Turkish Online Journal of Qualitative Inquiry (TOJQI)
Volume 13, Issue 1, January 2022: 1052-1063

Effect of Cost Estimation on Project Performance in Construction Firms in Abuja

Ike Egboga[a], Dr Cross Ogohi Daniel[b], Dr Hauwa Lamino Abubakar[c]
[a] Department of Business Administration, Nile University of Nigeria, Abuja
[b] Department of Business Administration, Nile University of Nigeria, Abuja
[c] Department of Business Administration, Nile University of Nigeria, Abuja

Abstract

Adverse profitability in the construction industry is associated with the organizational leaders' inability to accurately estimate project costs and manage project schedules. This results to high rate of abandoned project and building, to be able to boost of successful completed projects, effective and efficient cost estimation and planning is the very key. The study investigated the effect of cost estimation on project performance in construction firms in Abuja. The objectives of the study are; To determine the effect of bottom up cost estimating and parametric cost estimating on the realization of work scope / specifications in construction firms in Abuja, To assess the impact of bottom up cost estimating and parametric cost estimating on time / schedule performance in construction firms in Abuja, To ascertain the impact of bottom up cost estimating and parametric cost estimating on cost performance in construction firms in Abuja. The researcher adopted the descriptive research design and structured questionnaire was used as instrument for data collection. The purposive sampling technique was adopted in the study. Data analysis was committed to descriptive statistics of mean and percentages as well as inferential statistics of correlation and multiple regression analysis. The results showed that both bottom-up estimation and parametric cost estimating are both positively and significantly influenced by scope/specifications, time/schedule and cost. The study concludes that project managers need to be cognizant of this relationship and focus on developing estimates and schedules using modern project management tools that would project accurate costs and schedules**.** It was recommended that for successful completion of projects, construction project managers should be fully abreast of cost estimating techniques through intensive training awareness and the use of both bottom up and parametric estimating techniques be adopted for construction projects as appropriate.

Keywords: Cost estimation, bottom-up estimating, parametric estimating, project performance

1 Introduction

Infrastructural development has been identified as one of the key activities that contribute significantly to the Gross Domestic Product of Nigeria and other nations **(Amadi & Amadi, 2020).** It involves projects which are usually complex and risky but plays a pivotal role in driving economic

growth and employment generation in both developed and developing nations **(Amadi & Amadi, 2020).**

The projects usually require the investment of large sums of money. Consequently, projects failure or abandonment would lead to huge financial losses. The losses are often due to poor cost and time estimations or non-existent risk management practices associated with the projects **(Renuka et al, 2014**). These losses associated with project failure makes it important to understand what makes for a successful project performance **(Kishk & Ukaga, 2018)** and how effective cost estimation contributes to such performance.

Project cost estimation is challenging but very effective for use in bidding, negotiations, cost monitoring and controls (**Valtanen, 2020)** and is closely related to the success or failure of projects **(Jiang, 2020).** When projects fail or are abandoned, the resources already invested becomes a waste to the organisation or nation in the face of competing needs. If the project succeeds, on the other hand, a valuable asset is created that will satisfy its intended use and adds value to the organisation, industry or nation. The value addition may include enhanced profitability, employment creation, infrastructural development that will enhance economic development, income to government by way of taxes and multiplier economic effects. It is therefore compelling that proper cost estimation procedures are developed and adopted prior to and in the course of project execution to enhance project performance and ensure project objectives are met.

Project performance is difficult to define because of the complexity and dynamics of the concepts of the project. Construction project success or performance has been discussed by many researchers and until now, there are myriad of opinions on the critical factors that should be used to measure project performance **(Bodicha, 2015)**. The performance or success of a project is measured by the full actualisation of the project objectives. The objectives include achieving the agreed work scope and specifications within the constraints of cost, time and quality (**Al-Hammadi & Bernard, 2016; Sylvester & Rani, 2011).** Also, **Oyedele (2012),** define project performance as the ability of a project to meet the planned cost, time, quality, safety and stakeholder satisfaction.

