Journal of Business Management and Economic Research

2020, 4 (2) DOI: 10.29226/TR1001.2020.195
Journal Homepage: https://www.jobmer.org

Influence of Project Triple Constraint on Residential Building Project among Kuantan Malaysian Construction Industry

I. N. Lam[1] & *A.Q. Adeleke[2]

[1,2]*Faculty of Industrial Management, Universiti Malaysia Pahang, Lebuhraya Tun Razak, 26300 Gambang, Pahang, Malaysia*

**Corresponding author: adekunle@ump.edu.my*

Abstract

The main goal was to examine a series of hindrances that are related to the construction projects, most of which were caused by delay in time, cost overrun and poor quality of the projects. Aside from these, the lack of proper planning regarding cost estimation may sometimes lead to overestimation or underestimation, thus resulting in the delay of construction projects or incompletion of the task. To address these issues above, this research paper aims to: 1) To investigate the significant relationship between time and construction project among Kuantan, Malaysia construction industry,; 2) To investigate the significant relationship between cost and construction project among Kuantan, Malaysia construction industry; and 3) To investigate the significant relationship between quality and construction project among Kuantan, Malaysia construction industry. The data were collected from 89 respondents among Kuantan construction companies. In this research, PLS-SEM technique was used to assess both the measurement and structural models. The result shows that there is a significant relationship between the quality and construction projects of residential building in Kuantan, Malaysia. The relationship of quality in triple constraints and the residential buildings was also found to be positively correlated in this study.

Keywords: *Construction industry, time, cost, quality, residual building project.*

Suggested Citation:

Lam, I. N. & Adeleke, A. Q. (2020). Influence of Project Triple Constraint on Residential Building Project among Kuantan Malaysian Construction Industry. *Journal of Business Management and Economic Research (JOBMER)*, Vol: 4, Issue:2, 216-230.

1. Introduction

Construction projects had clearly become a central activity in most organizations and companies and they are rapidly increasing their investment resources in projects especially on housing projects. The construction industry is vital to the economic growth of Malaysia and still remains one of the major contributors to the Gross Domestic Product (GDP) of Malaysia despite the financial recession (Egerer,

Langmantel, and Zimmer 2016). The construction industry had been consistently contributing an average of 3.8% to the Malaysian GDP for over three decades (CIDB, 2006). Therefore, the economy of a country has a close relationship with the construction outputs (United Nations Department of Economic and Social Affairs, 2015).

According to Wang (1994) and Abanda et al. (2013), as construction activities are becoming more complex, a more sophisticated approach is necessary to deal with initiating, planning, financing, designing, approving, implementing and completing a project. Therefore, the main aim of this research is to see how the triple constraints (time, cost and quality) affect the housing construction project in Kuantan, Malaysia (Hassan & Adeleke, 2019; Bamgbade et al., 2019).

The main aim of this study is to address problems been faced by project managers concerning the elements of the triple constraint (time, cost and quality) in the construction projects activities (Michael, 2004). In order to achieve this and successful completion of any project, the project team must understand the importance of the constraint quality (Pretorius, 2012).

Besides, projects have a strategy and clear objectives for easier completion based on project management (Adeleke et al., 2019; Fred, 2015). Previous studies have given a list of the requirements needed by the project management in order to have successful completion of building projects. There must be a proper schedule which must be well suited to stakeholders' expectation, management of project activities, task-related works, and ability of project manager to meet the objectives of the projects.

Also, the quality of performance in project management will help in identifying and overcoming challenges during the project execution. Building risk may result from unsuitable timing, budget, and quality. In addition, improper cost of material sometimes occurs during project management which may affect the completion of the project (Abulhakim & Adeleke, 2019; Darrel, 2010).

2. Literature Review

2.1. Overview of the Malaysian Construction Industry

According to (Department Of Statistics Malaysia 2018), the total population of Malaysia is 31.62 million populaces in the final quarter of 2017 consists of 13 states and three federal territories, separated by the South China Sea into two similarly sized regions, Peninsular Malaysia and East Malaysia (Malaysian Borneo). The country is multi-ethnic and multi-cultural. About half the population is ethnically Malay, with large minorities of Malaysian Chinese, Malaysian Indians, and indigenous peoples (Azman & Adeleke, 2018; Taofeeq et al., 2019; Bamgbade et al., 2019).

