EXTERNAL FACTORS AFFECTING CONSTRUCTION PROJECT PERFORMANCE IN IRAQ USING PESTLE FACTORS

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DEDICATION

Sincerely dedicated my beloved father & mother for their support and prayers.

For my beloved partner Tessa De Clercq for her unconditional supports in all my endeavours.

For my beloved Brothers & Friends with their endless supports.

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ABSTRACT

Construction industry is extremely dynamic sector and plays an important role in developing economy of a country, and in contribution to economic growth. However, construction projects face several risks that limit their progress, which frequently have negative effect on overall project performance in term of exceeding initial time and cost estimates. Most research only considered factors affecting the project performance that related to company specific or project specific and overlooked the external factors were in spite of their importance. Understanding those factors is vital for countries to avoid risks, regulate expenditures, and enhance project performance. This research aims to investigate the effect of the external factors on the performance of construction project in Iraq. The external factors are identified by using PESTLE technique. A conceptual model for the relation between the PESTLE factors and project performance is developed. The research utilizes a mix method comprising quantitative and qualitative approaches to collect the required data. The quantitative approach used a survey questionnaire involving 127 respondents selected from several construction companies in Iraq to evaluate the conceptual model and develop the SEM model using the PLS-SEM for data analysis. The qualitative approach used an interview with several experts in construction industry in Iraq for further insight to support the questionnaire findings. The interview data is analyzed using content analysis. The SEM model evaluation results indicated the reliability of the model. The results of the questionnaire data analysis indicate that all PESTLE factors have significant effects on performance but in different extents. Economic, and technological followed by political factors have larger effects on project performance. The results also indicated that more than 64.8 % of performance in terms of cost, time, and quality can be attributed to PESTLE effect. The interview analysis is consistence with the survey findings. The SEM model was verified by several experts in the construction industry, and the findings resulted economic, and technological followed by political factors have larger effects on project performance its ability to define the structural relations between the PESTLE factors and the project performance in Iraq construction industry. The findings of this research help governments to put regulations, policies, and strategies to avoid or mitigate PESTLE factors effect in case of their occurrence. Therefore the effectivness to manage risks, control expenses, increase competitiveness and improve the quality of project is more manageable and systematic.

ABSTRAK

Industri pembinaan adalah sektor yang sangat dinamik dan memainkan peranan penting dalam membangunkan ekonomi sesebuah negara, dan sebagai sumbangan kepada pertumbuhan ekonomi. Walau bagaimanapun, projek pembinaan menghadapi beberapa risiko yang membataskan kemajuan mereka, yang sering member kesan negative ke atas prestasi keseluruhan projek dari segi melebihi masa awal dan anggaran kos. Kebanyakan kajian hanya mempertimbangkan faktor-faktor yang mempengaruhi prestasi projek yang berkaitan dengan spesifik syarikat tertentu atau projek khusus dan mengabaikan faktor-faktor luaran walaupun terdapat kepentingan mereka. Memahami faktor-faktor ini penting bagi negara untuk mengelakkan risiko, mengawal perbelanjaan, dan meningkatkan prestasi projek. Penyelidikan ini bertujuan untuk menyiasat kesan faktor-faktor luaran terhadap pelaksanaan projek pembinaan di Iraq. Faktor luaran dikenal pasti dengan menggunakan teknik PESTLE. Model konseptual bagi hubungan antara faktor PESTLE dan prestasi projek dibangunkan. Kajian menggunakan kaedah campuran yang terdiri daripada pendekatan kuantitatif dan kualitatif untuk mengumpul data yang diperlukan. Pendekatan kuantitatif menggunakan soal selidik tinjauan yang melibatkan 127 responden dipilih dari beberapa syarikat pembinaan di Iraq untuk menilai model konseptual dan membangunkan model SEM menggunakan PLS-SEM untuk analisis data. Pendekatan kualitatif menggunakan temu bual dengan beberapa pakar dalam industri pembinaan di Iraq untuk mendapat kajian lanjut bagi menyokong penemuan kaji selidik. Data wawancara dianalisis menggunakan analisis kandungan. Hasil penilaian model SEM menunjukkan kebolehpercayaan model. Hasil analisis data kaji selidik menunjukkan bahawa semua faktor PESTLE mempunyai kesan yang signifikan terhadap prestasi tetapi dalam berbagai kategori. ekonomi, dan teknologi yang diikuti oleh faktor politik mempunyai kesan yang lebih besar terhadap prestasi projek. Hasilnya juga menunjukkan bahawa lebih daripada 64.8% prestasi dari segi kos, masa, dan kualiti boleh dikaitkan dengan kesan PESTLE. Analisis wawancara adalah konsisten dengan hasil kajian. Model SEM disahkan oleh beberapa pakar dalam industri pembinaan, dan penemuan mendedahkan keupayaannya untuk menentukan hubungan struktur antara faktor-faktor PESTLE dan prestasi projek dalam industri pembinaan Iraq. Penemuan kajian ini dapat membantu kerajaan untuk membuat peraturan, dasar, dan strategi untuk mengelakkan atau mengurangkan kesan-kesan faktor PESTLE sekiranya berlaku. Oleh yang demikian keberkesanan untuk menguruskan risiko, mengawal perbelanjaan, meningkatkan daya saing dan meningkatkan kualiti pembinaan projek lebih terurus dan sistematik.