Estimating project costs and schedules are extremely difficult because large projects contain a complex web of cost-influencing factors including material cost, possible design and scope changes, ground conditions, duration, the size of the project, type of client, tendering method, and other technical requirements **(Ali & Chew, 2017**). A well-controlled project schedule and good estimates are critical for project performance and delivery in this highly competitive global market because it leads to performance improvement. Therefore, this study will examine effect of cost estimation on project performance in construction firms.

2. Significance of the Study

Cost estimating is an important aspect of a construction project. The performance and overall project success is often dependent on how closely the actual cost compares to the estimated cost. Thus, accurate cost estimates for construction projects are extremely important to both the clients and contractors because it provides the basis for the contractor to submit a tender. It also allows the parties to understand their respective commitments at the early stages of a project as well as for monitoring and evaluation during the projects execution phase.

Based on the above, it is imperative to evaluate the effect of cost estimates on construction projects performance which this study aims to achieve and propose appropriate measures that would help to encourage its use in order to reduce inaccuracies in cost estimating, thereby enhancing the performance of construction projects. Successful projects completion will have a multiplier effect on the economy through business continuity, creation of complementary businesses, job creation, enhanced GDP and additional taxes to both national and state governments.

3. Review of related Literature

3.1The Concept of Cost Estimation

Cost estimation is a vital process required of every project because it is the predecessor for budget estimates, resource allocation, monitoring and control of the project for successful completion (**Hashemi & Ebadati, 2020).** Cost estimation has been defined by The Association for the Advancement of Cost engineering (**AACE, 1990**) as "the determination of the quantity and the predicting, or forecasting, within a defined scope of the costs required to construct and equip a facility, to manufacture goods, or to furnish a service. Included in these costs are assessments and evaluation of risks and uncertainties". Cost estimatio3n accounts for each element required including both direct and indirect costs required to bring a project to completion. These costs, include labour cost (direct labour and indirect labour), materials cost, equipment cost, services and facilities, overhead costs (site overhead and office overhead) and mark up (risk contingencies and profit) adds up to a total amount that determines a project's budget. Cost estimate is vital to construction contract tendering and provides the basis for establishing the likely cost of resource elements of the bid price for construction projects. Also, the approximate total project cost, called the cost estimate, is used to authorize a project's budget and manage its costs (**Bello & Odusami, 2013**).

Project cost estimation applies to everything from building a bridge to developing that new killer app. It all costs money, so the clearer you are on the amount required, the more likely you'll achieve your objective. Cost estimates are typically revised and updated as the project's scope becomes more precise and as project risks are realized as noted by the Project Management Body of Knowledge (PMBOK). Cost estimating is an iterative process that requires constant review and update as circumstances change and new facts emerge. To usefully serve its purpose, project cost estimate requires a reasonable level of accuracy, reliability, efficiency and transparency and has to be justified with underlying assumptions clearly documented. The data forming the cost estimation bases must be relevant, current, appropriate, and of good quality and value.

Construction cost estimate can be used for one of three purposes: design, bid and control. Each comes at different stages of project development with the required levels of accuracy varying accordingly. The design estimate which usually emanates from the project owner comes in four stages: rough order of magnitude estimate made before the project design at the project initiation phase based on the cost data of similar projects in the past and the accuracy range is -50% to +75%; preliminary or conceptual estimates based on the project's conceptual design at the early project planning phase which has become available and the accuracy range is -30% to +50%; detailed estimate made when the project work scope has been clearly defined based on a detailed design with an accuracy of -15% to +30% and the work elements can be broken down into smaller packages and the engineer's estimate arising from the final plans and specifications at the time the project owner is

already to invite bids from construction vendors (accuracy ranges from -5% to +10%). The bid estimate comes from the construction vendor and is usually a reflection of both the estimating tools available to the vendor and their desire to win the tender. The owner provides the design and specifications upon which the vendor extracts the materials take off for the preparation of their bids. The control estimate is required by both the project owner and the vendors which forms the baseline for project control during execution. For the owner, this may be the same as the detailed estimate which must be revised periodically to take account of change orders, unexpected cost overruns or savings.

