



Effect of Critical Success Factors on Measures of Construction Project Success in Abuja

Maroof Opeyemi Anifowose^a, Kehinde Tola Taiwo^b, Ezekiel Babatunde Ogunbode^c

^{a,b} Department of Quantity Surveying, Federal University of Technology Minna, Niger State, Nigeria

^c Department of Building, Federal University of Technology Minna, Niger State, Nigeria.
anifowosemo@futminna.edu.ng

Abstract

The paper examine the effect of Critical Success Factors (CSFs) on measures of construction project success in Abuja with a view of improving the project delivery. A preliminary comprehensive literature study of previous research works served as the basis of the CSFs, which will be the guide factors to predict the probability of a project success. At the end of the study, the contribution of each critical success factor to the project success will be established. Data was collected with the use of structured questionnaire administered to 139 construction professionals within the local chapter in Abuja selected through simple random sampling technique with a response rate of 41%. Analysis of data was undertaken using Mean Item Score (MIS) and Regression Analysis. Findings from the study revealed that the most important critical success factors for delivery of construction projects are Adequate resources; Effective monitoring and control; Financial support and respectively. It was also shown that the perception of stakeholders on measures of project success range between Quality performance criterion; Schedule performance criterion; and Cost performance criterion. The study also shows relationship between Critical success factors and measures of project success. It tends to test the relationship between the two variables, where Critical Success Factors constitutes the independent variables and Project Success as the dependent variable. The obtained P-value which is less than 0.05 ($P < 0.05$) indicates that a significant relationship exist between these factors and Project Success. It can therefore be concluded that the critical success factors has a significant effect on the measures of construction projects success in Abuja. It was however recommended that in order to improve project success, construction professionals should ensure adequate resources are provided and team work exists among professionals for successful project success in Abuja.

Keywords: Critical success factors, Measures of project success, Project delivery, Abuja.

1. Introduction

The construction industry is a major engine of the worldwide economy, accounting for over 13% of global GDP (gross domestic product), which is a measure of the economy's output, employment, and revenue (Hyginus *et al.*, 2020). By extension implies that the construction industry is on the forefront of the GDP of a nation because every year, both the government and private sector organizations invest resources into variety of projects aimed at attaining specific goals. (Hyginus *et al.*, 2020). Despite massive investments by both the government and the business sector in Nigeria over the previous three decades, the expected outcomes or objectives appear to be a vision (Hyginus *et al.*, 2020). This is evidenced by many recorded cases of poor performance of construction projects, abandonment of projects and outright failure of construction projects especially in building and road sectors of the construction industry which according to Okechukwu (2017) is retrogresses of a nation's economy. This was corroborated by the continuous decline in the impact of the industry to the GDP, increased poverty in the country and poor state of infrastructures.

The construction industry is one of the most important sectors and is regarded as one of the most important contributors to a country's socioeconomic development (Elawi *et al.*, 2016). Throughout the last decade, and owing to the importance of construction, numerous studies have studied factors that support successful completion of construction projects, particularly those factors have more impact on project success than others (Tabish & Jha, 2012; Ihuah *et al.*, 2014; Kandelousi *et al.*, 2011; Gunduz & Yahya, 2018; Gudiene *et al.*, 2013; Ogwueleka, 2011; Yong & Mustafa, 2012; Cserháti & Szabó, 2014). The construction industry provides a

greater challenge to retain its scheduled or time, budgetary or cost, and appropriate quality (Elawi *et al.*, 2016). According to Asgari, Kheyroddin & Naderpour (2018), a construction project is a set of different events, expected or unexpected, which occur during the project life cycle and continues its life under the shadow of environmental changes. However, there are certain factors which bear double importance in the success or failure of a project. These factors are defined as critical success factors (CSFs). CSFs are defined as "a collection of environmental elements that influence the project's outputs" (Asgari *et al.*, 2018). The valuation of project success may vary and depends on the evaluator perception (Thi & Swierczek, 2010). Although success criteria and success factors in general are different in nature, the two issues are highly interconnected (Yong & Mustafa, 2013). Chan and Chan (2004) have proposed two groups of key performance indicators for construction project success. The first group was objective measures, which were the issues of time, cost, safety, and environment. The second group was subjective measures, which comprised quality, functionality, and satisfaction of different project participants. In an attempt to model project success, Elattar (2009) came out with a framework to measure construction project success. In his model, Elattar identified and put forward three (3) main criteria for project success. He observed the success criteria from the perspective of the project owners, the designers and the contractors. The success criteria from the owner's point of view entail: schedule, budget, a function for intended use, end result as envisioned, quality, aesthetically pleasing, return on investment, marketability, and minimized aggravation. The criteria from the designer's view is made up of: satisfied client, quality architectural product, meeting of design fee and profit goal, professional staff fulfilment, meeting of project budget and schedule, marketable product/process, minimal construction problems, absence of liability claims, social acceptability of the project, payment by the client and well defined scope of work. Despite numerous works that have been done on this topic, only few if at all there is any had considered Abuja as a case study. Hence, the reason why the effects of critical success factors on measures of construction project success in Abuja need to be examined. In view of this background, this study focused on the effects of critical success factors on measures of construction project success and its resultant effect on construction project delivery. In order to achieve the aim of the study, the following objectives are formulated:

- i. To identify the critical success factors for delivery of construction project.
- ii. To examine the perception of stakeholders on measures of construction project success.
- iii. To analyze the effects of the critical success factors on measures of project success.