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CHAPTER 1

INTRODUCTION

1.1 Background

The construction industry has a substantial role in nations development, and it contributes considerably to the development of their economic (Durdyev and Ismail, 2012). It has a significant effect on other sectors growth and on the economy of all countries (Zewdu and Aregaw, 2015; Mpofu *et al*., 2017; Okoye *et al*., 2018). The development of construction industry contributed to the gross domestic product (GDP) and employment of all countries. It creates a multiplier effect on others industry (Olawale and Sun, 2010; Okoye *et al*., 2018). Large construction projects account 10% of gross domestic product (GDP) of several developing countries and around 50% of the capital invested in fixed assets (Kathomi, 2016).Therefore, improving the efficiency of construction sector would considerably participate in the reduction of all country expenses. The construction industry is big, evolving continuously and needs great capital expenditure (Mpofu *et al*., 2017). Moreover, the construction industry importance is exclusive irrespective the country development extent (Noni and Bonga, 2016).

Projects performance is evaluated by several factors including cost, time, quality, satisfaction of clients, performance and safety of business. Memon *et al*. (2012) stated that

a project completion time, and estimated expenses are essential indicators of the project performance. Chin and Hamid (2015) pointed out that successful project is the one completed within budget, in specified time, , and fulfilled the wanted specifications. Abd El-Karim *et al*. (2015) stated that key factors in achieving a successful construction project performancec are time and cost. However, construction project achievement is exposed to numerous restraints and risks that restrict its start or progressing that often have substantial negative effect on overall project performance (Alinaitwe, *et al*., 2013; Apolot, 2013). Generally, the factors influencing the performance of project construction are related to the project and its parties, and to external environment such as weather conditions, unforeseen site situations, economic, and political regulatory changes (Jaszkowiak, 2012; Sorooshian, 2014; Rastogi and Trivedi, 2016).

1.2 Problem statement

All parties of construction projects strive for accomplishing projects on time, within specified budget, in high quality and safely environment (Abd El-Karim, 2015; Abiodun *et al*., 2017). However, up to the present time, the construction industry is confronting difficulties associated with time overrun, cost overrun, quality and safety, and legal issues (Nguyen *et al*., 2013). Many construction projects experience poor performance owing to exceeding initial time and cost estimates. For example, in Indian About 57% of construction projects exceed their specified time. in Saudi Arabia, only 30% of construction projects have been finalized within the estimated time, and the normal slipping period ranged between 10%-30% (Mohammed and Jasim, 2017). Further research revealed that 20% of construction projects did not attain their objectives due to time overun, or cost overrun, which increase the probability of failure of any construction project (Jarkas, 2012; Kathomi, 2016). Delay is a global phenomenon in the construction industry (Owolabi *et al*., 2014). It happens in every construction project and the extent of delay differs significantly from project to another. Delays lead to work disruption, productivity loss, late project incompletion, costs increase and may lead to terminate the

contract (Mpofu *et al*., 2017). According to Challal and Tkiouat (2012), about 51% of the delay responsibility attributed to enterprises, 30% attributed to projects managers and followed by clients 19%.

Li *et al*. (2017) and Tayeh *et al*. (2018) indicated that important criteria of construction projects performance include work development, quality standard, resources, financial constancy, safety and health, management competences, contract disagreements, relationship with clients, consultants and subcontractors, reputation and subcontracting amount. Kazaz *et al*. (2012) attributed the problems in construction projects performance to several causes including designers and contractors incompetent, change management and poor estimation, technological issues, social matters, site problems and inappropriate tools and methods. Zavadskas et al. (2014) indicated that construction project performance includes time, cost, quality, people, safety and health, client satisfaction, environment and communication. Ogwueleka (2011) said that management, design management, technical issues, support of top management, management of risk, financial support affect the project performance. Saraf (2013) elucidated that project performance is affected by incorrect planning and designing, decision making, construction procedures, management of site, materials quality and shortage, labor and technical personnel lack, construction errors, imperfect work and efficiency. Sibiya *et al*. (2014) indicated that the constraints and risks include few resources, unskilled labor, low productivity level, overruns and extreme loss, weak structure, fake practices and incapability to implement best practice.

It can be concluded that previous research consider only the factors influencing the project performance that related to company specific or project specific (Rastogi and Trivedi, 2016). In other word, they are internal factors related to all project parties. On the other hand, external factors were overlooked in spite of their importance. External factors are those outside the organization control that makes them hard to identify (Rastogi and Trivedi, 2016). Tayeh *et al*. (2018) and Omran *et al*. (2011), stated that business environment, political stability and economic should be considered with managerial quality, financial, technical and organizational performance to accomplish construction project successfully. Helen *et al*. (2015) indicated that external factors such as economic, political, social, and cultural risks influence seriously the construction projects performance. According to (Pulaj and Kume, 2013), systems, strategies and

organizational procedures, should adapt with external environment since they are characterized by uncertainty and dynamics increase, which required detailed analysis of the macro-environment factors through the PESTLE technique. The PESTLE comprises political (P); economic (E); social (S); technological (T); legal (L) and environmental (E). Ansah *et al*. (2016) indicated that there is a need to study complex and dynamic business environments that needs organization strengths and weaknesses evaluation in addition to opportunities and threats due external environment challenges. They added that the major external challenges are methodically analyzed and classified into fundamental groups known as "PESTLE" factors.