3.2 Dimensions of Cost Estimation

The Project Management institute (PMI, 2017) recommends several tools and techniques for estimating cost (bottom up, parametric, analogous, three point, top down and expert judgment estimating techniques). However, this study has adopted two of the most commonly used methods or techniques as follows as the independent variables for this study:

Bottom up estimating

This is the most reliable method for cost estimating when the work scope is properly defined and the work can be broken down into smaller packages known as Work breakdown Structures (WBS) (**Goh, 2015**). The cost of each of the smaller packages or deliverables are separately determined more precisely and aggregated to determine the project cost estimate. However, the development of the packages or deliverables is usually time consuming, especially for complex projects. This belongs to the detailed estimating group as it can only be done when detailed information about the project is available. Bottom-up estimating is a method of estimating a component of work. The cost of individual work packages or activities is estimated to the greatest level of specified detail. The detailed cost is then summarized or rolled up to higher levels for subsequent reporting and tracking purposes. The cost and accuracy of bottom-up cost estimating are typically influenced by the size and complexity of the individual activity or work package. The major setback of this technique is the great amount of details required and time required. On the other hand, the process for deriving the cost estimate is easily understandable and repeatable.

Parametric Estimating

This method uses independent variables from historical data and parameters and applies it to the current project. It is very popular in construction project estimating (**Chan, 2015**). This technique is based on the building of "Cost Estimation Relationships" (CERs) which are simple mathematic relations between the costs of a work element and some of its parameters called 'cost drivers'. For instance, the knowledge of the cost per sq meter of floor space for building or cost per km of a road of given width can be applied to determine current cost estimate. It is more accurate than analogous method but requires more initial data and needs correct and realistic unit costs for the independent variable. This method belongs to the conceptual group since more detailed information are not available at this time.

3.3Measures of Project Performance

When do we say a project has been successfully performed? The project life cycle starts from initiation. Initiation is preceded by some objectives in mind and plans are then put in place to achieve these objectives through project execution and control. The extent to which these objectives have been met upon completion is a measure of the project performance (**Takim et al, 2018**).

These four variables; Cost (budget), Schedule (time), scope (specifications) and quality (CSSQ) are the major measures or indicators of project performance and the ultimate objective of the project is to ensure that these four measures are satisfied. Based on the triple constraints theory, three of these (scope, time and cost0 has been selected as the dependent variables for this study.

Scope (specifications): Scoping projects accurately is an important skill. The scope must be clearly defined and understood by the various stakeholders in the project. With this common understanding, a Works Breakdown structure is created with a scope management plan. This is continually revalidated, monitored and controlled to ensure scope creep and avoidable changes do not arise to impact on time and cost. Unfamiliarity with project scope and project complexity has been adduced as one of the causes of poor project execution leading to project failure. It also causes valuation disputes which could lead to project execution delays with attendant cost and time overrun. Scope creep is also a major issue affecting project execution outcome. Scope creep is an increase in scope without a commensurate increase in resources or an extension to the project schedule.

Schedule (time). This is very important in assessing the success of a project. The work schedule must be properly and skillfully developed through a detailed activities listing and sequencing. The schedule is then monitored and controlled throughout project duration to avoid avoidable delays that could create variation orders which may impact on cost and quality. It has been established that delay is a common issue faced in projects execution all over the world especially in developing countries and consequently, most projects do not end successfully

Cost (budget). With the activities listing loaded with required resources, costs can be estimated and projects budget determined. The budget is closely monitored and controlled to avoid unnecessary cost overruns. Next to poor risk management is cost overruns in terms of ranking for project failures arising from poor project execution. Managing costs within approved budget is acknowledged as a critical project execution parameter based on studies. This is more so as money is the scarce and driving force everywhere.