The government of Malaysia has drawn a roadmap to transform the economy of the country in order to be recognized as a developed nation. Since its independence, the Malaysian economy has observed strategic plans with five-year thrusts. The strategic trusts are in line with the goal to become a high-income nation by 2020. Looking towards the 2020 target, the challenge is to sustain the impetus of healthy growth which requires an average and consistent growth of 6.0 % in GDP per annum during the Eleventh Plan Period. To achieve this target, the economic sectors are to play significant roles in which the construction industry is active and features prominently in terms of policy formulation and implementations.

The construction industry is an economic investment and its relationship with economic development is well theorized. Many studies have emphasized the important contribution of the construction industry to national economic development (Myers 2013). Nation-building necessitates participation in and contribution to the efficiency, productivity, cost competitiveness, and environment in the construction industry in order to develop the industry and make use of its resources more efficiently (Adeleke et al., 2019; Badawi, 2007).

The construction industry has assumed a vital role in creating wealth and improving the standard of living of citizenry through government's socio-economic policies and infrastructural develepomewnt; it further creates a multiplier effect on other industries, in manufacturing, financial services, and professional services (Robby, 2015).

Quality in the construction industry will have to involve more than contractors alone. Architects and engineers will need to be involved as well using the three contributing factors (material, construction and design faults). About 50% of the failures of construction projects can be attributed to design faults while 40% are due to construction faults and 10% are as a result of material faults (CIDM, 2015). The strategies and the action plans implemented by CIMP covered 10 years (2006 to 2015). This has been adopted for the growth of the construction industry in Malaysia (Jamil and Adeleke et al., 2018; Najib, 2015).

2.2. Conceptual Framework

This research is conducted using the specified model with clearly defined independent and dependent variables. Based on the conceptual framework, the independent variables in this research project triple constraints (time, cost and quality), and the dependent variable is building construction projectv(residential building project) delivery. Thus, the framework shows the relationships between these variables, which the findings will indicate whether they are significant or not (Hassan et al., 2019; Adeleke et a., 2015).

Figure 1 shows the conceptual framework for project triple constraints for residential building projects.