Generally, the factors that influence the performance of projects significantly include internal factors associated to the project and its parties, and external factors related to environment, economic stability, and political situation. Internal factors have a significant impact, but can be expected and included within the proper planning of the project and thus can be remedied. External factors are unforeseeable and may cause irreversible effects without significant losses, therefore, its significant to examine their influence. Construction projects in Iraq as the construction projects around the world, experience several problems in performance such as time, cost, quality and safety. They also suffer from unstable political and economic situations especially after the invasion of Iraq by the United States. In Iraq, several research were conducted on the influential factors as a whole and the external factors have not been studied separately despite their significant impact due to the deterioration of the political, economic and social situation in Iraq. Therefore, understanding the factors that influence the construction industry performance is crucial for nations to control expenditures, manage risks, take advantage of opportunities. This research seeks to handle this gap, particularly in Iraq that suffers significantly from the effects of these factors. This research is among the first researches that investigate the effect of PESTLE on project performance in terms of cost, time, and quality. PESTLE is utilized to identify the external factors because it is an inclusive framework and an active tool to understand, analyze, and classify the different variables in macro environment that affect the construction projects performance. The research arouses several questions that have to be addressed:

1. What are the factors that affect the construction projects performance?

2. How to define the influence of the external factors on Iraqi construction projects performance?
3. How to develop a final model of external factors influencing construction projects performance?
4. How to evaluate the effectiveness of the final model?

1.3 Aim and objectives

This research aims to identify various external factors influencing construction project the performance in Iraq. The external factors are identified by using PESTLE Technique. PESTLE technique is a strategical management technique, which can be used efficiently in identification process of external factors. The research helps to identify the project anticipated risks in advance in order to assist companies in taking suitable measures to avoid or at least alleviate them. To attain this goal, the subsequent objectives are developed:

1. To identify factors influencing construction projects performance
2. To develop a hypothesized model of the external factors influencing construction projects performance
3. To develop a final model of PESTLE factors influencing performance of construction projects
4. To verify the final model outcome by experts

1.4 Research scope

This research seeks to investigate the effect of the external factors (PESTLE) on Iraqi construction projects by constructing a structural equation model. This research has

utilized a mix method comprising quantitative and qualitative approaches to gather the required data. The quantitative approach utilized a survey questionnaire to extract knowledge and experience of the research respondents. The research was conducted in public sectors in construction industry of Iraq. Six companies represent the whole Iraqi public companies were the target. They were selected because they are large companies including large numbers of different workers, which facilitates the process of distribution of the questionnaire and access to information that helps to attain the research objectives satisfactorily. Research respondents include the construction parties involving in construction projects in Iraq such as contractor, sub-contractor, consultants, civil engineers, and project managers. A simple random sampling method was used to choice the respondents sample size. The qualitative approach utilizes interviews with several experts from Iraqi construction industry. Pilot study and experts' judgments were performed to test the reliability and validity of the questionnaire. PLS-SEM software package was used analyze the collected survey data, which helps to establish structural relationships of influencing factors comprising PESTLE and the performance.

1.5 Research significance

A project failure is mostly attributed to performance problems. The results can be costly and protracted, and the worst outcomes may lead to unwanted legal action engagements. This research studies the factors influencing the construction projects performance in Iraq. The dependence on external environment is a problem when the environment is characterized by uncertainty and dynamics increase, which required detailed analysis of the macro-environment factors through the PESTLE technique. This became a vital aspect for every organization moves towards attaining best practices to solve and exceed performance problems.

1.6 Research limitation

Most researches often face some limitations during their development. These limitations comprise issues related to either the research resources or research investigation process. The research faced some limitation, however, the researcher did the best to avoid or mitigate the effect of those limitations. These limitations are introduced in the following:

1. Identifying the questionnaire items represents the first limitation. These items were extracted from the literature, which is difficult to be investigated totally. Therefore, the extracted items may not cover all the issues that measure the constructs of the research model.
2. The research was limited to Iraq construction projects. The Iraq had suffered and is still suffering from the consequences of the US invasion and ISIS terrorism, which affect the construction industry. Therefore the generalization of the research results could be impractical for other countries.
3. The weak cooperation between some companies with the researcher also represents a significant limitation. This led to wait for a long time to get the companies' approval to do the survey and to obtain the responses.
4. Getting the approval of the experts to participate in the interview and the verification process consumed a long time due to experts preoccupation in their work.

1.7 Thesis layout

This thesis is organized into seven chapters as introduced in the following:

Chapter 1: Introduction

The chapter demonstrates the research background. It highlights the problem and the research questions. The chapter also states the research objectives. The research significance is elucidated and discussed, in addition to the research scope.

Chapter 2: Literature Review

The chapter presents an overview of the construction project performance, environment, and challenges, in addition to the factors affecting the project performance and its indicators. It also explains the current status of the current construction industry of Iraq. The external factors (PESTLE) and their effects on project performance also are explained.

Chapter 3: Research Methodology

The chapter discusses the research methodology followed to achieve the objectives of the research. The chapter describes the research design, approach, and the required analysis. It explains the questionnaire and interview construction and contents, and provides a review on the validation process. The validation includes experts' judgment and a pilot study. The chapter also demonstrates the sampling technique and sample size of the actual survey, in addition to the research tool. Finally, the chapter elucidates the conceptual research model, and the model verification process.

Chapter 4: Data Collection and Descriptive Analysis

The chapter explains the data collection process and the pilot study. It provides the actual survey and pilot study demographic characteristics and reliability test, as well as the descriptive analysis of the actual survey.

Chapter 5: Model Development and Validation

The chapter starts with hypothesized conceptual model and mechanism for PLS model analysis and assessment. The chapter shows the measurement model and explains its validity process, as well as shows the structural equation model development. Finally, the chapter displays the model outcome and the interview analysis.

Chapter 6: Verification of The Model

The chapter explains the verification process of the research model outcome. The verification process is done through interviews with experts in Iraq construction industry. It also demonstrates proper applications of research model.

