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Identifying The Impact Of The COVID-19 Pandemic On The Indonesian Construction Sector Using The Exploratory Factor Analysis (EFA)

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A B S T R A C T

The COVID-19 pandemic has impacted Indonesia's construction sector. The growth of the construction sector severely declined due to the COVID-19 pandemic. However, the study of the impacts of the COVID-19 pandemic on the construction sector in Indonesia is still limited. The present study is aimed to examine the negative and positive impacts (opportunities) of the COVID-19 pandemic on the Indonesian construction sector. The study employed a quantitative approach with 128 contractors and consultants from 34 provinces in Indonesia. Through the factor analysis (EFA) and USG analysis approach, six negative and positive impacts of the COVID-19 pandemic and their priorities can be identified. The six negative impact factors are Workforce issues and Cost Overruns, Financial Performance Degradation, Project completion delays and schedule disruptions, Supply chain disruptions, Legal and contract issues, and Difficulties in implementing health protocols and adjusting to the standard operating procedure. Meanwhile, the three positive impacts are Increasing awareness of the importance of occupational safety and health and collaboration among stakeholders, Improving the use of technology in the construction sector, and Optimizing existing procedures and systems. The study shows that the pandemic has impacted both the workforce and business entities' business Indonesian construction sector. These findings are expected to be useful in formulating strategic formulation for handling and mitigating the impact of pandemics.

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1. Introduction

The construction sector is a community activity to create buildings that function as a support for social and economic activities to support the realization of national development [1]. The construction sector is one of the strategic sectors in supporting the achie's national development. The construction sector has a significant role in the Indonesian economy, 11,26 percent of Indonesia's Gross Domestic Bruto (GDP) in the fourth quarter of 2019 [2]. In 2020, the growth of the construction industry severely declined due to the COVID-19 pandemic [3]. The delay in several construction projects, both infrastructure, and property, has been a major factor in the decline of the construction sector. Construction sector activity has decreased in both the private and public sectors due to the COVID-19 pandemic.

In the Indonesian construction sector, the COVID-19 pandemic has had an impact on the planning phase (43%), the implementation phase (55%), and the operational phase (51%) [4]. COVID-19 also impacted the contractor management and economic aspects [5]. Meanwhile, the most noticeable impacts of the COVID-19 pandemic on Malaysia's construction industry are project suspensions, impacts on labor, time overrun, cost overrun, and financial implications [6]. In India, some specific construction projects such as power generation, real estate, and transportation, in general, experienced sharp increases in project costs due to rising labor costs, fabrication, and equipment compared to other sectors. The COVID-19 pandemic has also impacted supply chains [7]. In the United States, the Impact of the COVID-19 pandemic on the construction industry includes shortages and delays in material supply, licensing delays, lower productivity, cash flow problems, project suspensions, price increases, and potential conflicts and disputes [8].

From a different perspective, the COVID-19 pandemic also has increased opportunities for the use of technology in the construction sector [9]. The technology is used for project planners, implementation, and operations. This is in line with the era of the industrial revolution 4.0. The COVID-19 pandemic has also prompted adjustments to work plans [10] [11], encouraged collaboration and risk assessment [10] [11] [12] [13], increased use of precast components [9], and increased awareness of the importance of planning for unforeseen circumstances [9]. Other opportunities that have emerged due to the pandemic are lower interest rates, increased demand for construction in the medical, transportation, and housing sectors, and the ability to recruit skilled laborers [8]. The pandemic also can provide an impetus for behavioral changes related to construction site safety and health other than the COVID-19 outbreak [12].

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To formulate strategic policies for handling and to Mitigate the Impact of the COVID-19 pandemic, it is necessary to identify the impacts of the COVID-19 pandemic that the construction sector parties in Indonesia most feel. However, studies related to the impact of the pandemic on the construction sector in Indonesia are still limited, and data on the Impact of the COVID-19 pandemic is limited, and much remains unknown. This study was conducted to identify the Impact of the COVID-19 pandemic felt directly by the Indonesian construction sector parties and to assess the most priority impacts to be mitigated. In addition, this study is also to identify new opportunities that may have been created and the efforts made to manage challenges related to the pandemic.

