

Impact of COVID-19 on the Construction Industry Performance: A Case of Contractors in Kenya

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How to cite this paper: Lagat, D. K., Njuguna, M., Mutanu, M., Mwendu, A., Magak, A., & Nyakondo, S. (2023). Impact of COVID-19 on the Construction Industry Performance: A Case of Contractors in Kenya. *American Journal of Industrial and Business Management*, 13, 735-750.
<https://doi.org/10.4236/ajibm.2023.137040>

Received: June 15, 2023

Accepted: July 14, 2023

Published: July 17, 2023

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Abstract

COVID-19 created an unprecedented crisis for the construction industry in Kenya, with some activities getting halted, postponed, or delayed. This study adopted a cross-sectional survey design employed on a sample of 245 contractors identified through stratified random sampling. An interview schedule was used to collect data; thereafter, exploratory factor analysis was done to identify underlying components that could explain the pattern of correlations between the 23 impacts of COVID-19 identified in the literature. The study noted the highest impact on the supply chain (59.40), followed by finance (52.42) and workforce (39.58), and recommends the institutionalization of detailed business continuity plans in line with these three major factors as a priority to cushion industry players from similar occurrences.

Keywords

COVID-19, Contractors, Supply Chain, Workforce, Finance, Performance, Construction Industry

1. Introduction

In January 2020, the World Health Organization (WHO) declared Coronavirus Disease (COVID-19) a global health emergency, after it spread rapidly, and its source remained in dispute. Within a very short time, the virus swiftly spread to over 195 countries world-over, including virtually all African countries. Consequently, on 11 March 2020, the WHO officially declared COVID-19 a pandemic, signifying, in essence, globally challenging times (Gan & Koh, 2021). In Kenya, the first case of COVID-19 was confirmed on 13 March 2020 from a traveller

who had arrived from London. Since then, Kenya saw a surge in infections among her population. Consequent to this, the government declared and enforced measures to try and stop the spread of the virus. This included a ban on social gatherings, declaration of curfews, restrictions on in-country travel, and encouragement of work-from-home practices while reinforcing other preventive measures. These actions had adverse ripple effects, with some construction companies being forced to send staff on unpaid leave or to lower wages (Tariq, 2021). These unprecedented restrictions generally affected performance in the construction industry eco-system with significant impact on individual construction workers, professionals, construction projects, construction companies, and corporate institutions, creating chain reactions on the different interconnected critical areas such as supply chain, workforce, and finance (Maital & Barzani, 2020). According to PWC (2020), any slowdown across the infrastructure investment value chain due to any of the above scenarios can stall projects, ultimately impact the start dates and end dates, or create potential long-term economic repercussions. Generally, the pandemic disrupted global chains of demand and supply, causing effects such as a fall in revenues, job losses, bankruptcies, indebtedness, and liquidation of some firms, among others. This study, therefore, contextualizes the Kenyan construction industry and the significant impacts COVID-19 had on its performance.

This article is organized into six major parts. The first part gives a general introductory appraisal of the study, connecting the global and local effects of COVID-19. Part two delves into the effects of COVID-19 with a special focus on the workforce, supply chains, and finances. The third part gives an outline of the methods which were applied in the study including the timing of the study with regard to the prevalence of COVID-19, the research questions, sampling, and response rates among others. This then ushers in parts four, five, and six which entail the reporting of findings, discussion of findings, and conclusion of the study respectively. A list of references used in the study is also outlined at the end.