Chapter 7: Conclusion and Recommendations

The chapter introduces the research conclusion and recommendations. The chapter starts with the fulfilment of research objectives and concludes their results, as well as explains the research limitations, contribution and offers some recommendations for construction authorities and for future work.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

The literature review aims to provide a critical assessment of inclusive research and theories on a specific subject. It analyzes and accumulates previous research related to the target subject in order to review and obtain knowledge to reach final conclusions from the critical analysis. In this context, this chapter reviews the literature related to construction projects performance. It provides a theoretical foundation for performance concept, measure, and the influencing factors that affect such performance. The chapter includes five sections comprising the introduction and the summary. Section 2.2 provides an overview on construction project industry; its challenges and performance. Section 2.3 introduces the construction project performance indicators, while section 2.4 explains the constructions project environment.

REFERENCES

Abd El-Karim, M. S. B. A. A., El Nawawy, O. A. M., & Abdel-Alim, A. M. (2015). Identification and assessment of risk factors affecting construction projects. HBRC Journal.

Abdulai, R. T., & Owusu-Ansah, A. (2014). Essential Ingredients of a good research proposal for undergraduate and postgraduate students in the Social Sciences. Sage Open, 4(3), 2158244014548178.

Abdulhussein, H., Shibaani, A. (2016). Risk Management in Construction Projects in IRAQ: Contractors' Perspective International Journal of Engineering Research, Vol.4 (3).

Abdullah, M. R., Rahman, I. A., & Azis, A. A. A. (2010). Causes of delay in MARA management procurement construction projects. Journal of Surveying, Construction and Property, 1(1).

Abdulsattar, O. A. (2017). Performance in Construction Industry in Post- Conflict Situations – Iraq as a Case Study. American Journal of Engineering Research, Vol.6 (9), pp-188-195.

Abiodun, O. E., Segbenu, N. S., Oluseye, O. (2017). Factors Affecting Contractors' Performance in Construction Project Delivery in Akure, Ondo State, Nigeria. Journal of Knowledge Management, Economics and Information Technology,Vol. VII (4).

Adenuga, O. A. (2013). Factors affecting quality in the delivery of public housing projects in Lagos State, Nigeria. International Journal of Engineering and Technology, 3(3), 332-344.

Ahmad, S. B., Svalestuen, F., Andersen, B., & Torp, O. (2016). A review of performance measurement for successful concurrent construction. Procedia-Social and Behavioral Sciences, 226, 447-454.

Akanni, P. O., Oke, A. E., & Akpomiemie, O. A. (2015). Impact of environmental factors on building project performance in Delta State, Nigeria. HBRC Journal, 11(1), 91-97.

Akomah, B. B., & Jackson, E. N. (2016). Factors Affecting the Performance of Contractors on Building Construction Projects: Central Region, Ghana. International Journal of Innovative Research and Development, 5(10).

Al-Agele, H. K., & Al-Hassan, A. J. (2016). The Reasons of Costs Deviation in the Iraqi Construction Projects-Field Assessment. Applied Research Journal, Vol.2(5), pp.228-237.

Alamri, N., Amoudi, O., & Njie, G. (2017). Analysis of construction delay causes in dams projects in Oman. European Journal of Business and Social Sciences, 6(2), 19-42.

Alinaitwe, H., Apolot, R., & Tindiwensi, D. (2013). Investigation into the causes of delays and cost overruns in Uganda's public sector construction projects. Journal of Construction in Developing Countries, 18(2), 33.

Ameh, O. J., & Osegbo, E. E. (2011). Study of relationship between time overrun and productivity on construction sites. International Journal of Construction Supply Chain Management, 1(1), 56-67.

Ameh, O. J., Soyingbe, A. A., & Odusami, K. T. (2010). Significant factors causing cost overruns in telecommunication projects in Nigeria. Journal of Construction in Developing Countries, 15(2), 49-67.

Amoatey, C. T., & Ankrah, A. N. O. (2017). Exploring critical road project delay factors in Ghana. Journal of Facilities Management.

Ansah, R. H., Sorooshian, S., Mustafa, S. B., & Duvvuru, G. (2016). An Environmental Impact Framework for Evaluating Construction Projects Delays.

Apolot, S. (2013). Potential of shool gardening as a laboratory for developing life skills in agriculture in primary schools: a case study of Soroti and Kamuli Districts, Uganda.

Arditi, D., Nayak, S., & Damci, A. (2017). Effect of organizational culture on delay in construction. International Journal of Project Management, 35(2), 136-147.

Ashokkumar, D. (2014). Study of Quality Management in Construction Industry. International Journal of Innovative Research in Science, Engineering and Technology, 3(1), 36-43.

Attar, A. A., Gupta, A. K., & Desai, D. B. (2012). A study of various factors affecting labor productivity and methods to improve it. IOSR Journal of Mechanical and Civil Engineering, 1(3), 11-14.

Ayalew, T., Dakhli, Z., Lafhaj, Z. (2016). Assessment on Performance and Challenges of Ethiopian Construction Industry. Journal of Architecture and Civil Engineering, Vol. 2 (11), pp: 01-11.

Aziz, R. F., & Abdel-Hakam, A. A. (2016). Exploring delay causes of road construction projects in Egypt. Alexandria Engineering Journal, 55(2), 1515-1539.

Bekr, G. A. (2015). Causes of delay in public construction projects in Iraq. Jordan Journal of Civil Engineering, 9(2).

Bijwar, R. M., & More, A. B. (2017). Delay analysis in construction of redevelopment residential project.