2. Methodology

This study is deductive. Survey questionnaires were utilized as a data collection strategy in quantitative methods. The questions posed in the questionnaire were formulated from a review of various works of literature, including published COVID-19 reports. Due to the limited literature on the Impact of COVID-19, it is encouraging to add references from popular articles and webinars related to the topic. The initial hypotheses of factors and variables are compiled based on literature related to the Impact of the COVID-19 pandemic from various similar studies conducted in different countries. The hypothesized factors with their associated variables are used to develop the first questionnaire survey to assess the negative and positive impact variables. Factor analysis was used to process the first questionnaire. It is used to find the key factors for the impacts of the pandemic. Based on the questionnaire result, USG analysis is used to determine the priority of the impact factors.

2.1 Variables

This study hypothesized 10 key factors with 45 associated variables (items) of the negative Impact and 8 key factors with 22 associated variables (items) of the positive impact of the pandemic.

Table 1. Hypothesized factors and variables of the negative Impact

No	Factor		Variables of Negative Impacts		Reference
1	Legal and Contract (LC)	1.1	Temporary suspension of the project	TSP	[6], [8], [10], [12]–[14]
		1.2	Contract review and amendment	REV	[4], [6], [15]
		1.3	Contract disputes	DIS	[6], [8]
		1.4	Potential construction claims	CLA	[8], [10], [13], [15]
		1.5	Contract termination	TER	[4], [13] [18]
2	Workforce (WF)	2.1	Labor shortage	LSH	[6], [8]
		2.2	Lack of access to skilled labor	LSK	[13]

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No	Factor		Variables of Negative Impacts		Reference
		2.3	Restricted movement at work and travel restrictions	RES	[5], [6], [14], [16]
		2.4	Decreased productivity	PRO	[5], [6], [8], [14], [16]
		2.5	Difficulties in transitioning work-from-home culture for non-field employees	WFH	[8]
		2.6	Employee layoffs and reduction in employee salary	LAY	[5], [6], [13]
		2.7	The decline in workers' health	HEA	[13]
		2.8	Increased employee anxiety	ANX	[9]
3	Cost (CT)	3.1	Increase in the price of goods/materials	GCS	[3], [6], [10], [13]
		3.2	Additional labor costs	LCS	[10], [13]
		3.3	Additional mobilization costs	MCS	[10]
		3.4	Additional equipment cost	ECS	[5], [10]
		3.5	Additional cost for health protocol	HCS	[5], [10], [12]
		3.6	Price escalation	ESC	[5], [8]
		3.7	Late payment	PAY	[8]
4	Time and Schedule (TS)	4.1	Time extension in construction contract	TEX	[3], [10], [13], [16]
		4.2	Construction delay	DEL	[6], [13], [16], [17]
		4.3	Problems in planning and scheduling	PPS	[6], [15]
		4.4	Subcontractor scheduling disruption	SSD	[6]
		4.5	Delayed in the new project	NEW	[8]
5	Supply Chain (SC)	5.1	Disturbances and delays in the mobilization of goods	MOB	[6], [8], [13]–[16]
		5.2	Shortage of imported material	SHM	[3], [5], [6], [8], [10], [13]
		5.3	Scarcity of local materials	SLM	[3], [13], [16]
		5.4	Difficulties in the procurement	PRC	[13]
6	Budget Relocation (BR)	6.1	Construction bidding delay	BID	[3], [10]
		6.2	Budget cuts	CUT	[16]
7	Financial Performance (FP)	7.1	Decrease in contracts obtained	CON	[3], [10], [17]
		7.2	Lower company profit	PRP	[3], [8], [13]
		7.3	Higher company debt	DEB	[3]
		7.4	Company losses	LOS	[4], [14]
		7.5	The Bankruptcy of the company	BCY	[4], [13]
		7.6	Liquidity crisis	LIQ	[4]
		7.7	Decreased cashflow	CAS	[5], [16]
8	Investors Confidence (IC)	8.1	Re-evaluation and investment cuts by capital owners/donor countries	INV	[5]
		8.2	Delayed capital injections due to the tightening of financing from the bank	INJ	[5]
		8.3	Postponement and termination of project plans by capital owners	PSP	[12]
9	Health protocol (HP)	9.1	An additional cost of adjusting operational standards	OCS	[5], [12]
		9.2	Difficulty in implementing health protocol	DIF	[5], [8], [9]
10	Administrative (AD)	10.1	Delay in licensing	LIC	[8]
		10.2	Problems with the disbursement of security deposit	DEP	[5]