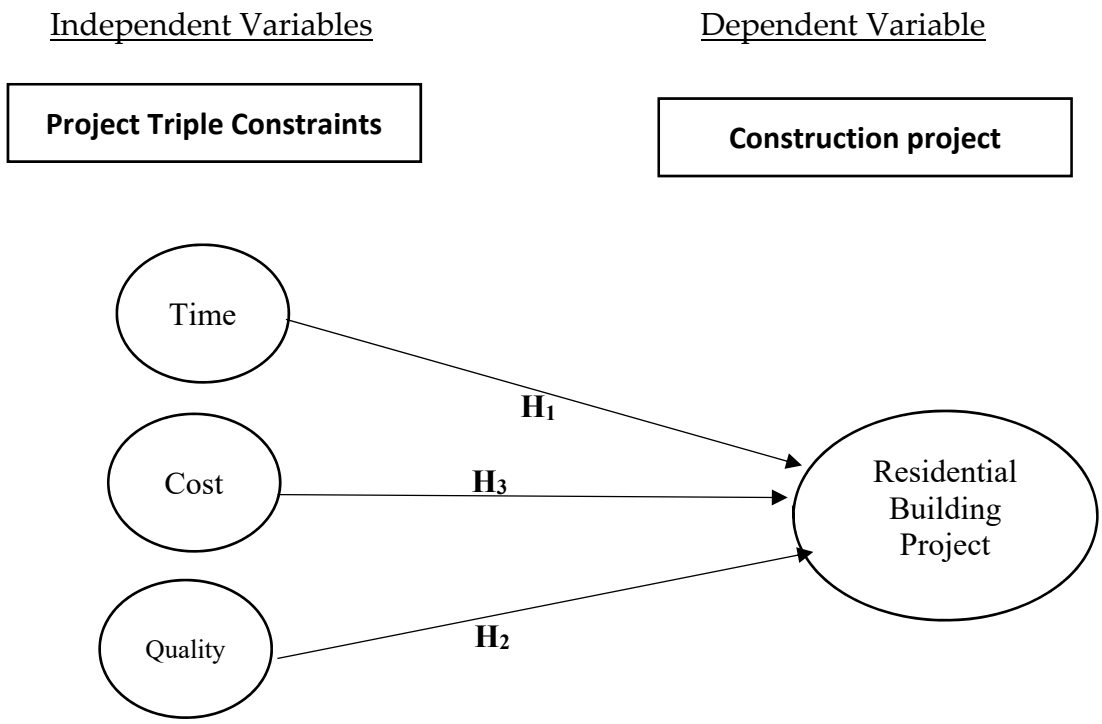

Figure 1: Conceptual Framework

2.2. Relationship between Triple Constraints and Construction Projects (Residential Building Projects)

It has been given many names, the project management triangle, the iron triangle, and the project triangle, the project triple constraint is a model that measures the project success in project management. It indicates the best way of assessing projects during construction. Cost, time and quality of the building projects were considered in the construction companies in this study as shown in Figure 1 as emphasized by Leon, (2011). This model is related to carrying out projects with substantial change; however, project managers always overlook this case in the construction industry.

Moreso, when changes occur in the process of operating the project triple constraint, it is necessary to consider constant variables during the construction projects. But sometimes no limitation is incurred in some projects (Malik & Adeleke, 2018; Taofeeq et al., 2019; Dobson, 2004). Project triple constraint is important for decision and evaluation of the building projects. Sometimes it is not enough because it requires other previous project activities for the evaluation (Pretorius, 2011). The constraint of projects varies in terms of cost, time and quality which are called project triple constraint. It is important to identify and balance the variables in order to complete projects so as to enjoy the benefit. (Samaha,

2007). The unsuccessful outcome of projects is mostly due to delay in time, the intended deliverable areas, over cost and inadequate system (Gelbard and Pliskin, 2002). In addition, lack of analysis and design sometimes results in problems as previously suggested (Rahman & Adeleke, 2018; Nienaber, 2003).

The quality of work in the construction industry is mostly related to the improvement of projects based on project triples such as time, cost and quality. Before evaluating the performance of a job, the breakdown of the system should be understood because it depends on the project quality (Stellman, 2012). The time of the project is another constraint. The estimated and intended time of project completion should be evaluated in the construction company. Companies should always engage in following up scheduled projects by systematically planning operations so as to set up projects (Steyn, 2006). Project cost is the last element to consider while establishing a project. Cost should be estimated to cover the whole project. In view of the above, this study, therefore, initiates these relationships by putting the following hypotheses forward:

Hypothesis 1: There is a significant relationship between the time and construction projects of residential building projects in Kuantan, Malaysia.

Hypothesis 2: There is a significant relationship between the cost and construction project of residential building projects in Kuantan, Malaysia.

Hypothesis 3: There is a significant relationship between quality and construction projects of residential building projects in Kuantan, Malaysia.

3. Methodology

The section includes research design, data collection technique, questionnaire sampling, the method that been used, research instrument, statistical technique, hypothesis testing, data analysis and the summary for overall methodology. This research is a cross-sectional research design by using a structured questionnaire, the data was collected at single-point-in-time (Sekaran and Bougie 2013). Proportionate stratified random sampling technique was employed for sample selection in the research. The quantitative research approach was used in this study, as this is mostly adopted in social science researches (Sabodin & Adeleke, 2018; Sekaran 2006) This research was conducted among construction companies in Kuantan. A total number of 89 questionnaires were personally collected from the sampled companies in Kuantan, Malaysia.

3.1. Instrument Design

All the variables that are reviewed on the research framework for this research are needed to be measured, thus, an appropriate survey with five-point Likert scaling was adopted and adapted for the purpose of this study. So, responses from the respondent were measured with the scale as categorized thus: "Strongly disagree=5", "Disagree=4", "Neutral=3", "Agree=2" and "Strongly disagree=1".(Sekaran and Bougie 2013), The rating scale helps the researcher to compute the standard deviation and the mean feedback on the variables and the mid-point of the scale and likewise to prevent the respondents from selecting an unbiased point which may reduce the quality of the questionnaire. Below is the summary of the indicators that were measured.