2. Effect Covid-19 Pandemic on the Construction Industry

2.1. Overview

The COVID-19 pandemic persisted worldwide, with its effects having far-reaching implications on commercial, economic, and social activities, including the construction and engineering sectors (Mman, 2021). The global construction market size, for example, is reported to have declined from USD 11, 217 Billion to USD 10,741.2 Billion in 2020, while in Sub-Saharan Africa alone, general GDP shrunk by 1.9% due to about USD 612 Billion in output losses in 2020 (Deloitte, 2021a). In the midst of the COVID-19 crisis, the falling income and growing project delivery challenges led to the sector's contraction, with an equivalent negative impact on the supply chains, cash-flows, and workforces (ILO, 2021). Safety measures that were instituted such as travel restrictions, social distancing,

and quarantines resulted in unparalleled delays, interruptions, rising construction costs, uncertainty on construction projects delivery, and the absence of governmental workers required for project inspections (Robert et al., 2020; Holland & Knight's, 2021). This also led to the closure or suspension of new construction projects and the abandonment of existing ones in an attempt to reduce transmission (Harriet, 2020).

Going by International Labour Organization (ILO) statistics, about 72% of Africa's labour force is employed in informal sectors, making working from home problematic. Even before COVID-19, 76.7% of employment in Sub-Saharan Africa was vulnerable and not secured, with 64% of workers in the construction sector being either self-employed or employed in micro-enterprises with fewer than ten employees (ILO, 2015). These groups, therefore, become the most vulnerable to economic recessions as they often lack access to credit, have few assets, and are the least likely to benefit from fiscal stimulus measures by the government unless targeted. Generally, enterprises of all sizes have been looking for ways to address the impacts of COVID-19 on the performance of their projects, businesses, and employees. Measures that have been largely pursued include the exploitation of contractual provisions and legal principles vindicating liability for non-performance (force majeure), as well as explicit contractual requirements that allow for variation in time and finances.

2.2. Workforce Effects

COVID-19 has had far-reaching effects on the labour market. At face value, the crucial concern was on the health and safety of workers and their families, but the virus and the ensuing economic shocks affected the world of work across three major dimensions. These include 1) the number of jobs (both unemployment and underemployment); 2) the quality of work (e.g. wages and access to social protection); and 3) effects on groups that are more vulnerable to adverse labour market outcomes (ILO, 2020). The referenced ILO projections pointed to a significant rise in unemployment and underemployment in the wake of the virus. These estimates indicated a rise in global unemployment of between 5.3 million and 24.7 million jobs from a base level of 188 million in 2019 (Martín, 2020). PWC (2020) further observes that due to the COVID-19 pandemic, a majority of the skilled labour workforce could not be mobilized to construction sites due to prevalent uncertainty, apprehension, and distress about health and safety, primarily because of how tasks are carried out in construction. Manual processes associated with the construction industry especially in Africa made workers more vulnerable as it increases contact between workers themselves and the materials they handle catalysing the transmission of the virus when compared to other mechanized and automated industries like in the automotive sector (World Economic Forum, 2016). Adhikari & Poudyal (2021) further attributes workforce unavailability to illness and hesitancy associated with fear for potential exposure while on the job, which he argues leads to high absenteeism among labourers. This is further corroborated by a survey conducted by the

China Construction Industry Association that reported a severe impact associated with an acute shortage of labour recorded by 66.04% of the respondents in the report (CCIA, 2020).

According to the Kenya National Bureau of Statistics (KNBS) Survey 2020, the Kenyan construction industry employs 222,000 people (KNBS, 2020). The direct impact of COVID-19 in the sector, just like in other global jurisdictions, has therefore been reducing the labour force as the construction sites adhered to guidelines requiring contractors on-site to reduce the number of workers to those who can keep sufficient distance apart (Karanja, 2020). While specific figures on the construction sector were unavailable at the time of this writing, it is estimated that more than 604 companies had to let go of their employees, resulting in 1.7 million job losses in 2020 across all sectors. These estimates support the observed substantial rise in global unemployment (Deloitte, 2021a). Underemployment also did increase on a large scale, as witnessed in previous crises, and likely translated into significant downward adjustments on wages and working hours (ILO, 2020); and delays in projects (Adhikari & Poudyal, 2021).

