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Research Article

Modelling the Impact of Environmental Factors on the Performance of Construction Companies through the Lens of Institutional Pressures

Hassan Fehan[1*], **Osaro Aigbogun**[2]
[1]Binary University of Management and Entrepreneurship, Selangor, Malaysia.
[2]Faculty of Business, Curtin University, Sarawak, Malaysia.
E-mail: hassanfehan747@gmail.com

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Abstract: While investigating how environmental factors affect the performance of construction enterprises has remained a topical issue in the literature, many concerns about these factors, particularly in developing nations, are still unresolved. This study empirically examines specific environmental drivers affecting construction firms' performance and establishes the role of institutional pressures on construction firms' performance outcomes. Primary data were gathered from a sample of 197 respondents working in Syria's construction industry and were analysed using partial least squares structural equation modelling (PLS-SEM). When considering the impact of some environmental factors (economic environment, human capital, leadership, communication culture, socio-cultural environment, and political environment) on construction firm performance, the findings revealed that institutional pressures (coercive, mimetic, and normative) play a mediating role. However, the mediating influence of institutional pressures on the technological environment and performance of construction firms was not significant, thus indicating the need for more research. The findings of this study make a substantial addition to the current discussion about the most important environmental factors impacting construction firm performance. This study adds to the current debate about the causes of poor performance in construction firms by assisting managers in recognising the impact of the mentioned factors above on a firm's performance.

***Keywords*:** performance management, environmental analysis, institutional theory, construction firms, smart-PLS

1. Introduction

With its connections to other sectors of the economy, the construction industry has proven to be a vital participant in any nation's growth plan over the years. However, both professionals and academicians have emphasised the difficulties faced by construction firms; it is adjudged to be an industry that is complicated with a lot of dynamism where organisations must deal with constant obstacles and critical demands [1, 2]. To achieve a competitive advantage relative to the improving powerful emerging-market firms and attain outstanding performance in the upcoming construction markets, many of these challenges propel construction organisations to be extremely adaptive, efficiency-inclined and customer-focused [3].

The project level, stakeholders' level, and organisational level are areas in which performance improvements can be monitored in the construction industry [4]. With a massive concern in the literature for improving performance at a project level, several studies have shown that there is a deficiency that limits effective and efficient assessment of performance outputs in the instruction industry [5].

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Although performance measurement has advantages for those who use it for operations such as assessment, regulation, and the progression of company operations, the variables that impact and categorise an organisation's effectiveness at the medium or high stage have remained understudied at the organisational stage [6]. Due to their critical role, investigating these factors and their effect on a firm's performance outcomes has revived hope for an issue that has been argued by managers, activists, legislators, and academics for ages. According to construction researchers [7], environmental factors determine variation in organisational performance within the industry structure in which a firm functions. The exogenous environment of an organisation is a source of opportunities and difficulties because it is outside the control of the organisation; nonetheless, it is ubiquitous and has a substantial effect on its effectiveness [8]. Meanwhile, Oyewobi et al. [9] claimed that because firms must respond fast to high-competition situations, environmental munificence encourages organisational stability and lessens the requirement for congruence.

In construction firms, the relationship between environmental factors and the pressure for change is viewed through many theories to adopt sophisticated ways to enhance performance as a response to these changes. This current study builds on the strength of "institutional theory", which outlines the institutional environment that mounts total pressure on firms to conform to the ideals of the sector in which they function [10]. Identifying the external variables that can exert this pressure is so crucial. Examples include adopting best practices from outside the industry (mimetic), professionalising innovative methods that have been accepted by the industry (normative), and providing regulatory direction (coercive) [10]. Comparing performance to rivals could, however, unintentionally encourage isomorphism, or the propensity to operate similarly to other organisations. Nevertheless, simultaneous consideration of the three isomorphic pressures is limited to a few scholars in the subject matter of the construction management literature.

Construction companies' performance in the context of developing countries, such as Syria, has been reported to be below optimal levels, accounting for their low productivity and decreased contributions to gross domestic product (GDP), and operational failures [11]. However, it must be noted that many of these studies have been based on shaky evidence, as there hasn't been much information available about how environmental factors affect how well construction companies perform. Hence, clarifying the ambiguous evidence of the link between environmental restrictions, institutional pressures, and construction enterprises' performance outcomes is therefore crucial. Furthermore, there is a need for a comprehensive model that takes these factors into account in construction enterprises. As a result, the main objective of this study is to investigate the mediating influence of institutional pressures in the relationship between environmental factors and construction firm performance. This study develops a structural equation model (SEM) using data from a survey of respondents from construction enterprises in Syria, a developing nation, to address this objective.

2. A review of the literature

2.1 *Construction firm performance outcomes*

Construction firms function in an ever-changing commercial setting with different operational environments, and the different challenges mean that their outputs are not homogeneous. It is impossible to aggregate all outputs and enhance performance to ensure that organisational goals are being achieved [12]. Therefore, it is essential to understand the heterogeneous results and develop ways to analyse them [13]. While enhancing performance outcomes is considered helpful, there are arguments on how, why, and when it should be utilised [14]. In the construction sector, performance enhancement began at the project stage [4]. The scope of performance measurement in the construction industry has expanded from project to organisational and stakeholder levels. There is a significant relationship between stakeholders' performance and project success [15]. Because the construction business is branded by the concurrent implementation of multiple projects and the control of numerous input resources, it is vital to improving performance at the organisational level, as it represents total performance [16]. Over the years, numerous performance improvement frameworks that have been developed have laid more emphasis on project performance improvement relative to firm performance improvement [17]. Given this fact, this study considered four perspectives that reflect construction firm performance outcomes (customer satisfaction, process of internal business, and financial and environmental performances).

2.2 *The conceptualisation of environmental factors*

Scholars that study project management in the construction industry have put a lot of effort into determining

the variables that affect the performance of construction firms. Even though the construction industry has a good understanding of performance management, the nature of environmental elements' impact as intangible or tangible resources on total performance is still uncertain [18, 19]. These external influences can put pressure on businesses to detect their advantages and shortcomings, as well as fashion processes for recognising and adapting to pertinent business opportunities and changing corporate settings for either the reduction or elimination of economic risks towards performance enhancement. Additionally, distinct environmental drivers are shown to result in better outcomes for businesses in a variety of environmental conditions [20]. Several studies present an inconsistent impact of environmental factors on construction organisations, which preserves a causal explanation of performance discrepancies in the construction sector [21, 22]. The reasons for examining some aspects over others are unclear due to the differences in these factors between studies, even though the conclusions are heterogeneous in terms of direct or indirect options of influence [23, 24].

