



© Universiti Tun Hussein Onn Malaysia Publisher's Office

IJSCET<http://publisher.uthm.edu.my/ojs/index.php/ijscet>

ISSN : 2180-3242 e-ISSN : 2600-7959

International
Journal of
Sustainable
Construction
Engineering and
Technology

The Relationship between Movement Control Order Impact Factors and Construction Project Performance

Er Hui Xing¹, Radzi Ismail^{1*}, Muhammad Fikri Hasmori², Wang Dan³

¹School of Housing, Building and Planning,
Universiti Sains Malaysia, 11800 USM, Pulau Pinang, MALAYSIA

²Department of Civil Engineering, Faculty of Civil Engineering and Built Environment,
Universiti Tun Hussein Onn Malaysia, 86400, Parit Raja, Batu Pahat, Johor, MALAYSIA

³Guangzhou Vocational University of Science and Technology
1038 Guang Cong Jiu Road, Baiyun District, Guangzhou City, Guangdong Province, CHINA

*Corresponding Author

DOI: <https://doi.org/10.30880/ijscet.2023.14.02.006>

Received 24 March 2022; Accepted 07 February 2023; Available online 08 May 2023

Abstract: The Malaysian government's pursuit of the Movement Control Order (MCO) had a severe impact on the performance of the construction project, which was hampered as a result of their actions. It becomes even more difficult when the region around construction projects is defined as a "red zone". This situation affects the performance of construction projects, which is related to project delays, increase in construction costs, waste of construction materials, labourers who have not received any salary, lack of labour, and etc. This paper attempts to investigate the relationship between MCO impact factors and the performance of construction projects in Malaysia. The quantitative technique was applied in this study. The contractors registered under the Construction Development Board (CIDB) in the state of Selangor were chosen as the respondents. In total, 100 respondents participated and gave full support for this study. This relationship was investigated using a correlation analysis technique. The highest impact is the construction cost. The construction costs increased due to the increase in the prices of construction materials and machinery, lack of labours, and additional expenses for COVID-19 precautions. The findings found that the larger the negative impact of MCO's actions during the COVID-19 outbreak on time, cost, and resources, the worse the performance of Malaysian projects will be in general. These factors should be considered by the government before a decision is made. For future research, it is suggested to look at how the regulation can assist the construction stakeholders to ensure the MCO does not have a big impact on the construction projects.

Keywords: Movement control order, impact factors, construction project performance

1. Introduction

Before it seems to be too late, the Movement Control Order is the last indicator the government could use to mitigate the effects of a disaster on the country. Following the outbreak of Coronavirus Disease (COVID-19), the Malaysian government began implementing the Movement Control Order (MCO) on March 18, 2020, as part of its ongoing response. The MCO period was extended three times, each for two weeks, in order to bring the COVID-19 infectivity rate down to a manageable level. A new order, the Conditional Movement Control Order (CMCO), was

implemented to replace the MCO on May 13, 2020, and ended on June 9, 2020. It is followed by Recovery Movement Control Order (RMCO) that will last until the end of August 2020 (MDBC, 2020).

Whatever the action taken by the government, the main is objective to secure the country. According to (Gamil, Y., & Alhagar, A., 2020), many countries have started implementing measures to limit people’s movement, which could primarily obstruct the construction industry because this industry’s main activity requires on-site work. The decrease in the number of construction projects may lead to an increase in unemployment in the country. Nonetheless, the industry continues to face a skilled labor shortage (Al Amri, T., & Marey-Perez, M., 2020). The construction projects were difficult to execute due to a lack of labor on-site, and it affected the project performance.

In the wake of the epidemic, the construction industry has been viewed as one of the most affected businesses (Ebekozien, A., & Aigbavboa, C., 2021). During MCO, the construction industry is prohibited from operating, according to a statement approved by the National Security Council (NSC). Some key construction and construction-released industries were allowed to function throughout the MCO period, but only if they complied with the guidelines established by the Ministry of Works and Construction Industry Development Board (CIDB). Ministry of International Trade and Industry (MITI) later announced an update to this rule. According to (Idris, M., & Oruonye, E., 2020), the guidelines stipulate that no more than half of the total number of workers must be employed beyond the minimum threshold. These conditions affected the performance of the construction project due to a shortage labor on-site.