Past studies have addressed lot of issues on construction project success. Some of these studies identified according to Yang, Shen & Ho (2009), the unique nature of projects dictates that critical success factors identified in one industry cannot be directly transferred to other industries. This means that every project is unique on its own and no two projects are the same in nature, no matter how close they may be. Chan & Chan (2004) have proposed two groups of key performance indicators for construction project success. The first group was objective measures, which were the issues of time, cost, safety, and environment. The second group was subjective measures, which comprised quality, functionality, and satisfaction of different project participants. Garbharran *et al.* (2012) identified 18 critical success factors in construction industry in South Africa and grouped according to four COMs model: comfort, competence, communication and commitment. The findings suggest that both project managers and contractors strongly support the critical success factors as significant in achieving project success. Achieving project success is becoming more important in the area of project management. There have been various arguments as regarding those factors that contribute to the total success of every project. For projects to be implemented successfully, the two different components of success must be clearly defined and reviewed thoroughly.

2 Literature review

2.1 Project success

According to literature, there's no single definition of project success. Several researchers define project success in different ways; According to (Meskendahl, 2010), project refers to the central building block used in implementing strategies. The project management institute's guide to the project management body of knowledge (PMBOK Guide) (PMI, 2013) defines a project as a "temporary endeavour undertaken to create a unique product or service." Project success is reaching the objectives and the planned results in compliance with predetermined conditions of time, cost, and performance (Beleiu *et al.*, 2015). Project success was recognized to be a complex, multi-dimensional concept encompassing many attributes (Mir & Pinnington, 2014). The success of a construction projects is an important issue for most of the governments, users and communities. In modern construction projects there are significant challenges for both the clients and contractors to deliver the project successfully due to increasing complexity in design and the involvement of stakeholders. In the project management literature, project success has been widely discussed by many researchers. Most of the studies in project success have been focus on dimensions in how it is measured and other specific factors influencing the project success. For an architect, a project is termed success based on the aesthetic performance, and for a contractor, project is termed success when the contractor gets a profit from the project. Project will be considered as success when the project is completed on time, within budget and the quality is satisfied by all. The meaning of 'success' itself has undergone many changes due to involvement of so many stakeholders in nowadays complex project environment. The concept of project success is developed with criteria and standards to help project participants to complete projects with the most desirable results.

However, this concept remains somewhat of an enigma as there is no agreement on what should be the critical success criteria on construction projects despite several studies (Ramlee *et al.*, 2020). In addition, the theme of the project's success is more complex when applied in many industries, construction, information technology and defense industries (Abdul, 2010). The view of management field, the success of the project is a strategic concept in which the objectives of the project must be aligned directly with the organization's short-term and long-term goals (Al-Tmeems *et al.*, 2011). The success of the project can actually be classified into two categories: either the criteria for assessing the success of the project (or level) or critical success factors (CSFs) have been explored for several decades. The variables for Project Success includes: (i) Project management actions, (ii) Project procedures, (iii) Human factors, (iv) Human related factor, and (v) External issues.

2.2 Measures of project success

The importance of job satisfaction for the well-being of construction firms was highlighted by Loosemore *et al.* (2003). Fenn (2006) emphasized the importance of commercial project performance metrics. He admitted to project delays in terms of time, cost, and quality, as well as delay claims, scheduling, monitoring, and control. For the purpose of this study, the following project success factors were chosen: (i). Cost, (ii). Time, (iii). No claims or contractual disputes, (iv). Quality, (v). Safety, and (vi). Environment.

According to Salter & Torbett (2003), measuring project success through cost performance is the simplest and most typical method. The whole cost of the project covers all costs from start to finish, not just the tender amount. Project cost performance is usually the result of a thorough site inspection along with meticulous planning that gradually clarifies the scope. The cost variance is the difference between the actual project cost and the anticipated project cost, and it is a good indicator of project success (Georgy *et al.*, 2005). Time is defined by Chan & Chan (2004) as the duration it takes to complete a project. Time is one of the most important aspects in determining a project's success (Swan & Khalfan, 2007). As a result, the time component may signal to project managers and all stakeholders that the project went well and on time. Therefore, project managers prefer contracts with reasonable amount of time to execute completely. According to Mbachu (2008), a manager's capacity to make adjustments without making further claims is also a significant component in determining success. The goal of success criterion is defeated when claims can lead to contractual disputes on many construction projects.

