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The impact of the COVID-19 pandemic on project management in the Kingdom of Saudi Arabia

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Abstract: The aim of this research was to identify the impact of the COVID-19 pandemic on project management in the Kingdom of Saudi Arabia. The approach we used is a quantitative evidence to determine the degree of effect using a five Likert style scale by connecting building practitioners. . A total of 112 respondents participated in responding to the survey questionnaire. The results have shown that the overall impact of the pandemic on current activities is high. And that the impact of the Corona pandemic on employment and employees has been shown to a high degree in psychological impact of employees due to the COVID-19 pandemic and it is impact on employment and job loss (labor shortage) andthat Joint influence of project stakeholders with the COVID-19 pandemic has been shown to high degree in "The percentage of support that the government provided that reduces the impact of the current situation on your company orproject.

Keywords: Impact, COVID19, Projects, management, KSA, Globally

I. Introduction:

The coronavirus (COVID-19) disease is known to the whole world as a global pandemic and the trending topic of the year. Moreover, COVID19 has drastically impacted the economy, the lives of many people, the business operations and construction projects in numerous industries. Unfortunately, our beloved kingdom has not been spared and shared the same impact of the tragedy. Currently, nearly eight months have passed since the emergence of the severe acute respiratory syndrome-coronavirus-2. To date, there have been more than 32 million confirmed cases and more than 988,000 deaths globally caused by COVID-19). Nationally, strict public health measures have been implemented to control and prevent the spread of the outbreak by the Ministry of Health to maintain the health system and safety of the people, Thus, all constructive projects have been shut down unless they come within the necessary categories of medical sector and high importance of the governmental sector. Even though the still working projects are still in the tragedy of the shortened labour workers as a result of the distancing working protocols. So, it is also necessary to examine the effect of the disease on the building industry. The purpose of this article is to classify the effect and measure it on the basis of its level ofseverity.

II. Literature Review

The pandemic of COVID19 has affected many aspects of the research fields. Starting from the proposal to the conclusion of a research. Thus, the research publishing processes have been hindered. As a result, the number of articles that are newly published is decreased. Although, the pandemic has offered many opportunities to the researchers, there are scarce numbers of published articles related to the tragedy of COVID19. Moreover, the published papers are digging more about the pandemic effect in the medical, economic and financial features. On the other hand, there are few numbers of published articles which discuss the global effect of the pandemic. Therefor, the proposal of the effects of COVID19 on construction projects management is scant globally. Accordingly, the number is more reduced if we scoped for the same topic in our beloved kingdom. However, we tried our best to dig for more articles in each aspects of our theme. First, we divide the proposal theme into keywords: Effect, COVID19, Construction, Projects, industry, management, KSA, Globally. Then, we manipulated those keywords in the google scholar engine in order to gain as much as possible published papers. As a result, we discovered many articles discussing the effect of the pandemic globally on the medical, financial and economical perspectives. For such, a study by Fernandes, N. (2020) which addressed the economical impact of the pandemic outbreak on the economy of

30 countries and the study found that the gross domestic product (GDP) is likely to be hit by 3-6% or might fall to 15% in some countries. Whereas, Nicola et al. (2020) reported that the restrictions implied by the authorities had reduced the mobility causing many industries to shut down the business and resulted in job loss and the essential supplies like food and medical supplies which led to a socio- economic impact on each individual. Harari (2020) also expressed that COVID-19 pandemic is the biggest crisis of the generation and it may take years to recover and action must be taken decisively to subsidize and plan new strategies to avoid the travail of humankind. Fortunately, Yaser Gamil (2020) addressed the impact of Pandemic on the survival of Construction Industry. The study showed that project suspension, labor effect and work loss, time delay, expense overrun, and financial consequences are the most influential impacts of COVID 19. The results also allow project participants to consider the sequences of the sudden outbreak and brace for the worst-case scenario during the development project preparation process. However, up to November 2020 Without exception, no study is exclusively recorded as focusing on the influence of the pandemic on the construction industry in KSA, so this study aims to ascertain theimpacts.

III. Methodology

The approach we used is a quantitative evidence to determine the degree of effect using a five Likert style scale by connecting building practitioners. A total of 112 respondents participated in responding to the survey questionnaire (still more) .

