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Impact of COVID-19 on the Contracting & Engineering Companies in Gaza Strip

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Abstract

Construction projects are among the riskiest projects, which require the application of the right rules and to abide by the proper safety standards. Thus, this study aims to study the impact of COVID-19 on the construction and engineering companies due to the Corona pandemic in the Gaza Strip, and introducing the means used in dealing with this pandemic and how to avoid, limit and deal with it. And to shed light on the most important obstacles and challenges facing the construction sector in the light of the outbreak of the epidemic. To achieve this, a cross-sectional study based on an online questionnaire was conducted by Google Forms. Then, the data collected was analyzed using the thematic analysis approach. The results show that best procedures to mitigate the impact of this epidemic and to prioritize the safety and health of employees in contracting and engineering companies, to provide a safe work environment and developing plans to confront the spread of injury in the work-environment. The study recommends that government may provide financial support to companies and reduce taxes imposed on them in order to be able to confront this pandemic.

Keywords

COVID-19, Impact, Contracting & Engineering Companies, Mitigate, Gaza Strip

1. Introduction

COVID-19 disease is an infectious disease caused by the last discovered virus of the Corona virus strain. There was no knowledge of this new virus and its disease before the outbreak began in the Chinese city of Wuhan in December 2019 [1]. A few months later the virus evolved into a global pandemic that impacted nearly everyone worldwide. Therefore, this epidemic has led to the disruption of

the world in all its sectors, especially the construction sector, which includes engineering companies, factories and contracting companies [2] [3].

Construction is a sector that was amongst the first affected by COVID-19 [4]. It is evident that there are many factors which affect the construction industry; some are inherent problems due to the complex relationship among the employers, the architects and engineers, and the contractors, while others are local problems or problems out of human control such as the weather, floods, earthquakes and COVID-19 [5]. The COVID-19 pandemic has highlighted additional delay issues affecting management at all levels in construction industry cannot ignore it. Furthermore, COVID-19 pandemic may lead to unpredictable socio-economic consequences, affecting the construction industry across the globe [5] [6]. The Government of Palestine (GOP) has quickly and effectively responded to the outbreak of COVID-19, using an internationally and nationally coordinated, data-driven approach to contain the spread of the virus [7]. Contracting companies, engineering and consulting offices have been affected by the Corona pandemic in the Gaza Strip, where projects have stopped due to the curfew during the last period, and contracting companies do not have many options to overcome the difficult state and most companies, whether large or small and medium, have suffered losses as a result of the Corona pandemic.

In conjunction with the onset of the Corona pandemic, the Palestinian economy witness a decline in (GDP), most economic activities witness a significant decline; in addition the construction sector witnessed the highest rate of decline in the Gaza Strip, which is approximately 21% as a result of the closure imposed on the Gaza Strip [8]. In addition, construction sector suffers some problems such as: many companies and factories stopped a large number of layoffs, accumulation of debts and taxes on factory owners and companies, high unemployment and poverty index as a result of the closure, and direct and indirect losses to the construction industry sector in Gaza strip. In General, construction industries in Palestine have been adversely affected by COVID-19 pandemic, and will continue to have an impact on the contracting and engineering companies in particular during the coming period. The construction ecosystem and the nature of its work activities pose a risk in the transmission of communicable diseases if occupational and public health measures are not in place [9].

Several researchers have studied the effects of COVID-19 on the construction industry. Gan, W. & Koh, D. [9] described the various governmental, industry, supervisory and worker-specific interventions to prevent, detect and contain COVID-19 for safe resumption of work for the construction sector. AL Mansoori, & Yas, [10] provided a meticulous examination of the impact of COVID-19 on increasing the cost of labor and project prices in the United Arab Emirates (UAE). Moreover, Biswas, A., & Bardhan, P. K. [11] observes in several countries and describes the global impact of the Corona virus on the construction industry and explains how it is possible to continue construction work in this situation. However, Kabiru and Yahaya [12] addressed the impact of COVID-19

and discovered that professionals are faced with some challenges in the construction industry. Evaluate the impact of COVID-19 pandemic on construction projects by using the concept of rework projects and exploring the effects of COVID-19 on the built asset procurement and potential opportunities for the construction industry [13] [14]. On the other hand, Choi, S. D., & Staley, J. [15] summarizes the challenges and opportunities for construction stakeholders in implementing COVID-19 safety and health measures in the construction industry. Shrestha, S. [16] studied the Impact of COVID-19 on Construction Project in Nepal. Zamani, S. H., *et al.* [17] identifies problems caused by COVID-19 in the building construction industry and mechanisms to reduce COVID-19's negative impact. Thus, the aim of this study is to study the impact of COVID-19 on the contracting and engineering companies in the Gaza Strip., and to identify the different solutions to proceed with work during the COVID-19 pandemic through COVID-19 roadmap to help the contracting companies in the future for mitigating the risk of this pandemic.

