Saleh and Azam (2021). The Impact of Risk Determinant and Efficient Engineers on the Performance of Construction Projects in Libya. International Journal of Business Society, 5 (10), 423-429

Journal Homepage: www.ijo-bs.com

International Journal of Business Society

Contents lists available at: https://www.ijo-bs.com/issue.html

THE IMPACT OF RISK DETERMINANT AND EFFICIENT ENGINEERS ON THE PERFORMANCE OF CONSTRUCTION PROJECTS IN LIBYA

Ousama.J.Saleh[1]; S. M. Ferdous Azam[2]

[1]PhD Candidate, Management & Science University, Shah Alam Malaysia; Ojuaad@yahoo.co.com
[2]Senior Lecturer, Management & Science University, Shah Alam Malaysia; drferdous@msu.edu.my

Information of Article

Article history:
Received: 14 Sep 2021
Revised: 15 Sep 2021
Accepted: 29 Sep 2021
Available online: 1 Oct 2021

Keywords:
Risk Determinant
Efficient Engineers
Performance of Construction Projects
Libya

ABSTRACT

This study aims to determine the impact of risk determinants and efficient engineers on the performance of construction projects in Libya. The current study has used the quantitative research approach. In the quantitative approach, the researchers used the questionnaire to collect the primary data from the research respondents. The population of the study was all the staff who work in the unlisted construction projects in Libya. The participants' sample in the study was 245 samples. The SPSS was used to test the relationships between the independent variables and the dependent variable.
This study found positive and significant relationships between (risk-determine and efficient-Engineers) and the performance of construction projects in Libya. It is necessary to constantly train and develop employees in the management of Libyan projects at different career levels to give them skills that improve their performance. Raising their abilities, and acquiring their information about project management, risks, and the reasons for delays, especially concerning priorities (the basics of project management, planning, organisation risk study, project financing, contract management accounting and cost control, feasibility study, time management) to raise the level of project performance.

1. Introduction

It is well known in project management that time is one of the main objectives of any project in addition to cost and quality. If there is any delay in time, this will inevitably increase cost, thus reducing the feasibility of the project and reducing the project's contribution to the development and renaissance of society. Several parties contribute to a project's achievement (owners, designers, executors, supervisors, consultants); these parties have a role to play in implementing the project on time or in the delay that may occur (Khalid & Rahman, 2019). As the key parties, they are the owner and financiers of the project. They play an essential role from the concept of the project in the cradle as an idea through the design stages and the stages of implementation and to the stages of the use of the project. This role begins from the beginning of the project and continues until the end to ensure the project's implementation within the specified period. The owners of construction projects in Libya are diverse; they are either public entities of the state, public companies, or private entities such as private companies or participating companies and individuals (Barltrop, 2019). Many construction projects in Libya are exposed to delays in their implementation. It can be said that there are few, if not rarely found, projects that have been implemented during the time period specified in the schedule without any delay. Still, some projects sometimes stop for periods that may be prolonged or shortened after reaching stages, which has a negative impact on the feasibility of the project, as it adversely affects all the parties to the project and even to society since it will increase the cost either as additional costs to accelerate the work, the cost of completing the construction or as the cost for a delay. Therefore, to reduce the chances of extra costs for the project owner and to benefit the community through the project, the search for the role of each party to the project is of immense importance (Elsonoki, Yunus, Yunus, & Hamid, 2020).

Delay is one of the biggest problems for construction companies that can lead to many adverse effects such as lawsuits between project owners and contractors, increased costs, loss of productivity and income, and the termination of the contract. Although previous studies have considered the causes that affect delay, these studies rarely discussed common and general causes of delays in construction projects. Therefore, this study focused on specific causes of delays, such as inadequate and ineffective coordination and communication between the parties involved in construction projects in Libya (Almamlook et al., 2020). This study aims to determine the impact of risk determinants and efficient engineers on the performance of construction projects in Libya. This research will provide a comprehensive literature review of the research variables. The following sections will show the methodology used in this research and the tests and examinations used in the study. This paper will also discuss the findings of this research and include a conclusion for this research.