Billingham, S. A., Whitehead, A. L., & Julious, S. A. (2013). An audit of sample sizes for pilot and feasibility trials being undertaken in the United Kingdom registered in the United Kingdom Clinical Research Network database. BMC medical research methodology, 13(1), 104.

Bowen, N. K., & Guo, S. (2011). Structural equation modeling. Oxford University Press.

Braimah, N. (2014). Understanding construction delay analysis and the role of preconstruction programming. Journal of Management in Engineering, 30(5), 04014023.

Breakwell, G. M. (2014). The psychology of risk. Cambridge University Press.

Butcher, D. C., & Sheehan, M. J. (2010). Excellent contractor performance in the UK construction industry. Engineering, Construction and Architectural Management, 17(1), 35-45.

Challal, A., & Tkiouat, M. (2012). Qualitative approach risk period in construction projects. Journal of Financial Risk Management, 1(03), 42.

Chen, T. T. (2010, October). Partnerships among different participants in construction industry of Taiwan: Critical success and failure factors. In Industrial Engineering and Engineering Management (IE&EM), 2010 IEEE 17Th International Conference on (pp. 1912-1917). IEEE.

Chigara, T., & Moyo, T. (2014). Factors affecting labor productivity on building projects in Zimbabwe. International Journal of Architecture, Engineering and Construction, 3(1), 57-65.

Chin, L. S., & Hamid, A. R. A. (2015). The practice of time management on construction project. Procedia Engineering, 125, 32-39.

Chou, J.-S. & Yang, J.-G. (2012). Project management knowledge and effects on construction project outcomes: an empirical study. Project Management Journal, 43(5), 47–67.

Cohen, L., Manion, L., & Morrison, K. (2013). Research methods in education. routledge.

Cohen, J. (1992). A power primer. Psychological Bulletin, 112, 155–159.

Creswell, J. W., & Creswell, J. D. (2017). Research design: Qualitative, quantitative, and mixed methods approaches. Sage publications.

Devlieger, I., & Rosseel, Y. (2019). Multilevel factor score regression. Multivariate behavioral research, 1-25.

Dikko, M. (2016). Establishing construct validity and reliability: Pilot testing of a qualitative interview for research in Takaful (Islamic insurance). The Qualitative Report, 21(3), 521.

Diugwu, I. A., Etuk, E. H., Baba, D. L., Mohammed, M., & Yakubu, H. A. (2017). Modelling the Effect of Time Overrun and Inflation Rate on Completion Cost of Construction Projects in Nigeria. International Journal of Sustainable Construction Engineering and Technology, 8(2), 18-28.

Doloi, H., Sawhney, A., Iyer, K. C., & Rentala, S. (2012). Analysing factors affecting delays in Indian construction projects. International Journal of Project Management, 30(4), 479-489.

Doloi, H. (2013). Cost overruns and failure in project management: Understanding the roles of key stakeholders in construction projects. Journal of construction engineering and management, 139(3), 267-279.

Durdyev, S., & Ismail, S. (2012). Role of the construction industry in economic development of Turkmenistan. Energy Educ. Sci. Technol. Part A Energy Sci. Res, 29(2).

Enshassi, A., Kochendoerfer, B., & Al Ghoul, H. (2016). Factors Affecting Sustainable Performance of Construction Projects during Project Life Cycle Phases. International Journal of Sustainable Construction Engineering and Technology, 7(1), 50-68.

Eyisi, D. (2016). The Usefulness of Qualitative and Quantitative Approaches and Methods in Researching Problem-Solving Ability in Science Education Curriculum. Journal of Education and Practice, 7(15), 91-100.

Gbahabo, P. T., & Ajuwon, O. S. (2017). Effects of project cost overruns and schedule delays in Sub-Saharan Africa. European Journal of Interdisciplinary Studies, 3(2), 46-59.

Gonzalez, P., González, V., Molenaar, K., & Orozco, F. (2014). Analysis of causes of delay and time performance in construction projects. Journal of construction engineering and management, 140(1), 04013027.

Gündüz, M., Nielsen, Y., & Özdemir, M. (2013). Quantification of delay factors using the relative importance index method for construction projects in Turkey. Journal of management in engineering, 29(2), 133-139.

Gupta, A. (2013). Environment and PEST analysis: an approach to external business environment. International Journal of Modern Social Sciences, 2(1), 34-43.

Hair Jr, J. F., Hult, G. T. M., Ringle, C., & Sarstedt, M. (2016). A primer on partial least squares structural equation modeling (PLS-SEM). 2nd Ed. Sage Publications.

Hair Jr, J. F., Sarstedt, M., Hopkins, L., & G. Kuppelwieser, V. (2014). Partial least squares structural equation modeling (PLS-SEM) An emerging tool in business research. European Business Review, 26(2), 106-121.

Haque, M. (2010). Sampling methods in social research. Global Research Methodology, 1-6.

Haseeb, M., Bibi, A., & Rabbani, W. (2011). Problems of projects and effects of delays in the construction industry of Pakistan. Australian Journal of Business and Management Research, 1(6), 41.

Hassan, S. A., & Ghazali, R. (2012). Quik Tips Fast Track Conducting Quantitative Research . Selangor, Malaysia: Quiy Researcher.

Hasan, R., Suliman, S. M., & Malki, Y. A. (2014). An investigation into the delays in road projects in Bahrain. International Journal of Research in Engineering and Science, 2(2), 38-47.