In the construction sector, quality refers to the overall features that a project must have in order to meet a specific demand or criteria (Parfitt & Sanvido, 1993). However, quality in the construction sector is judged by the ability to adhere to established guidelines. Monitoring and feedback, according to Prabhakar (2008), is one of the variables that contribute to project success. Similarly, Papke-Shields *et al.* (2010) found that, among other things, constantly checking the status of the project, as described by Kamau and Mohammed (2015), increased the chances of project success. According to their study, monitoring and controlling was relevant in managing of project scope, time, cost, quality, human resources, communication and risks. Kamau and Mohammed (2015) affirmed that monitoring and evaluating, budget performance, schedule performance and quality performance could influence project success all times and clear scope definition of users' need are associated to the quality work on site during and after completion as described by Chua *et al.* (1999). According to Bubshait & Almohavis (1994), Safety is achieved when a project is completed without major accidents and injuries. Accidents, according to Chan and Chan (2004), can have a variety of effects on a project. Consequently, it can result in cost overruns or delays, as well as a negative impact on the company's reputation. Effective communication and clearly describing the scope of work are the only ways to ensure safety. Lack of clarity can lead to failure and the project could be classified as unsuccessful. The primary mandate for fostering safety performance criterion must be regular monitoring and support from top management, as well as feedback from users. The Environmental issues that arise as a result of construction cause a great deal of inconvenience for public users (Shen *et al.*, 2000). Waste minimization measures and environmental nuisances need a significant amount of effort (Wong & Chang, 2000). Incorporating sustainable ideas and techniques into building projects appears to meet the project's environmental success criteria.

2.3 Critical success factors for delivery project

Critical success factors (CSF) are used to support and measure the success of a strategic approach and tactics for implementation of projects intended to ensure the success of the project and support the proper allocation of limited resources. Success factors are inputs to management system which can lead directly or indirectly to project success in an organization. Projects are unique, this is the reason why project success criteria differ from one project to another (Muller & Turner, 2007). To increase complexity even more, within the last decades the concept of project success is approached in relationship with stakeholders' perception (Davis, 2014). What determines project success, referred to as success factors, is also approached and considered to be of great interest. For more than four decades, the traditional view of project management was that, if you complete the project and adhered to the competing constraints or the triple constraints of time, cost, and performance, the project was successful. Perhaps in the eyes of the project manager the project appeared to be a success. But in the eyes of the customer or even the parent company's senior management, the project might be regarded as a failure (Kerzner, 2014). As a project manager, you are ultimately responsible for delivering a successful project. The buck stops with you, so it is in your interest to make sure relevant tools and techniques are used to make this happen (Haughey, 2014). In order to appropriately determine project success, some set of criteria or principles are essential to act as standards guiding or regulating project success. These standards are referred

to as project success criteria. According to Atkinson (1999) as cited in Unegbu *et al.*, (2020), the most conventional standard for determining project success is the, "iron triangle" which determines project success in terms of cost, time and quality performance. This framework of criteria has proved to be limited in that it does not focus on a wide range of project stakeholders. It gives only a measurement of the result of the project deliverable which relates to project efficiency. Another approach to determining project success is measuring success with respect to cost per unit, speed of construction and delivery, growth of schedule and cost, and other measures of quality. Various lists of critical success factors includes; (i) Top management support, (ii) Effective communication, (iii) Stakeholders engagement, (iv) Project goals, (v) Team capacity, (vi) Team work, (vii) Roles and responsibilities, (viii) Adequate resources, (ix) Effective monitoring and control, and (x) Financial support.

2.4 Stakeholders perception on construction project success

Since the project's objectives change and are influenced by a variety of success factors, the various stakeholders' perspectives on project success and success factors differ as well (Oliver & Rowlinson, 2010). For example, the contractor's assessment of project success is based on his performance. It's practically impossible to give a list of project success factors because they're likely to differ from one project to the next. Various project stakeholders evaluate project success from two angles: macro and micro (Jing *et al.*, 2009). Stakeholders and users look at things from a macro perspective. It deals with the entire and one-of-a-kind realization of the project concept. Micro perspectives, on the other hand, cover the most fundamental aspects of a project, such as those involved in the construction phase (Goran & Lindahl, 2007). The main project management goals of contractual parties participating in the construction process include time, money, quality, and safety. At the micro level, different parties have different perspectives on project success (Peltokorpi *et al.*, 2008). The goals of designers and contractors differ from the goals of the owners. The designers and contractors are more concerned with generating a profit, but the owners are more concerned with finishing their projects on time and under budget (Heywood & Smith, 2006; Meeampol & Ogunlana, 2006). McVea, (2005) considered cost, schedule, quality, safety, and participant satisfaction as characteristics of a successful project. According to Nunnally, (1978) and Udechukwu *et al.*, (2008), budget and schedule performance are always in the top five of the primary project objectives.