https://dx.doi.org/10.30566/ijo-bs/2021.10.62

2. Literature Review

Risk is exposure to the possibility of economic or financial loss or gain, physical damage, or injury or delay due to the uncertainty associated with pursuing a particular cause of action. Many researchers have defined risk: Most definitions include the probability factors or probability of events and the negative impact on the project's objectives. In mathematics, the probability of an event is expressed statistically using the mean, dispersion, confidence interval, and other statistical parameters. Relevant data should be available for statistical analysis. In the absence of data, the experience and knowledge of the decision-maker are important in assessing the probability of an adverse event (Lopez-Uceda et al., 2018). Risk affects construction projects negatively affecting planned spending, project planning and quality of work. Both the increase in project duration and poor quality can be expressed in higher costs. The risk impact is often calculated both quantitatively and qualitatively. Risk exposure is the product of the probability and impact of the risk. Risk management is the process that, once done, ensures that everything that can be done will be done to achieve the project goal within the project bonds. Risk management includes risk planning, risk identification, risk analysis, development of risk response strategies and risk monitoring and control to determine how they changed. Since risk affects the achievement of project objectives, risk management is an aspect of good project management (Liu, Li, Bian, Song, & Xiahou, 2018).

According to (Mavi & Standing, 2018), the risk management process is linear and includes risk identification, analysis, and response. However, this linear process does not appreciate that most risk management activities are themselves sources of new risks. Many researchers, such as (Mohammadi et al., 2018; Umar, 2018; Xue et al., 2018); view risk management as a cyclical process with several different steps. The cyclical process appreciates that a response to risk can produce new events that can negatively influence the project and that the appropriate response must be identified, analysed, and anticipated. The emergency amount has long been added to the estimated construction cost and the time required to cover all risk events and uncertainties. This amount is often an arbitrary figure of 10% to 20% of the estimated amount of the contract or the duration of the project. However, this approach does not consider each project's specificities and therefore cannot be considered risk management. (Mohammadi et al., 2018) discussed the use of project reserves and contingency amounts as risk management strategies in construction projects. (Umar, 2018) developed a systematic approach to managing the budgetary risks of the project during the project assessment.

3. Research Model and Hypotheses

The study of (Gitau, 2015) aims to investigate the extent and impact of risk management at the planning stage and practices on project cost and performance of schedule time. The stages of planning the construction project involved risk-Determine and characterisation, efficient-Engineer, right-Location and verification of validity, identification of needs and validation of the cost of the development schedule. The study targets include architects, engineers, project managers and surveyors, chemists, contractors, regulatory authorities operating in Rwanda and key clients with significant investments in the construction industry. The study used qualitative and quantitative methods, data collection and review, physical questionnaires and e-mail delivery, and structured interviews to collect data. The data were processed using SPSS. The researcher pointed out that risk management practices at the planning stage had influenced the project's performance. Moreover, he noted that some unqualified architects influenced most projects in Rwanda. Otherwise, most participants did not study risk management. While the study indicated this risk, management was widely practised by 92% with the process that was essentially informal; thus, the risk management process was not sufficient, and no risk mitigation measures were taken. Various project team members have different opportunities in identifying different risks with a better opportunity to manage the project for most of the risks at the planning stage by involving skilled professionals in decision-making. The researcher discovered that consultant engineers and architects were often selected after the project design stage. This means that many projects have not benefited from professional input at the project planning stage. There was also a flaw in selecting experts and consultants to determine quality, cost and time, and the study proved that 45.2% of the projects surveyed were done poorly at the time while 35.7% of them were below that. It was found that the differences in the site of work were more than 10% of the estimated cost in 45% of the projects surveyed. After the study, the researcher recommended formal and structured risk management practice during project planning with construction professionals and end-users of the project. He also suggested including risk management for all workers who undertake the construction task and the need for continuous development through seminars in risk management for all construction specialists in Rwanda. Especially in construction projects, planning and purchase departments for developers in private and government constructions. Further, the researcher added that the architects, civilians, or project managers must be qualified to choose the sites of construction projects, needs, identification of buildings, the initial budget, and the development of the schedule until the end of the project.

