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Determinants of Project Success in Construction Organization: A Study of Mapron and Jeluz Construction Company, Abakaliki

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Abstract: Success has always been the ultimate goal of construction projects and different researchers have tried to evaluate it using different factors. The main aim of this paper is to analyze the determinants of project success in construction organization using Mapron & Jeluz construction company Abakaliki as the study focus. The study adopted both survey and descriptive research design approach. A structured questionnaire was administered on the 30 top and middle levels management staff of the company only. Secondary data on the other hand was obtained from the project execution performance and experience report from the company. Data collection was done using Likert 5 point scaling format in respect to objective one and inferential analysis in respect to objectives two and three. The formulated hypothesis were tested using chi-square statistical tool for hypothesis one, regression graphical method and Pearson product-moment correlation test statistic for hypothesis two and three respectively. The research finding reveals that clear project mission top management supervision and project planning has a great effect on the project success of M & J Company. The study also reveals that there is a relationship between project planning and project success in the company. It was therefore recommended among other that supervision by the top management should be mandatory policies and practice more in the company. Therefore the study encourages the management of M & J to always consult qualified and experienced stakeholders who have skills and technical know-how on all aspect of the project to make sure that these critical factors are carried out and executed successfully in the company.

Keyword: Project, Project management, Success factor, Project life cycle

1. Introduction

Managing project is one of the oldest and most respected accomplishments of mankind.Traditionally, project management has dealt only with managing the project planning and implementation process. This view of project management specifically views the project as a task or process that needs to be completed following the specifications, budget and time given. This approach has provided universally accepted metrics of cost, schedule and performance to evaluate the success of the project. This is highlighted by the achievement of the builders of pyramids, the architects of ancient cities, the mason and craftsmen of Great Wall of China and other wonders of the world (Peter 2001). Project make up around fifty percent of all work carried out and as a result is deemed the vehicle for the execution of organizational growth. According to Mobey and Parker (2002:67), "to increase the chances of project success, it is necessary for the organization to have an understanding of the factors that are critical to the success of the project and to systematically and quantitatively access them in terms of their effects on the project completion and then choose appropriate methods of dealing with them." The accomplishment of project through the application and integration of management process of initiation, planning, directing, controlling, executing and monitoring of resources to meet the technical cost and time function is known as project management. Project management integrates these functions progressively through the project life cycle with the aim of satisfying the stakeholders and constituents according to the project's established requirements. Stakeholders are those who have a direct stake in the project while the project's constituents are those who may be impacted by the consequences of the project. Project success is typically generated when the stakeholders and constituents express their collective satisfaction according to the degree of their involvement. Project management also includes planning, organizing, directing and controlling activity in addition to motivating what are usually the most expensive resources on the project.

In industries as diverse as construction organizations projects drive business and developments. It is essentially a service industry, obtaining its inputs and outputs from various sectors of the economy with which it is interrelated and interlined, often in quite complex ways.Badiru (1988) points out that construction companies

that consistently deliver products and service in a timely fashion, succeed mainly because of the efforts they commit to project management. Most of the time, high technology and complex projects fall because of a lack of adequate project management. It also played a major role in the efficient and effective development of new technology systems.

In the private sector, some of the factors that must be identified, assessed and tackle effectively are; "clear project mission, support from the top management, detail project plan/ schedule, effective use of plan, competent project personnel, the availability of machinery and technical task force among others,"Stevin and Pinto, (1986, 1987). If these factors are not taken seriously it might lead to the failure of the project. On the other hand, common threads relating to success criteria often develop not only within an individual project, but across the industry, as we relate success to the perceptions and expectations of the clients, the project manager, designer or contractor. This is because construction projects today operate under high level of uncertainty and project implementation are open to all sorts of external influences, unexpected events, price changing constraints, ever growing requirements and fluctuating resource flows.

Delay has an adverse effect on the delivery of projects. However, a large number of associated problems influence project delivery time performance: client's limited understanding of the construction process, inadequate project planning and design, poor quality management during design and construction; poor ground conditions, poor constructability, poor motivation of workers, non-participatory management style and adverse physical, economical and socio-political factors.

The study sought to;

1. Determine the extent to which clear project mission affects project success in M& J company, Abakaliki.
2. Find out whether top management supervision enhances project success in M & J company, Abakaliki.
3. Ascertain the relationship between project planning and project success in the company.

