Structural Equation Model to Evaluate the External Factors of Iraqi Construction Projects Performance Using PESTLE Technique

Layth Salman Khalid
Faculty of Civil and Environmental Engineering
University Tun Hussein Onn Malaysia (UTHM), Batu Pahat, Johor, Malaysia
Email- layth.s.khalid@gmail.com

Ismail Abdul Rahman
Faculty of Civil and Environmental Engineering
University Tun Hussein Onn Malaysia (UTHM), Batu Pahat, Johor, Malaysia
Email- ismailar@uthm.edu.my

Hayder Saadoon Abdulaali
Faculty of Engineering & Built Environment
Universiti Kebangsaan Malaysia (UKM), Bangi, Selangor, Malaysia
Email- haydersaadoonabdulaali@gmail.com

Mahmood Jamal Abdulhasan
Faculty of Science and Technology
Universiti Kebangsaan Malaysia (UKM), Bangi, Selangor, Malaysia
Email- mahmoodjamal676@yahoo.com

Abstract- The significance of the construction industry is special as it may lead to cost savings and economical development of countries around the world regardless of its status; underdeveloped, developing or developed. However, there are various restrictions and risks to the execution of a construction project that restrict its start or progression operations, which commonly have a major negative impact on the overall project performance. Prior study evaluated the effect of company-related internal variables on project performance and disregarded the external variables. This research seeks to fill this gap by using the PESTLE technique to evaluate the effect of the external factors on Iraq construction industry performance in terms of time, quality and cost. The research data is collected by a survey questionnaire with several construction project practitioners in Iraq. Structural Equation Modeling (SEM) was utilized to fulfill the research objective. Data collection is conducted utilizing a mix method approach comprises of a survey questionnaire with several construction project practitioners and an interview with several academicians relevant to the construction industry. The SEM reveals that the model is fit the nature of data and the research variables. The findings show that the PESTLE factors affect construction projects in different extents. The findings also indicate that the time, quality and cost are significantly contributed to performance in convergent extents. Investigating the effect of these factors will help construction industries to prevent or mitigate risks, control expenditures, and achieve competitive advantages.

Keywords – SEM model Construction project; Project performance; PESTLE.

I. INTRODUCTION

Construction industry carries a pivotal role in a nation's development. It significantly contributes to the growth and economy of the country, where construction projects constitute approximately 10% of Gross Domestic Product (GDP) in many developing and developed countries [1-3]. Thus, enhancing the construction industry performance is certainly contributing to cost saving and economic growth for countries globally, and it has to be dealt with efficiently at each construction stages starting from the design stage [4-6]. Many factors are used to evaluate project performance such as time, quality, cost, client satisfaction, safety and health business performance [3, 7] indicated that a project time, and estimated time and cost of a project are essential indicators of the project performance.

Completing a project in time, within specific budget according to certain specifications is an indicator of a success project [8, 9]. Auma [10] indicated that cost, time, quality influence the performance of construction project. Likewise, Abd El-Karim, et al. [11] confirmed the importance of cost and time as a significant determinant for the success of a construction project. Yet, a construction project execution is exposed to various restrictions and risks that limit its progress, consequently affect its performance [12-14]. As the construction industry works particularly on project-specific and multifaceted context including various parties, consulting professions, and contractual arrangements, it faces various challenges affecting its performance and development [15-17]. Enshassi, et al. [18] stated that accomplishing construction project effectively needs to consider business environment, political stability and economic with managerial quality, fiscal, technical and managerial performance. Rastogi and Trivedi [19] indicated that external factors cannot be controlled by organizations and they are difficult to be identified. Babalola, et al. [20] stated that external factors such as political, social, economic, and cultural have a significant impact on the performance of construction projects.

On the other hand, Pulaj and Kume [21] clarified that business strategies and managerial processes should consider the external environment due to their uncertainty and dynamics increase that need thorough analysis of the macro-environment using the PESTLE technique. Ansah, et al. [22] indicated that the key external challenges are categorized into essential groups called "PESTLE" factors. This strategic management technique utilized efficiently in the external factors recognition process. PESTLE refers to Political (P); Economic (E); Social (S); Technological (T); Legal (L) and Environmental (E). External factors are unforeseeable which may cause effects that cannot be simply handled or avoided without substantial losses; therefore, there is a necessity to study its influences on construction project. Understanding these influences is significant for construction industry to control expenditures, manage risks and achieve competitive advantages. This research considers Iraq as a case study due to the critical situation Iraq passing through especially political and economic difficulties that affect all aspects particularly after the American invasion in 2003 [23]. Some studies conducted in Iraq have investigated several influential factors on construction projects [24, 25] regardless studying the external factors separately despite their importance due to political, economic and social situation deterioration.