Quality. A quality management plan must be in place before project execution. This is designed to minimise failures / defects and to meet the expectations of the customer. Quality assurance and quality controls must be performed all through the execution phase to ensure that the desired quality of product is produced that will meet customer's expectations.

3.4 Theoretical Anchor: The Triple Constraints Theory

The recognition of the triple constraints theory as a veritable tool for measuring project performance as envisaged by Barnes differs amongst different scholars. While many scholars recognize the theory as appropriate and offering a concise definition of project success, many others do not agree with it. Scholars like **Parker et al (2015)** and **Sridararan et al (2017**) are in agreement with the theory

positing that the triple constraints are clear and effective indicators that project managers traditionally use to measure project performance. However, some scholars while adopting the three constraints of cost, time and scope added some additional measures like profit **(Franklin & Christina, 2015)** and customer satisfaction **(Joslin & Muller, 2016).**

A second group of scholars rejected the triple constraints as a measure of project performance but rather regarded the theory as simply a project management approach (**Rugenyi, 2015**) to govern the tradeoff between the triple constraints. In their opinion, the determination of project success or performance goes beyond meeting the project scope, time and cost. A third group of scholars (**Turner & Xue, 2018**) also rejected the triple constraints as a measure of project performance but rather as a measure of project efficiency or project management success by delivery of the project scope on time and within budget. In their opinion, a project may be delivered efficiently, yet the owners do not realize satisfactory benefits from the project. They believe that a better measure of success or performance would be delivering desired outcomes / objectives and benefits, positive net present values and meeting business or public needs. Some other scholars (**Scheumer, 2017**) are in agreement with this school of thought but only to the extent of regarding the triple constraints as an efficiency indicator. The most important measure of performance in their opinion is customer / stakeholder's satisfaction.

From the above submissions, the recognition of the triple constraints as the measure of project performance varies among scholars. While the first group recognized the theory as a measure of project performance, the second group considered it as just a project management approach to resolve tradeoff in the constraints. The last group considered it as a measure of efficiency or project management success. However, despite the objections by the second and third group of scholars, there is wider acceptance of the views of the first group. It is also generally regarded as easy to use since the triple constraints are all measurable. This position had been adopted by the Project Management Institute (**PMBOK, 2017**) and accordingly used as the theoretical framework for this study.

Project managers work within three project constraints: budget, scope and schedule. Schedule (or time) is at the top of the model (shaped like a triangle). Scope is on the left of the triangle and budget (or cost) is on the right. Depending on the project or who is involved, each of these project constraints could be the most important to the end-user. Quality resides in the middle of the project triangle, and effective project managers must balance the ebb and flow of tradeoffs within these three constraints in order to achieve success. This longstanding model provides a dynamic way to approach priorities on a project and supports describing items of value in a project team (particularly since each team member likely values something different)

4. Objectives of the Study

1. To determine the effect of bottom up cost estimating on the realization of work scope/ specifications in construction firms in Abuja.
2. To assess the impact of bottom up cost estimating on schedule performance in construction firms in Abuja.
3. To ascertain the impact of bottom up cost estimating on budget performance in construction firms in Abuja.

4. To determine the impact of parametric cost estimating on the achievement of work scope / specifications in construction firms in Abuja
5. To assess the effect of parametric cost estimating on schedule performance in construction firms in Abuja
6. To ascertain the effect of parametric cost estimating on budget performance in construction firms in Abuja

5. Hypotheses of the Study

H_{O1}: Bottom up cost estimating has no significant effect on work scope completion in construction firms in Abuja.

H_{O2}: Bottom up cost estimating has no positive impact on schedule performance in construction firms in Abuja.