The study (Chileshe et al., 2016) targeted late completions, frequent downtime and cost overruns, common problems in developing countries. The study used effective risk management (RM) to address common construction issues; however, the competence and understanding of risk management (RM) in Iran's construction industry was limited, like many developing countries. This study explored why RM was not used through a survey of 90 professionals in Iran's construction industry. (Hosseini et al., 2016) raise awareness of practices to improve risk management in developing countries. The study called for several solutions to deal with specific barriers. These solutions can be implemented or

https://dx.doi.org/10.30566/ijo-bs/2021.10.62

used as guidelines for construction companies and policymakers in other developing countries facing similar problems. The study concluded that knowledge and awareness are defined in implementing risk management in construction projects. The study also showed that the shift towards effective implementation of the RAM program in developing countries would occur only. If policymakers and researchers participate in a joint effort to enhance knowledge, provide the industry with the required resources and a regulatory framework to facilitate the penetration of risk culture in construction institutions. The study gave evidence that the views of all key stakeholders in the Iranian construction industry were consistent in their classification of barriers to the implementation of the random-access program. Thus, it can be concluded that such an agreement on the discovery of barriers can be an indicator of the possibility of overcoming problems due to the consensus among the major players in the construction industry in dealing with the barriers, difficulties and risks facing construction projects.

Hence this research proposes the following hypotheses.

H1: There is a positive and significant relationship between risk determinants and performance of construction projects development in Libya.

H2: There is a positive and significant relationship between efficient engineers and the performance of construction projects development in Libya.

Based on the above arguments, this research proposes the following conceptual framework:

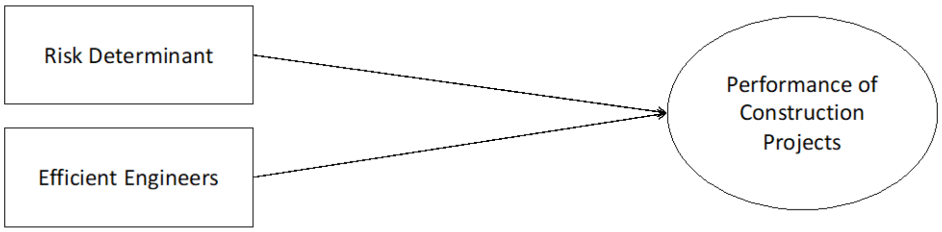

Figure 1: Research conceptual model.

4. Methodology

The current research has employed the quantitative research approach. Specifically, survey research following (Saeed, Bekhet and Dhar 2017), (Saeed, and Bekhet 2018). The quantitative approach is a type of research that presents facts and events. It shows the results in an observable, measurable, and numerically expressible manner by objectifying them. The aim is to measure the social behaviours of individuals objectively through observation, experiment, and test and to explain them with numerical data. This study utilised the questionnaire as a study tool, which has been adopted by several researchers who tested the validity and reliability of the questionnaire. For this study, the population is the staff who work in the unlisted construction projects in Libya. Therefore, this study decided to adopt these five departments as a statistical community for this study. In addition, the five departments are the largest in Libya and have the largest number of civil engineers and architects, besides being geographically distributed among the Libyan regions, representing the community required for the study. The following were the names of the departments.

1. Darna project management
2. Al Bayda project management
3. Sabha project Management
4. Tripoli project management
5. Benghazi projects management

The random sampling technique involved a sample chosen based on the observation of the respondents, which was used in the current study. The participant's sample in the study was 245 samples. The SPSS was used to test the relationships between the independent variables and the dependent variable.