This study investigates the impact of external factors on Iraqi construction projects performance based on time, quality and cost using PESTLE techniques. This technique is utilized because it is a comprehensive framework and an effective tool to recognize, investigate, and categorize the various variables in the macro environment [22].

II. RESEARCH MODEL AND HYPOTHESES

Researchers developed several models on factors influencing the project construction performance based on time, quality and cost, which mostly studied project and participant-related internal factors. Alias, et al. [26] in his model investigated external factors impact, inclusive of impact of additional factors on business project performance, which includes political, economic, social, and technological issues. Niagara and Datche [27] studied social, economic and technology impact, including other factors impacting construction project performance in coastal region of Kenya. Alfakhri, et al. [28] generated a study model on numerous factors impacting Libya's construction project. Among these factors are the external factors, which include weather changes, political, economic, unstable situations. As stated by Durdyev, et al. [9] who studied the effect of social, environmental and technological factors among several factors on construction projects in Cambodia. While Soewin and Chinda [14] studied the impact of environmental and technological factors among others on construction project performance. Alashwal, et al. [29] studied the impact of economic, political, social and technological factors, including other factors on the international construction projects in Malaysia. Evidently, previous research considered the impact of several factors including some external factors.

Therefore, this study extends the literature by examining the impact of most external factors on construction project performance using PESTLE technique based on time, quality and cost due to its significant utilization by most researchers as frequent indicators. Thus, a conceptual model is developed to define the effect of PESTLE factors on construction project performance. There are six independent variables in this research (PESTLE factors), while the dependent variable is the project performance. Time, quality and cost are included as factors in the

conceptual model to investigate how they contribute to project performance since the literature indicates that they are the main indicators of performance. In reference to the developed conceptual model, six hypotheses are developed to investigate PESTLE factors impact on performance. The following figure illustrates the model of this research.

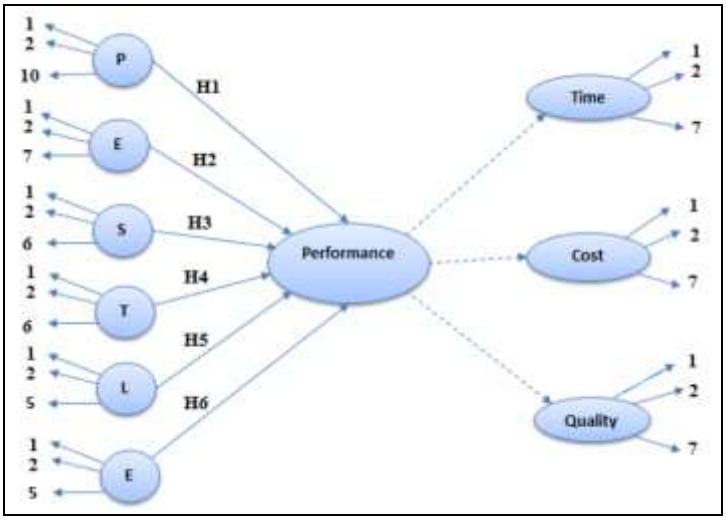

Figure 1. Research model

The model includes PESTLE factors with 39 items, and the time, quality and cost factors which include 21 items. Measurement sources of performance effects factors are introduced in Table 1.

Table -1 Measurement sources of performance effects factors

Constructs (Variables)	Items	Sources
Political	10	Jaber (2015), Jose and Ambili (2017), Kogi (2013), Omran et al. (2012), Olukyode et al. (2015), Alias et al. (2014)
Economic	7	Kogi (2013), Jose and Ambili (2017), Enshassie al. (2016), Olawale and Sun, (2010) , Alias et al. (2014)
Social	6	Adenuga (2013), Aziz and Abdel-Hakam (2016), Jose and Ambili (2017), Jaber (2015), Abdulsattar (2017), Alias et al. (2014)
Technological	6	Nyoni and Bonga (2016), Adenuga, (2013), Jaber (2015), Alias et al. (2014), Niagara and Datche (2015)
Legal	5	Enshassie al. (2016), Jaber (2015), Omran et al. (2012), Haseeb et al. (2011)
Environmental	5	Jaber (2015), Jose and Ambili (2017), Haseeb et al. (2011), Ogunde et al. (2017), Abdulsattar (2017)
Time	7	Enshassi et al. (2009), Haseeb et al., (2011), Jaber (2015), Aziz and Abdel-Hakam (2016)
Cost	7	Enshassi et al. (2009), Jaber (2015), Aziz and Abdel-Hakam, (2016), Abdulsattar (2017)
Quality	7	Enshassi et al. (2009), Omran et al. (2012), Jaber (2015), Enshassie al. (2016)