The research attempts to provide answers to the questions;

1. To what extent does clear project mission affect project success in the construction company?
2. How does top management supervision enhance project success of the construction company?
3. What is the nature of the relationship between project planning and project success in the construction company?

It was hypothesized that:

i. Clear project mission has positive effect on project success in the M & J Company, Abakaliki.
ii. Top management supervision has positive effect on project success in the M & J Company.
iii. There is significant relationship between project planning and project success in the company.

2. Review of Related Literature

A. Project

A project is a group of tasks performed in a definable time period, in order to meet a specific set of objectives. As project has the following characteristic, it is likely to be a one-time programme, it has a life cycle with specific start and end data, it has budget and likely to require the use of multiple resource, most of which may be scarce and have to be shared among others. It may require the establishment of special organizational boundaries (Harvey1999). Akarakiri (2007) defines project as any scheme, or part of a scheme for investing recourse which can reasonably be analyzed and evaluated as independent unit.

Spinner (1997) also defines project as series of task or activities that have several distinguishing characteristics. Such as: Having specific starting and ending data, achieving a specified result on product, well defined objectives, a unique, non-repetitive endeavor.

This view point is collaborated by Verna (1995), when he defines projects as the investment of capital in a time bound intervention to create assets. In the same way, Kerzner (2003) further define project as an assignment that has to be undertaken and completed within a set time, budget, resources and performance specification designed to meet the needs of stakeholders and beneficiaries.

Although, there are numbers of general definition of the term project; it must be recognized at the outset that projects are distinct from other organizational processes. As a rule, a process refers to ongoing, day-to-day activities in which an organisation engages, while producing goods and services, processes use existing systems, properties and capabilities in a continuous, fairly repetitive manner. Nevertheless, for the majority of organizations project management activities remain unique and separate from the manner in which more routine, process driven work is performed (Kerzner, 2003). Probably, the simplest definition is found in the project

management body of knowledge (PMBOK) guide of the project management institute (PMI). PMI is the world's largest professional project management association, with over 200,000 members' world wide as of 2005. In their PMBOK guide, a project is defined as "a temporary endeavor undertaken to create a unique product or service". PMI (2005) examined the various elements of projects as identified by the following:

- Projects are complex, one time processes – A project arises for a specific purpose. They are complex because they require the co-ordinate inputs of numerous members of the organizational unit involved in the project. Because a project intended to fulfill a stated goal, it is temporary it exist only until its goal has been met, and at that point it is dissolved.
- Projects are limited by budget, schedule and resources project works requires that members work with limited financial and human resources for a specified time period.
- Projects are developed to resolve a clear goal or set goals.
- Projects are customer focused: Whether the project ids responding to the needs of an internal organisation unit or intended to exploit a market opportunity external to the organization, the underlying purpose of any project is to satisfy customer needs
- Therefore project is not determined by the amount of money involved or its size. They are unique, well-defined objectives and constrained by a time factor in a broad sense.

Project Success

In recent time, organization activities are becoming more project based, the implication is that organization tends to split routine work into programs of project in order to quickly achieve organizational goal of value added. Good management of these projects is essential if the organization is going to succeed. Equally important to individual project success is ensuring that the right projects. Judges and Muller (2005) in their article mentioned that in order to define what success means in a project context is like gaining consensus from a group of people on the definition of "good art". Project success is a topic that is frequently discuss and get rarely agreed upon (Baccarini, 1999). On where limited to the implementation phase of the project life cycle to definitions that reflect an appreciation of success over the entire project and product life cycle (Judges and Muller, 2005).

Rowe et al (1982) say that "critical success factors (CSFs) provide clue that help to answer the question of whether the organization is able to effectively mobilize its resources where there are conflicting sub goals, environmental uncertainty and internal politics and constraints".

There is a proliferation of research studies investigating the subject of 'construction project success' over the past few decades and that literature pertains to achieving success on a wide range projects, either in a generic sense or related to particular areas, for example, focusing on time, budget, productivity and dispute etc. however, little is known about the impact of actual contract firms on project success as many researchers have failed to identify the form of contract as a critical success factor.

Verna (1995) writes that communication, teamwork and leadership are vital components of effective management of project of project objective successfully. "Freemen and Beale (1992) provided on interesting examples of different points of views of people. "An architect may consider success in terms of aesthetic appearance, an engineer in terms of technical competence, an accountant in terms of dollars spent under budget, a human resources manager in term of employee satisfaction, and chief executive officers rate their success in the stock market".