3. Research methodology

The design for this research was quantitative approach. The use of questionnaire was employed for data collection. Data collected were analysed using descriptive statistical techniques. The population for the study comprised of construction professionals within the local chapter of each profession in Abuja. A reasonable number of construction activities takes place in Abuja because it experiences rapid population increase and new developmental projects daily as a result of rapid urbanisation and rural-urban migration since it is the capital city of Nigeria (Kadiri *et al.*, 2014). According to the study of Mohammed (2019), there are a total of 996 professionals in Abuja. The frame covers professionals such as Architects, Quantity Surveyors, Builders, Estate Surveyors, Town Planners, Electrical Engineers, Mechanical Engineers and Civil Engineers in the built environment. The Sample size for the study was determined through Slovin's formula as adopted by (Mohammed, 2019; Anifowose & Raymond, 2023). A stratified sampling technique was used to sample the 139 professionals from the total population of 996 construction professionals in Abuja, and as such 139 Questionnaires were the instrument for data collection for the study. The data for the study were collected with the aid of questionnaires. Questionnaire was employed to collect data on the research objectives based on a five-point Likert's Scale format. However, from the target of 139 responses, the survey received 111 responses, which is approximately 87% of the total responses expected. This return rate can be said to be sufficient for the study as posited by Moser & Kalton (1999), who opined that a study can only be considered biased if the return rate is below 30%. Returned data were sorted coded and analysed. Analysis of data was carried out using descriptive methods of analysis which include Frequency count, Percentage, Relative Importance Index (RII), Mean Item Score (MIS) and Spearman's Rank Correlation analysis. MIS was employed to examine the perception of the measures of project success in Abuja in order of importance. RII was used to analyse the effects of critical success factors on measures of project success.

4. Data analysis and interpretations

4.1 Demography of respondents

Table 1, present the frequency and percentage of the respondents' designation on site, profession, academic qualification of the respondent, professional qualification and years of professional experience.

Table 1: Respondents' Profile

Variables	Categories	Frequency	%
Designation on site	Safety Officer	11	9.91
	Site Engineer	36	32.43
	Construction Manager	28	25.23
	Project Manager	17	15.32
	Others	19	17.12
	Total	111	100
Profession	Architect	23	20.72
	Builder	38	34.23
	Engineer	15	13.51
	Quantity Surveyor	18	16.22
	Others	17	15.32
	Total	111	100
Academic Qualification	HND	41	36.94
	Bsc/B.Tech	33	29.73
	Msc/M.Tech	26	23.42
	PHD	7	6.31
	Others	4	3.60
	Total	111	100
Professional Qualification	NIA	19	17.12
	NIOB	23	20.72
	COREN	19	17.12
	NIQS	9	8.11
	Others	41	36.94
	Total	111	100
Age	15 – 20	0	0.00
	20 – 25	15	13.51
	25 – 30	23	20.72
	above 30 years	73	65.77
	Total	111	100

Table 1 show that out of the 111 questionnaires returned completed, 23 (20.72%) were Architect, 38 (34.23%) were Builders, 15 (13.51%) were Engineer, 18 (16.22%) were Quantity Surveyor and 17 (15.32%) were other professionals, which comprises of Estate Managers and Valuers, Urban and Regional planners, Land Surveyors.

The respondents belong to diverse professional bodies which include NIA, NIOB, COREN, NIQS, and others. The larger percent of them belong to other professional bodies and NIOB with a percentage of 36.94% and 20.72% respectively. This was keenly followed by NIA and COREN with 17.12%, and NIQS with 8.11% respectively.

The academic qualifications of the respondents shows that respondents with HND, Bsc./B.Tech made the largest quota of the responses to this research with 36.94% and 29.73%, followed by MSc/M.Tech, PHD, and Others with 23.42%, 6.31% and 3.60% respectively. It was also observed that (0.00%) had 15-25years of work experience, 15(13.51%) had 20-25years of work experience, 23 (20.72%) had 25-30years of work experience, 73 (65.77%) had above 30years of work experience.

Table 2: The Critical Success Factors for Delivery of Construction Project

S/No.	Critical Success Factors	MIS	SD	Rank	Decision
1	Adequate Resources	3.82	0.76	1 st	Very Important
2	Effective Monitoring and Control	3.71	0.74	2 nd	Very Important
3	Financial Support	3.70	0.74	2 nd	Very Important
4	Top Management Support	3.67	0.73	4 th	Very Important
5	Effective Communication	3.55	0.71	5 th	Very Important
6	Team Work	3.51	0.70	6 th	Very Important
7	Team Capacity	3.20	0.64	7 th	Important
8	Roles and Responsibilities	3.19	0.64	7 th	Important
9	Project Goals	3.05	0.61	9 th	Important
10	Stakeholders Engagement	3.01	0.60	10 th	Important
Average		3.441			