Introductory Phase
(Literature, scope, identification of problem and objectives)
Questionnaire Survey

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Data Analysis

The method followed is performed in the study as seen in Figure 1. In order to describe and recognize the nature, challenge, and goals of the research, the introductory section cantered on the literature. The next step is to determine the impacts by using a questionnaire survey to include building professionals. The respondents were asked to use the 5 Likert style scale to classify the degree of influence. Using SPSS program, the obtained data was then statistically analysed. To define the element by the relative importance significance index and standard deviation, descriptive analysis was used. Nevertheless, the selection of sample size was based on a random sampling method for a questionnaire survey. In building analysis, the random sampling method is commonly used where the sample is chosen randomly from the population based on non-zero probability. This approach is considered appropriate because, by avoiding any voluntary response bias, it provides a sampling representative of the population (Sandelowski, 2000). Population is likely to have the same probability of being chosen as the sample and provide the larger public with accurate representation (Sharma, 2017). This approach is then used to pick the participants for this research. Enshassi & Al Swaity (2015) followed the approach of calculating the sample size of an infinite population to determine the samplesize.

$$SS = \frac{Z^2 \times P\ (1-P)}{C^2}$$

Where,
SS = Sample Size
Z = Z value (1.96 for 95% confidence level)
P = percentage picking a choice expressed as a decimal (0.5 used for sample size needed)
C = margin of error (9 %), maximum error of estimation which can be 9 or 8% (Memon & Ismail,2013).

After the completion of the survey, the SPSS software will be used to calculate the standard deviation, Relative importance index and making the tables then analyzing the data.
First: Relative Importance Index.
Estate Surveyors and Valuers) RII, **Relative Importance Index**, is the **mean** for a factor which gives it weight in the perceptions of respondents.

RII = □ W/ (A x N)

Where:

W = Weightage given to each factor by the respondents A = Highest weight (i.e., 5 in this case)

N = the total number of respondents

The interpretation of RII is similar to the relative risk. It summarizes the relative risk for the most advantaged group (at the top of the hierarchy) compared to the least advantaged group (at the bottom of the hierarchy). This interpretation assumes that the variables have been scored so that higher scores are consistent with increased risk. For example, an RII of 1.88 (95% confidence intervals 1.27 to 2.77), an indicator of low SES, on the risk of long-term illness, implies that those in the most deprived group are 1.88 times more likely to experience illness than those in the least deprivedgroup.

Second: Standard Deviation

A quantity expressing by how much the members of a group differ from the mean value for the group.

Overview of how to calculate standard deviation

The formula for standard deviation (SD) is

$$\mathrm{SD} = \sqrt{\frac{\sum |x-\mu|^2}{N}}$$

where $\sum$ means "sum of", x is a value in the data set, μ is the mean of the data set, and N is the number of data points in the population.

More precisely, it is a measure of the average distance between the values of the data in the set and the mean. A low **standard deviation** indicates that the data points tend to be very close to the mean; a high **standard deviation** indicates that the data points are spread out over a large range ofvalue.

IV. Reliability:

The instrument reliability was verified by calculating the coefficient of Cronbach's alpha for each aspect of the study and the total degree of the instrument.

Table (1) reliability

Scales	***No of items***	***Cronbach's alpha coefficient***
the pandemic on current activities	11	**0.691**
the Corona pandemic on employment and employees	7	**0.668**
the extent of its impact on project budgets	8	**0.712**
Stakeholders and their joint vulnerability to projects	**3**	**0.774**

As shown in table (1) it is clear that Cronbach's alpha and Split-half coefficients are valid, acceptable statistically because (α) values are greater than accepted percent (0.60).

Data Analysis and Results

Analysis of data was done using SPSS 16.0 statistical software. Descriptive statistics such as frequencies, percentages, means, and standard deviations was used to describe demographic data of participants and to measure the impact of the COVID-19 pandemic on project management in the Kingdom of Saudi Arabia.