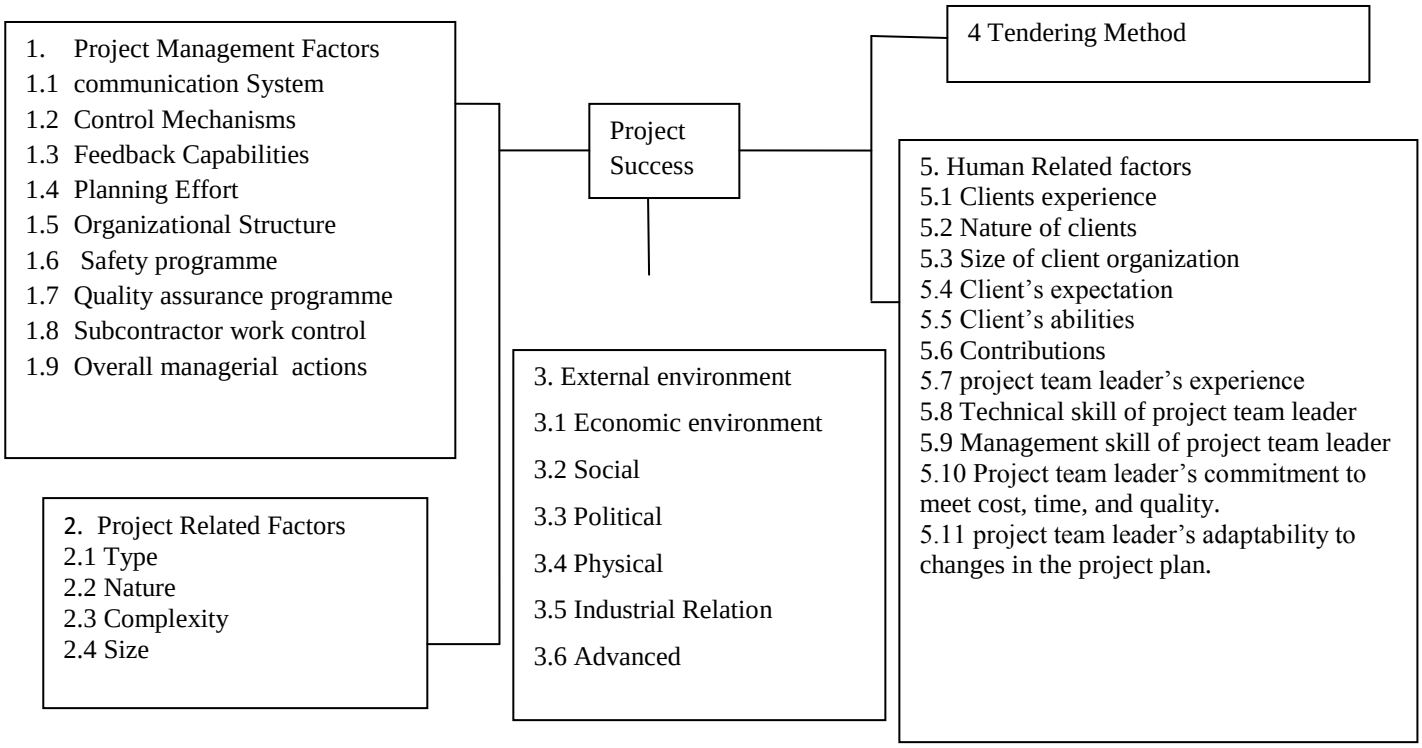
Project Management

Atkinson (1999) reported that project management has cost quality, and time as its critical factor. It concerned with the act of energizing, organizing, planning coordinating and controlling human and non-human resources in order to achieve stated objectives with constraints on cost, time and quality performance (Michael 2002). Turner and Muller (2005) in their study postulate that impart of project leader and his/her leadership style is the major determinant of project success on their research, they belief people ignore the impact of the project manager, and his or her leadership style and competence on project success. He therefore opined that project management involves pursing the life cycle of a project from conceptualization to completion in a turn-key style.