2. Research Methodology

The purpose of this study is to determine the impact of the COVID-19 contracting and engineering companies in the Gaza Strip. The research determines the most important obstacles and challenges facing the construction sector in the light of the pandemic. This research was conducted using several methods. One was the use of online interviews with recruiters in the construction industry and stakeholders involved in ongoing and impacted construction projects, among others. These interviews were held either in person or via telephone, email, or video call. However, the primary method used to quantify the impact of COVID-19 was the questionnaire in March 2021, The questionnaire was designed using Google Forms, which is a free electronic medium offered by Google, that has the ability to voluntarily collect information through the designed questionnaire. The questionnaire was divided into four sections: the first section was the demographics section, which contained the age, gender, field of work, the second section included questions regarding current implemented practices and their effect. The third section included the factors affecting infection with COVID-19 and incidents. Finally, the future procedures mitigate impact of COVID-19 on contracting & engineering companies.

In this case, the populations of this study are Palestinian construction companies from five governorates, to ensure that the chosen sample describes the population; a simple random sampling is used for each of the governorates. The questionnaire was sent to 80 contracting companies' practitioners working in Gaza Strip, including engineers, construction managers and supervisors. A total of 60 questionnaires were received. The researcher used the simple random sample method. It was determined based on the attached equation it was distributed to contracting and engineering companies. The following statistical equation was used to determine the sample size

$$n = \sum \frac{n'}{1 + n'/N} \quad (1)$$

$$n' = S^2/V^2 \quad (2)$$

where:

n: sample size from finite population.

n': sample size from infinite population, which can be calculated from this formula.

N: total population (contracting and engineering companies).

S^2: standard error variance of population elements, $S^2 = P(1 - P)$; maximum at $P = 0.5$.

V: standard error of sample population equal 0.05 for the confidence level 95%, $t = 1.96$.

3. Results and Discussion

3.1. Characteristics of the Population

The total number of questionnaires distributed was 80 and the number of respondents was 60 with a response rate of 75%. The distribution of respondents according to position is 51.7% of the respondents who are: head of the company, 26.7% manager of company, while 21.7% site manager, regarding to education 53.3% had a bachelor degree, 40.0% had a higher education, regarding to experience 31.7% had experience from 5 to 10 years, 23.3% had experience from 16 to 20 years. About 47.0% of the company in Gaza governments because it the center of Gaza Strip, 21.7% in Northern Governments, while 15.0% in Southern Governments, regarding to classification of company 35.0% of the company classified second, 37.7% classified first (A and B), 18.3% third grade and more, regarding to average budget of project in the construction sector 31.7% had project with budgeting more than one million, while 28.3% with budget from 250 to 500 thousand Dollar, 35.0% of the company had two projects implemented, as shown in Table 1.

3.2. Current Situation of the Contracting and Engineering Companies

Results from Table 2 indicated that "is the companies striving to reduce work-related injuries at its sites" was the highest factor form this question with percentage 96.7% of the respondents companies. This is an indication that the contracting & engineering companies avoid injuring one of the workers and thus avoid disrupting work inside the companies and provide a safe work environment. According the results about the current situation of the contracting & engineering companies, 55.0% of respondents companies have workers ever been exposed to Corona virus while working on the project, 53.3% of the respondents companies sponsored the worker's monthly salary when return to work, 78.3% of the respondents companies have a written safety policy, while 65% of the respondents companies conduct periodic safety meetings to prevent the virus, and

95% of the respondents companies provide protective and safety equipment for workers.

Finally, it is included that the lowest factor in this questions is "does the company have a safety supervisor" with percentage 48.3%. This is an indication that the contracting & engineering companies avoid assign safety supervisor due

Table 1. Distribution of participants by characteristics variables.