Table 1. Summary of the survey instrument in the questionnaire

Section	Description	Variable	No. of item
1	Demographic	-	8
2	Time	IV's	10
3	Cost	IV's	10
4	Quality	IV's	10
5	Building project	DV	10
		Total	48

4. Results and Discussions

4.1. Data Collection and Sample

Out of 135 sets of questionnaires that were distributed to the construction companies in Kuantan, Pahang, 89 copies were duly completed and returned which represent 65.93% for the response rate in this study. This is acceptable because the sample size for this research is 89 respondents (Taofeeq & Adeleke, 2019; Bamgbade et al., 2019).

Table 2. Summary of Demographic Scales of Respondents

Type	Items	Frequency (N)	Percentage (%)
Position	Site Engineer	50	56.20
	Project Manager	30	33.70
	General Employee	9	10.10
Working experience	1-5 years	30	33.70
	6-10 years	21	23.60
	11-15years	20	22.50
	>15 years	18	20.20
Gender	Male	50	56.20
	Female	39	43.80
Company Ownership	Local	89	100.00
Type of Project	Residual Building	83	93.30
	Educational Building	4	4.50
	Commercial Building	2	2.20
Company Prime Location	Local market areas	48	53.90
	Across Malaysia	27	30.30
	Within few states	14	15.70
Company Existence	1-5 years	1	1.10
	6-10 years	2	2.20
	11-15 years	12	13.50
	>15 years	74	83.10
Number of Employee	0-50	3	3.40
	50-100	22	24.70
	100-150	27	30.30
	>150	37	41.60

4.2. Measurement Model

Before examining the hypothesis, the measurement model and the outer model were tested through the partial least square structural equation modeling (PLS-SEM) technique. The figure below shows the model of this research with the structural dimensions below (Adeleke et al., 2018; Taofeeq et al., 2020).

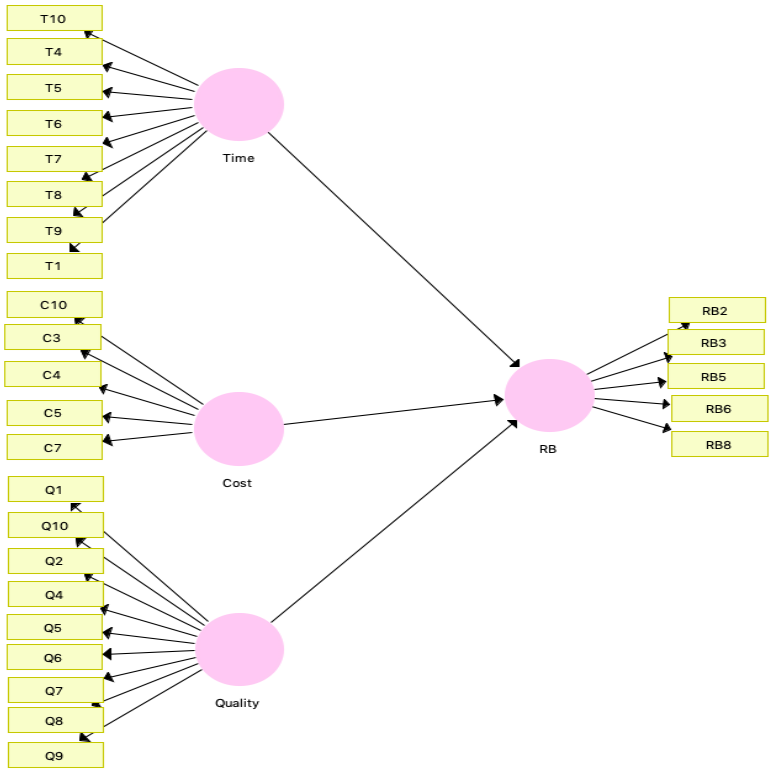

Figure 2. Measurement Model

Table 3 shows the content validity of the measurement model which is explained in two ways. Firstly, there are high loading in the items on their respective constructs when related to other constructs. Secondly is the loading of the items were significantly loading on their respective constructs affirming the content validity of the measure used in this research (Bamgbade et al., 2017; Adeleke et al., 2015; Chow and Chan, 2008).