When the area surrounding the construction projects is classified as a “red zone”, the situation becomes quite more difficult. According to Elengoe, A., 2020), the government declares “red zones” in districts with the highest cumulative number of positive cases. Although Malaysia’s cumulative positivity rate has dropped below 1%, which is 0.1 percent in August among Southeast Asian countries, the capital Kuala Lumpur and the Selangor district still account for more than half of Malaysia’s COVID-19 cases at the time (Soni, V. D., 2020). Nonetheless, Malaysia has experienced a second wave of COVID-19 outbreaks beginning in September 2020, following the Sabah election. This has resulted in a significant increase in daily new cases over the last two months. As a result, Kuala Lumpur and Selangor remain the most concerning regions after Sabah. As mentioned by (Ebekozien, A., & Aigbavboa, C., 2021) the COVID-19 crisis has had a significant negative impact on all industries, including the construction industry, bringing it to a halt and forcing the closure of construction sites all over the world.

The performance of the construction project was negatively affected because of the action taken by the Malaysian government to pursue the MCO. The aim of this study was to determine how these factors influence the performance of construction projects. This article attempts to examine the relationship between Movement Control Order impact factors and the performance of Malaysian construction projects.

2. The Impact of Movement Control Orders During the COVID-19 Outbreak

The government’s premature implementation of MCO threatens the entire economy. There is a direct influence on industries such as construction, retail, manufacturing, and other sectors. As mentioned by (Murugiah, S., 2020) most of the employees had been laid off immediately. As stated by (Cheng, C., 2020), small and medium-sized enterprises (SMEs) may be required to close because they do not fall under category of essential business, which could lead to the loss of numerous jobs and perhaps individual bankruptcy. When launching a massive action, the government must be extremely cautious to reduce the impact on the country.

The government’s decision to implement the MCO has an impact on the Malaysian construction industry. This action was taken as the number of COVID-19 cases continues to rise. Employees suffered as a result of construction companies’ lack of proper planning. During that time, they have no other source of income and rely solely on the government and their employer. According to the (Construction Industry Development Board (CIDB), 2021), the total number of Malaysian construction projects increased from 8,730 in 2018 to 10, 505 in 2019, but then dropped significantly to 5, 373 in midyear 2021, whereas the total value of projects decreased by 66.03 percent from RM 141.11 billion in 2018 to RM 47.93 billion in midyear 2021. This is clearly demonstrated by table 1 and figure 1 below.

Table 1 - Total number and value of Malaysia construction projects

Year	No. of Projects	Value of Projects
2018	8,730	RM 141.11 billion
2019	10,505	RM 112.08 billion
2020	9,883	RM 85.55 billion
2021	5,373	RM 47.93 billion

Source: (Construction Industry Development Board (CIDB), 2021)