From the construction perspective, it is mostly unknown how these elements work together to deliver improved performance. To help guide the study's path, it selected certain internal environmental factors (leadership, human capital, and communication culture) and certain external environmental factors (economic, sociocultural, technological, and political environments) as the main drivers that can address the cause of the construction industry's performance variance. As a result, the hypotheses are stated as follows:

Hypothesis 1 (H1): Political environment affects construction firms' performance outcomes.
Hypothesis 2 (H2): Economic environment affects construction firms' performance outcomes.
Hypothesis 3 (H3): The technology environment affects construction firms' performance outcomes.
Hypothesis 4 (H4): Socio-cultural environment affects construction firms' performance outcomes.
Hypothesis 5 (H5): Leadership affects a construction firm's performance outcomes.
Hypothesis 6 (H6): Human capital affects a construction firm's performance outcomes.
Hypothesis 7 (H7): Communication culture affects the performance outcomes of construction firms.

2.3 *Institutional pressures as factors that mediate*

The institutional theory claims that establishments function in a controlled environment or industrial field that necessitates compliance with social and legal standards through the use of pressure [10]. Consequently, firms modify their procedures, organisational layouts, and operational procedures to conform their actions to environmental needs [25]. Over time, the process of adaptation is prone to homogenisation and reduces heterogeneity because companies working in the same environment are under a variety of pressures and ensure they fulfil their demands. The decrease in heterogeneity between organisations leads to isomorphism [26].

Institutional isomorphism is a process that allows organisations to control their performance using a set of indicators that are strategically aligned [27]. This idea contends that a company's capacity to adjust to the internal and external environments in which it operates and preserve its acts and behaviours is essential to its existence [28, 29]. Norms, values, structures, and social behaviours are institutionalised as a result of the official and informal interactions amongst internal groups within the organisation [30]. In another way, the external context is thought to be crucial in determining the possibility of establishing multiple links between the enterprise, the rules and regulations of the regime, professional organisations (authorisation and certification), as well as other establishments, principally those in the same sector [31].

Organisations become homogeneous in their structures and activities, according to institutional researchers, by responding to external isomorphic forces (pressures), which can be mimetic, normative, or coercive. Coercive isomorphism ensues when companies satisfy governing conditions and thereby become responsible for their activities; mimetic isomorphism occurs when organisations keep track of the activities of competitors; and normative isomorphism occurs when organisations endow their leadership. These pressures are accountable for the manipulation of the relationship between a company's environment and its performance outcome. The discrepancies between these three forms of pressure are sometimes difficult to see because enterprises regularly experience multiple sorts of pressure [32]. The institutional theory presupposes that these pressures are driven by several sources, even though they may occur simultaneously and be challenging to discern in practice [33]. Over time, companies yield to these isomorphic influences, changing their organisational structures, cultures, and product offerings to obtain legitimacy, become more

homogeneous, and gain access to the resources they need to survive and succeed [34]. Dolnicar et al. [35] added that the clarity of how an organisation reacts to institutional pressure is largely decided by its dedication to its mission. This isomorphism is related to inconsistency with the most restrictive governmental or institutional policies, rules, or regulations and possibly influences the construction industry [9].

Therefore, this investigation makes the case that construction enterprises respond to institutional demands and environmental factors in different ways depending on how they perceive them and how they do so highlighting the effects that the pressures have on the performance of companies. They claim that institutional pressures and environmental conditions are what determine the superiority of the performance of an organisation. To justify this claim, this study model includes institutional pressures, external and internal environmental factors, which are classified as predictor or explanatory variables, and their effect on the outcome variable (construction firm performance). The hypotheses are given as follows, in conformity with Figure 1:

Hypothesis 8 (H8): Institutional pressures affect the performance outcomes of construction firms.
Hypothesis 9 (H9): Institutional pressures act as a mediator in the link that exists between the political environment and the performance outcomes of construction firms.
Hypothesis 10 (H10): Institutional pressures act as a mediator in the link that exists between the economic environment and the performance outcomes of construction firms.
Hypothesis 11 (H11): Institutional pressures act as a mediator in the link that exists between the technology environment and the performance outcomes of construction firms.
Hypothesis 12 (H12): Institutional pressures act as a mediator in the link that exists between the socio-cultural environment and the performance outcomes of construction firms.
Hypothesis 13 (H13): Institutional pressures act as a mediator in the link that exists between leadership and the performance outcomes of construction firms.
Hypothesis 14 (H14): Institutional pressures act as a mediator in the link that exists between human capital and the performance outcomes of construction firms.
Hypothesis 15 (H15): Institutional pressures act as a mediator in the link that exists between communication culture and the performance outcomes of construction firms.