Table 3. Factor Analysis and Loading of the items (Cross Loading)

	RB	Cost	Quality	Time
RB2	0.617	0.374	0.312	0.251
RB3	0.668	0.186	0.471	0.218
RB5	0.782	0.244	0.409	0.217
RB6	0.733	0.288	0.389	0.092
RB8	0.683	0.223	0.374	0.178
C3	0.254	0.734	0.56	0.621
C5	0.201	0.746	0.423	0.326
C7	0.261	0.748	0.412	0.54
Q1	0.352	0.41	0.617	0.366
Q2	0.382	0.394	0.621	0.313
Q4	0.375	0.395	0.728	0.324
Q5	0.376	0.62	0.785	0.492
Q7	0.294	0.461	0.705	0.35
Q8	0.442	0.369	0.658	0.273
Q9	0.522	0.672	0.786	0.354
T4	0.085	0.545	0.404	0.647
T5	0.084	0.377	0.284	0.643
T6	0.097	0.446	0.126	0.604
T7	0.177	0.56	0.43	0.742
T8	0.311	0.329	0.317	0.747

The convergent validity is considered to be the extent to which a group of variables converges to measure a specific concept. To establish the convergent analysis, there are three criteria that were examined, especially the factor loadings, composite reliability (CR) and average variance extracted (AVE). Furthermore, all items of loading were tested which is acceptable for all items then, its values must be more than 0.6 following the literature of the multivariate approach. Besides, the other criterion is the composite reliability (CR) to examine convergent validity. It referred to as the extent to which a set of items regularly indicate the latent construct (Hair et. al, 2010). In Table 4, the values of CR and AVE were tested. The values of CR from 0.870 to 0.940 which is more than expected values of 0.7. These results show the AVE measures the variance that covered by indicators in relation to the variance assigned to the measurement errors. Barclay et. al (1995), stated that the AVE value is at least 0.5, then a set of items have enough convergence to measure the concerned construct. So, the AVE value for this research ranged from 0.520 to 0.590 which can be categorized as a good level of the construct validity of measure employed (Adeleke et al., 2018; Taofeeq et al., 2019).

Table 4. The Convergent Validity Analysis

Construct dimensions	Items	Loading	Composite Reliability	AVE	Cronbach's Alpha
Residual Building	RB2	0.617	0.826	0.488	0.739
	RB3	0.668			
	RB5	0.782			
	RB6	0.733			
	RB8	0.683			
Cost	C3	0.734	0.813	0.468	0.71
	C5	0.746			
	C7	0.748			
Quality	Q1	0.617	0.877	0.448	0.842
	Q2	0.621			
	Q4	0.728			
	Q5	0.785			
	Q7	0.705			
	Q8	0.658			
	Q9	0.786			
Time	T4	0.647	0.841	0.402	0.805
	T5	0.643			
	T6	0.604			
	T7	0.742			
	T8	0.747			

The discriminant validity shown that items used different constructs does not overlap. As illustrated in Table 5, the square root of AVE for all constructs was replaced at the diagonal elements of the correlation matrix. Therefore, the discriminant validity of the outer model for this study was confirmed where the diagonal elements in the table were higher than the other elements of the column and row where they are located. From the testing made above for the construct validity of the outer model, it is believed that the obtained results pertaining to the hypotheses testing should be highly reliable and valid.

Table 5. Discriminant Validity Analysis

	Cost	Quality	RB	Time
Cost	**0.684**			
Quality	0.695	**0.669**		
RB	0.362	0.57	**0.699**	
Time	0.608	0.503	0.272	**0.634**

According to Table 6 above, the result shows the hypothesis testing for this study. The result showed that the quality variable has a significant positive relationship on residential building (β= 0.604, t = 5.569, p = 0). Therefore, the H3 of the effect of quality on the residential buildings was supported. So, only a variable has a significant relationship on residential building projects among Kuantan Malaysian construction industries (Omer & Adeleke, 2019).