Table 2 presents and discusses the Mean Item Score (MIS) results of the level at which 10 core identified Critical Success Factors for Delivery of Construction Project. The result shows that the critical success factors highly influence delivery of construction project. Adequate resources was ranked 1st with MIS of 3.82, Effective monitoring and control was ranked 2nd with MIS of 3.71, Financial support was ranked 2nd with MIS of 3.70, Top management support was ranked 4th with MIS of 3.67, Effective communication was ranked 5th with MIS of 3.55, Team work was ranked 6th with MIS of 3.51, Team capacity was ranked 7th with MIS of 3.20, Roles and responsibilities was ranked 7th with MIS of 3.19, Project goals was ranked 9th with MIS of 3.05, and Stakeholders engagement was ranked 10th with MIS of 0.60. On the average, the critical success factors for delivery of construction projects are very important, and important with an average MIS of 3.441, this implies that the level of importance is 75% on a five-point scale.

Table 3: Examine the perception of Stakeholders on the measures of project success

Project Success Measures	MIS	SD	Rank	Decision
Schedule Performance Criterion				
A high degree of trust shared by project participants	3.83	0.77	1 st	Very Important
Users need thoroughly understood and defined	3.76	0.75	2 nd	Very Important
No bureaucratic interference	3.39	0.68	3 rd	Important
Timely and valuable decisions from top management	3.19	0.64	4 th	Important
Average	3.54			
Cost Performance Criterion				
High degree of trust shared by project participants	3.41	0.68	1 st	Important
Thorough understanding of scope	2.98	0.60	2 nd	Important
Comprehensive site investigation	2.71	0.54	3 rd	Fairly Important
No social and political interference	2.59	0.52	4 th	Fairly Important
Average	2.92			
Quality Performance Criterion				
Regular quality control and quality assurance activities	3.99	0.80	1 st	Very Important
Regular monitoring and feedback from top management	3.83	0.77	2 nd	Very Important
Higher quality standards during construction	3.70	0.74	3 rd	Very Important
User needs understood and defined	3.17	0.63	4 th	Important
Average	3.67			
Safety Performance Criterion				
Clearly articulate scope of work	3.58	0.72	1 st	Very Important
Top management support	3.51	0.70	2 nd	Very Important
Regular monitoring and feedback from top management	3.40	0.68	3 rd	Important
Average	3.50			
No Claims & Contractual Dispute Performance				
Users need thoroughly understood and defined	3.65	0.73	1 st	Very Important
Regular monitoring and feedback from top management	3.11	0.62	2 nd	Important

Adequate communication among all project participants	3.01	0.60	3 rd	Important
Average	3.26			
Environmental Performance Criterion				
Evidence of high quality and sustainability after completion	3.10	0.62	1 st	Important
Incorporating sustainability designs and practices	3.04	0.61	2 nd	Important
Average	3.07			

Table 3 reveals Six (6) project success measures and each have four (4) effects on construction project success. These are Schedule Performance Criterion with two (2) effect ranked very important. These ranges from high degree of trust shared by project participants and users' needs thoroughly understood and well defined with MIS of 3.83 and 3.76, two (2) effect ranked important. These ranges from no bureaucratic interference and timely and valuable decisions from top management with MIS of 3.39 and 3.19 were ranked important. On the average, the measures of project success that have effect on construction project success are very important, and important with an average MIS 3.54. In Cost Performance Criterion, two (2) effects were ranked important. These ranges from high degree of trust shared by project participants and thorough understanding of scope with MIS of 3.41 and 2.98, two (2) effect was ranked fairly important, these ranges from comprehensive site investigation and no political and social interference with MIS of 2.71 and 2.59. On the average, the measures of project success that have effect on construction project success are important, and fairly important with an average MIS 2.92. In Quality Performance Criterion, three (3) effects was ranked very important, these are ranged from regular quality control and quality assurance activities, regular monitoring and feedback from top management and higher quality standards during construction with MIS of 3.99, 3.83 and 3.70 and User needs understood and defined was ranked important with MIS of 3.17. On the average, the measures of project success that have effect on construction project success are very important, and important with an average MIS 3.6. In Safety Performance Criterion, two (2) effects was ranked very important, these ranged from clearly articulate scope of work and top management support with MIS of 3.58 and 3.51 and regular monitoring and feedback from top management was ranked important with MIS of 3.40. On the average, the measures of project success that have effect on construction project success are very important, and important with an average MIS 3.50. In No Claims and Contractual Dispute Performance, one (1) effect was ranked very important, which is users need thoroughly understood and defined with MIS of 3.65, regular monitoring and feedback from top management and adequate communication among all project participants was ranked important with MIS of 3.11 and 3.01. On the average, the measures of project success that have effect on construction project success are very important, and important with an average MIS 3.26. In Environmental Performance Criterion, evidence of high quality and sustainability after completion and incorporating sustainability designs and practices was ranked important with MIS of 3.10 and 3.04. On the average, the measures of project success that have effect on construction project success are important with an average MIS 3.07.