Information	Variables	No.	%
Position	Head of Company	31	51.7
	Manager	16	26.7
	Site Manager	13	21.7
Education	Diploma	4	6.7
	Bachelor	32	53.3
	Higher Education	24	40.0
Experience	Less than 5 Years	10	16.7
	From 5 to 10 Years	19	31.7
	From 11 to 15 Years	9	15.0
	From 16 to 20 Years	14	23.3
	More than 20 Years	8	13.3
Place of Company	North Governments	13	21.7
	Gaza Governments	28	46.7
	Middle Governments	10	16.7
	South (khan-younis, /Rafah) Governments	9	15.0
Company Classification	First Grade A	15	25.0
	First Grade B	13	21.7
	Second Grade	21	35.0
	Third Grade and more	11	18.3
Average Budget Project in the Construction Sector	Less than 250 Thousand Dollar	6	10.0
	250 - 500 Thousand Dollar	17	28.3
	500 - 750 Thousand Dollar	11	18.3
	751 - 1 Million	7	11.7
	More than 1 Million Dollar	19	31.7
Number of Projects Implemented during the Last Year	One Project	12	20.0
	Two Projects	21	35.0
	Three Projects	12	20.0
	Forth Projects	5	8.3
	Fifth Projects	10	16.7

Table 2. Current situation of the contracting and engineering companies.

No	Question	Yes		No	
		No.	%	No.	%
1.	Has a worker ever been exposed to Corona virus while working on the project?	33	55.0	27	45.0
2.	Have you received the necessary treatment and support from your company?	31	51.7	29	48.3
3.	Has the company sponsored the worker's monthly salary for his return to work?	32	53.3	28	46.7
4.	Does the company have a written safety policy?	47	78.3	13	21.7
5.	Does the company conduct periodic safety meetings to prevent the virus?	39	65.0	21	35.0
6.	Does the company provide protective and safety equipment for workers?	57	95.0	3	5.0
7.	Is the company allocating adequate budget for safety?	39	65.0	21	35.0
8.	Does the company have a safety supervisor?	29	48.3	31	51.7
9.	Is the company striving to reduce work-related injuries at its sites?	58	96.7	2	3.3
10.	Does the company keep records of the accident cases?	33	55.0	27	45.0

to not having enough budget to hire a safety supervisor in the company and to reduce the financial burden on the company.

3.3. COVID-19 Impacts on Contracting and Engineering Companies

Table 3 presents the Impact COVID-19 on Contracting and Engineering Companies. According the results, 41.7% from respondents companies regarded to the COVID-19 pandemic threatening business with percent from 51% to 75%, therefore, it is clear that the pandemic has significantly and clearly affected the work of contracting companies and other institutions.

Abbreviations and 33.3% from respondents companies agree with the company's revenue been affected since the government-imposed lockdown with percent from 51% to 75.0%. 40.0% from respondents companies regarding of impact of total closure on business operations with percent from 51.0% to 75.0% while 10.0% agree with percent from 26% to 50.0%, moreover, 48.3% from respondents companies pay an employee's wages and it's the highest current costs, follow by taxes with percent 31.7%, regarding of evaluating government performance regarding the Corona outbreak 33.3% with equal percent agree with acceptable and bad performance, while 25.0% agree with good performance, about 38.3% asked for providing financial compensation to reduce the impact of lockdown on the company's financial position, while 30.0% asked to reduce taxes, 91.7% agree with the spread of the Corona virus will have a lasting impact on the financial economy.

About the percentage of difficulties 33.3% agree with percent from 50.0% to 75.0%, and 31.7% agree with percent from 25.0% to 50.0%, 46.7% had accomplished projects in light of the Corona crisis with acceptable, while 26.7% good, 35.0% of the participant agree with the percent of Corona effect at workers at the

Table 3. COVID-19 impact on contracting and engineering companies.