2.3. Supply Chain Effects

Global supply chains have always been susceptible to shocks that occur within the major exporting countries. Some of the shocks witnessed in the past include trade wars, pandemics, and political volatility, among others. This susceptibility is primarily because of factors that can hinder the seamless movement of goods and services from these exporting countries to the major import trading partners (Biswas et al., 2021; PwC, 2020). Since the COVID-19 shock was experienced globally rather than locally, it led to disruption mostly in supply chains. First, most industrial units that produce materials were non-operative for some time during the first uncertain days following the outbreak. This reduced or halted most international commercial activities connected to the supply of materials, ultimately leading to major delays in the projects (Husien et al., 2021). These include disruption of materials supply transactions and services for defective equipment at construction sites (ILO, 2021).

Reports from contractors' associations in India, Japan, and the Korean construction industry show that the supply chain in their countries had been highly affected, leading to a scarcity of imported construction materials in most of their local markets (Adam et al., 2020). In the US, nearly 75% of the companies had experienced supply chain interruptions as a result of virus-related transportation restrictions (Queiroz et al., 2020). Mman (2021) generalizes that the imposition of nationwide or region-wide lockdowns or restrictions by governments on travel around the world inhibited the production and movement of goods and the provision of services. Consequently, it was hard and in certain instances impossible for existing and new projects to obtain the required goods, materials, equipment, and workforce.

According to a survey conducted by Rapaccini et al. (2020) on the impact of COVID-19 on manufacturing firms, 24% of respondents experienced high nega-

tive impacts on logistics, while 31% experienced impacts on the continuity of service network. Further, 89% indicated that the impacts were caused by restrictions to travel across countries. According to Tokyo Shoko Research, disruption in the supply chain was the highest COVID-19-related impact on Small and Medium Enterprises (SMEs), accounting for 40% of total respondents. The impact in China was concerning stoppage in the production of construction materials (Japan External Trade Organization (JETRO, 2020)). As a result, construction was delayed due to challenges in obtaining housing materials that could not be transferred to customers.

Klynved Peat Marwick Goerdeler (KMPG) & the Kenya Association of Manufacturers (KAM) survey report (2020) on the impact of Covid-19 on the manufacturing sector in Kenya indicates that in regards to logistics, 76% of the respondents experienced challenges in locally sourcing or shipping in of raw materials, while 77% recorded an increase in the cost of obtaining imported raw materials. This as was in the international cases resulted from government restrictions imposed on the countries where the raw materials were being sourced from and other added challenges such as seeking credit insurance covers from banks, depreciation of the Kenya currency, and a number of suppliers invoking the force majeure clauses in their contracts. Businesses resorted to looking for alternate sources of raw materials to restock, which proved to be more costly (KAM & KMPG, 2020). Exporters were not spared, with 57% strongly agreeing that they faced challenges in exporting with limited cargo capacity and increased cost of air freight. AAK (2020) affirms that indeed there had been stoppages, delays, and/or suspensions of some ongoing construction works. KAM & KMPG (2020) reported that building consumer confidence and developing a supply chain strategy within the confines of the movement restrictions needed to be established to ensure businesses keep moving toward economic recovery.

2.4. Financial Effects

The financial impact of the crisis on construction enterprises has been significant, with many facing liquidity problems. Reduced spending and consumption capacity coupled with the operating restrictions of physical distancing, and fear of infection all contributed to this. As a result of disruptions, SMEs especially in developing countries became unsustainable as many also faced bankruptcy. According to Biswas et al. (2021), construction companies were not making any significant profit due to the suspension of work, leading to losses for both companies and suppliers. Zamani et al. (2021) identified three factors that mainly caused financial problems during COVID-19 in Malaysia as late payment, project cost increase, and reduced number and scope of projects. Late project payments were experienced because payment of claims was delayed due to government restrictions during the movement control order. Changes in foreign exchange rates and increased demand for supplies also saw the cost of materials increase hence escalating the project costs. New projects were also reduced because of the limited award of new tenders and contracts competitiveness in the

face of uncertainty.