Table 4: Summary of the measures of project success

Project Success Measures	MIS	SD	Rank	Decision
Quality Performance Criterion	3.67	0.73	1 st	Very Successful
Schedule Performance Criterion	3.54	0.71	2 nd	Very Successful
Safety Performance Criterion	3.50	0.70	3 rd	Very Successful
No Claims & Contractual Dispute Performance	3.26	0.65	4 th	Successful
Environmental Performance Criterion	3.07	0.62	5 th	Successful
Cost Performance Criterion	2.93	0.58	6 th	Fairly Successful
Average	3.33	0.67		Successful

Table 4 shows the project success measures on delivery of construction projects. Quality performance criterion was ranked 1st with MIS of 3.67, Schedule performance criterion was ranked 2nd with MIS of 3.54, Safety performance criterion was ranked 3rd with MIS of 3.50, No claims and contractual dispute performance was ranked 4th with MIS of 3.26, Environmental performance criterion was ranked 5th with MIS of 3.07, and Cost performance criterion was ranked 6th with MIS of 2.93.

Table 5: Summary of Regression Model of the Effects of Critical Success Factors on Measures of Project Success Delivery

		Regression Statistics		
Multiple R			0.801525	
R Square			0.642442	
Adjusted R Square			0.523257	
Standard Error			28.50212	
Observations (N)			111	
	Coefficients	Standard Error	t Stat	P-value
Intercept	70.09656	18.80411	3.727725	0.003628
Slope	-0.7642	0.329158	-2.32169	0.102925

Table 5 presents the finding on the relationship between Critical success factors and measures of project success. It tends to test the relationship between the two variables, where Critical Success Factors constitutes the independent variables and Project Success as the dependent variable. The obtained P-value which is less than 0.05 ($P < 0.05$) indicates that a significant relationship exist between these factors and Project Success. However, the coefficient of determinant indicated by (R^2) as shown on the table with a value of 0.642 signifies that 64.2% of the variation in Project success with the study area is explained by the Critical Success Factors.

Summary of the Findings

The study undertook a quantitative research through the use of questionnaire survey. Data collected were analysed with the use of descriptive statistical methods. The following were found from the analysis of data carried out:

- i. The most important Critical Success Factors for delivery of construction projects in Abuja are Adequate Resources; Effective Monitoring and Control and Financial Support with MIS values of 3.82, 3.71 and 3.70 respectively. On the average, all the identified Critical Success Factors for delivery of construction projects in Abuja are very important (MIS = 3.44).
- ii. The most successful measures of project success range between Quality Performance Criterion (MIS = 3.67), Schedule Performance Criterion (MIS = 3.54) and Safety Performance Criterion (MIS = 3.50). Averagely, all the identified measures of project success in Abuja are successful (Average MIS = 3.33).

5. Conclusions

The study was undertaken to address the effects of critical success factors on the measures of construction project success. In order to achieve this, the study identified the critical success factors for delivery of construction project, the measures of project success and the effect of critical success factors on the measures of project success. Data was collected from registered construction professionals within the local chapter in Abuja using questionnaires. Analysis of data was carried out with the use of Mean Item Score and Regression analysis. The findings from the data analysis carried out led to vital conclusion stated in this section.

The critical success factors for the delivery of construction project range between adequate resources and team work are very important with average. The measures of construction project success range from Quality Performance Criterion and Safety Performance Criterion and are very successful and are capable of improving construction project delivery. It can therefore be concluded that the critical success factors has a significant effect on the measures of construction projects success in Abuja. Thus, the findings of this study led to the following recommendations:

- i. Communication among construction professionals should be harmonized so as to ensure effective project performance. Construction professionals should ensure adequate resources are provided and team work exists among professionals for successful delivery of construction projects.
- ii. Construction professionals should ensure construction projects are completed within the desired quality of the building client and adhere strictly to the safety performance so as to ensure construction project success. All relevant construction professionals should be well informed and be involved in the planning and implementation of construction projects to ensure its success.

References

- Abdullah, W.M.W. (2010). Critical factors in project success: a study of public sector construction projects in Malaysia. University Malaya, Kuala Lumpur.
- Anifowose, O. M., & Raymond, J. (2022). Assessment of Housing Reconstruction Needs and Post Conflict Recovery Efforts in Adamawa State, Nigeria. *African Journal of Environmental Sciences & Renewable Energy*, 8(1), 89-110.
- Al-Tmeemy, S. M., Abdul-Rahman, H., & Harun, Z. (2011). Future criteria for success of building projects in Malaysia. *International Journal of Project Management*, 29(3), 337-348.
- Alzahrani, J. I., & Emsley, M.W. (2013). The impact of contractors' attributes on construction project success: A post construction evaluation, *International Journal of Project Management*, 31 (2013) 313-322.