5. Data Analysis and Results

To achieve the research objective, the descriptive statistics analysis was employed to clarify the respondent's profile and the assigned factors of the research. The descriptive analysis shows the mean and standard deviation. Before proceeding to the inferential tests, explanatory tests were used; the purpose of conducting the explanatory test is to examine the respondents' profile, reliability and validity of the used model, several tests such as normality test, reliability test, and convergent validity. And finally, the correlation test was employed.

https://dx.doi.org/10.30566/ijo-bs/2021.10.62

5.1 Respondents Profile

This section discusses and explains the respondents' personal information, including age, Gender, scientific qualification, and experience, presented in each table below. Table 1 shows the distribution of respondents among age groups. Most respondents belonged to the age group of 31 to 40 years old of age comprising 44.2% respondents of the 92 participants. This is followed by the age groups of 41 to 50, comprising 21.2% of the 44 respondents of the survey participants. 18.8% of 39 respondents comprise less than 30-year-old age group. 9.1% of 19 respondents comprise the age group from 51 to 60 years of age. the lowest percentage was indicated by the more than 60 years of age group. This is expected because of the retirement system, representing a population of 14 respondents by 6.7%. The table shows that 84.2% of respondents were less than 50 years of age. This is consistent with the distribution of age groups in Libyan society if under 50 years of age is 90%.

Table 1: Distribution of respondents by age group

Age group	%	Frequency
30 years or less	18.8	39
31-40	44.2	92
41-50	21.2	44
51-60	9.1	19
>60	6.7	14
Total	100.0	208

Table 2 shows the distribution of respondents by Gender, indicating that the majority of the respondents were male at 71.2% by 148 respondents, while female at 28.8% by 60 respondents. This percentage is normal due to the nature of work in this sector as the women are weak in this sector generally.

Table 2: Distribution of respondents by Gender

Gender	%	Frequency
Male	71.2	148
Female	28.8	60
Total	100	208

Table 3 refers to respondents' level of education, showing that bachelor's holders gave the highest percentage of respondents at59.1% by 123 respondents, followed by master's holders with a percentage of 26% by 54 respondents.

Table 3: Distribution of respondents by Level of Education

Qualification	%	Frequency
Bachelor	59.1	123
Master	26	54
PhD	14.9	31
Total	100	208

Table 4 shows the distribution of researchers based on years of experience, demonstrating that 37.9% or 114 respondents have scientific experience from 16 - 20 years, followed by 27.9% or 84 respondents with scientific experience from 5 - 10 years, then 25.9% or 78 respondents who have scientific experience from 11 - 15 years. Additionally, 7.6% or 23 respondents have more than 20 years of experience, and only 0.07% or two respondents have less than five years of experience. Almost all respondents have more than five years of experience, which indicates that their choice to answer the questions of this questionnaire was a good choice they have told the university they are working and the environment around them.

Table 4: Distribution of respondents by scientific experience

Experience	%	Frequency
5 years or less	10.6	22
5 – 10	20.7	43
11 – 15	34.1	71
16 – 20	15.9	33
> 20	18.8	39
Total	100.0	208

5.2 Normality Test

The normality test is used to ensure whether all data meet the normality assumption and provide all variables in the proposed model were examined. Firstly, it was used to measure the influences that can happen due to the sample size. For this, two main tests were used, which were the Skewness and kurtosis tests. The researcher examined the kurtosis, skewness, and the normal distribution of data (Histogram). Table 5 shows the kurtosis and skewness values, which were within the permissible level as the highest kurtosis value was - 0.302 for risk determinant and the lowest value was - 0.646 for the performance of construction projects. These values fall within the range of less than two absolute terms (±2), while for Skewness, the highest value was - 0.163 for risk determinant and the lowest value was - 0.382 for the performance of construction projects. These values fall within the permissible range; so, the data can be concluded to be normality distributed.

https://dx.doi.org/10.30566/ijo-bs/2021.10.62

Table 5: Results of Skewness and Kurtosis for Normality Test

Constructs	Skewness	Kurtosis Statistic
Risk Determinant	- 0.163	- 0.302
Efficient Engineers	- 0.336	- 0.474
Performance of Construction Projects	- 0.382	- 0.646

5.3 Construct Reliability

The reliability was tested using the Cronbach Alpha Index. Table 6 indicates that the Cronbach Alpha for all variables has exceeded the value of 0.70, thus suggesting that all variables have their reliability. The composite reliability of all variables was tested, which requires a value of variables higher than 0.70. It was then observed that all the composite reliability values had exceeded this value, thus concluding that all variables have achieved composite reliability. One of the most important preparatory steps for the measurement model is that the conditions of convergent validity are fulfilled, which requires the value of the variance extracted to be greater than 0.50. It can be observed that all values of variance extracted for the variables have exceeded the value of 0.50. Thus, it was concluded that all variables had achieved convergent validity (legitimacy). Table 6 displays the values for Cronbach Alpha, composite reliability, and convergent validity for all variables and elements of this study.