Source: Expert validation of negative impact factors and variables (2021)

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Table 2. Hypothesized factors and variables of the positive Impact

No	Aspects		Variables of Positive Impacts		Reference
1	Technology (IT)	1.1	Increased use of construction technology	ICT	[9]
		1.2	Use of online communication technology	OCT	[18]
		1.3	Improved technology and construction methods of prefabrication, pre-assembly, and modularization	CMT	[19]
2	Cost (CT)	2.1	Lower Loan Interest Rates	INT	[8]
		2.2	Operational efficiency	EFF	[8]
3	Goods and Material (GM)	3.1	Changing the direction of supply to more reliable and diversified local suppliers	SUP	[19]
		3.2	Increased use of precast components	PRC	[9]
4	Work Procedure (WP)	4.1	Work Optimization	OPT	[8]
		4.2	Modern procurement planning	MPP	[9]
		4.3	Internal review and improvement of existing systems	SYS	[8]
		4.4	Adjustment of the work plan	AWP	[9]
		4.5	Raising the importance of contingency planning	RIA	[9]
		4.6	Creative and collaborative thinking	CCT	[8], [10]
		4.7	More general design and process updates for improving safety	GDP	[18]
5	Workforce (WF)	5.1	Availability of skilled labor	SKL	[8]
6	Occupational Health and Safety (OH)	6.1	Increasing the importance of OHS	OHS	[12]
		6.2	Improved hygiene standards more broadly	HYG	[12]
		6.3	Behavioral changes related to construction site safety and health other than the COVID-19 outbreak	BCS	[12], [16]
		6.4	Cleaner offices and workplaces	COF	[19]
7	Communication (CM)	7.1	Increased collaboration among stakeholders	COL	[8]–[11]
		7.2	Better relations between construction stakeholders	REL	[8], [10], [20]
8	Contract (CO)	8.1	Increased Demand for Medical, Transportation, Housing, and Other Projects	DEM	[8]

Source: Expert validation of positive impact factors and variables (2021)

2.2 Questionnaire

This study used two-stage questionnaires. The first questionnaire aims to assess the negative and positive impacts of the COVID-19 pandemic. It was designed to gather ordinal scale data from the respondents. The respondents were presented with the identified variables. They were asked to rate their level of Impact of the variables using a five-point Likert scale with five being extremely impacted, four being very impacted, three being neutral, two being slightly impacted, and one is not impacted. The second questionnaire aims to identify impact priorities based on the results of the first questionnaire. It was conducted using a scoring method by measuring the level of Urgency, Seriousness, and Growth (USG) of issues/problems by determining a scale of 1-5. Related to the ongoing COVID-19 pandemic, questionnaires were distributed online.