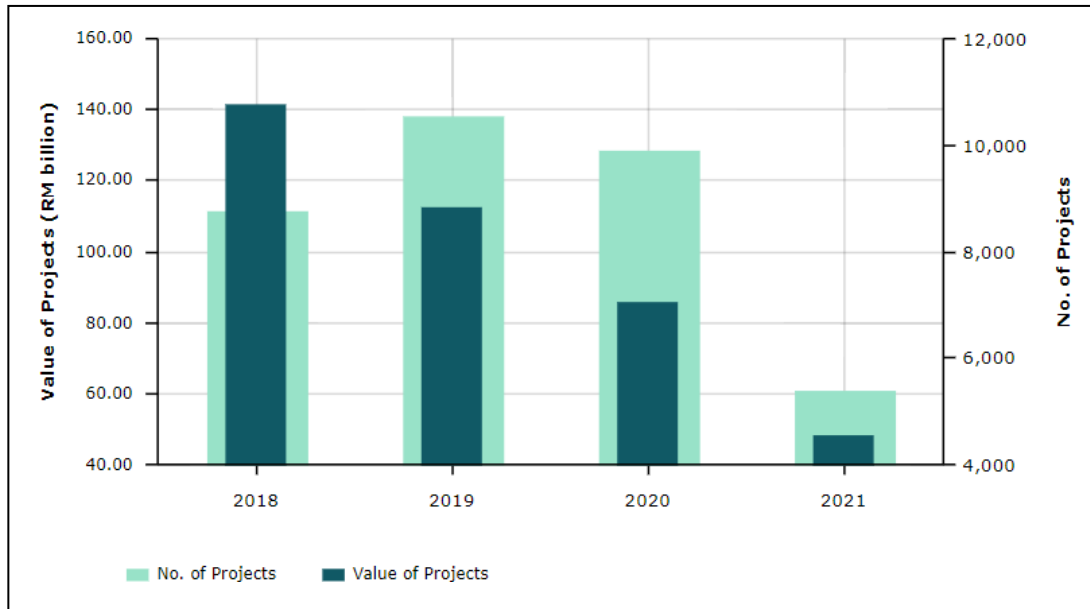


Fig. 1 - Total number and value of Malaysia construction projects
 Source: (Construction Industry Development Board (CIDB), 2021)

As announced by the National Security Commission (NSC), all construction activities are prohibited from operating since they are considered non-essential services. However, MITI later issued an ordinance allowing certain crucial construction and construction-related industries to continue operating during the MCO. These sectors include slope maintenance, work to ensure the safety of scaffolding, tower cranes, and chain cranes, as well as traffic management control. As mentioned by (Idris, M., & Oruonye, E., 2020) adhere to the Ministry of Works and CIDB requirements as the manpower is limited to no more than 50% of the required manpower. This order stops construction from going on normally and has a negative effect on the project's performance. construction projects can be directly or indirectly harmed by the MCO's negative effect on time, cost, and resources, which can slow down work and cost money.

2.1 Time - Related Impacts

The contract between the client and the principal contractor includes a time clause, and the principal contractor is responsible for completing the construction within the time frame agreed upon to avoid Liquidated Ascertained Damage (LAD). This project delay was also evident in the Malaysian construction industry, where all construction activities have been instructed to cease operation during the MCO period, except for specified important construction work that can still be carried out. Standard Operating Procedures (SOP) for the construction sector in the region must be followed by all activities and operations that take place in the region and are governed by the MCO. As far as the timing is concerned, the employer must adhere to the operating hours regulations established by the local government, as the operating restrictions are in accordance with normal working hours (Ministry of Works, 2021). As such, the operating hours for construction sites begin at 7.00 am and end at 10.00 pm, and the area covered by an Enhanced Movement Control Order (EMCO) is not permitted to be used for construction purposes (Ministry of Local Government and Housing Sarawak (MLGH), 2020).

When a disaster hits, schedule overruns are among the most prevalent issues that construction companies must deal with. Natural disasters or technological failures contributed to the unpredictability of the calamity that occurred. As a result, if there is no contingency plan, a variety of unanticipated scenarios may arise and delay the progress of the construction project, thus increasing project expenses (Pamidimukkala, A. et al., 2020). Time overruns on a construction project might lead to time and expense overruns, as well as revenue losses and contract conflicts, among other things (Mukuka, M. et al., 2015). According to (Gamil, Y., & Alhagar, A., 2020), one of the outcomes of the COVID-19 epidemic was a time overrun connected to the movement and measurement control period, as well as other factors. It will take more time to fight the pandemic to finish the work, even though it will take longer to complete the project as it is currently planned.

Because of these delays, the owner's handover of the project will be delayed. Several obstacles, including the discontinuation of operations by manufacturers as well as the provider's inability to cross the state or region, contributed to the delay in handing over the project to the client, which has been discovered throughout MCO. As a

result, the contractor is forced to reschedule the project's schedule and restructure the work breakdown to fulfil the needs of the clients within a restricted budget and a short time frame (Esa, M. B. et al., 2020). According to (Majumder, S., & Biswas, D., 2021) due to supply chain problems, financial constraints, and cash flow problems, many major construction projects had to be rescheduled or extended. The time-related impacts led the construction project performance to fail from the start.