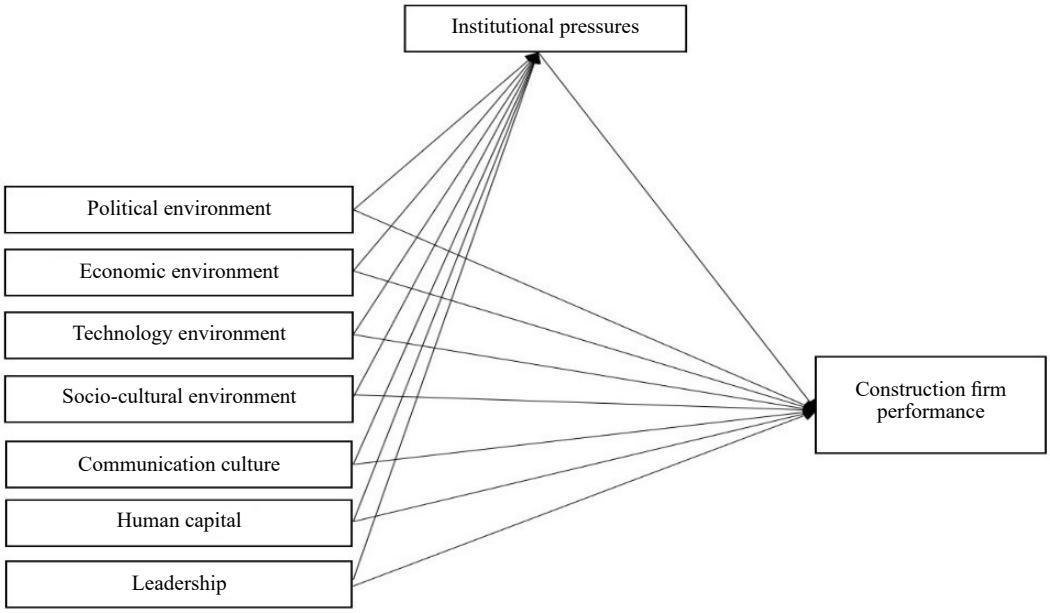

Figure 1. Conceptual framework

3. Research methods

This investigation has examined the direct and joint impacts of environmental factors and institutional pressures on construction companies' performance outcomes, as well as the potential indirect impacts of institutional constraints on the connection between environmental challenges and construction firms' performance. To increase the reliability and validity of the final study tool for this research, a prior pilot survey was performed among 25 construction businesses in this field of research before distributing the primary survey, which illustrated satisfactory results [36]. Due to the war situation happening in Syria during the time of conducting this study, an official data source that captures the exact number of construction firms, as well as their operations within Syria, was not accessible; thus, a non-probability sampling strategy was adopted. Snowball sampling as part of a convenience sample was utilised as a non-probability sampling technique to address this limitation, which led to the survey of 49 valid construction firms with active operations during the period of this investigation. The unit of analysis was the construction firms, while the unit of observation was the professionals within these construction firms.

A power analysis was executed using the G*Power 3.1.9.2 software tool to decide the sample size for this report. The rule of thumb for evaluating sample size was applied; hence, the input parameters were effect size ($f^2 = 0.15$), significant alpha level ($\alpha = 0.05$), craved statistical power ($1 - \beta = 0.95$), and eight predictors (Figure 2). Therefore, a sample size of 160 was adopted for this report, going by the G*Power 3.1.9.2 assumptions for partial least squares structural equation modelling (PLS-SEM).

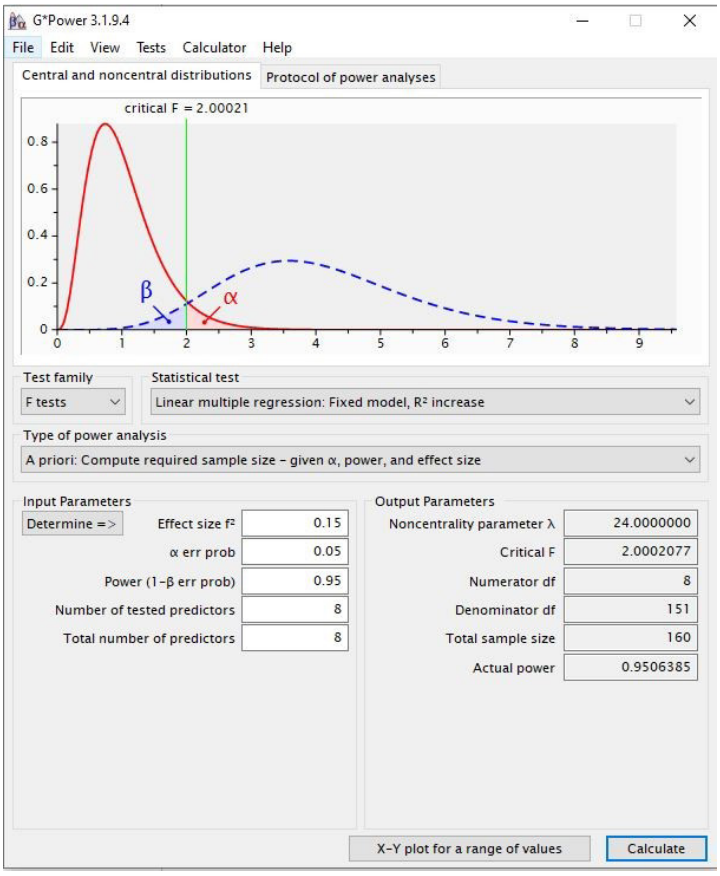

Figure 2. Medium effect's power analysis.

Using a snowball sampling technique, 250 questionnaires were distributed, and 197 valid questionnaires were returned. Therefore, the effective response rate was approximately 78.8%, an adequate survey response rate contrasted

to most postal questionnaire surveys in the construction business, which have a response rate of 20% to 30% [37]. A sample's demographic composition is an important factor to consider. The respondents were asked to respond to the 92 questions anchored on a five-point Likert scale on their views regarding the environmental elements and institutional forces that affect the performance of construction enterprises in Syria (Table 1).

Table 1. The respondents' and construction firms' demographical characteristics

Demographic factor	Category	Frequency	Percentage (%)
Position in the company	Managing director	10	5.1
	Project manager	27	13.7
	Engineer (mechanical, electrical, structural, planner, and architect)	126	64.0
	Manager of the site	29	14.7
	Quality officer	5	2.5
	Foreman	0	0
	Total	**197**	**100.0**
Business activities in the company	Officials of government (specialists, professionals, mayors and engineers)	156	97.2
	Contractors	26	13.2
	Consultants	15	7.6
	Client or client representative	0	0
	Total	**197**	**100.0**
Length of service in present role	Less than 5 years	72	36.2
	5 to 10 years	31	15.7
	11 to 15 years	11	5.6
	16 to 20 years	59	29.9
	beyond 20 years	24	12.2
	Total	**197**	**100.0**
Educational qualifications	Study of vocation	11	5.6
	Bachelor of Science (BSc)	149	75.6
	Master of Science (MSc)	26	13.2
	Doctor of Philosophy (PhD)	11	5.6
	Total	**197**	**100.0**

4. Analysis and result

4.1 *Model for measurement*

4.1.1 *Reliability and convergent validity*

The reliability of the accepted model in this study was determined by two parameters. Each singular item's dependability was first decided by probing the outer loadings of each measure of the constructs, which should be greater than 0.70, and any loadings less than that should be deleted [38-40]. 26 out of 84 items were removed since their loadings were less than the threshold of 0.70. However, only 58 components survived for the whole model since they showed loadings ranging from 0.700 to 0.966 (Table 2). Next, to establish the internal consistency of measures, the composite reliability (CR) coefficient and average variance extracted (AVE) were utilised. Other researchers proposed that the composite dependability coefficient and AVE should respectively be 0.70 and 0.50 at the minimum [41]. Table 2 shows the CR coefficients of the individual latent construct, which range between 0.849 and 0.957, and the AVE, which

ranges between 0.562 and 0.859, both of which are higher than the baseline thresholds of 0.70 and 0.50, respectively. As a result, the current study's measurement consistency and reliability are deemed sufficient.