H_{O3}: Bottom up cost estimating has no significant effect on budget performance in construction firms in Abuja

H_{O4}: Parametric cost estimating has no significant effect on work scope completion in construction firms in Abuja

H_{O5}: There is no significant effect of parametric cost estimating on schedule performance in construction firms in Abuja

H_{O6}: Parametric cost estimating has no significant effect on budget performance in construction firms in Abuja

6 Population and Sample

The study adopted survey design. The population of this study comprised 286 employees of selected building construction firms in Abuja, Nigeria. The participating companies were selected from the list of building companies in Abuja using purposive sampling. This is an acceptable non probabilistic sampling technique using the researcher's judgment regarding the experience, competence and capability of the firms. The respondents were selected from the junior, middle and senior management of the participating firms as well as some of the project consultants and project owners. The questionnaire was divided into 2 major sections. Section A sought information on the demography of respondents. Section B elicited information relevant for answering the single research questions posed in the study. 274 of the 286 questionnaires administered were duly completed and returned.

6.1 Statistical Technique Used in the Present Study

While the descriptive statistics was used to analyze the data gotten from the questionnaire generally, multiple regression analysis was used to test the stated hypotheses. This helped to determine the effect of the independent variables (Bottom Up cost estimation and Parametric cost estimation) in conjunction with the moderating variable (project monitoring and evaluation) affect the dependent variables (Scope, Time and Budget), which is project performance in the selected companies in Abuja, Nigeria. Specifically, statistical software called Statistical Package for the Social Sciences (SPSS) version 24.0 and EViews version 8.0 were used to conduct the necessary analysis and hypotheses tested at 5% level of significance. Finally, the Durbin-Watson statistic was used to rule out multi-collinearity in the model.

6.2 Model Specification

The theoretical framework for analyzing project performance was adopted from previous studies. Based on the conceptual framework, project performance is theorized to interact with cost estimation. The cost estimation factors or constructs for empirical investigation are bottom up cost estimating and parametric cost estimating. The project performance factors or constructs are scope completion, schedule performance and budget performance. The sole moderating variable is project monitoring and evaluation.

The functional relationship is expressed as;

PERF = $\beta_0 + \beta_1 BCE_i + \beta_2 PCE_i + \varepsilon_i$ …… (3.1)

Where;

PERF = Project Performance (Scope [PPS], Time [PPT], Budget [PPB])

The regression models relating to the variables of the study are given as:

Model 1

$PPS_i = \beta_0 + \beta_1 BCE_i + \beta_2 PCE_i + \varepsilon_i$ …… (3.2)

Model 2

$PPT_i = \beta_0 + \beta_1 BCE_i + \beta_2 PCE_i + \varepsilon_i$ …… (3.3)

Model 3

$PPB_i = \beta_0 + \beta_1 BCE_i + \beta_2 PCE + \varepsilon_i$ …… (3.4)

Where:

PPS = Project performance (Scope)

PPT = Project performance (Time)

PPB = Project performance (Budget)

BCE = Bottom up cost estimating

PCE = Parametric cost estimating

β_0= Constant

ε= Error term

And *a priori* expectations: $\beta_1 and \beta_2 > 0$

6.3 Regression Analysis Results and Interpretation

Regression analysis was performed to establish the effect of cost estimation on project performance in selected construction firms in Abuja. The results of the regression analysis are shown in table 1

below. The table shows the relationship between cost estimation dimensions (bottom up cost estimating and parametric cost estimating) and the three constructs of project performance (scope, time / schedule and budget).

Table 1: ***Estimation of the relationship among independent and dependent variables***

Variables	**Model 1**	**Model 2**	**Model 3**
	Project Performance Scope (PPS)	**Project Performance Time (PPT)**	**Project Performance Budget (PPB)**
C	0.2579	-0.6556	0.2018
	(0.7398)	(2.0429)	(0.5267)
	{0.4600}	{0.4240}	{0.5988}
Bottom up cost estimating (BCE)	0.5574	0.4924	0.4811
	(7.4348)	(7.1351)	(5.8377)
	{0.0000}	{0.0000}	{0.0000}
Parametric Estimating (PCE)	0.2829	0.2403	0.3315
	(2.9919)	(2.7601)	(3.1882)
	{0.0030}	{0.0062}	{0.0016}
R-Squared	0.2903	0.2701	0.2289
Adj. R-Squared	0.2851	0.2648	0.2232
F-statistic	55.4248	50.1524	40.2218
Prob (F-statistic)	0.0000	0.0000	0.0000
Durbin Watson	2.0215	1.8918	1.7535
Number of Observations	274	274	274