In the last two decades, there's no doubt Kenya registered increased construction activity, attributed to increased investor outlay and government huge spending on infrastructure projects, cumulatively leading to a rise in the sector's contribution to GDP from 5.6% growth in 2019 to 11.8% in 2020 (KNBS, 2021). The COVID-19 pandemic, however, saw Kenyan banks' asset quality weaken, as a result of the high Non-Performing Loans (NPL) ratio of 15% by the end of 2020 compared to an NPL ratio of 12% by the end of 2019. However, prudent growth strategies by Treasury and the Central Bank saw client loans grow by 7% in 2020. As part of the recovery strategy, Kenyan banks restructured more than KES 1.1tn loans, which was about 38% of the total industry loan book in 2020, in line with the Central Bank's directive on loan reclassification and restructuring (Deloitte, 2021a). These timely interventions and the rate cap repeal enabled the financial services sector to grow by 5.5%, contributing 4.8% to Kenya's GDP in 2019. However, in the absence of targeted stimulus or relief packages, the effects of COVID-19 may have a long-term impact on the construction industry's performance. It will take time for construction activities to return to pre-COVID-19 levels (ILO, 2021).

2.5. Gap in Literature

The effects of COVID-19 have been reported variously in different jurisdictions. Different authors have contextualized their studies because of the lack of a universal approach to mitigating the effects of this unforeseen pandemic. With regards to impacts on labour, Deloitte (2021b), ILO (2020), Adhikari & Poudyal (2021), and PWC (2020) discuss labour issues very generally, while other authors like CCIA (2020) discuss the same with specific reference to the Chinese construction industry. In terms of effects on the supply chain, Biswas et al. (2021), PwC (2020), Husien et al. (2021), and ILO (2021) discuss it globally, while others like Adam et al. (2020) take a contextual view of India, Japan, and the Korean contractor associations, while Queiroz et al. (2020) look at it from the United States (US) perspective. Similarly, in terms of the financial impacts, authors such as Biswas et al. (2021) and ILO (2021) gives the global dimensions, while other such as Zamani et al. (2021) look at specific jurisdictions, in this case, the Malaysian market. There has been no other comprehensive study carried out on the effects of COVID-19 on the construction industry of Kenya, this article contributes to the ongoing discourse on the impacts of COVID-19 by awakening curiosity on the locally most-felt consequences of the crisis, and can guide on measures towards resilience in case of future pandemics.

3. Methodology

The study aimed to determine the impacts of the COVID-19 pandemic on Kenya's construction industry's performance. A cross-sectional survey design involving looking at data from a population at one specific time was employed to

capture information on the impacts of the pandemic. Data collection was carried out in March 2021, a year after the onset of COVID-19 and when the country was experiencing the third wave of the pandemic. To curb the spread of the virus, the government of Kenya had imposed a countrywide curfew from 10 pm to 4 am and limited movements across the Country. A comprehensive literature review identified 23 factors that inform the impacts of the COVID-19 pandemic on the construction industry's performance. The study was guided by the following research questions: 1) What is the implication of the COVID-19 pandemic on construction projects? 2) What is the implication of the COVID-19 pandemic on the workforce? 3) What is the implication of the COVID-19 pandemic on finance? 4) What is the implication of the COVID-19 pandemic on supply chains? 5) How should the industry handle similar occurrences in the future?