Demographic characteristics

Table (2) Participant's characteristics

		No	**%**
work sector	**Governmental**	49	44.1%
	Special	63	55.9%

	Total	***112***	***100%***
Years of Experience	**0 -5 years.**	75	67.0%
	5-10 years.	15	13.4%
	10 -15 years.	3	2.7%
	15 -25 years.	10	8.9%
	25 years and more	9	8.0%
	Total	***112***	***100.0%***
Type of employment	**Advisor**	28	25.0%
	contractor	37	33.0%
	Owner	47	42.0%
	Total	***112***	***100.0%***

As shown in table (2) the respondents who work in the government sector with a percentage of (44.1%), while those who work in the private sector (55.9%), and the majority of the respondents years of experience are less than 5 years with a percentage of (67%) flowed by respondents whose years of experience are between (5-10 years.) with a percentage of (13.4%) then those with experience (15 -25 years.) with a percentage of (8.9%) then (25 years and more) with a percentage of (8.0%) and finally those with experience (10 -15 years.) with a percentage of (2.7%).

The impact of the pandemic on current activities

Table (3) Measuring the impact of the pandemic on current activities

Items	**Mean**	**±Std. Deviation**	**Rank**
How would you rate the impact of the Corona pandemic on project man	4.21	0.75	2
How disrupted the work of the projects during the curfew period	4.33	0.83	1
The rate of obtaining exceptions (obtaining permits) so that projects are not disrupted	2.91	1.09	9
How often are there other obstacles to projects other than curfews during a pandemic	3.82	0.99	5
Enterprise loss ratio	3.73	1.02	7
Affection on the completion of projects during the curfew period	3.97	1.20	4
The incidence of delayed delivery of projects	3.41	1.02	8
The incidence of scarcity of resources	3.76	1.07	6
The rate of change in the prices of materials used in the project	4.09	1.00	3
The percentage of a possible scenario to be followed in the event that the Corona crisis continues in the coming months	2.56	1.21	11
How confident are you in your work's ability to overcome the current crisis	2.88	1.35	10
Totalmean±Std.	***3.61 ±1.05***		

As shown in table (3) the total mean score of the impact of the pandemic on current activities is (3.61) with a standard deviation (±1.05) which is lies within (3.40 to less than 4.20), and the mean within this interval indicates that the overall impact of the pandemic on current activities is high. And the respondents assessed the impact of the COVID-19 pandemic on project management in general as very high, with mean score (4.21 , ±0.75), also they assessed the disrupttheworkoftheprojectsduringthecurfewperiodasveryhigh,withmeanscore(4.33, ±0.83).

The importance of the impact of the COVID-19 pandemic on project management, according to the respondents, was very high (mean score "3.40 to less than 4.20" in the first place at the "The rate of change in the

prices of materials used in the project" (4.09 , ±1.00) flowed by the "Affection on the completion of projects during the curfew period" (3.97 , ±1.20) then "How often are there other obstacles to projects other than curfews during a pandemic" (3.82 , ± 0.99).

Also from table (3) we find that the respondents 'confidence in the ability of their businesses to overcome the crisis of COVID-19 pandemic is high (2.88 , ± 0.99).

The impact of the Corona pandemic on employment and employees

Table (4) Measuring the impact of the Corona pandemic on employment and employees

Items	Mean	±Std. Deviation	Rank
How emotional are the employees due to the Corona pandemic	4.06	1.03	1
How do you rate workers' performance during the exception period	3.17	1.27	7
The rate of injuries among the work team	3.61	1.26	5
What percentage of the preventive measures have been taken to limit the spread of the virus among workers and other employees	2.82	1.22	8
The percentage of workers who have been suspended from work due to the Corona crisis	3.45	1.29	6
How affected are workers who were outside and were unable to return	3.93	1.00	3
The percentage of workers who made their decision to travel to their countries	3.81	1.04	4
The percentage of its impact on employment and job loss (manpower shortage)	4.06	1.03	1
Totalmean±Std.	***3.60 ±1.14***		

As shown in table (4) the total mean score of The impact of the COVID-19 pandemic on employment and employees is (3.60) with a standard deviation (±1.14) which is lies within (3.40 to less than 4.20), and the mean within this interval indicates that the overall impact of the Corona pandemic on employment and employees ishigh.

The impact of the Corona pandemic on employment and employees has been shown to a high degree in psychological impact of employees due to the COVID-19 pandemic and it is Impact on employment and job loss (labor shortage) (4.06 , ±1.03) in the second pleas "Affected workers who were abroad and could not return" (3.93 , ±1.00) flowed by "The percentage of workers who made their decision to travel to their countries" (3.81 , ±1.04). Also from table (4) we find that the respondents assessed "the percentage of the preventive measures have been taken to limit the spread of the virus among workers and other employees" as high (2.82 , ±1.22).