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Table 3. COVID-19 pandemic impact assessment Form

Identified impacts	Level of Impact				
	1	2	3	4	5
Legal and Contract (LC)					
n1.1. Temporary suspension of the project (TSP)					
n1.2. Contract review and amendment (REV)					
n...					
Contract (CO)					
p8.1. Increased Demand for Medical, Transportation, Housing, and Other Projects (DEM)					

Sources: The First Questionnaire of COVID-19 Pandemic Impact Assessment On The Indonesian Construction Sector (2021).
Level of impact: 1=not impacted, 2=slightly impacted, 3=neutral, 4=very impacted, and 5=extremely impacted.

2.3 Population and sample

Random sampling was used to determine respondents filling the questionnaire [6]. The method for determining the sample size of a large population used the following Cochran formula [21]. The 95% confidence interval and the desired precision level of 9% were used. The maximum value of the desired precision level can use 9% or 8% [22]; [6].

$$n_0 = \frac{z2(p)(q)}{e2}$$

Where:
n_0 = number of samples
Z = value based on significance level/confidence level
p = estimated proportion of population attributes (0.5 was used in this study)
q = proportion of categories other than p, formulated as (1-p)
e = margin of error

Thus, the minimum number of samples in this study is:

$$n_0 = \frac{1.96^2(0.5)(0.5)}{0.09^2} = 118.56$$ or rounded up to 119 respondents.

2.4 Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO-MSA)

Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO-MSA) and Bartlett's Test of Sphericity (BTS) assessed that the data set is suitable for factor analysis. Bartlett's test of sphericity has to be significant ($p < .05$) for the factor analysis to be considered appropriate. The KMO index ranges from 0 to 1, with 0.6 suggested as the minimum value for good factor analysis [23]. The KMO values close to 1 indicate that the data or sample used is feasible for factor analysis [24]. The IBM SPSS Statistics version 25 was used for KMO-MSA calculations. KMO-MSA were calculated concurrently when factor analysis was processed in SPSS.

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2.5 Exploratory Factor Analysis (EFA)

The Exploratory Factor Analysis (EFA) was used to find patterns and relationships in many impact variables and determine whether the information could be summarized in a data set of several factors or simpler components [25]. It is used where there is no knowledge of how many factors exist between items and which factors are determined by those [26] [27]. In the initial step, KMO-MSA tests were used to assess the data's suitability. The second step is the factor extraction process which is the core step of factor analysis is carried out. Principal Component Analysis (PCA) has been used to analyze the data to obtain the minimum number of factors required to represent the available data set. In this step, the determination of the formed factors can be seen through the eigenvalues. The minimum eigenvalues to determine factors is 1.0.

Furthermore, factor rotation and interpretation are carried out to further clarify the position of the variable to the formed factor. Therefore, rotation of the matrix or weighting factor is carried out by changing the initial weighting factor into a new weighing factor to improve interpretive power. The Varimax method has been used to minimize the number of variables with high loadings on each factor [27][28].

2.6 USG Analysis

USG analysis is one of the tools to prioritize the order of issues to be resolved [29] [30]. USG analysis is also a simple way to set priorities using the categories Urgency, Seriousness, Growth [31]. USG analysis sets the order of priority issues by the scoring technique method. This is done by determining the urgency, seriousness, and development of the issue/problem by determining a score scale of 1-5 or 1-10. The highest total score is the issue/problem that is a priority [29].

3. Discussion

3.1. Description of Respondents

Respondents in this study represent Indonesian construction companies in 5 state-owned enterprises and 123 national private companies. Most of the respondents (72%) were company leaders (Owner, Board of Directors, or Commissioner) and the majority of respondents had more than 10 years of experience in the construction industry. This implies that the answers to the questionnaire collected from the respondents are reliable due to the experienced respondents.