Table 6: Reliability and convergent validity

Constructs	Cronbach's alpha (> 0.7)	Composite Reliability (> 0.7)	Average Variance Extracted (AVE) (> 0.5)
Risk Determinant	0.913	0.932	0.696
Efficient Engineers	0.867	0.898	0.629
Performance of Construction Projects	0.928	0.941	0.667

5.4 Descriptive Statistics

As the name implies, the descriptive analysis consists of describing the key trends in the existing data and observing situations that lead to new facts. This analysis is based on one or several research questions and does not have hypotheses. In addition, it includes the collection of related data, then organizes, tabulates, and describes the results.

A basic descriptive analysis involves calculating the simple measures of composition and distribution of variables. Depending on the type of data, they can be proportions, rates, ratios, or averages. In addition, when necessary, as in the case of surveys, association measures between variables can be used to decide whether the observed differences between women and men are statistically significant or not.

According to table 7, the minimum measurement scale was 1, while the maximum measurement scale was 5. The mean scores for the variables (risk determinant, efficient engineers, and performance of construction projects) are equal to 3.73, 3.86, and 2.20, respectively. These results confirm most respondents were in average agreement with the items stated in the questionnaire. Also, these results demonstrate the essential role of the independent variable on the performance of construction projects. Furthermore, the standard deviations for the variable were 1.08997, 1.04479, and 1.06337, respectively.

Table 7: Descriptive Statistics for Study Variables

	N	Minimum	Maximum	Mean	Std. Deviation
RD	208	1.00	5.00	3.73	1.08997
EE	208	1.00	5.00	3.86	1.04479
PCP	208	1.00	5.00	2.20	1.06337

RD: Risk Determinant; EE: Efficient Engineers, and PCP; Performance of Construction Projects.

5.5 Direct Effect Test

This section discusses the effects of the risk determinant and efficient engineers on the performance of construction projects in Libya. Table 8 illustrates and presents the direct effects of independent factors effect. The results of this study were obtained using the outputs of SPSS, where the results are shown in Table 8. The results displayed a positive relationship between risks-Determine and project implementation. All values were indicated to be matching the specified criteria (β= 0.128, t=2.000, $p<0.05$). In other words, the more accurate the risks-Determine, the greater the performance by 12.8% relationship, showing high importance and a significant solid statistical level. The direct effect of a risks-Determine variable on the performance of projects (0.128) and the value of T was calculated to equal to 2.000, which was greater than the scheduled value of 1.645 and is statistically significant at $p < 0.05$. The level of indication was 0.023, which indicates the change in the risks-Determine that affected the Implementing projects. That is, the more interest in risks-Determine, the higher the level of projects implementation performance.

There was a positive and statistically significant relationship between the efficient-Engineers on project implementation performance where all values were indicated in conformity with the specified criteria (β = 0.116, t = 2.320, $p <0.05$), In

https://dx.doi.org/10.30566/ijo-bs/2021.10.62

other words, development technology increased performance by 11.6% with a strong statistically significant relationship. The direct effect of the efficient-Engineers on the performance of projects (0.116) and the t value was calculated to equal 2.320, greater than the scheduled value of 1.64. It was statistically significant at $p < 0.05$ at the level of 0.010. This indicates that the increased efficient-Engineers affected the performance of projects in Libya. In other words, the more efficient-Engineers are, the higher the level of projects implementation in Libya. From the above, the second hypothesis was accepted.