Based on the research model, six hypotheses are developed:

H1: Political factor has a significant impact on project performance

H2: Economic factor has a significant impact on project performance

H3: Social factor has a significant impact on project performance

H4: Technological factor has a significant impact on project performance

H5: Legal has a significant effect on project significant impact on project performance

H6: Environmental has a significant impact on project significant effects on project performance

III. Research Methodology

To evaluate the validity of the proposed research model, data collection is conducted using a structured questionnaire with various project parties in several organizations in public sector in construction industry in Iraq. The actual survey questionnaire is the outcome of a reliability test and a validation process. The reliability test includes a pilot study with 30 respondents from construction projects of Iraq, while the validation includes 12 expert judgments from construction sector in Iraq and Malaysia. The actual questionnaire includes three sections for demographic factors, effects of PESTLE on project performance and effects of time, quality and cost on project performance respectively.

The target respondents for this survey are different construction project parties such as contractors, sub-contractors, consultants, project manager, and civil engineers who are selected based on random sampling technique. The selected sample size based on Hair Jr, et al. [30] stated that the equal is to 10 times the largest number of formative indicators used to measure a single construct. The size should be 100, but in total of 140 sets of questionnaires was administered for varying reasons (incomplete, missing, disregarded) to prevent insufficiency in the total survey questionnaire. Respondents were requested to rate all the research variables items using the Likert 5-point scale. Using PLS-SEM package, the questionnaire data is analyzed utilizing various statistical analysis (e.g. Descriptive analysis and Multivariate analysis) to construct the SEM-model of the influencing PESTLE factors.

IV.SEM Model

The next stage is to carry out the test to construct the SEM model, after specifying the convergent and discriminant validity. The SEM-PLS is applied to test the research model and evaluate the research hypothesizes. The structural model explains the relations among all research variables. The bootstrap procedure is used to estimate the PLS path models and assess the significance of path coefficients.

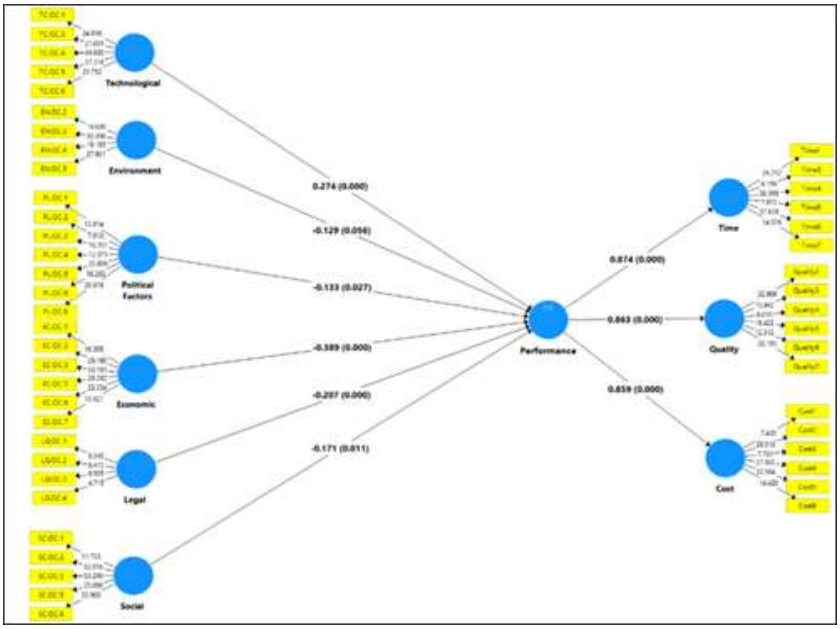

Figure 2. The SEM Model

A. Path Coefficient

The results of the boot strapping method are introduced in Table 7. They include the standardized path relationships among the PESTLE constructs (path coefficients) in the structural equation model as well as the significance estimation of relationships. Hair Jr, et al. [30] stated that the path coefficients (β) possess standardized values of between – 1 to +1. To demonstrate the importance of a relationship, P value should be less than 0.05 and the t value should be greater than 1.96 [30].