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Table 4. Description of Respondents

Category/Classification	Frequency	(%)
Position		
• Company Leaders	92	72%
• Manager/Team Leader	12	9%
• Engineer/ Experts	10	8%
• Admin/Staff	14	11%
Respondent's Experience		
• < 5 years	17	13%
• 6 - 10 years	38	30%
• > 10 years	73	57%
Type of Business		
• Consultant	77	60%
• General Contractors	41	32%
• Integrated Construction	10	8%

Category/Classification	Frequency	(%)
Business Entity Qualification		
• Large (B1,B2)	19	15%
• Medium (M1,M2)	17	13%
• Small (K1,K2,K3)	92	72%
Firm Location		
• Sumatera	29	23%
• Java-Bali	49	38%
• Nusa Tenggara	6	5%
• Kalimantan	21	16%
• Sulawesi	10	8%
• Maluku	7	5%
• Papua	6	5%

Source: The First Questionnaire Data Processing (2021)

3.2. The Impact Of The COVID-19 Pandemic On The Indonesian Construction Sector

3.2.1. Factor Analysis Of The Negative Impact Of COVID-19 Pandemic

The EFA is performed to extract the 45 variables (items) of the negative impacts of the COVID-19 pandemic. The Kaiser-Meyer-Olkin (KMO) test on the negative Impact shows a KMO MSA = 0.933 ≥ 0.5. The KMO values close to 1 indicate that the data or sample used is feasible for factor analysis. Bartlett's Test of Sphericity (BTS) results on the negative impact resulted in a significance of 0.000 < 0.05, indicating a correlation among variables. Therefore, it can be concluded that the variables of negative Impact in this study meet the requirements for factor analysis. The results of the MSA test show that all variables of negative Impact have an MSA value of more than half (MSA>0.5). Thus, 45 variables were involved in the factor analysis.

Determination of the formed factors can be seen through the eigenvalues. The minimum eigenvalues to determine factors is 1. Six factors (components) are extracted from 45 variables of negative Impact. The total of the six factors will be able to explain the variables of negative Impact. In contrast, this study cannot explain the other because it does not represent the information explained by formed factors. Hence, it can be concluded that there are 6 factors extracted as 6 factors have an eigenvalue above 1. The number of extracted factors is different from the initial hypothesis, which assumed that there were 10 key negative factors.

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Table 5. Total Variance Explained of the variables of negative impacts

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Var.	Cum. %	Total	% of Var.	Cum. %	Total	% of Var.	Cum. %
1	26.799	59.553	59.553	26.799	59.553	59.553	10.765	23.921	23.921
2	2.687	5.971	65.524	2.687	5.971	65.524	6.806	15.124	39.045
3	1.732	3.850	69.374	1.732	3.850	69.374	4.921	10.937	49.982
4	1.336	2.969	72.343	1.336	2.969	72.343	4.281	9.513	59.494
5	1.166	2.591	74.933	1.166	2.591	74.933	4.092	9.094	68.589
6	1.009	2.243	77.176	1.009	2.243	77.176	3.864	8.587	77.176

Source: Output of Total Variance Explained (IBM SPSS Statistic, 2021)

A factor rotation was carried out to clarify the position of a variable in the 6 components (factors) extracted. The purpose of factor rotation is to improve the interpretability of factor solutions by achieving a simple structure. The method used is the varimax procedure. Based on the factor loading value described in **Table 5**, the position of a variable included in one of the components (factors) formed can be determined. The results of the interpretation of the name of the extracted factor are presented in **Table 6.**

Table 6. Interpretation of formed negative factor names

Factor	Interpretation of extracted negative factor
Factor 1	Financial Performance Degradation (FIN)
Factor 2	Workforce issues and Cost Overruns (WCO)
Factor 3	Legal and contract issues (LEG)
Factor 4	Supply chain disruptions (SUP)
Factor 5	Project completion delays and schedule disruptions (DEL)
Factor 6	Difficulties in implementing health protocols and adjusting to the standard operation procedure (SOP)

Source: Factor Interpretation (2021)

Table 7. Result of the EFA for negative factor

Variables of negative Impact	Factor					
	1	2	3	4	5	6
	FIN	WCO	LEG	SUP	DEL	SOP
CON	0.825					
LOS	0.784					
CAS	0.777					
CUT	0.77					
DEB	0.763					
LIQ	0.756					
PRP	0.726					
PSP	0.718					
BID	0.701					
INV	0.687					
BCY	0.687					
NEW	0.665					
INJ	0.627					
TSP	0.533					
PAY						
ANX		0.716				