2.2 Cost-Related Impacts

Delays in construction projects have a wide range of ramifications for all parties involved. However, on the other hand, the client lost money because the structure was not used as scheduled. Furthermore, if the money is obtained from a bank, the lender will then have to deal with the issue of interest rate increases on non-performing assets. According to (Ojoko, E. O. et al., 2016), if the project's duration increases, the contractor will be responsible for paying the penalty associated with the use of idle labour and equipment. As (Laing, T., 2020) points out, the COVID-19 virus had a negative effect on construction sector investment, stakeholder gains or losses, wage payments to employees, and government tax payments.

Aside from cost overruns, the SOP emphasises two additional criteria that increase project expenses. As mentioned by (Esa, M. B. et al., 2020) the first obligation was to supply all personnel with masks and hand sanitizers and to keep the premises and workspaces clean. After that, the transport vehicles must be washed and sanitised after each use and inspected. However, enforcing these restrictions on construction sites will increase expenses and complicate operations (Ezeokoli, F. O. et al., 2020). Precaution on site will raise costs for the contractors, and these costs are not included in the contract.

According to (Esa, M. B. et al., 2020), the COVID-19 test is similarly expensive, costing between RM150 and RM300 per individual. It will cost the contractor tens of thousands of Malaysian Ringgit if they require more than ten employees. Even though the COVID-19 pandemic was foreseen, neither the severity nor how much the contractor's finances were affected by it were thought to be possible. Because of the lockdown, contractors and developers will need to find creative ways to get their employees to work. In addition, skilled workers may demand greater wages, resulting in a rise in the cost of labour.

2.3 Resources-Related Impacts

According to (Esa, M. B. et al., 2020), resources are limited during the MCO phase in terms of personnel, material resources, and machinery, all of which are interconnected. A lot of labour is required by the construction industry, which is unusual in comparison to other businesses (Othman, I. et al., 2012). This means that both direct and indirect construction employees are involved. According to (Halpin, D. W. et al., 2017) one of the most difficult things to predict in construction is the availability of skilled workers. The lack of resources in construction project will affect their performance.

The entire project has been impacted by the COVID-19 pandemic because of a few factors, including a decrease in on-site workers and the closure of vendors due to lockdowns (Jones, W. et al., 2020). Some jobs will take longer than normal since the personnel must maintain a social distance. When the number of workers on the construction site is low, a second shift should be implemented to speed up the process. In addition, additional duties should be changed or performed in a different manner, and a site should use off-site manufacturing to eliminate the need for an employee approach, even if this increases the direct expenses of the operation.

COVID-19 has a global impact, disrupting global supply chains and most international business activity related to the supply of building materials, leading to severe project delays. For example, the Pacific Contractors Association, which includes the construction associations of India, Japan, and Korea, claims that COVID-19 has had an impact on their supply chain that most local markets are experiencing severe shortages of imported building materials. A similar situation occurred when China or India stopped importing into the Maldivian market (Husien, I. A. et al., 2021).

3. Construction Project Performance

The performance of the construction project is dependent on the contractor's ability to complete the project within the time, budget, and quality specifications specified in the contract. According to (Sezer, A. A., 2016), project performance should be monitored to benchmark, reward, and monitor if a company's strategy is effectively implemented at all levels of the organization. In ex post evaluation, project performance indicators are used to evaluate expected and actual performance. These indicators are created as relative measurements to compare planned and actual performance. The performance of on-going projects may be assessed by comparing them to typical industry statistics at various phases of the project lifecycle (Yun, S. et al., 2016). The parameters of the project were frequently cited as the most important criteria in effective project management, and they were also frequently cited as the most significant indicators of poor project performance measurement. However, the issue of poor construction project performance is one that affects clients across the world (Mahamid, I., 2016). The construction project's performance depends on how the contractors monitor and manage their projects without major issues on the site and the changes in government policy to execute the project.

Project performance will be at its best if the work is done smoothly and on time, and the budget and time frame are met. Changing a project requirement because of a change order has a negative effect on how well it works (Ismail, A. et al., 2012). Changes or modifications to the design, quality, or scope of work can be made only if there is an agreement on how much work will be done and how it will be done. The complicated process of the construction industry was prone to changes that couldn't be stopped (Hanif, H. et al., 2016). Variation Order (VO) will eventually cause project completion to be pushed back (Arain, F. M. et al., 2004). The cost of building has gone up because of price changes and changes in the prices of different building components, such as cement, labour, and other materials (Hanif, H. et al., 2016). The changes that were made during the construction process will affect everything, such as technical aspects, budget, time, quality, and relationships between stakeholders.