Table 2. Result of validity of measurement model-convergent

Constructs	Items	Outer loadings	CA	AVE	CR
FP	F-3	0.732	0.883	0.629	0.91
	F-4	0.842			
	F-5	0.833			
	F-6	0.72			
	F-7	0.832			
	F-8	0.788			
CS	C-5	0.795	0.843	0.681	0.895
	C-8	0.739			
	C-9	0.899			
	C-10	0.859			
IBP	IBP-6	0.727	0.946	0.701	0.954
	IBP-11	0.802			
	IBP-12	0.867			
	IBP-13	0.754			
	IBP-14	0.896			
	IBP-16	0.86			
	IBP-17	0.808			
	IBP-18	0.953			
	IBP-19	0.844			
EP	EP-1	0.801	0.916	0.66	0.933
	EP-3	0.751			
	EP-4	0.751			
	EP-7	0.815			
	EP-8	0.82			
	EP-9	0.865			
	EP-10	0.901			
PE	PE-1	0.824	0.918	0.8	0.941
	PE-2	0.896			
	PE-3	0.937			
	PE-4	0.918			
EE	EE-1	0.913	0.941	0.848	0.957
	EE-2	0.909			
	EE-3	0.923			
	EE-4	0.939			
TE	TE-1	0.909	0.919	0.859	0.948
	TE-2	0.923			
	TE-3	0.948			

Note: CA = Cronbach's alpha; FP = financial performance; CS = customer satisfaction; IBP = internal business processes; EP = environmental performance; PE = political environment; EE = economic environment; and TE = technology environment

Table 2. *(Continued)*

Constructs	Items	Outer loadings	CA	AVE	CR
SE	SE-2	0.86	0.731	0.652	0.849
	SE-3	0.74			
	SE-6	0.818			
LS	LS-2	0.966	0.838	0.85	0.919
	LS-4	0.875			
HC	HC-1	0.83	0.881	0.675	0.912
	HC-2	0.852			
	HC-3	0.844			
	HC-4	0.762			
	HC-5	0.788			
CC	CC-1	0.899	0.736	0.791	0.883
	CC-2	0.88			
IP	CP-1	0.769	0.903	0.562	0.92
	CP-2	0.832			
	CP-3	0.816			
	CP-4	0.7			
	MP-1	0.706			
	MP-2	0.714			
	MP-3	0.759			
	NP-1	0.729			
	NP-2	0.706			

Note: CA = Cronbach's alpha; SE = socio-cultural environment; LS = leadership; HC = human capital; CC = communication culture; and IP = institutional pressures

4.1.2 *Discriminant validity*

The results of the heterotrait-monotrait ratio (HTMT) discriminant conditions adopted to evaluate the discriminant validity of the measurement model are shown in Table 3. Table 3 shows that all of the latent constructs' HTMT estimates were less than 0.90. As a result, individual latent construct measurements were found to discriminate contrary to others [42].

Table 3. HTMT discriminant criteria

Constructs	CS	CC	EE	EP	FP	IBP	IP	LS	SE	PE	HC	TE
CS	-											
CC	0.533	-										
EE	0.243	0.133	-									
EP	0.728	0.769	0.206	-								
FP	0.423	0.679	0.327	0.44	-							
IBP	0.768	0.821	0.272	0.867	0.56	-						
IP	0.41	0.771	0.362	0.764	0.807	0.694	-					
LS	0.327	0.514	0.593	0.408	0.567	0.396	0.824	-				
SE	0.634	0.56	0.576	0.829	0.716	0.791	0.892	0.628	-			
PE	0.292	0.212	0.851	0.35	0.456	0.394	0.551	0.488	0.726	-		
HC	0.281	0.554	0.501	0.682	0.616	0.556	0.801	0.797	0.845	0.593	-	
TE	0.246	0.563	0.472	0.798	0.397	0.736	0.69	0.543	0.812	0.574	0.735	-

Note: CS = customer satisfaction; CC = communication culture; EE = economic environment; EP = environmental performance; FP = financial performance; IBP = internal business processes; IP = institutional pressures; LS = leadership; SE = socio-cultural environment; PE = political environment; HC = human capital; and TE = technology environment

4.2 *Structural model*

4.1.1 *The research hypotheses' path coefficient*

To identify the significant path of the real model's coefficients, a normal bootstrapping approach with 5,000 bootstrap samples and 197 examples was employed [42]. Table 4 displays the significant paths of the coefficients for this research model. The diagrammatical histrionics of the structural modelling analysis findings intended to look at the hypothesised interconnection between the latent variables are also portrayed. This is because the hypotheses are presented in a directive manner and because of the power of the two-tailed test. Results show the support of all the hypotheses, H1 to H8.

Table 4. Path coefficients testing the direct effect hypotheses

Hypothesis	Link	Standard beta	Standard error	T-value	p-value	Verdict
H1	Political environment → Construction firm's performance outcomes	0.546	0.113	4.833	0.000	supported **
H2	Economic environment → Construction firm's performance outcomes	0.428	0.106	4.055	0.000	supported **
H3	Technological environment → Construction firm's performance outcomes	0.225	0.053	4.234	0.000	supported **
H4	Socio-cultural environment → Performance outcomes of construction firm	0.525	0.064	8.178	0.000	supported **
H5	Leadership → Construction firm's performance outcomes	0.597	0.067	8.924	0.000	supported **
H6	Human capital → Construction firm's performance outcomes	0.153	0.077	1.982	0.045	supported **
H7	Communication culture → Construction firm's performance outcomes	0.301	0.055	5.454	0.000	supported **
H8	Institutional pressure → Construction firm's performance outcomes	0.707	0.128	5.512	0.000	supported **

Note: Significant at p** = < 0.01; and p* < 0.05

4.2.2 *Coefficient of determination (R^2)*

The research model revealed 86.9% of the total variance in the performance outcomes of construction companies and 91.4% of the total variance in institutional pressures, both of which are considered high. Meanwhile, it was recommended that the R^2 estimate of 0.10 be the least acceptable state [43]. The conclusion is that the endogenous latent variable has the R^2 value threshold.

4.2.3 *The goodness of fit (GoF) of the model*

GoF is the geometric mean of both the AVE and the mean of R^2 of the internal variables [44]. Because the GoF model in this investigation has an estimate of 0.8594, which is above 0.36, it can be argued that the GoF model is sufficiently large to deliberate on sufficient global partial least squares (PLS) model validity.

4.3 *Structural model*

To decide the intensity of the mediating impact of institutional pressures on the connection between environmental characteristics and construction enterprise performance outcomes, this research used the bootstrapping technique with PLS-SEM. To begin, and according to Preacher et al. [45] and Preacher et al. [46], the first stage is to bootstrap the total effect (indirect effect), which requires a significant association between independent variable (IV) and dependent variable (DV) via a mediator with a p-value below 0.05.