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Variables of negative Impact	Factor					
	1	2	3	4	5	6
	FIN	WCO	LEG	SUP	DEL	SOP
RES		0.702				
HEA		0.695				
WFH		0.61				
LSK		0.608				
HCS		0.586				
PRO		0.567				
MCS		0.566				
REV		0.53				
LCS		0.529				
LAY	0.511	0.518				
GCS						
DIS			0.779			
CLA			0.738			
TER			0.685			
LSH			0.501			
SHM				0.663		
SLM				0.654		
PRC				0.588		
MOB				0.507		
ECS						
TEX					0.66	
DEL					0.622	
PPS					0.571	
SSD						
DEP						
DIF						0.682
OCS	0.568					0.569
LIC						
ESC						

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 11 iterations.

Source: Output of Rotated Component Matrix (IBM SPSS Statistic, 2021)

Based on the results of the factor rotation, in general, each variable item is well distributed and grouped according to the factor. There are 38 variables with a factor loading value of more than 0.5, but seven variables have a factor loading value of less than 0.5. Thus, they were excluded from the next process.

A variable acts to form a factor indicated by the highest factor loading value. Of the 38 negative impact variables, six main components (factors) were extracted. Factor 1 is associated with 14 variables (items) with factor loadings from 0.533 to 0.825. These variables come from 3 initial factors, including Financial Performance (FP), Budget Relocation (BR), and Investors Confidence (IC). Factor 2 is associated with 11 variables with factor loadings from 0.518 to 0.716. These variables come from 2 initial factors, including Workforce (WF) and Cost (CT). Factor 3 is

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associated with 4 variables with factor loadings from 0.501 to 0.779 from Legal and Contract (LC). Factor 4 is associated with 4 variables with factor loadings from 0.507 to 0.663 from Supply Chain (SC). Factor 5 is associated with 3 variables with factor loadings from 0.571 to 0.66 from Time and Schedule (TS). Factor 6 is associated with 2 variables with factor loadings from 0.569 to 0.682 from Health Protocol (HP).

3.2.2. Factor Analysis of the Positif Impact of COVID-19 Pandemic

The EFA is performed to extract the 22 variables (items) of the positive impacts of the COVID-19 pandemic. The results of the Kaiser-Meyer-Olkin test on the variables of the positive impact show KMO MSA = 0.927 ≥ 0.5. The results of Bartlett's Test of Sphericity on the variables of the positive impact yield a significance of 0.000 < 0.05. The results show a correlation among the positive impact variables of a pandemic. For this reason, it can be concluded that the variables of positive Impact meet the requirements for factor analysis. The test results on the anti-image matrix show that all variables of positive Impact have an MSA value of more than half (MSA>0.5). Thus, the 22 variables of positive Impact can be involved in factor analysis.

Table 8 shows three components (factors) of the 22 variables of positive Impact analyzed. The total of the three factors will be able to explain the total 22 variables of negative Impact. In contrast, this study cannot explain the other because it does not represent the information explained by formed factors. Consequently, it can be concluded that there are three factors extracted since these three factors have an eigenvalue above 1. The number of extracted factors is different from the initial hypothesis, which assumed that there were 8 key positive factors. All positive impact variables (22 variables) also have a factor loading value of more than 0.5. Thus, all positive impact variables can be processed further.