Table -2 Path coefficients of time, cost and quality

Hypotheses	Path	β	SE	*t* value	*P* Values	Inference
H1	Political ---> Performance	-0.133	0.06	2.212	0.027	Significant
H2	Economic -----> Performance	-0.389	0.057	6.795	0	Significant
H3	Social ------> Performance	-0.171	0.067	2.537	0.011	Significant
H4	Technological -----> Performance	0.274	0.058	4.712	0	Significant
H5	Legal ------> Performance	-0.207	0.053	3.932	0	Significant
H6	Environment ---> Performance	-0.129	0.068	1.985	0.04	Significant

Table 2 shows that values of β are within the limit. The values of (P & t) indicate significant effects of the PESTLE constructs on performance.

Table 3 shows the path coefficients of the SEM model regarding to how the total performance in terms of time, quality and cost is affected by the PESTLE.

Table -3 Measurement sources of performance effects factors

Relatio	β	SE	*t* value	*P* value	Inference
Performance -----> Cost	0.859	0.02	42.207	0	Significant
Performance -----> Quality	0.863	0.036	24.222	0	Significant
Performance -----> Time	0.874	0.032	27.339	0	Significant

Table 3 shows that the t values are more than 1.96 and P values are zero, and β is large. This confirms that time, quality and cost can be significantly used to measure the project performance and this is in line with most literature.

B. Hypotheses Testing

The non-parametric bootstrap with 5000 repetitions was used for testing the hypotheses by calculating t-value. The corresponding t values was calculated using 5000 bootstrap samples. A two-tail t-test was used for all paths. In addition to the summary of the path coefficients results, Table 9 displays the research hypotheses for the relations between PESTLE factors and the performance. Table 9 displays the research hypotheses for the relations between PESTLE factors and the performance.

Table 4 shows that values of β are within the limit. The values of (P & t) indicate significant effects of the PESTLE constructs on performance. Therefore, all the hypotheses are supported.

- Hypothesis H1 is supported. This is in agreement with Abdulsattar [25], Jaber [24] and Ogwueleka [31] who confirmed the effect of political factors on project performance.
- Hypothesis H2 is supported. This is in agreement with Chan, et al. [32] and Jha and Iyer [33] who indicated that economic as one of the factors affecting project performance.
- Hypothesis H3 is supported. This is in agreement with Abdulsattar [25] and Jaber [24] who indicated that social factors such as unofficial holidays have an effect on project performance. This is also in accordance with Jha and Iyer [33] who indicated that social conditions have an effect on project performance.
- Hypothesis H4 is supported. Most researchers verify technology's impact on project performance [24, 31, 34].
- Hypothesis H5 is supported. This is in agreement with Rezakhani [35] who indicated that legal factors affect project performance. It also in accordance with Ogwueleka [31] who stated that rules and regulations have an effect on project performance.
- Hypothesis H6 is supported. These is consistent with Chan, et al. [32] and Toor and Ogunlana [36] who indicated the effect of environment on project performance.

Table -4 PESTLE hypotheses testing results

No.	Hypotheses	β	SE	*t* value	*P* Values	Inference
H1	Political factor has a significant effect on project performance	-0.133	0.06	2.212	0.027	Fail to reject
H2	Economic factor has a significant effect on project performance	-0.389	0.057	6.795	0	Fail to reject
H3	Social factor has a significant effect on project performance	-0.171	0.067	2.537	0.011	Fail to reject
H4	Technological factor has a significant effect on project performance	0.274	0.058	4.712	0	Fail to reject
H5	Legal factor has a significant effect on project performance	-0.207	0.053	3.932	0	Fail to reject
H6	Environmental factor has a significant effect on project performance	-0.129	0.068	1.985	0.04	Fail to reject

C. Model Evaluation

Significant evaluation metrics of the structural model consists of determination coefficients (R2), effect size (f2), and predictive relevance (Q2) [30].