The estimates after using the Preacher and Hayes mediator analysis tactic to evaluate the mediating impact of institutional pressures on the connection between the external and internal latent variables are revealed in Figure 3 and Tables 5 and 6. Institutional pressures appreciably affect the link between the political environment and the performance outcomes of construction companies, according to H9. However, regarding the bootstrap as well as the total indirect effect, the results reveal a statistically significant effect with a p-value of 0.000, signifying that there is a significant relationship between the political environment and the performance outcomes of construction companies, which is the mediation role of the institutional pressures.

There are different ways to determine the type of mediating effect of mediators; however, the current mediation literature discusses two different types of mediation, which are full and partial mediation [47]. The results in Table 6 show a full mediation impact.

Similarly, for H10, H12, H13, H14, and H15, institutional forces (pressures) play a key role in mediating the link between independent variables (economic environment, socio-cultural environment, leadership, human capital, and communication culture, respectively) and the dependent variable (performance outcomes of construction firms). Results are statistically significant for the bootstrap total indirect effect since the p-value is less than the threshold value of 0.05. Furthermore, the bootstrapped confidence interval values are void of true zero value; as a result, institutional forces mediate each association between latent constructs and performance outcomes of construction firms. The mediator's type, based on Nitzl et al. [47], as unveiled in Table 6, was a full mediation effect for H10, a complementary partial mediation effect for H12, a competitive partial mediation for H13, a full mediation impact for H14, and a complementary partial mediation for H15.

Only H11 was not supported, which claimed that institutional pressures substantially mediate the connection between technological environment and construction firm performance results; the outcome is statistically insignificant for bootstrap total indirect influence with a p-value of 0.726. It contains a true zero value, according to the bootstrapped confidence interval estimates (95% lower limit [LL] = -0.050, 95% upper limit [UL] = 0.071). Owing to this, H11 was not endorsed, and institutional pressures did not influence the connection between technological elements and construction company performance outcomes.

Table 5. Bootstrapped confidence intervals (lower and higher levels)

	Original sample = standard beta						
	IV → Mediator	Mediator → DV	Automatic calculation	Standard deviation	Automatic calculation	Bootstrapped confidence interval	
	Path a	Path b	Indirect impact		T-value	95% LL	95% UL
M1 (PE)	0.732	0.707	0.518	0.105	4.929	0.312	0.723
M2 (EE)	-0.789	0.707	-0.558	0.116	-4.809	-0.785	-0.330
M3 (TE)	0.02	0.707	0.011	0.03	0.342	-0.050	0.071
M4 (SE)	0.14	0.707	0.100	0.03	3.239	0.040	0.161
M5 (LS)	0.50	0.707	0.354	0.07	4.777	0.208	0.499
M6 (HC)	0.20	0.707	0.144	0.05	2.774	0.042	0.246
M7 (CC)	0.22	0.707	0.155	0.04	4.301	0.084	0.225