Table 6. Result of the Inner Structure Model

Item		Beta	S/E	T Value	P Values	Findings
H1	Time -> RB	0.07	0.113	0.024	0.49	Not significant
H2	Cost_ -> RB	-0.065	0.149	0.451	0.326	Not significant
H3	Quality_ -> RB	0.604	0.11	5.569	0	significant

Cohen (1988) suggested that the criteria of effect size is less than 0.02 (0.02 = small, 0.15 = medium, 0.35 = high). From Table 7, there is a medium effect size of the quality on building construction project (Adeleke et al., 2016).

$$\text{Effect size (f)} = \frac{R^2 \text{ incl} - R^2 \text{ excl}}{1 - R^2 \text{ incl}}$$

Table 7. Direct Effect IV-DV

R-squared	Included	Excluded	f-squared	Effect size
Time	0.327	0.327	0	none
Cost	0.327	0.324	0	none
Quality	0.327	0.159	0.285	medium

5. Conclusion

This research is focused on project triple constraints (time, cost and quality) and how they affect the success of residential building projects in Kuantan Malaysian construction industries. Therefore, the future researcher can be explored to investigate the triple constraints on residential building projects and empirically validate the proposed model in this research. Thus, this research does not only benefit the academics world but it also of immense benefits to those in construction industries as well.

6. Acknowledgment

Authors of this study acknowledge the research funding from the Fundamental Research Grant Scheme (FRGS), Managed by PNI, Universiti Malaysia Pahang [Grant code: RDU190127].

7. References

Adeleke, A. Q. and Bahaudin, A. Y. and Kamaruddeen, A. M. and Bamgbaded, J. A. & M., Waris and Panda, Sitansu and Afolabi, Yakibi Ayodele (2019) An Empirical Analysis of Organizational External Factors on Construction Risk Management. *International Journal of Supply Chain Management (IJSCM), 8 (1). pp. 932-940*

Adeleke, A. Q., Bamgbade, J. A., Salimon, M. G., & Lee, C. K. (2019). Project Management Performance and Its Influence on Malaysian Building Projects. *KnE Social Sciences*, 313-329.

Adeleke, A. Q., Windapo, A. O., Khan, M. W. A., Bamgbade, J. A., Salimon, M. G.,& Nawanir, G. (2018). Validating the Influence of Effective Communication, Team Competency and Skills, Active Leadership on Construction Risk Management Practices of Nigerian Construction Companies. *The Journal of Social Sciences Research*, 460-465.

Adeleke, A. Q., Bahaudin, A. Y., & Kamaruddeen, A. M. (2018). Organizational Internal factors and construction risk management among nigerian construction companies. *Global Business Review*, *19*(4), 921-938.

Adeleke, A. Q., Nasidi, Y., & Bamgbade, J. A. (2016). Assessing the Extent of Effective Construction Risk Management in Nigerian Construction Companies. *Journal of Advanced Research in Business and Management Studies*, *3*(1), 1-10.

Adeleke[1], A. Q., Bahaudin, A. Y., & Kamaruddeen, A. M. (2015). A Partial Least Square Structural Equation Modeling (PLS SEM) Preliminary Analysis on Organizational Internal and External Factors Influencing Effective Construction Risk Management among Nigerian Construction Industries. *Rev. Téc. Ing. Univ. Zulia*, *38*(143), 143-55.

Adeleke, A., Bahaudin, A., & Kamaruddeen, (2015) A Level of Risk Management Practice in Nigeria Construction Industry-From a Knowledge Based Approach. *Journal of Management Marketing and Logistics*, *2*(1), 12-23.

Abanda, F.H. et al. 2013. "Construction Project Management Handbook." Automation in Construction.

Abdullah, N., and F. Sulaim. 2013. "The Oil Palm Wastes in Malaysia." In Biomass Now - Sustainable Growth and Use,.

Abulhakim, N., & Adeleke, A. Q. (2019). The Factors Contributing to Accident Occurrenceon Malaysia Building Projects through Partial Least Square Structural Equation Modeling. *Social Science and Humanities Journal*, 1096-1106.

Amal Hayati Ishak, Siti Noorbiah Md Rejab, Nurul Himmah Kassan. 2010. "Meneroka Potensi Sektor Pelancongan Di Malaysia Dalam Menjana Pertumbuhan Ekonomi Negara." Prosiding Seminar Pengurusan Perhotelan dan Pelancongan Islam (SPPPI 2010) "Memperkasa Pengurusan Industri Perhotelan dan Pelancongan Islam" 22 dan 23 Jun 2010 (Selasa dan Rabu) Institute of Leadership & Quality Management (iLQAM), UiTM Shah Alam.