The financial impact and the extent of its impact on project budgets

Table (5) Measuring the financial impact and the extent of its impact on project budgets

Items	Mean	±Std. Deviation	Rank
What is the impact of quarantine taken by the state, on project budget	3.64	1.25	3
With the preventive measures (such as quarantine) taken by the state, what is the size of their impact on the current average productivity rate compared to the last quarter of 2019	3.31	1.20	7
What is the impact of changing the weekly exchange rate on projects since the beginning of the crisis	2.96	1.22	8
What is the expected impact on project revenues in the long term (by the end of 2020)	3.46	1.18	6
The rate of payment of fines for the delay that occurred due to the Corona pandemic	3.60	1.05	4
The percentage of the impact of the pandemic on projects by exceeding the costs of the project	4.51	0.74	1

If things improve and start to return to normal, what is the rate of recovery until you resume your activity normally	3.46	1.11	5
In light of the current spread of the Coronavirus, what is your assessment of the government's performance with regard to the economy	3.90	1.29	2
Total mean± Std.	***3.56 ±1.13***		

As shown in table (5) the total mean score of the financial impact and the extent of its impact on project budgets is (3.56) with a standard deviation (±1.13) which is lies within (3.40 to less than 4.20), and the mean within this interval indicates that the overall financial impact and the extent of its impact on project budgets is high.
The financial impact of COVID-19 pandemic and the extent of its impact on project budgets has been shown to a very high degree in "The percentage of the impact of the pandemic on projects by exceeding the costs of the project" (4.51 , ±0.74), and high in "the impact of quarantine taken by the state, on project budget" (3.64 , ±1.25), flowed by "The rate of payment of fines for the delay that occurred due to the Corona pandemic" (3.60 , ±1.05) then "the expected impact on project revenues in the long term (by the end of 2020)" (3.46 , ±1.18).
Also from table (4) we find that the respondents assessed the government's performance with regard to the economy In light of the current spread of the Coronavirus, as high (3.90 , ±1.29).

Stakeholders and their joint vulnerability to projects
Table (5) Stakeholders and their joint vulnerability to projects

Items	**Mean**	**±Std. Deviation**	**Rank**
The percentage of all government agencies continuing to work during the outbreak of the pandemic	3.63	1.18	3
The percentage of support that the government provided that reduces the impact of the current situation on your company or project	4.02	1.04	1
The rate of disruption of maintenance work for projects during the outbreak of the pandemic	3.67	1.19	2
Totalmean±Std.	***3.77 ±1.14***		

As shown in table (5) the total mean score of the Stakeholders and their joint impact on projects is (3.77) with a standard deviation (±1.14) which is lies within (3.40 to less than 4.20), and the mean within this interval indicates that the overall Stakeholders and their joint impact on projects ishigh.

Joint influence of project stakeholders with the COVID-19 pandemic has been shown to high degree in "The percentage of support that the government provided that reduces the impact of the current situation on your company or project" (4.02 , ±1.04) flowed by "The rate of disruption of maintenance work for projects during the outbreak of the pandemic" (3.67 , ±1.19) then "The percentage of all government agencies continuing to work during the outbreak of the pandemic" (3.63 , ±1.18).

V. Conclusion

- The overall impact of the pandemic on current activities is high. And the respondents assessed the impact of the COVID-19 pandemic on project management in general as veryhigh.
- The overall impact of the Corona pandemic on employment and employees is high.
- The impact of the Corona pandemic on employment and employees has been shown to a high degree in psychological impact of employees due to the COVID-19 pandemic and it is Impact on employment and job loss (labor shortage), and in the second pleas "Affected workers who were abroad and could notreturn.
- The overall financial impact of COVID-19 pandemic and the extent of it on project budgets is high. The financial impact of COVID-19 pandemic and the extent of its impact on project budgets has been shown to a very high degree in "The percentage of the impact of the pandemic on projects by exceeding the costs of the project" and "the impact of quarantine taken by the state, on projectbudget".

- The respondents assessed the government's performance with regard to the economy In light of the current spread of the Coronavirus,as.
- Joint influence of project stakeholders with the COVID-19 pandemic has been shown to high degree in "The percentage of support that the government provided that reduces the impact of the current situation on your company or project" and "The rate of disruption of maintenance work for projects during the outbreak of thepandemic".

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