Helen, B. I., Emmanuel, O. O., Lawal, A., & Elkanah, A. (2015). Factors influencing the performance of construction projects in Akure, Nigeria. International Journal of Civil Engineering, Construction and Estate Management, 3(4), 57-67.

Isa, C. M. M., Saman, H. M., & Preece, C. N. (2015). Determining significant factors influencing Malaysian construction business performance in international markets. Journal of Construction in Developing Countries, 20(2), 1.

Jaber, F. K. (2015). Establishing Risk Management Factors for Construction Projects in Iraq. IJARET, Vol. 6(1).

Jahanger, Q. (2013). Important causes of delay in construction projects in Baghdad city. Australian Journal of Basic and Applied Sciences, 7(4), 14-23.

Jarkas, A. M. (2012). Analysis and measurement of buildability factors influencing rebar installation labor productivity of in situ reinforced concrete walls. Journal of Architectural Engineering, 18(1), 52-60.

Jaszkowiak, L. M. (2012). Firm Fixed Price and Cost Plus Fixed Fee Construction Contracts in Iraq and Afghanistan (No. AFIT/GEM/ENV/12-M10). Air Force Institute of Technology, Wright-Patterson Air Force Base, Ohio, Graduate School of Engineering and Management.

Jatarona, N. A., Yusof, A. M., Ismail, S., & Saar, C. C. (2016). Public construction projects performance in Malaysia. Journal of Southeast Asian Research, 1-7.

Jose, C. M., & Ambili, S. (2017). Critical Factors Influencing Quality Performance in Construction Projects.International Journal of Recent Trends in Engineering & Research, Vol. 3(0).

Joy, T. (2014). A study on factors influencing quality of construction projects. International Journal of Innovative Research and Development, 3(5).

Johnston, A. (2014). Rigour in research: theory in the research approach. European Business Review.

Johanson, G. A., & Brooks, G. P. (2010). Initial scale development: sample size for pilot studies. Educational and psychological measurement, 70(3), 394-400.

Kazaz, A., Ulubeyli, S., & Tuncbilekli, N. A. (2012). Causes of delays in construction projects in Turkey. Journal of civil Engineering and Management, 18(3), 426-435.

Kihoro, M. W., Waiganjo, E. (2015). Factors Affecting Performance of Projects in the Construction Industry in Kenya: A Survey of Gated Communities Innairobi County. Strategic Journal of Business & Change Management, 2(2).

Kikwasi, G. (2013, February). Causes and effects of delays and disruptions in construction projects in Tanzania. In Australasian Journal of Construction Economics and Building-Conference Series (Vol. 1, No. 2, pp. 52-59).

Kogi, D. M. (2013). Factors Influencing Effectiveness of Implementation of the Economic Stimulus Programme (ESP): Case of Construction Projects in Nairobi County. University of Nairobi, Kenya.

Kossova, T., & Sheluntcova, M. (2016). Evaluating performance of public sector projects in Russia: The choice of a social discount rate. International journal of project management, 34(3), 403-411.

Koumparoulis, D. N. (2013). PEST Analysis: The case of E-shop. International Journal of Economy, Management and Social Sciences, 2(2), 31-36.

Lack, M., & Bruce, J. C. (2014). How nursing students perform in problem-based learning tutorials-A South African perspective. Journal of Nursing Education and Practice, 4(7), 156-164.

Larsen, J. K., Shen, G. Q., Lindhard, S. M., & Brunoe, T. D. (2016). Factors affecting schedule delay, cost overrun, and quality level in public construction projects. Journal of Management in Engineering, 32(1), 04015032.

Lee, M. R., Ismail, S., & Hussaini, M. (2013). Key performance indicator (KPI) of contractor on project performance for housing construction in Malaysia. In 1st Int. Conf. on Human Capital and Knowledge Management (HCKM 2013), Universiti Teknologi Malaysia, Kuala Lumpur, Malaysia.

Li, Z. Q., Tan, H. C., Anumba, C., & Chia, F. C. (2017). Development of a web-based system for managing suppliers' performance and knowledge sharing in construction project. Built Environment Project and Asset Management.

Liu, J., Xie, Q., Xia, B., & Bridge, A. J. (2017). Impact of design risk on the performance of design-build projects. Journal of Construction Engineering and Management, 143(6), 04017010.

Maiyaki, A. A., & Mokhtar, S. S. M. (2010). Determinants of customer behavioral responses: A pilot study. International business research, 4(1), 193.

Marzouk, M. M., & El-Rasas, T. I. (2014). Analyzing delay causes in Egyptian construction projects. Journal of advanced research, 5(1), 49-55.

Marzouk, M. M., & El-Rasas, T. I. (2014). Analyzing delay causes in Egyptian construction projects. Journal of advanced research, 5(1), 49-55.

Maya, R. A. (2016). Performance Management for Syrian Construction Projects. International Journal of Construction Engineering and Management, 5(3), 65-78.

Mahamid, I. (2013). Common risks affecting time overrun in road construction projects in Palestine: Contractors' perspective. Construction Economics and Building, 13(2), 45-53.

Memon, A. H., Abdul Rahman, I., & Aziz, A. A. A. (2011). Time overrun in construction projects from the perspective of project management consultant (PMC). Journal of Surveying, Construction and Property, 2(1).

Memon, A. H., Rahman, I. A., & Azis, A. A. A. (2012). Time and cost performance in construction projects in southern and central regions of Peninsular Malaysia. International Journal of Advances in Applied Sciences, 1(1), 45-52.

Meng, X. (2012). The effect of relationship management on project performance in construction. International journal of project management, 30(2), 188-198.