D. Explain Variance

Explained variance R2 (Also known as determination coefficients) is used to inspect the total model ability in representing the effect of independent variables toward the dependent variables. R2 = 0.25 (weak), 0.50 (medium), while 0.75 (high) [30]. The SEM model's explained variance results is as shown in Table 5.

Table -5 SEM Model's explained variance results

	R^2	R^2 Adjusted
Performance	0.648	0.63

The R2 value in Table 5 indicates the SEM model reliability since its value exceeds 0.5. This value indicates that more than 64.8 % of performance in terms of time, quality and cost can be attributed to PESTLE effect.

E. Effect Size

The size of the effect is used to evaluate whether the model's particular exogenous construct may have significant effect on endogenous constructs. Hair Jr, et al. [30] specifies f2 = 0.2 (small), 0.15 (medium) and 0.35 (large). Table 6 listed the SEM model's effect size results:

Table -6 Effect size results of the SEM Model

Exogenous Variables	Performance
Economic	0.276
Environment	0.029
Legal	0.117
Political Factors	0.047
Social	0.059
Technological	0.159

Table 6 shows various effect sizes of the PESTLE factors on performance. The economic factors have medium effect size (0.276) followed by medium effect of technology (0.159), the remaining factors had smaller impact sizes.

F. Predictive Relevance

Predictive relevance (Q2) is the model's ability to predict omitted sample values using blindfolding process [37]. With a Q2 value above zero, the path model possesses a predictive relevance for selected reflective endogenous construct.

Table -7 Predictive relevance results of second model

	SSO	SSE	Q^2
Performance	2,286.00	1,771.83	0.225

Table 7 demonstrated that the Q2 has a value higher than zero, that indicate the path model predictive relevance for the performance construct.

G. Interview Result

The targeted interviewees are construction industry experts from Iraq with relevant experiences to this study. Interviewees' information is listed in Table 8. All the interviewees confirmed the effect of all PESTLE factors on their projects performance but in various extents. Based on Table 8, the most frequent factors are EC=10, TC=10, PL =7, SC=7, LG=5, and EN=2. This means that economy and technology are the most effect factors, followed by social, political, legal, and environmental. This is in consistence with the survey findings, where the economic factors have larger effect size followed by technology.

Table -8 Interviewee's information

No.	Position	Qualification	Experience (Years)	Project size Million USD	Notified Factors
1	Civil engineer	Master	5-7	Low-medium 10-50 M	SC, EN Hostile social environment , Problems due adjacent or nearby projects
2	Project Manager	Master	7-10	Low-medium 10-50 M	EC, TC Hostile social environment, Bribes and commissions, Limited authority of supervisors engineers
3	Civil engineer	PhD	5-7	Low Less than 10M	EC, TC, SC Unavailability of experienced and qualified personnel, Unavailability of resources, Escalation of material prices
4	Civil engineer	Master	5-7	Medium 50-100 M	TC Unavailability of experienced and qualified personnel, Low skill of project leadership
5	Civil engineer	Master	13	Low Less than 10M	TC, LG, Low contractor experience
6	Project Manager	PhD	7-10	Large More than 100 M	EC, LG, TC Unqualified staff, Late payment
7	Project Manager	PhD	5-7	Low Less than 10M	LG Lack of coordination among all parties
8	Civil engineer	Master	5-7	Medium 50-100 M	SC Religious observances Unqualified staff
9	Civil engineer	Master	5-7	Large More than 100 M	TC Design change, Unavailability of IT
10	Project Manager	Master	7-10	Low-medium 10-50 M	SC, PL Hostile Social Environment, Bureaucracy
11	Civil engineer	Master	5-7	Low Less than 10M	EC Financial Appraisals: fake bank statement
12	Civil engineer	Master	14	Large More than 100 M	PL, EC, TC, SC, EN Critical situation, Government budget, Hostile social environment, Unexpected climate conditions
13	Consultant	PhD	7-10	Medium 50-100 M	PL, EC, SC, LG
14	Civil engineer	PhD	5-7	Large More than 100 M	PL, EC, TC Work delay, low performance quality
15	Civil engineer	PhD	5-7	Low Less than 10M	PL, EC, SC Critical situation, Economic is not stable, Hostile social environment (difficult to interact with people)
16	Consultant	PhD	5-7	Low-medium 10-50 M	PL, EC, TC
17	Civil engineer	PhD	5-7	Low Less than 10M	PL, TC
18	Project Manager	PhD	7-10	Medium 50-100 M	EC, LG

V.CONCLUSION

The SEM model indicate various significant effects of the PESTLE factors on the performance. The findings also confirm the SEM model reliability, and show that PESTLE factors affect more than half of the performance based on time, quality and cost. It also indicates that time, quality and cost significantly contribute to the convergent extents performance. This can interpret their usage by most researchers to measure the project performance. This is also in agreement with this research that utilizes them as key performance indicators. The findings help to increases the awareness of the construction companies in Iraq to consider the effect of PESTLE factors so as to prevent risks and delay in construction projects development, control expenditures, and achieve competitive advantages.