Note: *t-statistic values are in brackets while p-values are presented parentheses*

Table 1, model 1 revealed that bottom up cost estimating *[β= 0.5574; p<0.05]* and parametric estimating *[β= 0.2829; p<0.05]* positively and significantly related to project performance scope (PPS). The result also shows that the coefficient of determination (R^2) of the model is 0.2903. The value of the Adjusted R^2 is 0.2851 which indicates that the independent variables explained 28.51% of the variation in the dependent variable. The F-statistic of 55.4284 is statistically significant at p<0.05. Finally, the Durbin-Watson statistic of 2.0215 rules out multi-collinearity in the model.

Similarly, Table 1 model 2 revealed that bottom up cost estimating *[β= 0.4924; p<0.05]* and parametric estimating *[β= 0.2403; p<0.05]* positively and significantly related to project performance time/schedule (PPT). The result also shows that the coefficient of determination (R^2) of the model is 0.2701. The value of the Adjusted R^2 is 0.2648 which indicates that the independent variables explained 26.48% of the variation in the dependent variable. The F-statistic of 50.1524 is statistically significant at p<0.05. Finally, the Durbin-Watson statistic of 1.8918 rules out multi-collinearity in the model.

Finally, Table 1, model 3 revealed that bottom up cost estimating *[β= 0.4811; p<0.05]* and parametric estimating *[β= 0.3315; p<0.05]* positively and significantly related to project performance budget (PPT). The result also shows that the coefficient of determination (R^2) of the

model is 0.2289. The value of the Adjusted R^2 is 0.2232 which indicates that the independent variables explained 22.32% of the variation in the dependent variable. The F-statistic of 50.1524 is statistically significant at $p<0.05$. Finally, the Durbin-Watson statistic of 1.7535 rules out multi-collinearity in the model.

6.4 Hypotheses Testing

The results in Table 1 were used to test the hypotheses stated for this study.

Hypothesis One: *Bottom up cost estimating has no significant effect on work scope completion in construction firms in Abuja.*

Table 1, model 1 shows that there is a positive and significant relationship between bottom up cost estimating and work scope completion *($\beta= 0.5574; p<0.05$).* The t-statistic of 7.4348 and p-value of less than 5% confirmed the result. Based on the result, we reject the null hypothesis. We therefore conclude Bottom up cost estimating has significant effect on work scope completion in construction firms in Abuja.

Hypothesis Two: *Bottom up cost estimating has no positive impact on time / schedule performance in construction firms in Abuja.*

Table 1, model 2 shows that there is a positive and significant relationship between bottom up cost estimating and time/schedule performance *($\beta=0.4924$ $p<0.05$).* The t-statistic of 7.1351 and p-value of less than 5% confirmed the result. Based on the result, we reject the null hypothesis. We therefore conclude Bottom up cost estimating has significant effect on schedule performance in construction firms in Abuja.

Hypothesis Three: *Bottom up cost estimating has no significant effect on budget performance in construction firms in Abuja.*

Table 1, model 3 shows that there is a positive and significant relationship between bottom up cost estimating and budget performance *($\beta=0.4811; p<0.05$).* The t-statistic of 5.8377 and p-value of less than 5% confirmed the result. Based on the result, we reject the null hypothesis. We therefore conclude Bottom up cost estimating has significant effect on budget performance in construction firms in Abuja.