Atkinson, Roger. 1999. "Project Management: Cost, Time and Quality, Two Best Guesses and a Phenomenon, Its Time To ..." International Journal of Project Management.

Azman, N. A. S. M., & Adeleke, A. Q. (2018). Effect of Time Overruns on Apartment Building among Kuantan Malaysian Construction Industries. *Journal of Advanced Research in Applied Sciences and Engineering Technology, 10 (1), 41-47.*

Bamgbade, J. A., Salimon, M. G., Adeleke, A. Q., & Nasidi, Y. (2019). Contractor's Technology Acceptance for Firm Sustainability Performance. *KnE Social Sciences*, 1084-1101.

Bamgbade, J. A., Nawi, M. N. M., Kamaruddeen, A. M., Adeleke, A. Q., & Salimon, M. G. (2019). Building sustainability in the construction industry through firm capabilities, technology and business innovativeness: empirical evidence from Malaysia. *International Journal of Construction Management*, 1-16.

Bamgbade, J. A., Kamaruddeen, A. M., Nawi, M. N. M., Adeleke, A. Q., Salimon, M. G., & Ajibike, W. A. (2019). Analysis of some factors driving ecological sustainability in construction firms. *Journal of cleaner production*, *208*, 1537-1545.

Bamgbade, J. A., Kamaruddeen, A. M., & Nawi, M. N. M. (2017). Towards environmental sustainability adoption in construction firms: An empirical analysis of market orientation and organizational innovativeness impacts. *Sustainable Cities and Society*, *32*, 486-495.

Baratta, Angelo. 2006. "The Triple Constraint, A Triple Illusion." In PMI Global Congress Proceedings,.

Barnes, Martin. 1988. "Construction Project Management." International Journal of Project Management.

Chan, Albert P. C., David Scott, and Ada P. L. Chan. 2004. "Factors Affecting the Success of a Construction Project." Journal of Construction Engineering and Management.

CIDB. 2006. Construction Industry Development Board Malaysia Construction Industry Master Plan Malaysia 2006-2015.

Cronbach, X., Meel, P. 1962. "Construct Validity in Psychologal Texts." Psychological bulletin.

Davis, Roy B., Sylvia Õunpuu, Dennis Tyburski, and James R. Gage. 1991. "A Gait Analysis Data Collection and Reduction Technique." Human Movement Science.

Department Of Statistics Malaysia. 2018. "Department Of Statistics Malaysia." Statistics of Graduates in the Labour Force Malaysia.

Egerer, Matthias, Erich Langmantel, and Markus Zimmer. (2016). "Gross Domestic Product." In Regional Assessment of Global Change Impacts: The Project GLOWA-Danube,.

Frechtling, Joy. 2002. "An Overview of Quantitative of Qualitative Data Collection Methods." In The 2002 User-Friendly Handbook for Project Evaluation,.

Hassan, A. K., & Adeleke, A. Q. (2019). The Effects of Project Triple Constraint on Malaysia Building Projects. *Social Science and Humanities Journal*, 1222-1238.

Hassan, A. K., Adeleke, A. Q., & Hussain, S. (2019). Partial Least Square Structural Equation Modeling: An Approach to the Influence of Project Triple Constraint on Building Projects among Malaysian Construction Industries. *Social Science and Humanities Journal*, 1445-1464.

Jaskowski, P, and S Biruk. 2011. "The Conceptual Framework For Construction Project Risk Assessment." Reliab. Theory Appl.

Kaur S.P. 2013. "Variables in Research." International Journal of research in medical sciencs 3(4):36–38.

Kimberlin, Carole L., and Almut G. Winterstein. 2008. "Validity and Reliability of Measurement Instruments Used in Research." American Journal of Health-System Pharmacy.

Kog, Yue Choong, and Ping Kit Loh. 2011. "Critical Success Factors for Different Components of Construction Projects." Journal of Construction Engineering and Management.