Table 8: Summary of the Direct Effect

Hypothesis	Relationship	Std Beta	Std Error	t-value	p-value	Decision
H1	RD -> PCP	0.128	0.064	2.000	0.023	Supported
H2	EE -> PCP	0.116	0.05	2.320	0.010	Supported

6. Discussion and Implications

The discussion section is the last step in the process of the findings. This section presents the results related to the research hypothesis and compares them with the results and findings of the previous studies. It has been found that risk determinants and efficient engineers positively and significantly impact the performance of construction projects in Libya. The previous studies support these results. It is consistent with that by (M. Abeer, 2017), stating that at the beginning of each project, the expected risks and the most appropriate methods to address these risks must be studied to avoid any future consequences affecting the project's success. The study also indicated the need to use risk management in construction projects to reduce the risks before they occur. The results of this study are also in line with the obtained by (Ikediashi et al., 2014). The study revealed that poor risk management was classified as the most important failure factor for infrastructure projects in Saudi Arabia and the deficiencies in project management. In addition, (Gitau, 2015) supported that a formal and structured practice of risk management is necessary during project planning with the participation of construction professionals and end-users of the project. He further recommended including risk management for all workers who undertake construction and continuous development seminars on risk management for all construction professionals, especially in construction projects and buildings' planning and procurement for developers in private and government departments.

Houghton and Castillo-Salgado (2019) added a need for knowledge and awareness of implementing risk management in construction projects. The study also clarified that the shift towards effective implementation of the records and archives management program in developing countries would not occur unless policymakers. Researchers participate in a mutual effort to enhance their knowledge and provide the industry with the required resources and the regulatory framework to facilitate the penetration of risk management culture in construction building institutions. The study results showed that awareness of risk management processes was the most important to improve decision-making processes in construction organisations, in addition to knowing and understanding the time of the risk management process that would contribute to identifying and managing the underlying risks effectively. This will lead to achieving the project goals in terms of time, cost, and quality. Consistent with Zidane and Andersen's (2018) study presented delays related to engineers and the engineer's role as an arbitrator for the project, the project owner gave an impact rate of 57%. This study also corresponds to a study by Zhang et al. (2018) showing the most important factors of project delays, namely bad planning for the project, timetable and cost estimates for the project, poor location management and supervision, unqualified team for the project and slow response to the consultant engineer. All of this comes from not choosing engineers with high efficiency and experience in supervising construction work. In his study, Xue et al. (2018) concluded that there were significant reasons for the delay related to planning and scheduling the inappropriate construction project by the engineers. One of the main reasons related to the delay in the projects was consultant engineers who lack experience. This was also revealed by the study of (Ikediashi et al., 2014), where the current project schedule, poor estimation practices. Design differences and inefficiency of change management were categorised as the most important failure factors for infrastructure projects, which were caused by the lack of choice of efficient-Engineers in implementing construction projects.

Whereas X. Wu et al. (2018) confirmed that most of the projects were affected by engineers who were not qualified to work, thus recommended choosing efficient engineers, civil engineers, or projects managers. Construction locations, needs, identification of buildings, and all engineers should participate in the first stages of the project. (Dharani, 2016) through his study, stated that it is necessary to provide good supervision in construction locations through efficient-Engineers to improve the performance. This study also agreed with that by (Jimoh et al., 2013), mentioning that companies must make efforts to invest in developing their workforce and the ability to select, train and evaluate employees and determine the level of performance in the construction industry as it leads to an improvement in total productivity in the long run.

7. Conclusion

construction projects. It is also crucial that these individuals understand the causes of delay, its effects and results, and the skills that enable them to avoid and reduce it. Any failure in the performance of these entities or those individuals

https://dx.doi.org/10.30566/ijo-bs/2021.10.62

may lead to the occurrence of the delay, especially with the scarcity of studies related to the owners of the projects and their employees, including civil, architectural, financial, and legal engineers.

Based on the information addressed by the study problems, the reality of the performance of construction project management in Libya and the lack of solutions for this problem, the performance of construction projects in the direction of Libyan projects were examined. The examination was done using risk-determine and efficient-Engineers as the factors that affect the performance of construction projects.The current study has used the quantitative research approach. In the quantitative approach, the researchers used the questionnaire to collect the primary data from the research respondents. The population of the study was all the staff who work in the unlisted construction projects in Libya. The participants' sample in the study was 245 samples. The SPSS was used to test the relationships between the independent variables and the dependent variable. This study found positive and significant relationships between (risk-determine and efficient-Engineers) and the performance of construction projects in Libya. It is necessary to constantly train and develop employees in the management of Libyan projects at different career levels to give them skills that improve their performance, raising their abilities, and developing their information about project management. Risks and the reasons for delays, especially about priorities (the basics of project management planning, organisation risk study, project financing, contract management accounting and cost control feasibility study, time management) to raise the level of project performance.