The respondents in this study were contractors who were actively involved in construction activities. The study employed interview schedules containing open-ended questions and multiple-choice questions to capture both quantitative and qualitative information. The impacts were rated on a 0 - 5-point scale, where 0 means not affected, and 5 means extremely affected. Yamane's sample size determination formula was adopted to calculate the total sample size required for this study. Yamane provides a simplified formula for determining the minimum sample size that meets the desired precision as below.

$$n = \frac{N}{1 + N(e)^2}, \quad n = \frac{912}{1 + 912(0.05)^2}, \quad n = 278$$

The minimum sample size that could be used in this study was found to be 278. Therefore, a sample size of 300 was viable and representative of the entire population. Face-to-face data collection was conducted on a sample of 300 respondents that were randomly selected from a pool of 912 contractors. Random selection was used because it was assumed that all the respondents had been impacted by the COVID-19 pandemic and thus had an equal chance of inclusion to participate in the study. The response rate was recorded at 82% after receiving 245 complete interview schedules, which met the threshold of 75% and above, which has been set by many researchers. The preliminary section of the interview schedule collected data on the respondents' background information, while the other parts were designed to consider the aim of the study. Descriptive statistics such as mean, standard deviation, and frequencies were used to interpret the results. Further, factor analysis was performed to understand the underlying factors that explain the correlation pattern among the impacts.

4. Findings

4.1. Respondents' Profile

The demographics showed that 93.47% of the respondents were male, and 6.53% were female. This is a clear indication that the male gender highly dominates the construction industry in Kenya. A majority constituting 24.69%, had 4 to 7 years

of experience in the construction industry, while the minority, 8.64%, had 16 to 19 years of experience (Figure 1).

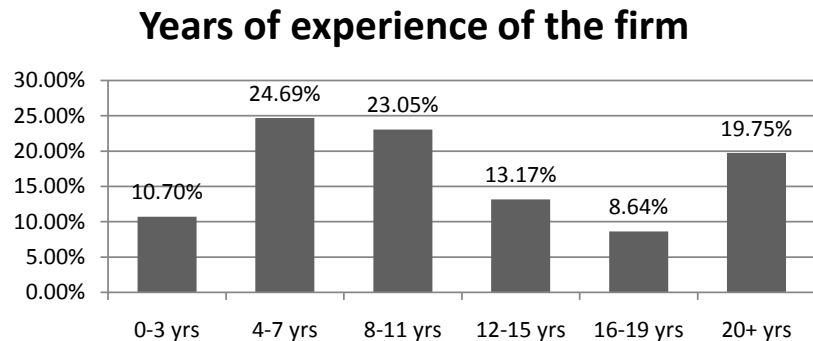


Figure 1. Graph showing the distribution of respondents based on the firm's years of experience. Source: Authors.

4.2. Impacts of COVID-19 on Construction Performance

A review of the literature identified 23 factors that could explain the impacts of COVID-19 on the construction industry's performance. Respondents (Contractors) were invited through an interview schedule to rate them on a scale of 0 - 5, where 0 represented "not affected" while five represented "extremely affected". The information was analyzed, and the mean and standard deviation was presented. As rated by the respondents, the significant impacts felt as a result of the COVID-19 pandemic were the high cost of materials (3.72), disruption in cash flow (3.61), delays in payments (3.60), challenges in accessing credit facilities (3.55), increased project cost (3.53), increased rates of taxation (3.47), disruption of the transport system (3.40), increased foreign exchange rates (3.36) and increased overhead costs (3.35) (Table 1). In essence, factors with mean values of three and above were considered the most felt impacts, while those who recorded mean values of less than three were minor concerns. The standard deviation indicates the displacement of the observations from the mean. The lower the standard deviation, the closer the observation is to the mean; that is, the distribution of the observations is symmetrically around the mean.

4.3. Loss Incurred Due to the Pandemic

The respondents were asked whether or not they had incurred any losses in their financial accounts. From the findings, 77% of the respondents indicated that they had incurred losses in their financial accounts due to the COVID-19 pandemic, while 23% had not incurred any losses. This translated to an average loss of 30.81% incurred by construction contractors due to the COVID-19 pandemic as of March 2021.