4. Methodology

For data collection and analysis, this study employed a quantitative approach. The local contractors in Selangor who registered with CIDB Malaysia were the study's target demographic, as their registration certificates and licenses had to be valid at the time of data collection. According to CIDB, Selangor has the highest number of contractors among the 13 states and three federal territories until May 2021, with 21, 223 contractors registered with CIDB, which may provide a huge quantity of data for researchers to gather. Furthermore, Selangor was the state worst hit by the COVID-19 epidemic. Selangor has the largest number of verified COVID-19 instances through May 31st, 2021, with 186, 926 cases, or 32.66 percent of Malaysia's overall number of confirmed COVID-19 cases, 572, 357 cases. These have a significant impact on the pace of construction projects in Selangor. The sample size for this study was 331 respondents, and a total of 100 respondents returned their questionnaire.

5. Results and Discussion

Table 2 shows that, out of a total of 100 respondents, 42 contractors stated that their organisations had been in operation for 21 years or more, which is 42 percent of the respondents. Meanwhile, 10 contractors stated that their organisations had been in operation for less than 5 years, which is 10 percent of the respondents. This shows that over half of those who answered the survey had a great deal of experience in the construction industry.

Table 2 - Period of the organization operate

Period of The Organization Operate	Frequency (Contractor)	Percent
Less than 5 years	10	10 %
6 - 10 years	19	19 %
11 - 15 years	13	13 %
16 - 20 years	16	16 %
21 years and above	42	42 %
Total	100	100 %

As shown in table 3, 35 percent of respondents, or 35 contractors out of 100, had a bigger organisation because they had a high number of workers (61 or more), whereas 20 percent of respondents, or 20 contractors out of 100, had a smaller organisation because they had a small number of workers (1 to 20 employees). There were 31 and 14 contractors at that time, and they hired 21-40 and 41-60 workers, for a total of 31 and 14 percent of contractors.

Table 3 - Size of organization

Number of Employee	Frequency (Contractor)	Percent
1 - 20 employees	20	20 %
21 - 40 employees	31	31 %
41 - 60 employees	14	14 %
61 employees and above	35	35 %
Total	100	100 %

The Pearson Correlation Coefficient between impact factors and construction project performance was shown in table 4. The Pearson Correlation Coefficient between the COVID-19 pandemic's time impact and the performance of

construction projects was the lowest, at 0.552, demonstrating a statistically significant positive correlation between these two variables. These findings were supported by (Gamil, Y., & Alhagar, A., 2020) study, which found that the COVID-19 pandemic will affect project schedules and cause the time overruns or delays.

There was a strong connection between the COVID-19 pandemic’s impact on resources and how well construction project went, which was shown by a Pearson Correlation Coefficient of 0.597. This finding was support by (Husien, I. A. et al., 2021) study, which found that without the construction materials in the market, there was no progress on site and the construction project performance was affected. The construction project depends on the supply chain of resource. Some of the resources are not available in Malaysian, and the contractor needs to order them from another country. During the MCO, the contractor can’t order the material, and the progress of the construction project becomes slow and sometimes needs to stop due to that issue.

A strong positive relationship exists between the cost impact of the COVID-19 pandemic and construction project performance, as indicated by the Pearson Correlation Coefficient of 0.668. This is consistent with prior research, which has shown that the COVID-19 pandemic has resulted in a variety of unanticipated and extra expenses. Because of the difficulties in getting raw materials during the MCO era, the contractors were forced to shoulder the high material prices and inflation that resulted from this study. Consequently, the construction work may be continued if it is unable to be finished within the specified timeline, which will cause the project’s completion date to be delayed. The decrease in the labour force, delays in material delivery, and disruption of the supply chain all provide significant challenges for project managers and construction businesses when calculating the resource requirements for a project.