Memon, A. H., Rahman, I. A., Abdullah, M. R., & Azis, A. A. A. (2014). Factors affecting construction cost performance in project management projects: Case of MARA large projects. International Journal of Civil Engineering and Built Environment, 1(1).

Mishra, A. K., & Chaudhary, U. (2018). Cost effectiveness assessment of different nepalese cement brands for selected sites of supermarket. J Adv Res Const Urban Arch, 3(3), 12-33.

Mohajan, H. K. (2017). Two criteria for good measurements in research: Validity and reliability. Annals of Spiru Haret University. Economic Series, 17(4), 59-82.

Mohammed, S. R., & Jasim, A. J. (2017). Study and Analysis of the Delay Problems in Iraqi Construction Projects. IJSR, Vol. 6 (5).

Motaleb, O., & Kishk, M. (2010, September). An investigation into causes and effects of construction delays in UAE. In Procs 26th Annual ARCOM Conference (pp. 6-8).

Mpofu, B., Ochieng, E. G., Moobela, C., & Pretorius, A. (2017). Profiling causative factors leading to construction project delays in the United Arab Emirates. Engineering, Construction and Architectural Management.

Mwawasi, S. W. (2015). Time And Cost Overruns In Road Construction Projects In Kenya Under Kenya National Highways Authority.

Naik, M. B., Sharma, N. D., & Kashiyani, B. K.A. (2013). Review on Factors Affecting Contractor Performance in Construction Work. IJARESM

National Performance Management Advisory Commission. (2010). A performance management framework for state and local government: From measurement and reporting to management and improving. Chicago: Author.

Ngacho, C. (2013). An assessment of the performance of public sector construction projects an empirical study of projects funded under constituency development fund cdf in western provience kenya.

Ngasa, R. (2016). stakeholders'views on the contribution of wards secondary schools in promoting progression to the next level of study in shinyanga rural (Doctoral dissertation, Mzumbe University).

Ngassa, E. A. (2017). Assessment of the Effectiveness of Employee Involvement on Organisational Performance (Doctoral dissertation, The Open University of Tanzania).

Nguyen, T. A., Chovichien, V., & Takano, S. E. (2013). Quantitative Weighting for Evaluation Indexes of Construction Project Success by Application of Structural Equation Modeling. International Journal of Construction Engineering and Management, 2(3), 70-84.

Niazai, G. A., & Gidado, K. (2012). Causes of project delay in the construction industry in Afghanistan. In Proceedings of EPPM 2012 International Conference on Engineering, Project and Production Management.

Nyoni, T., & Bonga, W. G. (2016). An Empirical Investigation of Factors Affecting Construction Sector Labour Productivity in Zimbabwe. International Journal of Business and Management Invention Vol.,kk

Ogunde, A., Olaolu, O., Afolabi, A. O., Owolabi, J., & Ojelabi, R. (2017). Challenges confronting construction project management system for sustainable construction in developing countries: Professionals perspectives (a case study of Nigeria). Journal of Building Performance, 8(1), 1-11.

Ogwueleka, A. (2011). The critical success factors influencing project performance in Nigeria. International Journal of Management Science and Engineering Management, 6(5), 343-349.

Olaniran, O. J. (2015). The effects of cost-based contractor selection on construction project performance. Journal of Financial Management of Property and Construction.

Okoye, P. U., Mbakwe, C. C., & Igbo, E. N. (2018). Modeling the Construction Sector and Oil Prices toward the Growth of the Nigerian Economy: An Econometric Approach. *Economies*, *6*(1), 16.

Olatunji, S. O., Oke, A. E., & Owoeye, L. C. (2014). Factors affecting performance of construction professionals in Nigeria. International Journal of Engineering and Advanced Technology, 3(6), 76-84.

Olawale, Y. A., & Sun, M. (2010). Cost and time control of construction projects: inhibiting factors and mitigating measures in practice. Construction management and economics, 28(5), 509-526.

Olukyode, O. F., Mathew, F. A., Taiwo, A. A. (2015). An Assessment of Major Factors Affecting Construction Project Cost in Nigeria. IJSBAR, Vol. 24 (4), pp. 308-318.

Omran, A., Abdulbagei, M. A., & Gebril, A. O. (2012). An evaluation of the critical success factors for construction projects in Libya. International Journal of Economic Behavior, 2, 17-25.

Orihuela, P., Pacheco, S., & Orihuela, J. (2017). Proposal of Performance Indicators for the Design of Housing Projects. Procedia Engineering, 196, 498-505.

Owolabi, J. D., Amusan, L. M., Oloke, C. O., Olusanya, O., Tunji-Olayeni, P. F., Dele, O., & Omuh, I. O. (2014). Causes and effect of delay on project construction delivery time. International journal of education and research, 2(4), 197-208.

Pärn, E. A., Edwards, D. J., & Sing, M. C. (2017). The building information modelling trajectory in facilities management: A review. Automation in Construction, 75, 45-55.

Pandit, D., & Yadav, S. M., Vallabhbhai, S. (2015). Factors Affecting Efficient Construction Project Design Development: A Perspective from India. Supply Chain Management, 5(2), 34-50.

Petter, S., DeLone, W., & McLean, E. R. (2013). Information systems success: The quest for the independent variables. Journal of management information systems, 29(4), 7-62.

Pike, S., & Page, S. J. (2014). Destination Marketing Organizations and destination marketing: A narrative analysis of the literature. Tourism management, 41, 202-227.

Polit, D. F., & Beck, C. T. (2010). Generalization in quantitative and qualitative research: Myths and strategies. International journal of nursing studies, 47(11), 1451-1458.