4.4. State of Construction Projects during the Pandemic

Information on the proportion of the respondents who had suspended and terminated projects was also recorded. From the findings, 68.1% of the respondents

Table 1. Descriptive statistics showing how the different factors were rated.

Impacts of COVID-19 (scale of measurement = 0 - 5, n = 245)	Mean	Standard deviation
High cost of materials	3.72	1.13
Disruptions in cash flow	3.61	1.28
Delays in payment	3.60	1.27
Challenges in accessing credit facilities	3.55	1.30
Increased project cost	3.53	1.19
Increased rates of taxation	3.47	1.28
Disruption of transport systems	3.40	1.22
Increased exchange rates	3.36	1.29
Increased overhead cost	3.35	1.22
Delays in the acquisition of approval/permits	3.18	1.31
Unavailability of outsourced labour	3.09	1.24
Delays in delivery	3.08	1.21
Shortage of materials	3.07	1.32
Increased time in acquisition/delivery of materials	3.00	1.25
High absenteeism of labour	2.97	1.29
Unavailability of supplies	2.96	1.33
Increased project claims	2.95	1.31
Cancellation of supplies	2.88	1.31
Unavailability of labour	2.79	1.25
Lack of access to equipment	2.69	1.27
Disruption of recruitment processes	2.65	1.38
Labour strikes	2.54	1.3
Interference by the labour union	2.49	1.23

Source: Authors.

had suspended at least one project, while 37.0% had terminated at least one project. It is deduced that, in every 100 contractors, 68 have suspended at least one project, and 37 have terminated at least one project. Generally, an average of 52.0% of projects were ongoing, 32.0% of projects had been suspended, and 16.0% of the projects had been terminated.

4.5. Layoffs as a Result of the Pandemic

The reduced workforce due to layoffs was identified to be one of the impacts of COVID-19 on the performance of the construction sector. To quantify this impact, respondents were asked to indicate the number of laid-off employees. From the findings, 58.37% of the respondents stated that they had laid off at least one employee. This number translated to an average of 36.77% layoffs by contractors

as of March 2021.

4.6. Factor Analysis

Factor analysis was conducted to identify underlying factors that explain the correlation pattern within a set of observed variables, which in this study are the impacts of the COVID-19 pandemic. The value of Cronbach alpha was used to test the reliability of the items extracted from the questionnaires. The alpha statistic for the factor was 0.942, indicating the internal consistency of the factors. To differentiate the correlation between the variables, Bartlett's test for sphericity and Kaiser-Meyer-Olkin (KMO) tests were conducted to inform the study on the applicability of factors analysis. Bartlett's test of sphericity was significant ($p < 0.05$), while the value of the KMO index was 0.933, which is greater than the threshold (0.5) (Table 2). Therefore, the data were suitable for factor analysis.

Factor extraction and factor rotation were conducted. The method of factor extraction employed was a principal component (PCA), while factor rotation was conducted using varimax rotation. From the 23 factors, three components were extracted that can provide meaningful correlation amongst impacts of COVID-19 pandemic and were reliable for factor analysis. Higher factor loadings indicate a higher factor's contribution to the component. All the factor loadings were greater than 0.5, which is considered the threshold by many researchers (Table 3). In essence, factor loadings greater than 0.5 show that the factor can significantly interpret the component.

Rotated factor loadings matrix—factor loadings for COVID-19 impacts

Factor 1 consisted of 9 surrogates: Increase time in acquisition/delivery of materials; Increased overhead cost; Unavailability of supplies; Disruption of transport systems; Shortage of materials; Cancellation of supplies; Lack of access to equipment; Unavailability of labor and Delays in the acquisition of approval/permits. Since these surrogates were impacts related to the issues of supplies, this factor was named supply chain effects.

Factor 2 consisted of 9 surrogates: High cost of materials; increased rates of taxation; increased project cost; Challenges in accessing credit facilities; increased overhead cost; increased project claims; increased exchange rates; Delays in payment, and Disruptions in cash flow. Since these surrogates were impacts related to financial issues, this factor was named financial effects.