Table 4 - Pearson correlation between impact factors and construction project performance

		Construction Project Performance
Time-Related Impact	Pearson Correlation	.552**
	Sig. (2-tailed)	.000
	N	100
Cost-Related Impact	Pearson Correlation	.668**
	Sig. (2-tailed)	.000
	N	100
Resource-Related Impact	Pearson Correlation	.597**
	Sig. (2-tailed)	.000
	N	100

The results of this research agreed with the suggestion in the literature review that the impacts in terms of time, cost, and resources of the COVID-19 pandemic had been statistically significant to Malaysian construction project performance. The analysis results show that the direction of the relationship between the impacts in terms of time, cost, and resources of the COVID-19 pandemic and Malaysian construction project performance was positively correlated, which means that these variables move in the same direction. The greater the negative impacts in terms of time, cost, and resources of the COVID-19 pandemic, the poorer the Malaysian construction project performance. Overall, the strength of the correlation was strong ($0.40 < r < 0.69$). These findings were in line with the findings (Esa, M. B. et al., 2020), which found that one of the lockdown alternatives due to the COVID-19 pandemic, MCO, had a lot of negative effects on the project’s performance. MCO will also had an impact on the factors that made a project a success, like how long it takes, how much it costs, and how many resources are available.

6. Conclusion

The MCO has wide-ranging implications for the construction sector, including cost, time, and resources. This study focuses more on the implications for contractors in handling construction projects. According to the findings of the study, the MCO has significant impact on the construction performance. The cost-related impact has emerged as the most important influencing factor on construction performance. Whenever the construction costs increase, it becomes difficult for the main contractor to meet the obligations that are stated in the contract. Negotiation between the main contractor and client, which considers a win-win situation, will assist in the completion of construction projects. The government plays an important role in handling this problem because it occurs after they make their decision to implement the MCO. The government should have a backup plan to control the damage. The results show cost-related impact, resource-related impact, and time-related impact significantly influence the construction project performance.

These related impacts need to be considered when the government wants to make a big decision such as the MCO. By considering these factors, it will reduce the impact on the construction project's performance and save the construction players. Without proper planning by the government, there will be a big impact on the construction industry. After the MCO, the government needs to move quickly to help the construction players survive.

Acknowledgement

Acknowledgement to "Ministry of Higher Education Malaysia for Fundamental Research Grant Scheme with Project Code: FRGS/1/2018/TK10/USM/03/3".