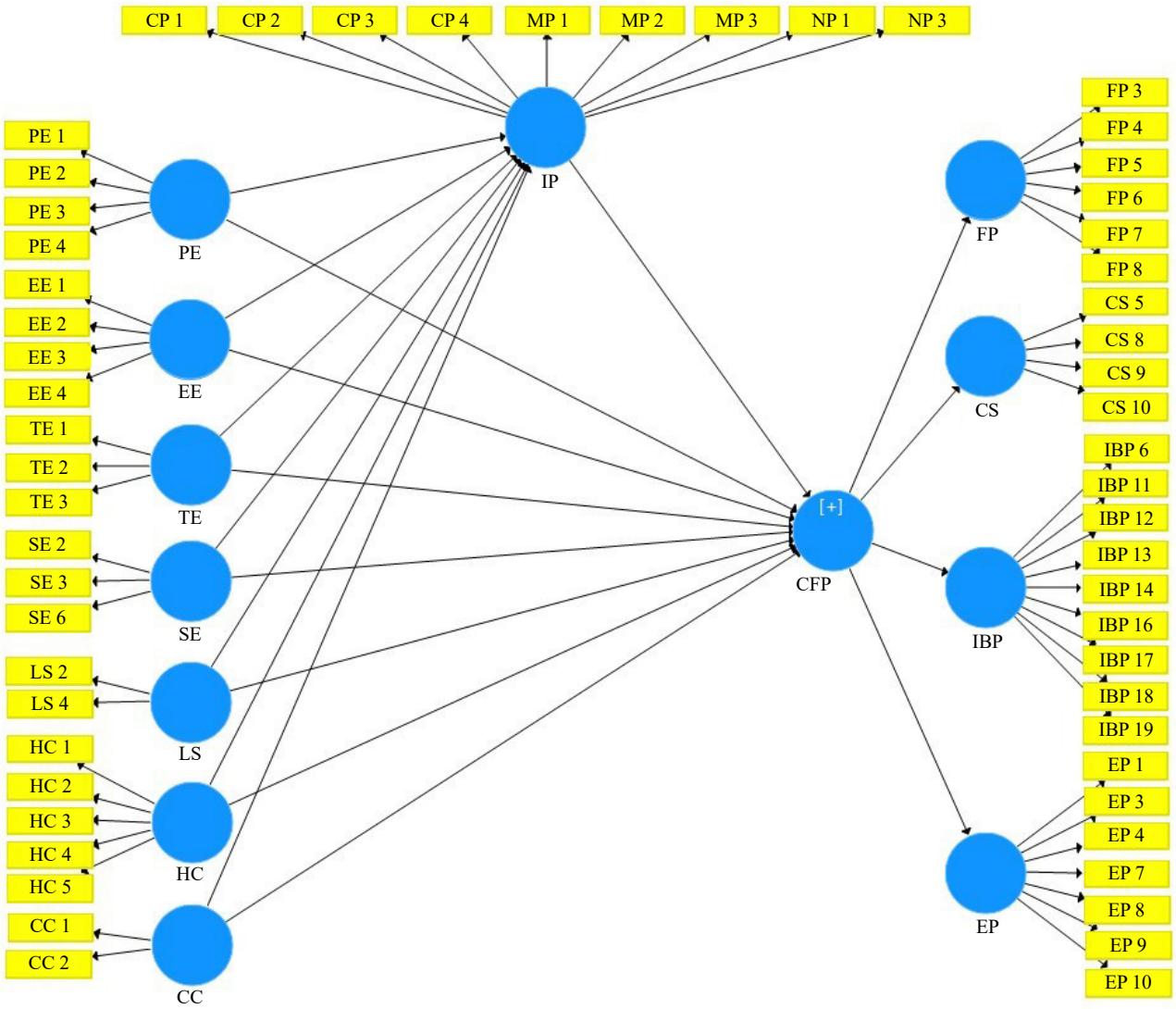

Figure 3. Mediation path model

Table 6. The mediator type

	p-value of the direct effect (C`)	Decision	Indirect impact's original sample (a*b)	Direct impact's original sample (c`)	Type of mediator
M1 (PE)	0.764	Not-significant	0.518	-0.028	Full mediation
M2 (EE)	0.167	Not-significant	-0.558	-0.13	Full mediation
M3 (TE)	0	Significant	0.011	0.236	No-effect
M4 (SE)	0	Significant	0.1	0.625	Complementary partial mediation
M5 (LS)	0.001	Significant	0.354	-0.243	Competitive partial mediation
M6 (HC)	0.898	Not-significant	0.144	-0.009	Full mediation
M7 (CC)	0	Significant	0.155	0.456	Complementary partial mediation

5. Discussion

This study merged two aspects of literature. On one hand, the impact of various environmental elements (political, economic, technological, socio-cultural, leadership, human capital, and communication culture) as well as institutional constraints (coercive, normative, and mimetic) on construction company performance was examined. On the other hand, the function of institutional pressures as a mediator in the relationship between environmental elements and the performance of construction firms was investigated. Hypotheses were developed based on information from previous studies and then investigated in an SEM analysis using SmartPLS 3. The PLS structural model analysis via the R^2 shows that 86.9% of the variance in construction company performance and 91.4% of the variance in institutional pressures are explained by the independent variables.

Investigating the influence of environmental factors on the performance of construction firms provides major benefits to the industry. The findings show that positive and significant relationships exist between environmental factors such as technological, socio-cultural, leadership, and human capital as independent variables and construction firm performance as a dependent variable (H3, H4, H5, and H6), which is consistent with many studies [48-51]. Meanwhile, the results from the effect of other environmental factors such as political, economic, and communication culture (H1, H2, and H7) are contrary to the findings from some other studies [52-54]. Furthermore, the direct link between institutional pressures and construction firm performance (H8) was positive and significant, by other studies [55].

The indirect effects of institutional pressures as a mediator in the relationship between environmental factors and performance outcomes of construction firms accorded a value-added point to construction firms, as all indirect effects through institutional pressures as a mediator were supported (H9, H10, H12, H13, H14, and H15), with only one case (between technological environment and construction firm performance (H11)) being insignificant. Consequently, the results demonstrate that institutional forces (pressures) mediate the influences of external environmental factors over the performance of construction firms in distinct ways.

The conclusions presented in this research are important for construction management. The general topic of institutional theory is covered first. In prior studies on construction management premised on institutional theory, performance results have often been viewed as an isomorphic operation at the project stage. Performance outcomes were viewed as an inter-organisational issue in this article, allowing us to focus on the institutional processes at work at the company level within a hierarchical environment.

6. Theoretical and practical implications

Organisational and social components that are subject to regional and international institutional pressures influence the implications of this research for construction management in addition to national institutional frameworks by how organisations adjust to the rules and norms in a field to obtain legitimacy. Hence, businesses must understand that institutional pressures must be aligned with the performance improvement plan and how they may shape organisations

in this discipline in their quest for acceptability.

Although institutional theory has been extremely helpful, it has become so widely used that a better understanding of its broad application to construction industry research is required. Therefore, this study is the first to examine institutional and environmental forces as a significant predictor of firm performance, and management at all levels should find it interesting that coercive pressures, normative pressures and mimetic pressures are essential elements of the institutional environment that should be incorporated in corporate strategies towards enhanced performance. The study prepared the basis for upcoming researchers concerned with examining the causes of variational performance in construction companies from a theoretical perspective. It also has important implications for construction professionals and management concerning designing and distributing assets, as well as approaches for achieving outstanding quality.

The research results are likely to pique the interest of chief executive officers (CEOs) and managers of projects, including those delegated decision-making duties in construction companies, that need to comprehend the kinds of endogenous pressures that are most appropriate for various commercial settings to enhance the performance of their enterprises. The discoveries of this study may catch the attention of public entities entrusted with establishing and implementing policies related to the performance of the construction industry, as well as construction specialists.

Nevertheless, care should be taken in the interpretation of the discoveries since, in a complicated business context, construction managers must collate and analyse market and environmental data to reduce ambiguity. Results show that managers are responsible for making strategic decisions for their companies. From the standpoint of a corporate environment, it will be easier to choose which of the numerous complicated environmental concerns will entail more focus and yield healthier results.

7. Limitations and future directions

Although this investigation has shed some light on how institutional pressures and environmental factors affect the performance of construction firms, it is not without its shortcomings. Due to the cross-sectional approach used in the current investigation, no underlying conclusions about the research population can be made. Therefore, a longitudinal data collection strategy (mixed approach) with more exacting procedures could produce better results. Additionally, sample size limits could prevent the results from being generalised because larger experimental populations could lead to more accurate conclusions that would be more realistic. Future scholars may attempt to increase the study samples from the current 197 to improve performance and increase the variety to more than 86.9% by incorporating other external effects. To strengthen the validity of the results, they may be repeated in a different climate and using other samples. The results open the door for further investigation into the topic of construction management to examine institutional pressures' potential moderating effects and several other charismatic traits like legitimacy.

Conflict of interest

There is no conflict of interest in this study.

References

[1] Beatham S, Anumba C, Thorpe T, Hedges I. KPIs: A critical appraisal of their use in construction. *Benchmarking: An International Journal*. 2004; 11(1): 93-117. https://doi.org/10.1108/14635770410520320

[2] Balatbat MCA, Lin CY, Carmichael DG. Management efficiency performance of construction businesses: Australian data. *Engineering, Construction and Architectural Management*. 2011; 18(2): 140-158. https://doi.org/10.1108/09699981111111120

[3] Accenture. *Infrastructure & Transportation Services: Achieving High Performance in the Construction Industry.* https://www.accenture.com/t20150523t042717__w__/us-en/_acnmedia/accenture/conversion-assets/dotcom/documents/global/pdf/industries_2/accenture-achieving-high-performance-construction-industry.pdf [Accessed 19th October 2021].

