was prolonged by the unavailability of supplies and materials as well as the extra expense for safety precautions like PPE, sanitizers, masks, vaccinations, etc. This finding was consistent with the findings of a study on the effect of COVID 19 on Oman's construction industry [23].

Similar to this, in the event of contractual disputes and claims pertaining to the COVID-19 lockdown, the lockdown would serve as a pretext for contractors to conceal their mistakes (poor planning and management), and the lockdown is likely to result in a rise in contractual disputes. which was in line with the findings of the investigation into COVID 19's effects on Oman's construction sector [23].

4.2 From Anova Test

For Hypothesis 1

Ho: There is no significant difference between the response of Client, Consultant and Contractor

Ha: There is significant difference between the response of Client, Consultant and Contractor

Table 1: ANOVA Test Summary of Hypothesis 1

ANOVA					
Mean					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1.105	2	0.553	5.432	0.008
Within Groups	4.07	40	0.102		
Total	5.175	42			

Based on Table 1. The F value is 5.432 and the P value, or Sig, value is 0.008, both of which are less than 0.05 (for a 95% confidence level). This indicates that the alternate hypothesis, Ha, is accepted and the null hypothesis, Ho, is rejected. It also suggests that there is a significant difference in the responses from the client, consultant, and contractor, and that the impact on the various parties involved in the construction differs depending on their roles and responsibilities..

For Hypothesis 2

Ho: There is no significant difference between the responses from different types of projects

Ha: There is significant difference between the responses from different types of projects

Table 2: ANOVA Test Summary of Hypothesis 2

ANOVA					
Mean					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	0.128	4	0.032	0.241	0.913
Within Groups	5.047	38	0.133		
Total	5.175	42			

From Table 2 above. As we can see, the alternate hypothesis, Ha, is rejected and the null hypothesis, Ho, is accepted at the 95% confidence level. This suggests that there is no significant difference between the responses from different types of projects. The F value is 0.241 and the P value, or Sig, value is 0.913. Thus, we can conclude that COVID-19 has a similar effect on labor, materials, and other comparable factors across a variety of project types.

5. Conclusion and Recommendation

5.1 Conclusion

The COVID-19 lockdown caused project costs and schedules to increase because of the uncertainty surrounding labor, suppliers, and subcontractors' availability. Increases in labor costs resulted from contractors having to select from a smaller pool as a result of government protocols, PCR testing, and travel restrictions. However, the nature and scale of the project determine the impact on time and cost. The cost of labor and equipment is a major factor in projects like the Rural Connectivity Improvement Project (RCIP) and the Construction of Various Works of Lekhnath II Co/financing Water Supply and Sanitation Project (Water Supply Project); in contrast, the cost of materials at the site and damage to the materials at the site determines the cost of the Mount Monastery of COVID-19. . The Rural Connectivity Improvement Project (RCIP) experienced a maximum time extension due to labor and material shortages, while the Itahari Regional Building and Air Transport Enhancement Project only claimed a time extension because work was completed within an enclosed perimeter and was only interrupted by site infections and material shortages.

In addition, extra expenses were paid for all safety-related projects, including PPE, sanitizers, masks, vaccinations, and compensation for workers who became ill. Additionally, social

distancing and wearing protective gear reduced productivity at work, which added to the expense.

Additionally, the results of the ANOVA test show that the responses from various project types do not significantly differ from one another. We can conclude that COVID-19 has an impact on projects in one way or another, which affects the cost and duration of the projects, even though secondary data indicates that the impact varies depending on the type of project. Thus, all construction projects have an impact on time and cost.

Contractual disputes are probably going to increase as a result of the COVID-19 lockdown. The additional expenses the contractor incurred as a result of the COVID-19 lockdown would not be compensated as the time extension of six months is declared by the government. However, the COVID-19 lockdown would provide contractors with plenty of opportunity to request a delay and cost extension. Furthermore, the contractor would be able to conceal their mistake (poor planning and management) by using the COVID-19 lockdown as an excuse.

Additionally, based on the lessons learned from the previous lockdowns, similar kinds of lockdowns can be appropriately addressed in contracts for future projects, preventing disputes between the parties and ensuring the smooth operation of the projects.

From ANOVA test we get that there is no significant difference between the responses from different type of project as it indicates that there is in any type of projects, contractual disputes and issues are likely to occur due to COVID-19.

5.2 Comparison of Impact of COVID-19

There is impact of COVID-19 on cost and time on all the construction projects. But the scale of impact of COVID-19 on different types of projects is different according to the nature of the project. In case of Cost in Rural Connectivity Improvement Project and Lekhnath water supply project, there is impact on cost due to lack of availability of labours, materials that are to be brought from other countries and the idle equipment cost.

In case of Hotel Mount Monastery additional cost was incurred due to the damage of material at site and the previously done work. In Construction of Itahari Regional Centre and Air Transport Capacity Enhancement Project additional cost was not claimed by the contractor

In case of extension of time the projects in which work was completely stopped during the lockdown and also after the ease of lockdown due to lack of labors and materials the work could not be started like in Rural Connectivity Improvement project and Lekhnath water supply project. And, in Hotel Mount Monastery the work was also halted due to the COVID-19 infection at site.

In Air Transport Capacity Enhancement Project, as some work was done during the lockdown period due to closed premises and no air traffic so less amount of time extension was claimed in that project.

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