Malik, N. S. A., & Adeleke, A. Q. (2018). The Effect of Organizational Culture on Material Risk among Malaysian Construction Industries. *Journal of Advanced Research in Applied Sciences and Engineering Technology, 10 (1), 34-40.*

MIDA. 2014. "Performance Report 2014." Malaysian Investment Development Authority. Ministry of Finance Malaysia. 2015. "Budget 2018: Full Speech." The Star.

Nambiappan, Balu et al. 2018. "Malaysia: 100 Years of Resilient Palm Oil Economic Performance." Journal of Oil Palm Research 30(1): 13–25.

Narayanan, Sheshadri, and Fu Chung Lin. 2017. "Sampling Technique." In Therapeutic Drug Monitoring and Toxicology by Liquid Chromatography,.

N.D Jamil, A.Q. Adeleke (2018). The relationship between team competency and design risk management among construction industries in Kuantan. *Journal of Advanced Research in Applied Sciences and Engineering Technology, 10 (1), 77-81.*

Omer, M. S., & Adeleke, A. (2019). Systematic Critical Review of Risk Management in Malaysian Construction Companies. *Journal of Humanities and Social Sciences Studies (JHSSS) Vol*, *1*.

Ofori, G. 2000. "Challenge of Construction Sector in Developing Country." bdgofori@nus.edu.sg.

Orihuela, Pablo, Santiago Pacheco, and Jorge Orihuela. 2017. "Proposal of Performance Indicators for the Design of Housing Projects." Procedia Engineering 196(June): 498–505. http://dx.doi.org/10.1016/j.proeng.2017.07.230.

Rahman, N. F. A., & Adeleke, A. Q. (2018). The Relationship between Effective Communication and Construction Risk Management among Kuantan Malaysian Construction Industries. *Journal of Advanced Research in Applied Sciences and Engineering Technology, 10 (1), 18-24.*

Sabodin, N., & Adeleke, A. Q. (2018). The Influence of Government Regulation on Waste Reduction Among Kuantan Malaysian Construction Industry. *Journal of Advanced Research in Applied Sciences and Engineering Technology, 10 (1), 72-76.*

S, Vyas Gayatri S, Kulkarni Saurabh. 2013. "Performance Indicators for Construction Project 1." (1): 61–66.

Sekaran, Uma. 2006. John Wiley & Sons, Inc. Research Method of Business: A Skill Building Approach.

Sekaran, Uma, and Roger Bougie. 2013. "Summary for Policymakers." In Climate Change 2013 - The Physical Science Basis,.

Stehman, Stephen V. 2009. "Sampling Designs for Accuracy Assessment of Land Cover." International Journal of Remote Sensing.

Takim, Roshana, and Akintola Akintoye. 2002. "Performance Indicators for Successful Construction Project Performance." University of Northumbria. Association of Researchers in Construction Management 2(September): 545–55.

Taofeeq, D. M., Adeleke, A. Q., & Hassan, A. K. (2019). Factors Affecting Contractors risk attitude from Malaysia construction industry perspective. *Social Science and Humanities Journal*, 1281-1298.

Taofeeq, D. M., Adeleke, A. Q., & Hassan, A. K. (2019). The Moderating Role of Government Policy on Contractors' Risk Attitudes in Malaysia Construction Companies. *Social Science and Humanities Journal*, 1261-1280.

Taofeeq, D. M., & Adeleke, A. Q. (2019). Factor's Influencing Contractors Risk Attitude in the Malaysian Construction Industry. *Journal of Construction Business and Management*, *3*(2), 59-67.

Taofeeq, D. M., Adeleke, A. Q., & Lee, C. K. (2020). The synergy between human factors and risk attitudes of Malaysian contractors': Moderating effect of government policy. *Safety science*, *121*, 331-347.

Taofeeq, D. M., Adeleke, A. Q., & Lee, C. K. (2019). Individual factors influencing contractors' risk attitudes among Malaysian construction industries: the moderating role of government policy. *International Journal of Construction Management*, 1-20.

United Nations Department of Economic and Social Affairs. 2015. ESA Working Paper World Population Prospects: The 2015 Revision, Key Findings and Advance Tables.

Van Wyngaard, C. J., J. H C Pretorius, and L. Pretorius. 2012. "Theory of the Triple Constraint -A Conceptual Review." IEEE International Conference on Industrial Engineering and Engineering Management: 1991–97.