References

Khalid, L. S., & Rahman, I. A. (2019). Measuring the Effect of the External Factors on Iraqi Construction Projects Performance USING PESTLE Technique.

Barltrop, R. (2019). Oil and Gas in a New Libyan Era: Conflict and Continuity.

Elsonoki, M., Yunus, R., Yunus, S., & Hamid, A. (2020). The Adoption of Value Engineering Practices in the Libyan Construction Industry. Paper presented at the IOP Conference Series: Earth and Environmental Science.

Almamlook, R., Bzizi, M., Al-Kbisbeh, M., Ali, T., Almajiri, E. J. A. J. o. E. S., & Engineering. (2020). Factors Affecting Labor Productivity in the Construction Industry. 4(2), 24-30.

Lopez-Uceda, A., Galvin, A. P., Ayuso, J., Jimenez, J. R., Vanwalleghem, T., & Pena, A. (2018). Risk assessment by percolation leaching tests of extensive green roofs with fine fraction of mixed recycled aggregates from construction and demolition waste. Environ Sci Pollut Res Int, 25(36), 36024-36034. doi:10.1007/s11356-018-1703-1

Liu, P., Li, Q., Bian, J., Song, L., & Xiahou, X. (2018). Using Interpretative Structural Modeling to Identify Critical Success Factors for Safety Management in Subway Construction: A China Study. Int J Environ Res Public Health, 15(7). doi:10.3390/ijerph15071359

Mavi, R. K., & Standing, C. (2018). Critical success factors of sustainable project management in construction: A fuzzy DEMATEL-ANP approach. Journal of Cleaner Production, 194, 751-765.

Mohammadi, A., Tavakolan, M., & Khosravi, Y. (2018). Developing safety archetypes of construction industry at project level using system dynamics. J Safety Res, 67, 17-26. doi:10.1016/j.jsr.2018.09.010

Umar, T. (2018). Causes of delay in construction projects in Oman. Middle East Journal of Management, 5(2), 121-136.

Xue, X., Zhang, R., Wang, L., Fan, H., Yang, R. J., & Dai, J. (2018). Collaborative innovation in construction project: A social network perspective. KSCE Journal of Civil Engineering, 22(2), 417-427.

Houghton, A., & Castillo-Salgado, C. (2019). Associations between Green Building Design Strategies and Community Health Resilience to Extreme Heat Events: A Systematic Review of the Evidence. Int J Environ Res Public Health, 16(4). doi:10.3390/ijerph16040663

Saeed, M. A. Y., & Bekhet, H. A. (2018). Influencing Factors of Mobile Marketing among Young Malaysian Customers. Australian Journal of Basic and Applied Sciences, 12(9), 63-72.

Saeed, M. A. Y., Bekhet, H. A., & Dhar, B. K. (2017). Constructing model to explore the influence of marketing audit on organizational performance–An innovative arena of marketing. International Journal of Business Society, 1(1), 37-47.

Zidane, Y. J.-T., & Andersen, B. (2018). The top 10 universal delay factors in construction projects. International Journal of Managing Projects in Business, 11(3), 650-672.

Zhang, Y., Liu, S., Tan, J., Jiang, G., & Zhu, Q. J. I. j. o. p. m. (2018). Effects of risks on the performance of business process outsourcing projects: The moderating roles of knowledge management capabilities. 36(4), 627-639.

Wu, X., Li, Y., Yao, Y., Luo, X., He, X., & Yin, W. (2018). Development of Construction Workers Job Stress Scale to Study and the Relationship between Job Stress and Safety Behavior: An Empirical Study in Beijing. Int J Environ Res Public Health, 15(11). doi:10.3390/ijerph15112409

https://dx.doi.org/10.30566/ijo-bs/2021.10.62