Paragraph	Variables	No.	%
Percent of extent of the Corona virus threatening to your business	Less than 25%	9	15.0
	From 26% to 50%	14	23.3
	From 51% to 75%	25	41.7
	More than 75%	12	20.0
How has the company's revenue been affected since the government-imposed lockdown	Less than 25%	13	21.7
	From 26% to 50%	6	26.7
	From 51% to 75%	20	33.3
	More than 75%	11	18.3
The percentage of impact of total closure on business operations	Less than 25%	9	15.0
	From 26% to 50%	6	10.0
	From 51% to 75%	24	40.0
	More than 75%	21	35.0
How long will you still be able to bear/incur the financial aspect in the event of the continuing lockdown	Until the beginning of the year	17	28.3
	Until mid-term	12	20.0
	Until the end of lockdown	12	20.0
	Unable to manage the crises from the beginning	19	31.7
What are the current highest costs	Taxes	19	31.7
	Loses of clients	8	13.3
	Pay rents	4	6.7
	Pays wages	29	48.3
From the company's point of view, how do you evaluate government performance regarding the Corona outbreak	Very Good	5	8.3
	Good	15	25.0
	Acceptable	20	33.3
	Bad	20	33.3
The measures would the government, if taken, reduce the impact on the company's financial position	Delay rental payments	3	5.0
	Reducing customs	7	11.7
	Reducing taxes	18	30.0
	Providing financial compensation	23	38.3
	Providing interest-free loans	3	5.0
	Others	6	10.0
Will the spread of the Corona virus have a lasting impact on the financial economy	Yes	55	91.7
	No	5	8.3
What are percent of difficulties that the company faced in supplying resources in light of the Corona crisis	Less than 25%	9	15.0
	From 26% to 50%	19	31.7
	From 51% to 75%	20	33.3
	More than 75%	12	20.0

Continued

From your point of view, to what extent the company has accomplished projects in light of the Corona crisis	Very Good	1	1.7
	Good	16	26.7
	Acceptable	28	46.7
	Bad	15	25.0
What does the percent of Corona affect at workers at the site	Less than 25%	13	21.7
	From 26% to 50%	31	35.0
	From 51% to 75%	20	33.3
	More than 75%	6	10.0
The extent of the impact of the Corona virus on inter-departmental interaction in the company	Less than 25%	18	30
	From 26% to 50%	21	35
	From 51% to 75%	16	26.7
	More than 75%	5	8.3
In light of the decline in currency prices due to the Corona virus, what is the extent of the company's impact	Less than 25%	6	10.0
	From 26% to 50%	22	36.7
	From 51% to 75%	17	28.3
	More than 75%	15	25.0

site from 25.0% to 50.0%, while 33.3% agree with percent from 51.0% to 75.0%, 35.0% of the respondent agree with the extent of the impact of the Corona virus on inter-departmental interaction in the company from 25.0% to 50.0%, while 30.0% agree with percent less than 25.0%. In regard of the light of the decline in currency prices due to the Corona virus, what is the extent of the company's impact 36.7% agree with percent from 25% to 50.0%, while 28.3% agree with percent from 51.0% to 75.0%.

3.4. The Challenges Facing the Contracting & Engineering Companies due to the COVID-19

Results from Table 4 indicated that "provide a safe work environment' was the first rank from challenges with weighted mean 81.4%. This is an indication that this factor is the most important factor. It is due to several reasons, including: contracting companies is not considered safety as priority in their planning and low safety culture in their companies. The results also revealed that "lack of awareness among workers" and "develop contingency plans" in second rank with weighted mean 80.4%, as the awareness among workers and contingency plans plays an important factors in reducing the risks during the implementation of the projects. In addition, this contingency plan is represented by an integrated work team and has the necessary knowledge in all aspects to formulate strict instruction to organize, work and mitigate the negative impact of the pandemic. While the last rank was "establish incentives and rewards for those committed to prevention measures" with weighted mean 70.4%. This is an indication that

the insufficient budgets into the projects to provide rewards and incentives for those committed to safety and prevention measures.

3.5. Procedures Taken to Mitigate the Impact of the COVID-19

Table 5 shows the following results: the measures taken to mitigate the impact of the Corona crisis on the company: 66.4% agree with prioritize the safety and health of employees through take vaccine. This is an indication that it is noticed

Table 4. Distribution of challenges facing the contracting & engineering companies due to COVID-19.