References

- Al Amri, T., & Marey-Perez, M. (2020). Impact of covid-19 on Oman's construction industry. *Technium Soc. Sci. J.*, 9, 661.
- Araim, F. M., Assaf, S., & Pheng, L. S. (2004). Causes of discrepancies between design and construction. *Architectural Science Review*, 47(3), 237-249.
- Cheng, C. (2020). *COVID-19 in Malaysia: Economic impacts & fiscal responses*. Institute of Strategic and International Studies.
- Construction Industry Development Board (CIDB) (2021) *Key Indicators of Construction Projects and Contractors*. Retrieved May 20, 2021, from <https://convince.cidb.gov.my/> (Accessed: 22 July 2021).
- Ebekozien, A., & Aigbavboa, C. (2021). COVID-19 recovery for the Nigerian construction sites: The role of the fourth industrial revolution technologies. *Sustainable Cities and Society*, 69, 102803.
- Ebekozien, A., Aigbavboa, C., & Aigbedion, M. (2021). Construction industry post-COVID-19 recovery: Stakeholders perspective on achieving sustainable development goals. *International Journal of Construction Management*, 1-11.
- Elangoe, A. (2020). COVID-19 outbreak in Malaysia. *Osong public health and research perspectives*, 11(3), 93.
- Esa, M. B., Ibrahim, F. S. B., & Kamal, E. B. M. (2020). Covid-19 pandemic lockdown: The consequences towards project success in Malaysian construction industry. *City*, 25, 2.
- Ezeokoli, F. O., Okongwu, M. I., & Fadumo, D. O. (2020). Adaptability of COVID-19 safety guidelines in building construction sites in Anambra State, Nigeria. *Arch. Curr. Res. Int.*, 20(4), 69-77.
- Gamil, Y., & 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), 122-122.
- Halpin, D. W., Lucko, G. & Senior, B. A. (2017) *Construction Management*. JohnWiley & Sons.
- Hanif, H., Khurshid, M. B., Lindhard, S. M., & Aslam, Z. (2016). Impact of variation orders on time and cost in mega hydropower projects of Pakistan. *Journal of Construction in Developing Countries*, 21(2), 37.
- Husien, I. A., Borisovich, Z., & Naji, A. A. (2021). COVID-19: Key global impacts on the construction industry and proposed coping strategies. In *E3S Web of Conferences* (Vol. 263, p. 05056). EDP Sciences.
- Idris, M., & Oruonye, E. (2020). Socioeconomic impact of COVID-19 in oil exporting countries: an analytical review of the macroeconomic indicators in Nigeria. *International Journal of World Policy and Development Studies*, 6(5), 44-50.
- Ismail, A., Pourroostam, T., Soleymanzadeh, A., & Ghouyounchizad, M. (2012). Factors causing variation orders and their effects in roadway construction projects. *Research Journal of Applied Sciences, Engineering and Technology*, 4(23), 4969-4972.
- Jones, W., Chow, V., & Gibb, A. (2020). Covid-19 and construction: early lessons for a new normal?. *Loughborough University*, 1-18.
- Laing, T. (2020). The economic impact of the Coronavirus 2019 (Covid-2019): Implications for the mining industry. *The extractive industries and society*, 7(2), 580-582.
- Mahamid, I. (2016). Factors contributing to poor performance in construction projects: studies of Saudi Arabia. *Australian Journal of Multi-Disciplinary Engineering*, 12(1), 27-38.
- Majumder, S., & Biswas, D. (2021). COVID-19 impacts construction industry: now, then and future. In *COVID-19: prediction, decision-making, and its impacts* (pp. 115-125). Springer, Singapore.
- MDBC (2020). Updates on MCO/NRP National Recovery Plan, Retrieved October 22, 2020, from <https://www.mdbc.com.my/mco-updates/>
- Ministry of Local Government and Housing Sarawak (MLGH) (2020) Standard Operating Procedure (SOP) at Construction Site During Disease Outbreak. Retrieved December 22, 2020, from <https://sarawakdisastermc.com/wp-content/uploads/2020/06/STANDARD-OPERATING-PROCEDURE-SOP-AT-CONSTRUCTION-SITE-DURING- DISEASE-OUTBREAK.pdf>.
- Mukuka, M., Aigbavboa, C., & Thwala, W. (2015). Effects of construction projects schedule overruns: A case of the Gauteng Province, South Africa. *Procedia Manufacturing*, 3, 1690-1695.
- Murugiah, S. (2020). Covid-19 to place Malaysian economy into technical recession, says AmBank. *The Edge Markets*.

- Ojoko, E. O., Tanko, B. L., Jibrin, M., Ojoko, O., & Enebuma, W. L. (2016, August). Project delay causes and effects in the construction industry. In *IGCESH. Proceedings of the 6th International Graduate Conference on Engineering, Science and Humanities, 15th* (pp. 221-223).
- Othman, I., Idrus, A., & Napiyah, M. (2012). Human resource management in the construction of a sustainable development project: towards successful completion. *WIT Transactions on Ecology and the Environment*, 162, 169-180.
- Pamidimukkala, A., Kermanshachi, S., & Karthick, S. (2020, July). Impact of natural disasters on construction projects: Strategies to prevent cost and schedule overruns in reconstruction projects. In *Creative Construction e-Conference 2020* (pp. 49-57). Budapest University of Technology and Economics.
- Sezer, A. A. (2016). *Construction Performance Measurement: Site Managers in Refurbishment Projects*. Chalmers Tekniska Hogskola (Sweden).
- Soni, V. D. (2020). Global Impact of E-learning during COVID 19. Available at SSRN 3630073.
- Yun, S., Choi, J., de Oliveira, D. P., & Mulva, S. P. (2016). Development of performance metrics for phase-based capital project benchmarking. *International Journal of Project Management*, 34(3), 389-402.