B. Success Factors

A construction project is completed through a combination of many wants and interactions, planned or unplanned, over the life of a facility, with changing participants and processes in a constantly changing environment certain factors are more critical to a project's success them others. These factors are called critical project success factors. The term critical success factors in the context of the management of projects was first used by Rockart in 1982 and is defined as those factors predicting success on projects. A careful study of

literature suggests that the most accurate and extensive model to define all the critical success factors in whatever construction project is the one describe by Chan et al., (2004). From this model, themain structure of critical success factors are project management factors, project related factors, external factors, tendering method, and human related factors. Nevertheless, all of them based on the most important goal: client satisfaction



Success Factor and Project Stages

The construction stage is where all the project goals of contractual parties like time, cost, performance, quality, safety and so on one established and put to test. Project stage or project life cycle is one method that has been used with some regularity in order to help managers conceptualize the work and budgetary requirement of a project. The concept is familiar to most modern managers. The degree of effectiveness of the project management functions and the degree to which the individual party will perceive the project as being successful from its own viewpoint,(Lim and Mohamed 1999). It is during this project stage that the demand for time, cost and quality requirement becomes most acute. In practice there are plenty of examples in which a project takes a long time to be decided, planned, tendered, awarded and signed. Finally when it comes to the construction stage, all the past inadequacies of every preceding stage appear and everything must be done within the schedule and budget given. Therefore the critical success factors come up as the project progresses from the conceptual stage to finalization stage. Fig 2.depicts the complete project stages as a project progresses.

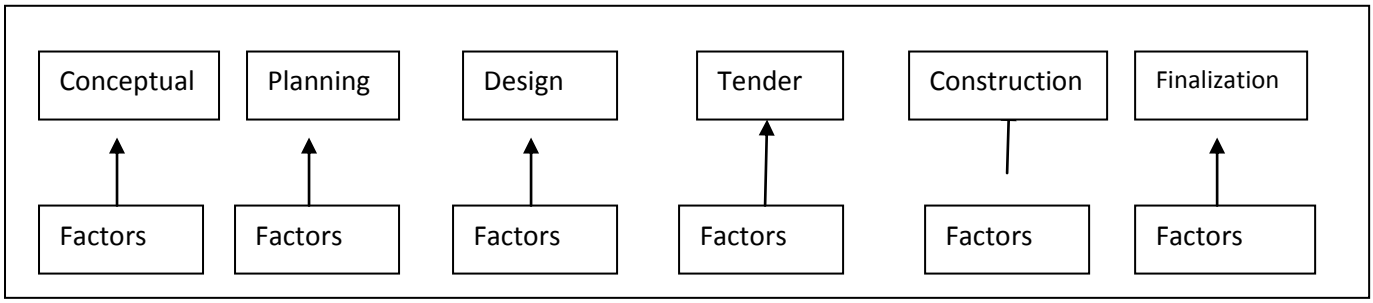


Fig 2: Project life cycle

Adams and Barndt (19983) in King and Cleland added (1983:222-244) divided the project life cycle into four distinct stages:

1. **Conceptualization**:-This is the initial project stage. At this stage a project is determined as being necessary. Goals and alternatives are specified with the aim to accomplish those goals
2. **Planning**:-This stage involves establishment of formalized set of plans to accomplish the conceptual developed goals planning activities involves scheduling, budgetary, allocating of other specific tasks and resources.
3. **Execution:-**This stage involves the actual work of the project. Material and resources are procured, produced, and performance capabilities are verified
4. **Termination:-**Once the project is completed, the termination activities are performed. These activities usually include the release of resources and transfer of the completed project to the clients and if necessary, the reassignment of project team personnel.

Critical Success Factors over the Stages on Project Life Cycle

Slvin and Pinto (1986, 1987) identified ten critical factors relating to project implementation success.

1. **Project Mission:**The initial clarity of goods and general direction.
2. **TopManagement Support:** Willingness of top management to provide the necessary resources and authority/power for project success
3. **Project Plan/Schedule:** A detailed specification of the individual action steps required for project implementation
4. Client Consultation: Communication, consultation and action on behalf of all impacted parties
5. **Personnel:** Recruitment, selection and tracing of the necessary personnel for the project team.
6. **Technical Task:** Availability of the required technology and expertise to accomplish the specific technical steps.
7. **Client Acceptance:** The act selling the final project to its ultimate intended users
8. **Monitoring and Feedback:** Timely provision of comprehensive control information at each stage in the implementation process.
9. **Communication:** The provision of an appropriate network and necessary data to all key actors in the project implementation.
10. **Trouble – Shooting:** Ability to handle unexpected cries and deviations from plan.

Pinto and Prescott (1988) have investigated the relationship between the project life cycle and behavioral issues from the initial stage of conceptualization to the final stage of termination where the completed project is transferred to its intended risers.