Table 8. Total Variance Explained the variables of positive Impact

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Var.	Cum. %	Total	% of Var.	Cum. %	Total	% of Var.	Cum. %
1	12.369	56.222	56.222	12.369	56.222	56.222	5.738	26.081	26.081
2	2.635	11.978	68.200	2.635	11.978	68.200	5.592	25.419	51.500
3	1.140	5.184	73.384	1.140	5.184	73.384	4.814	21.884	73.384

Source: Output of Total Variance Explained (IBM SPSS Statistic, 2021)

After obtaining three main positive impact factors, the interpretation of the names of the factors was carried out. Factor interpretation was made by knowing the variables that make it up. **Table 9.** presents the results of the interpretation of the names of the three factors formed:

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Table 9. Interpretation of extracted positive factor names

Factor	Interpretation of formed positive factor names
Factor 1	Optimizing existing procedures and systems (OPS)
Factor 2	Increasing awareness of the importance of occupational safety and health and collaboration among stakeholders (OHC)
Factor 3	Improving the use of technology in the construction sector (ITC)

Source: Factor Interpretation (2021)

Table 10. Result of the EFA for positive factor

Variables of positive impacts	Component		
	1	2	3
SUP	0.874		
PRC	0.861		
INT	0.842		
MPP	0.759		
SYS	0.748		
OPT	0.695		
EFF	0.661		
SKL	0.564		
BCS		0.857	
HYG		0.843	
OHS		0.841	
COF		0.832	
COL		0.791	
REL		0.546	
OCT			0.807
ICT			0.780
CMT			0.674
CCT		0.507	0.637
AWP			0.622
RIA		0.549	0.610
GDP			0.591
DEM			0.576

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 5 iterations.

Source: Output of Rotated Component Matrix (IBM SPSS Statistic, 2021)

Of the 22 positive impact variables, three key components (factors) were extracted. Factor 1 is associated with 8 variables (items) with factor loadings from 0.564 to 0.874. These variables come from 4 initial factors, including Goods and Material (GM), Cost (CT), Work Procedure (WP), and Workforce (WF). Factor 2 is associated with 6 variables (items) with factor loadings from 0.546 to 0.857. These variables come from 2 initial factors, including Occupational Health and Safety (OH) and Communication (CM). Factor 3 is associated with 8 variables (items) with factor loadings from 0.576 to 0.807. These variables come from 3 initial factors, including Technology (IT), Work Procedure (WP), and Contract (CO).

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3.2. Priority of the Impact

Based on the results of the USG assessment, the priorities of the negative impacts are WCO, FIN, DEL, SUP, LEG, and SOP. Meanwhile, the results of the USG assessment of the positive Impact show that priorities for positive impacts are OHC, ITC, and OPS.

Tabel 11. Priority Assessment of the Negative Impact

Factor	Negative Factors	U	S	G	USG Score	Rank
Factor 2	WCO	41	43	43	127	1
Factor 1	FIN	40	40	44	124	2
Factor 5	DEL	38	39	39	116	3
Factor 4	SUP	37	38	39	114	4
Factor 3	LEG	35	35	37	107	5
Factor 6	SOP	34	38	35	107	5

Source: The Second Questionnaire Data Processing(2021)

Tabel 12. Priority Assessment of the Positive Impact

Factor	Positive Factors	U	S	G	USG Score	Rank
Factor 2	OHC	42	41	43	126	1
Factor 3	ITC	39	38	39	116	2
Factor 1	OPS	36	36	35	107	3

Source: The Second Questionnaire Data Processing(2021)

4. Conclusions

This study has identified 6 negative impacts and 3 positive factors of the COVID-19 pandemic on the Indonesian construction sector. The six negative factors include Workforce Issues and Cost Overruns, Financial Performance Degradation, Project Completion Delays, and Schedule Disruptions, Supply Chain Disruptions, Legal and Contract Issues and Difficulties in Implementing Health Protocols Adjusting to The Standard Operating Procedure. Meanwhile, three positive impact factors are Increasing Awareness Of The Importance of Occupational Safety and Health and Collaboration, Improving the use of technology in the construction sector, and Optimizing existing procedures and systems. This finding is expected to be useful in formulating strategic policies for handling and mitigating the impact of pandemics.

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