[4] Yang H, Yeung JFY, Chan APC, Chiang YH, Chan DWM. A critical review of performance measurement in construction. *Journal of Facilities Management*. 2010; 8(4): 269-284. https://doi.org/10.1108/14725961011078981
[5] Luu TV, Kim SY, Cao HL, Park YM. Performance measurement of construction firms in developing countries. *Construction Management and Economics.* 2008; 26(4): 373-386. http://dx.doi.org/10.1080/01446190801918706
[6] Dorsey D, Mueller-Hanson R. *Performance management that makes a difference: An evidence-based approach*. The Society for Human Resource Management (SHRM). 2017.
[7] Oyewobi LO, Windapo AO, Rotimi JOB. Determinants of construction organisational performance: A partial least square-path analytic method. *Journal of Financial Management of Property and Construction*. 2017; 22(1): 37-61. https://doi.org/10.1108/JFMPC-05-2016-0021
[8] Pati RK, Nandakumar MK, Ghobadian A, Ireland RD, O'Regan N. Business model design-performance relationship under external and internal contingencies: Evidence from SMEs in an emerging economy. *Long Range Planning*. 2018; 51(5): 750-769. https://doi.org/10.1016/j.lrp.2018.01.001
[9] Oyewobi LO, Windapo A, Rotimi JOB, Jimoh R. Analysis of the South African construction industry business environment. *Journal of Facilities Management*. 2020; 18(4): 393-416. https://doi.org/10.1108/JFM-05-2020-0033
[10] DiMaggio PJ, Powell WW. The iron cage revisited: Institutional isomorphism and collective rationality in organizational fields. *American Sociological Review*. 1983; 48: 147-160. https://doi.org/10.2307/2095101
[11] Maya RA. Performance management for Syrian construction projects. *International Journal of Construction Engineering and Management*. 2016; 5(3): 65-78. http://article.sapub.org/10.5923.j.ijcem.20160503.01.html
[12] Rathore Z, Elwakil E. Hierarchical fuzzy expert system for organizational performance assessment in the construction industry. *Algorithms*. 2020; 13(9): 1-25. https://doi.org/10.3390/a13090205
[13] Vogl B, Abdel-Wahab M. Measuring the construction industry's productivity performance: Critique of international productivity comparisons at industry level. *Journal of Construction Engineering and Management*. 2015; 141(4): 1-10. https://doi.org/10.1061/(ASCE)CO.1943-7862.0000944
[14] Parker C. Performance measurement. *Work Study*. 2000; 49(2): 63-66. https://doi.org/10.1108/00438020010311197
[15] Wang A, Guess M, Connell K, Powers K, Lazarou G, Mikhail M. Fecal incontinence: A review of prevalence and obstetric risk factors. *International Urogynecology Journal*. 2006; 24: 253-260. https://doi.org/10.1007/s00192-005-1338-x
[16] Lin G, Shen Q. Measuring the performance of value management studies in construction: Critical review. *Journal of Management in Engineering*. 2007; 23(1): 2-9. https://doi.org/10.1061/(ASCE)0742-597X(2007)23:1(2)
[17] Ali HAEM, Al-Sulaihi IA, Al-Gahtani KS. Indicators for measuring performance of building construction companies in Kingdom of Saudi Arabia. *Journal of King Saud University - Engineering Sciences*. 2013; 25(2): 125-134. https://doi.org/10.1016/j.jksues.2012.03.002
[18] Ma'ruf B, Ratnaningsih A. Analysis of business entities affecting the competitiveness of the construction industry in Indonesia with the multivariate approach. In: Anam K, Wiyono RUA, Darmayanti RF, Setiawan FA, Rohman A. (eds.) *AIP Conference Proceedings: Climate Change and Sustainability Engineering in ASEAN 2019*. College Park, Maryland: AIP Publishing; 2020. p.1-10.
[19] Shatilo O. The impact of external and internal factors on strategic management of innovation processes at company level. *Ekonomika.* 2019; 98: 85-96. https://doi.org/10.15388/Ekon.2019.2.6
[20] Bright DS, Cortes AH, Hartmann E, Parboteeah KP, Pierce JL, Reece M, et al. *Principles of management*. Houston, Texas: Rice University; 2019. https://openstax.org/details/books/principles-management
[21] Guo T, Wang G, Wang C. Empirical study on the effect of environmental factors on enterprise growth - Comparative analysis of Chinese large scale industrial enterprises and small/medium industrial enterprises. *Eurasia Journal of Mathematics, Science and Technology Education*. 2017; 13(11): 7549-7559. https://doi.org/10.12973/ejmste/77910
[22] Jin MEE. *Factors affecting growth of construction organizations in Nairobi*. Master's degree thesis. United States International University-Africa; 2018.
[23] Fehan H, Aigbogun O. Influence of internal organizational factors and institutional pressures on construction firms' performance. *Construction Economics and Building*. 2021; 21: 81-99. https://doi.org/10.5130/AJCEB.v21i2.7593
[24] Hassan B, Omran J, Maya R. Measuring the performance of construction firms, using data envelopment analysis. *Tishreen University Journal of Research and Scientific Studies - Engineering Sciences Series*. 2019; 30: 147-168. http://journal.tishreen.edu.sy/index.php/engscnc/article/view/7109
[25] Hsu PF, Hu PJH, Wei CP, Huang JW. Green purchasing by MNC subsidiaries: The role of local tailoring in the presence of institutional duality. *Decision Sciences*. 2014; 45(4): 647-682. https://doi.org/10.1111/deci.12088
[26] Kondra AZ, Hinings CR. Organizational diversity and change in institutional theory. *Organization Studies*. 1998; 19(5): 743-767. https://doi.org/10.1177/017084069801900502