REFERENCES

[1] N. Kathomi, "Factors Influencing Quality Of Building Construction Projects: A Case Of Tharaka Nithi County Government, Kenya," Master thesis, University Of Nairobi, 2016.

[2] P. U. Okoye, C. C. Mbakwe, and E. N. Igbo, "Modeling the construction sector and oil prices toward the Growth of the Nigerian Economy: An Econometric Approach," *Economies*, vol. 6, no. 1, p. 16, 2018.

[3] W. Bello, "Project performance diagnostics: a model for assessing construction project performance in Nigeria," University of Salford, Manchester, 2018.

[4] H. Abdulaali, I. Usman, and M. Al-Ruwashedi, "A Review on Sustainable and Green Development in the Tourism and Hotel Industry in Malaysia," *Journal of Advanced Research in Dynamical and Control Systems*, vol. 11, pp. 854-867, 10/31 2019.

[5] H. Abdulaali, M. Hanafiah, i. usman, N. U. M. Nizam, and M. Abdulhasan, "A Review on Green Hotel Rating Tools, Indoor Environmental Quality (IEQ) and Human Comfort," vol. 29, pp. 128-157, 01/27 2020.

[6] H. Abdulaali, I. Usman, M. Hanafiah, M. Abdulhasan, M. Hamzah, and A. Nazal, "Impact of poor Indoor Environmental Quality (IEQ) to Inhabitants' Health, Wellbeing and Satisfaction," pp. xx-xx, 01/01 2020.

[7] I. Abdul Rahman *et al.*, "Time and cost performance of construction projects in southern and central regions of Peninsular Malaysia," 2012.

[8] L. S. Chin and A. R. A. Hamid, "The practice of time management on construction project," *Procedia Engineering*, vol. 125, pp. 32-39, 2015.

[9] S. Durdyev, H. T. Eng, and K. Y. Cheng, "Quantification of Critical Success Factors of Contractors in Cambodia: AHP Approach," *Journal of Management, Economics, and Industrial Organization*, vol. 2, no. 2, pp. 51-6, 2018.

[10] E. Auma, "Factors affecting the performance of construction projects in kenya: a survey of low-rise buildings in Nairobi Central Business District," *The International Journal of Business & Management*, vol. 2, no. 12, p. 115, 2014.

[11] M. S. B. A. Abd El-Karim, O. A. Mosa El Nawawy, and A. M. Abdel-Alim, "Identification and assessment of risk factors affecting construction projects," *HBRC journal*, vol. 13, no. 2, pp. 202-216, 2017.

[12] H. Alinaitwe, R. Apolot, and D. Tindiwensi, "Investigation into the causes of delays and cost overruns in Uganda's public sector construction projects," *Journal of Construction in Developing Countries*, vol. 18, no. 2, p. 33, 2013.

[13] S. Apolot, "Potential of school gardening as a laboratory for developing life skills in agriculture in primary schools: A case study of Soroti and Kamuli Districts, Uganda," 2013.

[14] E. Soewin and T. Chinda, "Factors affecting construction performance: exploratory factor analysis," in *IOP Conference Series: Earth and Environmental Science*, 2018, vol. 140, no. 1, p. 012102: IOP Publishing.

[15] M. Sibiya, C. Aigbavboa, and W. Thwala, "A Theoretical Harmonization of the Factors Affecting the Performance of Construction Projects," in *6th International Conference on Humanities, Geography and Economics (ICHGE'2014) Nov*, 2014, pp. 27-28.

[16] L. S. Khalid and I. A. Rahman, "Measuring the Effect of the External Factors on Iraqi Construction Projects Performance USING PESTLE Technique," 2019.

[17] L. S. Khalid and I. A. Rahman, "Conceptual Model for the External Factors Affecting Project Performance Using PESTLE Factors."