Table 2. Test of sphericity and sampling adequacy.

Bartlett Test of sphericity and Kaiser-Meyer-Olkin Test (KMO)		
Kaiser-Meyer-Olkin test		0.933
	Chi-square	3337.576
Bartlett test of sphericity	Degrees of freedom	253
	<i>P</i> -value	0.000

Source: Authors.

Table 3. Factor analysis for impacts of COVID-19 on the performance of the construction industry.

Factor	Name	Impacts of COVID-19	Factor Loadings
Factor 1	Supply Chain Effects	Increased time in acquisition/delivery of materials	0.7231
		Delays in delivery	0.7209
		Unavailability of supplies	0.6976
		Disruption of transport systems	0.6950
		Shortage of materials	0.6941
		Cancellation of supplies	0.6406
		Lack of access to equipment	0.6399
		Unavailability of labour	0.6044
		Delays in the acquisition of approval/permits	0.5160
Factor 2	Financial Effects	High cost of materials	0.6337
		Increased rates of taxation	0.6291
		Increased project cost	0.6153
		Challenges in accessing credit facilities	0.5854
		Increased overhead cost	0.5737
		Increased project claims	0.5466
		Increased exchange rates	0.5444
		Delays in payment	0.5278
Factor 3	Workforce Effects	Disruptions in cash-flow	0.5276
		Labour strikes	0.7145
		Interference by the labour union	0.6963
		Disruption of recruitment processes	0.6939
		Unavailability of outsourced labour	0.5805
		High absenteeism of labour	0.5206

Source: Authors.

Factor 3 consisted of 5 surrogates: Labour strikes; Interference by labour unions; Disruption of recruitment processes; Unavailability of outsourced labour, and High absenteeism of labour. These surrogates were impacts related to labour; hence this factor was named workforce effects.

The three factors were ranked using mean values to ascertain the weight of the impact of COVID-19 on each factor. Supply chain effects had the highest mean value of 59.4. This is an indication that the COVID-19 pandemic had the highest impact on the supply chain of contractors. Financial effects came second with a mean value of 52.42, followed by workforce effects with a mean value of 39.58 (**Table 4**).

Table 4. Mean rank for Factor 1, Factor 2, and Factor 3.

Factor	Name	N	Mean	Std. Deviation	Mean rank
Factor 1	Supply chain effects	245	59.40	17.33	1
Factor 2	Financial effects	245	52.42	17.58	2
Factor 3	Workforce effects	245	39.58	18.70	3

Source: Authors.

5. Discussion of Findings

The impacts of COVID-19 on the construction industry's performance were assessed through supply chain effects, financial effects, workforce effects, and construction project implications. The effects of COVID-19 were analyzed to demonstrate the effectiveness of the paper's discussions.

5.1. Supply Chain Effects

COVID-19 had the highest impact on the supply chain of the construction industry with a mean value of 59.4 compared to finance (52.42) and workforce (39.58). The finding is in line with a study done by the Japan External Trade Organization on the impacts of COVID-19 on the supply chain where disruption in the supply chain was the highest impact as reported by 40% of the respondents due to stoppage in production of construction materials in China (Japan External Trade Organization (JETRO, 2020)). From the study's findings, the most contributing impact on the supply chain is the disruption in the transport system which led to delays in the delivery of materials. At least 75% of companies globally were noted to have experienced disruption in the supply chain due to transportation restrictions (Queiroz et al., 2020). This finding is also in line with a study conducted by Rapaccini et al. (2020) on the impacts of COVID-19 on service operations, which reports that 24% of the respondents experienced high or very high negative impacts on logistics, 89% indicated that restrictions to travel across regions was the primary cause of those impacts (Rapaccini et al., 2020).