- Asgari, M., Kheyroddin, A., & Naderpour, H. (2018). Evaluation of Project Critical Success Factors for Key Construction Players and Objectives.
- Beleiu, I., Crisan, E., & Nistor, R. (2015). Main factors influencing Project Success. *Interdisciplinary Management Research*, 11 (2), 59-72.
- Chan, A. P. C., & Chan, A. P. L. (2004). Key Performance Indicators for Measuring Construction Success, Benchmarking, *International Journal of Project Management*, 11 (3), 203-221.
- Cheong Yong, Y., & Emma Mustafa, N. (2012). Analysis of factors critical to construction project success in Malaysia. *Engineering, Construction and Architectural Management*, 19(5), 543-556.
- Cserhádi, G., & Szabó, L. (2014). The relationship between success criteria and success factors in organisational event projects. *International Journal of Project Management*, 32(4): 613-624.
- Davis, K. (2014). Different stakeholder groups and their perceptions of project success, *International Journal of Project Management*, 32 (4), 189-201
- Elattar, S. M. S. (2009). Towards developing an improved methodology for evaluating performance and achieving success in construction projects, *Scientific Research and Essays*, 4(6), 549-554.
- Elawi, G. S. A, Algahtany, M, & Kashiwagi, D. (2016). Owners' perspective of factors contributing to project delay: Case studies of road and bridge projects in Saudi Arabia. *Procedia Engineering*, 145 (3), 1402-1409.
- Fenn, P. (2006). Conflict management and dispute resolution, in Lowe, *Blackwell Publishing, Oxford*, 234-691.
- Garbharran, H., Govender, J., & Msani, T. (2012). Critical success factors influencing project success in the construction industry. *ActaStructilia*, 19(2), 90-108.
- Georgy, M. E., Chang, L. M., & Zhang, L. (2005) Prediction of engineering performance: A Neurofuzzy approach. *Journal of Construction Engineering and Management* 131 (5): 548-557
- Gudiene, N., Banaitis, A., Podvezko, V. & Banaitiene, N., (2014). Identification and evaluation of the critical success factors for construction projects in Lithuania: AHP approach. *Journal of Civil Engineering and Management*, 350-59.
- Gunduz, M., & Yahya A.M.A. (2018). Analysis of project success factors in construction industry. *Technological and Economic Development of Economy*, 24(1), 67-80.
- Haughey, D. (2014). Eight Key factors to ensuring project success. Retrieved from <https://www.projectsmart.co.uk/white-papers/eight-key-factors-to-ensuring-project-success.pdf>.
- Ihuah, P.W., Kakulu II, & Eaton, D. (2014). A review of critical project management success factors (CPMSF) for sustainable social housing in Nigeria. *International Journal of Sustainable Built Environment*, 3(1), 62-71.
- Ika, L.A. (2009). Project Success as a Topic in Project Management Journals, *Project Management Journal*, 40(4), 6-19.
- Kadiri, Z. O., Nden, T. Avre, G. K., Oladipo, T. O., Edom, A., Samuel, P. O. & Ananso, G. N (2014). Causes and Effects of Accidents on Construction Sites (A Case Study of Some Selected Construction Firms in Abuja F.C.T Nigeria). *IOSR Journal of Mechanical and Civil Engineering (IOSR-JMCE)*. 11(5), 66-72.
- Kamau, G.C., & Mohammed, H. B. (2015). Efficacy of Monitoring and Evaluation Function in Achieving Project Success in Kenya: *A Conceptual Framework*.
- Kandelousi, N. S., & Abdollahi, A. (2011). Key success factors for managing projects world academy of science. *Engineering and Technology*, 59 (4), 1826-1830.
- Kernzer, H. (2014). Understanding Project Success and Project Failure.
- Khang, D. (2008). Success Criteria and Factors for International Development Projects: A lifecycle based framework.
- Kougoulos, S. (2010). Factors related to Project Management and their contribution to the effective delivery of residential construction projects in Greece. Master of Science in Construction Project Management, *Dissertation for Heriot Watt University*.
- Lindahl, G., & Ryd, N. (2007). Client's goals and the construction project management process. *Facilities*, 25(3/4), 147-156.
- Loosemore, M., Dainty, A., & Lingard, H. (2003). Human Resource Management in Construction Projects: *Strategic and Operational Approaches*, 1, 124-136.
- Mbachu J., (2008). Conceptual framework for the assessment of subcontractors' eligibility and performance in the construction industry, *Construction Management and Economics*, 5, 471-484.
- Mohammed, D. (2019). The effect of Boko Haram Crisis on Socio-Economic Activities in Yobe State. *The International Journal of Social Sciences and Humanities Invention*, 1(4), 251-257.
- Mugenda, O., & Mugenda, A.G. (2003). Research Methods; Quantitative Qualitative Approaches, Revised, *ACTS Press, Nairobi*.
- Meskendahl, S. (2010). The Influence of Business Strategy on Project Portfolio Management and its Success.
- Mir, F. A., & Pinnington, A.H. (2014). Exploring the value of project management: Linking project management performance and project success. *International Journal of Project Management*, 32(2), 202-217.
- Muller, R., & Turner, R. (2007). Matching the Project Manager's leadership style to Project Type. *International Journal of Project Management*, 25 (3), 21-32.
- Ogwueleka, A. (2011). The critical success factors influencing project performance in Nigeria. *International Journal of Management Science and Engineering Management*, 6(5), 343-349.