Pourrostam, T., & Ismail, A. (2012). Causes and effects of delay in Iranian construction projects. International Journal of Engineering and Technology, 4(5), 598.

Pulaj, E., & Kume, V. (2013). How the Albanian external environment affect the construction industry. Annales Universitatis Apulensis: Series Oeconomica, 15(1), 295.

Rajkumar, K., Kavin, S., & Jagadeesh, S. (2016). An Emprical Study on Factors Affecting the Quality in Construction Project. IJIRSE, Vol.2(5).

Ramanathan, C., Narayanan, S. P., & Idrus, A. B. (2012). Construction delays causing risks on time and cost-a critical review. Construction Economics and Building, 12(1), 37-57.

Rastogi, N. i Trivedi, MK (2016). PESTLE technique–A tool to identify external risks in construction projects. International Research Journal of Engineering and Technology, 3(1), 384-388.

Razzaq, A., Thaheem, M. J., Maqsoom, A., & Gabriel, H. F. (2018). Critical external risks in international joint ventures for construction industry in Pakistan. International Journal of Civil Engineering, 16(2), 189-205.

Rodd, J. (2012). Leadership in early childhood. McGraw-Hill Education (UK).

Ruqaishi, M., & Bashir, H. A. (2015). Causes of delay in construction projects in the oil and gas industry in the gulf cooperation council countries: a case study. Journal of Management in Engineering, 31(3), 05014017.

Saraf, D. D. (2013). Study of Factors Affecting Performance of Construction Project. International Journal of Science and Research, 4(5), 1339-1341.

Savalei, V., & Bentler, P. M. (2010). Structural equation modeling. Corsini encyclopedia of psychology.

Sekaran, U. & Bougie, R. (2010). Research methods for business: A skill building approach. 5th ed. John Willey & Sons Ltd

Shah, G. S., Pitroda, J. R., & Bhavsar, J. J. A Critical Literature Review on Integrated Framework for Assessing Factors Affecting Construction Performance.

Shanmugapriya, S., Subramanian, K. (2013). Investigation of Significant Factors Influencing Time and Cost Overruns in Indian Construction Projects. International Journal of Emerging Technology and Advanced Engineering, Vol. 3(10).

Shehu, Z., Endut, I. R., & Akintoye, A. (2014). Factors contributing to project time and hence cost overrun in the Malaysian construction industry. Journal of Financial Management of Property and Construction.

Shrestha, P. P., & Mani, N. (2014). Impact of design cost on project performance of design-bid-build road projects. Journal of Management in Engineering, 30(3), 04014007.

Sim, J., & Lewis, M. (2012). The size of a pilot study for a clinical trial should be calculated in relation to considerations of precision and efficiency. Journal of clinical epidemiology, 65(3), 301-308.

Sibiya, M., Aigbavboa, C.O., Thwala, W.D. (2014). A Theoretical Harmonization of the Factors Affecting the Performance of Construction Projects. 6th International Conference on Humanities, Geography and Economics (ICHGE'2014), Cape Town, South Africa.

Sonson, S. J., Kulatunga, U., & Pathirage, C. (2017, September). Performance measurement and management in construction: a conceptual framework. In 13th IPGRC 2017 Full Conference Proceedings (pp. 516-528). University of Salford.

Sorooshian, S. (2014). Delay-based reliability analysis on construction projects. Life Science Journal, 11(3), 104-113.

Sweis, R. J., Bisharat, S. M., Bisharat, L., & Sweis, G. (2014). Factors affecting contractor performance on public construction projects. Life Science Journal, 11(4s), 28-39.

Tao, X., Chow, S. K. Y., & Wong, F. K. Y. (2014). Determining the validity and reliability of the Chinese version of the Kidney Disease Quality of Life Questionnaire (KDQOL-36™). BMC nephrology, 15(1), 115.

Tayeh, B. A., Al Hallaq, K., Alaloul, W. S., & Kuhail, A. R. (2018). Factors affecting the success of construction projects in Gaza Strip. The Open Civil Engineering Journal, 12(1).

Tunji-Olayeni, P. F., Mosaku, T. O., Fagbenle, O. I., Amusan, L. M., Omuh, I. O., & Joshua, O. (2016). Evaluating Construction Project Performance: A Case of Construction SMEs in Lagos, Nigeria.

Van Arensbergen, P., van der Weijden, I., & van den Besselaar, P. (2014). The selection of talent as a group process. A literature review on the social dynamics of decision making in grant panels. Research evaluation, 23(4), 298-311.

Van Belle, G. (2011). Statistical rules of thumb (Vol. 699). John Wiley & Sons.

Wai, S. H., Yusof, A. M., Ismail, S., & Ng, C. A. (2013). Exploring success factors of social infrastructure projects in malaysia. International Journal of Engineering Business Management, 5, 4.

Williams, T. (2016). Identifying success factors in construction projects: A case study. Project Management Journal, 47(1), 97-112.

Xi, W. (2014, June). Construction engineering quality reflected in financial information and model establishment. In Service Systems and Service Management (ICSSSM), 2014 11th International Conference on (pp. 1-4). IEEE.

Zavadskas, E. K., Vilutienė, T., Turskis, Z., & Šaparauskas, J. (2014). Multi-criteria analysis of Projects' performance in construction. Archives of Civil and Mechanical Engineering, 14(1), 114-121.

Zewdu, Z. T., & Aregaw, G. T. (2015). Causes of contractor cost overrun in construction projects: The case of Ethiopian construction sector. International Journal of Business and Economics Research, 4(4), 180-191.