[18] A. Enshassi, S. Mohamed, and S. Abushaban, "Factors affecting the performance of construction projects in the Gaza strip," *Journal of Civil engineering and Management*, vol. 15, no. 3, pp. 269-280, 2009.

[19] N. Rastogi and M. Trivedi, "PESTLE technique–a tool to identify external risks in construction projects," *International Research Journal of Engineering and Technology (IRJET)*, vol. 3, no. 1, pp. 384-388, 2016.

[20] I. Babalola, O. E. Oluwatuyi, A. Lawal, and E. Aiyewalehinmi, "Factors influencing the performance of construction projects in Akure, Nigeria," *International Journal of Civil Engineering, Construction and Estate Management*, vol. 3, no. 4, pp. 57-67, 2015.

[21] E. Pulaj and V. Kume, "How the Albanian external environment affect the construction industry," *Annales Universitatis Apulensis: Series Oeconomica*, vol. 15, no. 1, p. 295, 2013.

[22] R. H. Ansah, S. Sorooshian, S. B. Mustafa, and G. Duvvuru, "Lean construction tools," in *Proceedings of the 2016 International Conference on Industrial Engineering and Operations Management Detroit, Michigan, USA*, 2016.

[23] G. A. Bekr, "Factors affecting performance of construction projects in unstable political and economic situations," 2006.

[24] D. Jaber, "FK Establishing Risk Management Factors for Construction Projects in Iraq," *International Journal of Advanced Research in Engineering and Technology*, vol. 6, no. 1, 2015.

[25] O. A. Abdulsattar, "Performance in Construction Industry In Post-Conflict Situations–Iraq As A Case Study."

[26] Z. Alias, E. Zawawi, K. Yusof, and N. Aris, "Determining critical success factors of project management practice: A conceptual framework," *Procedia-Social and Behavioral Sciences*, vol. 153, pp. 61-69, 2014.

[27] P. Niagara and E. Datche, "Factors Affecting the Performance of Construction Projects: A Survey of Construction Projects in the Coastal Region of Kenya," *International Journal of Scientific and Research Publications*, vol. 5, no. 10, p. 1, 2015.

[28] A. Alfakhri, A. Ismail, M. A. Khoiry, I. Arhad, and H. I. M. Irtema, "A conceptual model of delay factors affecting road construction projects in Libya," *J. Eng. Sci. Technol*, vol. 12, pp. 3286-3298, 2017.

[29] A. M. Alashwal, N. F. Fareed, and K. M. Al-Obaidi, "Determining success criteria and success factors for international construction projects for Malaysian contractors," *Construction Economics and Building*, vol. 17, no. 2, pp. 62-80, 2017.

[30] J. F. Hair Jr, G. T. M. Hult, C. Ringle, and M. Sarstedt, *A primer on partial least squares structural equation modeling (PLS-SEM)*. Sage publications, 2016.

[31] A. Ogwueleka, "The critical success factors influencing project performance in Nigeria," *International Journal of Management Science and Engineering Management*, vol. 6, no. 5, pp. 343-349, 2011.

[32] A. P. Chan, D. Scott, and A. P. Chan, "Factors affecting the success of a construction project," *Journal of construction engineering and management*, vol. 130, no. 1, pp. 153-155, 2004.

[33] K. Jha and K. Iyer, "Critical factors affecting quality performance in construction projects," *Total Quality Management and Business Excellence*, vol. 17, no. 9, pp. 1155-1170, 2006.

[34] A. Enshassi, B. Kochendoerfer, and H. Al Ghoul, "Factors affecting sustainable performance of construction projects during project life cycle phases," *Factors Affecting Sustainable Performance of Construction Projects during Project Life Cycle Phases*, vol. 7, no. 1, 2016.

[35] P. Rezakhani, "Classifying key risk factors in construction projects," *Buletinul Institutului Politehnic din lasi. Sectia Constructii, Arhitectura*, vol. 58, no. 2, p. 27, 2012.

[36] S. U. R. Toor and S. O. Ogunlana, "Problems causing delays in major construction projects in Thailand," *Construction management and economics*, vol. 26, no. 4, pp. 395-408, 2008.

[37] T. Ramayah, N. S. Ling, S. K. Taghizadeh, and S. A. Rahman, "Factors influencing SMEs website continuance intention," 2015.