Hypothesis Four: *Parametric cost estimating has no significant effect on work scope completion in construction firms in Abuja.*

Table 1, model 1 shows that there is a positive and significant relationship between bottom up cost estimating and work scope completion *($\beta= 0.2829; p<0.05$).* The t-statistic of 2.9919 and p-value of less than 5% confirmed the result. Based on the result, we reject the null hypothesis. We therefore conclude Parametric cost estimating has significant effect on work scope completion in construction firms in Abuja.

Hypothesis Five: *Parametric cost estimating has no positive impact on time / schedule performance in construction firms in Abuja.*

Table 1, model 2 shows that there is a positive and significant relationship between bottom up cost estimating and time/schedule performance *(β=0.2403; p<0.05).* The t-statistic of 2.7601 and p-value of less than 5% confirmed the result. Based on the result, we reject the null hypothesis. We therefore conclude Parametric cost estimating has significant effect on schedule performance in construction firms in Abuja.

Hypothesis Six: *Bottom up cost estimating has no significant effect on budget performance in construction firms in Abuja.*

Table 1, model 3 shows that there is a positive and significant relationship between bottom up cost estimating and budget performance *(β=0.3315; p<0.05).* The t-statistic of 3.1882 and p-value of less than 5% confirmed the result. Based on the result, we reject the null hypothesis. We therefore conclude Parametric cost estimating has significant effect on budget performance in construction firms in Abuja.

7 Recommendations

i. For the timely completion of projects, construction project managers should be fully abreast of estimating techniques that include the use of cost estimation tools for estimation of work elements through adequate and related intensive project training and an awareness campaign.

ii. Due to the positive effect of parametric cost estimating approach on projects performance, it's use should be encouraged when available data is not sufficient for a bottom up estimate. This approach requires the use of previous estimates with modifications where necessary.

iii. When sufficient data is available at the time of cost estimation, bottom-up estimation method is most recommended. In this approach, the cost of individual work programs or activities is estimated at the highest level of detail available. This may include cost estimates on contingency reserves to address cost uncertainty and ensure that updates project documents depending on the risk record

iv. More focus should be placed on the major factors affecting construction cost in order to reduce the cost of construction, enhance construction performance and generate confidence within the construction industry.

8 Conclusion

The purpose of this research was to examine Effect of Cost Estimation on Project Performance in Selected Construction Firms in Abuja. The results of the statistical test using multiple regression analysis showed that there exists a statistically significant relationship between the independent variables (bottom up cost estimation and parametric cost estimation) and the dependent variables (scope/specifications, time / scheduling, and Budget). Based on this result, project managers need to be cognizant of this relationship and focus on developing estimates and schedules using modern project management tools that would project accurate costs and schedules.

References (APA)

[1]. AACE International (2017).Cost engineering terminology, recommended practice. Online Available at: www.aacei.org Accessed 5 May (2012).