No	Paragraph	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Weighted Mean	SD	T TEST	Sig.	Rank
1.	Lack of awareness among workers	0.0	3.3	23.3	41.7	31.7	80.4	0.83	9.45	0.000	2
2.	Lack of technical guidance	0.0	8.3	41.7	36.7	13.3	71.0	0.83	5.12	0.000	9
3.	Failure to take preventive measures	1.7	13.3	20.0	36.7	28.3	75.4	1.06	5.58	0.000	6
4.	Establish incentives and rewards for those committed to prevention measures	1.7	20.0	21.7	38.3	18.3	70.4	1.07	3.76	0.000	10
5.	Establish penalties for dishonesty committed to preventive measures	0.0	3.3	26.7	40.0	30.0	79.4	0.84	8.88	0.000	4
6.	Meetings with safety representatives and workers periodically	0.0	6.7	33.3	35.0	25.0	75.6	0.90	6.71	0.000	7
7.	Develop contingency plans	0.0	1.7	18.3	56.7	23.3	80.4	0.70	11.24	0.000	2
8.	Commit to reviewing safety procedures before and after the mission	0.0	5.0	10.0	68.3	16.7	79.4	0.69	10.88	0.000	4
9.	Assigning safety personnel to the job site	3.3	15.0	16.7	50.0	15.0	71.6	1.03	4.39	0.000	8
10.	Provide a safe work environment	0.0	3.3	15.0	53.3	28.3	81.4	0.76	10.93	0.000	1
Total Mean 76.46%											

Table 5. Importance of procedures taken to mitigate the impact of the COVID-19.

No	Safety Performance Improvement Practices						Weighted Mean	SD	T TEST	Sig.	Rank
	Procedure	Very Low	Low	Moderate	High	Very High					
1.	Postponement of payments	18.3	35.0	33.3	8.3	5.0	49.4	1.049	3.938	0.000	7
2.	Seeking financial support from financial institutions	28.3	20.0	33.3	10.0	8.3	50.0	1.242	3.119	0.000	6
3.	Prioritize the safety and health of employees through take vaccine	6.7	13.3	38.3	25.0	16.7	66.4	1.112	2.205	0.000	1
4.	Reducing costs overall	11.7	21.7	50.0	11.7	5.0	55.4	0.981	1.843	0.000	4
5.	Wage reduction/layoffs	31.7	25.0	23.3	16.7	3.3	47.0	1.191	4.228	0.000	8
6.	Reducing marketing expenditures	18.3	20	31.7	18.3	11.7	57.0	1.26	0.922	0.000	3
7.	Finding alternative sources of supplies and products	20.0	25.0	38.3	15.0	1.7	50.6	1.033	3.500	0.000	5
8.	Annual budget review	11.7	25.0	31.7	20.0	11.7	59.0	1.185	0.327	0.000	2

that the arrival of the vaccine to Gaza Strip make a big leap in the projects and the economy. Moreover, the vaccine guarantees a cure from this infection, so the procedures become less and also the movement becomes stronger and the implementation is faster, so this factor is considered one of the factors, and therefore that plays an important procedure in the continuation of projects. In addition, the decision of taking vaccine affects their health and the health of their families. Therefore, each of them must take responsibility and take the initiative on his own in order to preserve the safety of his family and the safety of his colleagues.

Also, 57.0% agree with reducing marketing expenditures, 55.4% agree with reducing costs overall, 50.6% agree with finding alternative sources of supplies and products, 50.0% agree with seeking financial support from financial institutions. The last factor from procedures is "wage reduction/layoffs" with weighted mean 47.0%. This is an indication that this factor in not important to mitigate the impact of the COVID-19. This is an indication that the contracting companies saving the dignity of the workers, because there is no alternative sources of income for the workers and to reduce the unemployment and the exploitation of the wages of workers in the construction sector.

4. Conclusion

In conclusion, this article has investigated and assessed the impact of pandemic COVID-19 on the contracting and engineering companies in the Gaza Strip. COVID-19 pandemic affected all segments of the population and all economic sectors. Palestinian companies striving to reduce work-related injuries, Based on previous result obtained from questionnaire survey, it was clear from the results that some practice should be improved and the following strategies are recommended: the engineering companies must prioritize the safety and health of employees through take vaccine and establish incentives and rewards for those committed to prevention measures. Moreover, government agencies in reducing taxes imposed on implementing agencies for construction sector projects. Enhance effective community participation in educating the Palestinian community about the seriousness of the outbreak of the novel corona virus and work to prevent it. On the other hands, the workers should receive the necessary treatment and support from contracting and engineering companies to void the impact of COVID-19.

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Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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