5.2. Financial Effects

The high cost of materials is the highest felt financial impact of covid-19 with a mean value of 3.72. This finding is in line with a report by the EIC Federation (2021), which revealed that contractors are faced with higher costs caused by shortages of construction materials, which leads to higher prices of materials.

This study also reported that contractors had recorded a financial loss of 30.81% in their financial accounts. Companies and suppliers in the construction sector made losses due to work stoppages and shutdown in the supply chain (Biswas et al., 2021). This directly impacts the sector's growth, which affects the country's economy. According to the AAK (2020) survey, there was potential for permanent impairment of a large section of the construction industry as 37.93%

of the respondents estimated that they stood to lose up to 50% of their monthly revenues.

5.3. Workforce Effects

The unavailability of outsourced labour was; the highest impact felt by the contractors due to the increased demand for skills during the pandemic. COVID-19 significantly impacted the outsourcing companies, which act as a helping hand for many businesses. This is in line with the findings of [KAM & KMPG \(2020\)](#), which showed that the restrictions brought about by the pandemic have resulted in a reduction of businesses, which in turn leads to the shutting down of many outsourcing companies. The study's finding is also supported by a survey conducted by the China construction industry association, which shows that the significant impact of COVID-19 on construction projects is the shortage of labour as reported by 66.04% of the respondents surveyed ([CCIA, 2020](#)).

Based on KNBS annual report 2020, the construction industry employed almost 222,000 people ([KNBS, 2020](#)). As per the present study, the percentage of layoffs in the construction sector is 36.77%. This implies that labour turnover has reduced by almost 37% and contributed to an increased unemployment rate. In essence, the direct pandemic impact in the construction sector has been the immediate reduction in the labour force as construction sites adhere to guidelines requiring contractors on-site to reduce the number of workers to a level that can allow workers to keep at least a meter apart ([Karanja, 2020](#)).

5.4. Impacts on Construction Projects

An average of 32% of the projects had been suspended, and 16% had been terminated as per the study findings. There was a notable delay in the commencement of new projects, and many ongoing construction sites had been suspended to reduce the transmission of COVID-19 ([Harriet, 2020](#)). According to the AAK survey on the impacts of COVID-19 on the built environment, 58.91% of the respondents expected a suspension of their ongoing projects due to the constraint of movement and supply shortage ([AAK, 2020](#)).

6. Conclusion

This study contributes to the ongoing discourse on the impacts of COVID-19 on the construction industry by awakening curiosity on the most felt consequences of the crisis. The findings reveal that the supply chain, finance, and workforce have been hit by the pandemic significantly in different ways. Under the supply chain, the following are highly impacting factors: disruption of the transport system, delays in the acquisition of approvals/permits, delays in delivery, shortage of materials, and increased time in the acquisition/delivery of materials. The following are highly impacting factors under finance: the high cost of materials, disruption in cash flow, delays in payment, challenges in accessing credit facilities, increased project cost, increased rate of taxation, increased exchange rates,

and increased overhead cost. The most impacting factors under the workforce are the unavailability of outsourced labour and the high labour absenteeism.

Furthermore, the construction industry has also been highly impacted by project suspensions (32%) and project termination (16%), the layoff of workers (36.77%), and an average financial loss of 30.81% incurred by contractors. These impacts are irrefutably dangerous to maintain in the progress of the construction projects. The findings of this paper should serve as a practical and significant guide for the construction industry stakeholders and policymakers to realize the impacts of unforeseen pandemics on the construction industry and, more specifically, plan for continuity through the institution of the necessary safeguards especially with regard to planning supply chain, finance and workforce. This will help enhance coping strategies towards unexpected circumstances in the construction industry. Future studies should explore additional topics and conduct inferential statistical analysis to enrich the explanations and scope of this research.

Conflicts of Interest

The authors declare no potential conflict of interest concerning the research, authorship, and publication of this article.

Funding

The authors received financial support for this article's research, authorship, and publication from the National Construction Authority (NCA).

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