[27] Fehan H, Aigbogun O. Impact of external environmental factors on construction firms' performance, mediated by institutional pressures. *Civil Engineering Journal*. 2002; 8: 967-984. https://doi.org/10.28991/CEJ-2022-08-05-09
[28] Dacin MT. Isomorphism in context: The power and prescription of institutional norms. *Academy of Management Journal*. 1997; 40: 46-81. https://www.jstor.org/stable/257020
[29] Fuenfschilling L, Truffer B. The structuration of socio-technical regimes-Conceptual foundations from institutional theory. *Research Policy.* 2014; 43(4): 772-791. https://doi.org/10.1016/j.respol.2013.10.010
[30] Powell WW, DiMaggio PJ. (eds.) *The new institutionalism in organizational analysis.* Chicago, United States of America: The University of Chicago Press; 1991. https://doi.org/10.7208/chicago/9780226185941.001.0001
[31] Martínez JB, Fernández ML, Fernández PMR. Corporate social responsibility: Evolution through institutional and stakeholder perspectives. *European Journal of Management and Business Economics*. 2016; 25(1): 8-14. https://doi.org/10.1016/j.redee.2015.11.002
[32] Sowa JE. The collaboration decision in nonprofit organizations: Views from the front line. *Nonprofit and Voluntary Sector Quarterly*. 2008; 38(6): 1003-1025. https://doi.org/10.1177/0899764008325247
[33] Zorn TE, Flanagin AJ, Shoham MD. Institutional and noninstitutional influences on information and communication technology adoption and use among nonprofit organizations. *Human Communication Research.* 2011; 37(1); 1-33. https://doi.org/10.1111/j.1468-2958.2010.01387.x
[34] Meyer JW, Rowan B. Institutionalized organizations: Formal structure as myth and ceremony. *American Journal of Sociology*. 1977; 83: 340-363. https://doi.org/10.1086/226550
[35] Dolnicar S, Irvine H, Lazarevski K. Mission or money? Competitive challenges facing public sector nonprofit organisations in an institutionalised environment. *International Journal of Nonprofit and Voluntary Sector Marketing*. 2007; 13(2): 107-117. https://doi.org/10.1002/nvsm.311
[36] Fehan H, Aigbogun O. Analysis of the factors affecting Syrian construction companies' performance. *International Journal of Innovation, Creativity and Change*. 2020; 11(3): 243-258. https://www.ijicc.net/images/vol11iss3/11321_Fehan_2020_E_R.pdf
[37] Bowen P, Pearl R, Akintoye A. Professional ethics in the South African construction industry. *Building Research & Information*. 2007; 35(2): 189-205. https://doi.org/10.1080/09613210600980267
[38] Duarte PAO, Raposo MLB. A PLS model to study brand preference: An application to the mobile phone market. In: Vinzi VE, Chin WW, Henseler J, Wang H. (eds.) *Handbook of partial least squares: Concepts, methods and applications*. Berlin, Heidelberg: Springer; 2010. p.449-485.
[39] Hair JF, Sarstedt M, Pieper TM, Ringle CM. The use of partial least squares structural equation modeling in strategic management research: A review of past practices and recommendations for future applications. *Long Range Planning*. 2012; 45(5-6): 320-340. https://doi.org/10.1016/j.lrp.2012.09.008
[40] Hair Jr JF, Sarstedt M, Hopkins L, Kuppelwieser VG. Partial least squares structural equation modeling (PLS-SEM): An emerging tool in business research. *European Business Review*. 2014; 26(2): 106-121. https://doi.org/10.1108/EBR-10-2013-0128
[41] Hair Jr JF, Ringle CM, Sarstedt M. PLS-SEM: Indeed a silver bullet. *Journal of Marketing Theory and Practice.* 2011; 19(2): 139-152. https://doi.org/10.2753/MTP1069-6679190202
[42] Hair Jr JF, Hult GTM, Ringle CM, Sarstedt M. *A primer on partial least squares structural equation modeling (PLS-SEM)*. 2nd ed. Thousand Oaks, California: SAGE Publications; 2017. https://www.google.com.my/books/edition/A_Primer_on_Partial_Least_Squares_Struct/JDWmCwAAQBAJ?hl=en&gbpv=0
[43] Falk RF, Miller NB. *A primer for soft modeling*. Akron, Ohio: The University of Akron; 1992. https://www.researchgate.net/publication/232590534_A_Primer_for_Soft_Modeling
[44] Tenenhaus M, Vinzi VE, Chatelin YM, Lauro C. PLS path modeling. *Computational Statistics & Data Analysis*. 2005; 48(1): 159-205. https://doi.org/10.1016/j.csda.2004.03.005
[45] Preacher KJ, Hayes AF. SPSS and SAS procedures for estimating indirect effects in simple mediation models. *Behavior Research Methods, Instruments, & Computers.* 2004; 36: 717-731. https://doi.org/10.3758/BF03206553
[46] Preacher KJ, Hayes AF. Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior Research Methods*. 2008; 40: 879-891. https://doi.org/10.3758/BRM.40.3.879
[47] Nitzl C, Roldan JL, Cepeda G. Mediation analysis in partial least squares path modeling: Helping researchers discuss more sophisticated models. *Industrial Management & Data Systems*. 2016; 116(9): 1849-1864. https://doi.org/10.1108/IMDS-07-2015-0302
[48] Sepasgozar SME, Davis S. Construction technology adoption cube: An investigation on process, factors, barriers, drivers and decision makers using NVivo and AHP analysis. *Buildings.* 2018; 8(6): 1-31. https://doi.org/10.3390/buildings8060074
[49] Alade K, Windapo A, Wachira-Towey IN. Rethinking leadership in the fourth industrial revolution: Lessons for

construction business organizations. *Journal of Leadership Studies*. 2021; 15(1): 74-80. https://doi.org/10.1002/jls.21731

[50] Bahr M, Laszig L. Productivity development in the construction industry and human capital: A literature review. *Civil Engineering and Urban Planning: An International Journal (CiVEJ)*. 2021; 8: 1-15. https://doi.org/10.48550/arXiv.2104.00129

[51] Daineko LV, Goncharova NV, Larionova VA, Karavaeva NM, Sheveleva AE. Socio-cultural impact of church building in Russia (the case of the cathedral of Saint Martyr Catherine in Ekaterinburg). In: Solovev DB. (ed.) *International Science and Technology Conference "Earth Science"*. Bristol, United Kingdom: IOP Publishing; 2021. p.1-10.

[52] Asamoah RO, Baiden BK, Nani G, Kissi E. Review of exogenous economic indicators influencing construction industry. *Advances in Civil Engineering*. 2019; 2019: 1-8. https://doi.org/10.1155/2019/6073289

[53] Ezenekwe CI. Effect of environmental factors on firm productivity in manufacturing firms in Anambra State, Nigeria. *International Journal of Innovative Social Sciences & Humanities Research*. 2020; 8(1): 133-143. https://seahipaj.org/journals-ci/mar-2020/IJISSHR/full/IJISSHR-M-15-2020.pdf

[54] Kania E, Radziszewska-Zielina E, Śladowski G. Communication and information flow in Polish construction projects. *Sustainability*. 2020; 12(21): 1-23. https://doi.org/10.3390/su12219182

[55] Li X, Gao-Zeller X, Rizzuto TE, Yang F. Institutional pressures on corporate social responsibility strategy in construction corporations: The role of internal motivations. *Corporate Social Responsibility and Environmental Management*. 2019; 26(4): 721-740. https://doi.org/10.1002/csr.1713