[2[. Al-Hammadi, N., & Bernard, J. (2016).Key performance indicators for assessing project performance in the oil and gas industry of UAE. 6thInternational Engaged Management Scholarship Conference.
[3]. Ali, J., Chew, T.G., & Tang, T. C. (2017).Knowledge management in agile organizations. Sunway Academic Journal, 1, 13–20.
[4]. Amadi, K.C., & Amadi, A.I. (2020). Government expenditure on infrastructure as a driver for economic growth in Nigeria. Journal of International Business and Marketing, 5(2), 20-26
[5]. Barnes, M. (2007).Some origins of modern project management: a personal history .Project Management World Journal, 2(XI), 1-2. Retrieved from https://www.pmworldjournal.net
[6]. Bello, W., & Odusami, K. (2013).Weak Management of the Predictability of Contingency Allowance in Construction Projects in Nigeria.In: Smith, S.D and Ahiaga-Dagbui, D.D (Eds) Proceedings of the 29th Annual ARCOM Conference, 2-4 September 2013, Reading, UK, Association of Researchers in Construction Management.
[7]. Bodicha, H. (2015). How to measure the effect of project risk management process on the success of construction projects: A critical literature review. International Journal of Business and Management, 3(12), 99-110.
[8]. Chan, M., & Park, M. (2015). A comparative study of causes of time overruns in Hong Kong construction projects. International Journal of Project Management, 15(1), 55-63.
[9]. Franklin, J. M., & Cristina, D. P. (2015). Project management success: A bibliometric analysis. Revista De Gestão e Projetos, 6(**1**), 28-44. doi:10.5585/gep.v6i1.310
[10]. Goh, J. & Hall, N.G. (2015). Total cost control in project management via satisficing. Working paper, revised for publication, Fisher College of Business, The Ohio State University, Columbus, Ohio
[11]. Hashemi, S., Ebadati, O. & Kaur, H. (2020). Cost estimation and prediction in construction projects: a systematic review on machine learning techniques. SN Applied Sciences, 2, 1703 / https://doi.org/10.1007/s42452-020-03497-1
[12]. Jiang, Q. (2020). Estimation of construction project building cost by back-propagation neural network. Journal of Engineering Design and Technology, 18(3), 601-609
[13]. Joslin, R., & Müller, R. (2016).The relationship between project governance and project success. International Journal of Project Management, 34, 613-626. doi:10.1016/j.ijproman.2016.01.008
[14]. Kishk, M. & Ukaga, C. (2008).The impact of effective risk management on project success. In: Dainty A. (Ed): Process of 24th Annual ARCOM Conference, 1-3 September, 2008, 799-808.
[15]. Nguyen, T. A., & Chovichien, V. (2014).A practical list of criteria for evaluating construction project success in developing countries. ASEAN Engineering Journal, 3**(2**), 21-41.
[16]. Oyedele, O. A. (2012). The roles of project management in Bridging the IT gap in developing countries. Being Paper presented at the Africa6IT Conference on March 22, 2012 at Lagos, Nigeria.
[17]. Parker, D. W., Parsons, N., & Isharyanto, F. (2015).Inclusion of strategic management theories to project management. International Journal of Managing Projects in Business, 8, 552-573.doi:10.1108/ijmpb-11-2014-0079
[18]. Project Management Institute (2017), Project Management Body of Knowledge (5th Edition) PMI Publications, New York
[19]. Renuka, S., Umarani, C., & Kemal, S. (2014). A review on critical risk factors in the life cycle of construction projects. Journal of Civil Engineering Research,4(**2A**), 31-36.
[20]. Rugenyi, F. (2015). Assessment of the triple constraints in projects in Nairobi: The project managers' perspective. International Journal of Academic Research in Business and Social Sciences, 5(11), 1-16. doi:10.6007/ijarbss/v5-i11/1889.
[21]. Scheuchner, G. A. (2017). Strategies to promote IT project success (Doctoral dissertations). Retrieved from ProQuest Digital Dissertations and Theses database (UMI No. 1986002893)
[22]. Sridarran, P., Keraminiyage, K., & Herszon, L. (2017).Improving the cost estimates of complex projects in the project-based industries. Built Environment Project and Asset Management, 7, 173-184. doi:10.1108/bepam-10-2016-0050
[23]. Sylvester, D., & Rani, N. (2011). Theoretical framework: Factors for project success in oil and gas companies in Mira, Sawarak, Malaysia. 2010International Conference on Business and Economics Research, Kuala Lumpur, Malaysia, 1,100-103.
[24]. Takim, R., & Adnan, H. (2008). Analysis of effectiveness measures of construction project success in Malaysia. Asian Social Science, 4(7), 74-91.
[25]. Turner, J. R., & Xue, Y. (2018).On the success of megaprojects. International Journal of Managing Projects in Business, 11, 783.doi:10.1108/IJMPB-06-2017-0062
[26]. Valtanen, A. (2020). Project Cost estimation: Promoting quality of cost estimation to reduce project variance. MSc Thesis, Faculty of Management and Business, Tampere University.