- Ojiako, U., Johansen, E., and Greenwood, D. (2008). A qualitative re-construction of project measurement criteria. *Industrial Management & Data Systems*, 108(3), 405-417.
- Okechukwu N., (2017). 436 Die in Building Collapse in four years, *The Punch Newspaper*, 13. Retrieved from: <http://punchng.com/436-die-in-building-collapse-in-four-years>.
- Papke-Shields, K.E., Beise, C., & Quan, J. (2010). Do project managers practice what they preach, and does it matter to project success. *International Journal of Project Management*.
- Parfitt, M.K., & Sanvido, V.E. (1993). Checklist of critical success factors for building projects. *Journal of Management in Engineering*, 9 (3), 243-249.
- Prabhakar, G. P. (2008). What is Project Success: A Literature Review. *International Journal of Business and Management*, 3 (9), 1-10.
- Project Management Institute (2013). A Guide to the Project Management Body of Knowledge (PMBOK® Guide), Fifth Edition, Newtown Square, PA, USA: Project Management Institute, 589.
- Rajkumar, S. (2010). Art of Communication in Project Management. Paper Presented at PMI Research Conference: Defining the future of Project Management. Washington, DC. Newtown Square, PA: Project Management Institute.
- Ramlee, N., Tammy, N.J., Raja Mohd Noor, R.N.H., Ainun Musir, A., Abdul Karim, N., Chan, H.B., & Mohd Nasir, S.R. (2016). Critical success factors for construction project. Shāh Alam, Malaysia.
- Salter, A., & Torbett, R. (2003). Innovation and performance in engineering design. *Journal of Construction Management and Economics*, 21(5), 573-580.
- Sanvido, V., Grobler, F., Parfitt, K., Guvenis, M., & Coyle, M. (1992). Critical success factors for construction projects. *Journal of Construction Engineering and Management*, ASCE, 118(1), 94-111.
- Shen, L.Y., Bao, Q., & Yip, S.L. (2000). Implementing innovative functions in construction project management towards the mission of sustainable environment, in Proceedings of the Millennium Conference on Construction Project Management - Recent Developments and the Way Forward, Hong Kong, 24 October, 77-84.
- Stuckenbruck, L. (1981). The Implementation of Project Management: The professional's handbook.
- Sudhakar, G. (2012). A model of critical Success Factors for Software Projects. *Journal of Enterprise Information Management*.
- Susil, K.S., Warnakulasuriya B.N.F., & Arachchige B.J.H. (2016). Critical Success Factors: EnRoute for Construction Projects. *International Journal of Business & Social Science*, 7(3), 27-37.
- Swan, W., & Khalfan, M.M.A. (2007). Mutual objective setting for partnering projects in the public sector. *Engineering, Construction and Architectural Management*, 14(2), 119-130.
- Tabish S.Z.S., & Jha, K.N. (2012). Important Factors for Success of Public Construction Projects. 2nd International Conference on Construction and Project Management IPEDR vol.15, IACSIT Press, Singapore.
- Thi, C.H., & Swierczek, F.W. (2010). Critical success factors in project management: Implication from Vietnam. *Asia Pacific Business Review*, 16(4), 567-589.
- Toor, S., and Ogunlana, S.O. (2009). Construction professionals' perception of critical success factors for large-scale construction projects. *Construction Innovation*, 9(2), 149-167.
- Unegbu, H.C.O., Yawas, D.S., & Dan-asabe, B. (2020). An Investigation of the Relationship Between Project Performance Measures and Project Management Practices of Construction Projects for the Construction Industry in Nigeria. *Journal of King Saud University - Engineering Sciences*, 1-13.
- Yahya, S., & Goh, W. (2002). Managing Human Resources toward achieving Knowledge Management.
- Yang, J., Nisar, T., and Prabhakar, G.P. (2017). Critical success factors for build-operate-transfer (bot) projects in china. *Irish Journal of Management*.
- Yang, J., Shen, Q., & Ho, M. (2009). An overview of previous studies in stakeholder management and its implications for the construction industry. *Journal of Facilities Management*, 7(2), 159-175.
- Yong, Y.C., & Mustaffa, N.E., (2013). Critical success factors for Malaysian construction projects: an empirical assessment. *Construction Management and Economics*, 959-978.