Pinto and Prescott (1988) sued a stepwise regression on the critical success factors at each of the four stages in the project life cycle. The results demonstrated that though there is empirical justification for several of the preciously listed critical success factors, the relative importance of various factors are subject to change at different phases of the project implementation process. The finding implies that future use of critical success factor analysis and implementation, regardless of the area to be examined may be contingent on other organizational phenomena, such project (or organizational) life cycle. Further, the practicing project manager would be in a better position to assist in the implementation of a project, given an increase awareness of the factors most critical to success at specific life cycle stages.

Let us take a cursory look at the relevant theory supporting to the study. The theory of constraints: According to (Goldratt, 1984), organizational performance is dictated by constraints. These are restrictions that prevent an organization from maximization of its performance and reaching its goals. Constraints can involve people, suppliers, information, equipment or even policies, and can be internal or external to an organization. Internal constraints includes equipment, the way equipment is currently used limits the ability of the system to produce more saleable goods and services, lack of skilled people limit the system. Mental models held by people can cause behavior that becomes a constraint. Policy: a written or unwritten policy prevents the system from making more.

The theory says that every system, no matter how well it performs has at least one constraint that limits its performance, and this is the system's weakest link. As we all know that chain is as strong as its weakest links, every organization is a chain. So if there are constraints affecting an organization, the constraints are tackled from its weakest link. The theory also says that a system can have only one constraint at a time and other areas of weakness is non-constraints until they become the weakest link. The theory is used in identifying the constraint and changing the way of working so as to overcome it. This theory evaluate how the constraints of the manager, stakeholder involvement and project team training influence success of construction projects in Mapron and Jeluz construction, Abakaliki.

With respect to empirical literature, some relevant studied reviewed, are very revealing. Babalola, Oluwatuyi, Akinloye, and Aiyewalehinmi (2015) carried out a research on factors influencing the performance

of construction projects in akure, Nigeria. A questionnaire survey was conducted and forty six factors were identified, categorized into eight (8) groups, evaluated and ranked according to participants' perspectives. Fifty (50) questionnaires were distributed as follows: 12 to clients, 18 to consultants and 20 to contractors. The outcome of these analyses showed that all the respondents agreed that construction projects were influenced by all the forty six factors indicated by the questionnaire. However, the analysis indicated that the top ten (10) factors that have the highest average index showed how these factors are affecting construction projects. Based on these findings, this study recommended that contractors' progress payment should be made on time as well as minimizing change orders during construction to avoid delays. Also, consultants should give full commitment to monitor the project progress and ensure the work was according to specifications and satisfactory quality; meeting owner needs and expectation within the project budget and stipulated time. Finally, continuous coordination and relationship between project participants were required through the project life cycle in order to ensure project performance.

Olanipekun(2017) conducted a research on thefactors Affecting Contractors' performance in construction project delivery inAkure, Ondo State, Nigeria.This study focuses on factors affecting contractors' performance in construction project delivery in Akure, Ondo State with a view to enhancing their performance in construction project delivery. It assesses the success criteria for project performance in the study area; the causes of non-performance of contractors in project delivery in the study area; and evaluates factors for improving contractors' performance in project delivery. A well-structured questionnaire was used to harness information from construction stakeholders. Data was analyzed using mean item score and single factor analysis of variance. The results indicated that the top three criteria for contractors' performance were completion to time, budget and required quality. The results also showed that quality related factors, project management related factors and procurement related factors were factors affecting contractor's performance the most. Furthermore, the study revealed that contractors' performance could be improved through appropriate planning, good leadership and good communication. It was concluded that to improve performance of contractors on construction projects, appropriate planning, good leadership and good communication must be enhanced.

Akewushola, Olateju, and Hammed (2012) carried out a study on effect of project management on project success. The study evaluates the effects of project management on project success in Blackstone Construction Company. The study adopted a survey research design, using a combination of stratified and judgmental sampling techniques, A structured questionnaire was administered on 40 top and middle levels management staff of the company. The scales in the questionnaire were content validated, and has a reliability correlation coefficient of 0.11.The data collected been analyzed using descriptive statistics and Chi−Square distribution. There search findings reveal that there is a relationship between project quality and business success, Project quality and technical success. The study also reveals that there is a significant relationship between Project cost and acceptability by clients. It was therefore recommended among others that total project cost on the side of clients should be minimized by ensuring that the project manager is innovative enough and creative in the apportion of project cost without reducing the quality of the project.

3. Methodology

The study employed both survey and descriptive research design in analyzing the effect of some selected critical factors or determinants on project success in Mapron&Jeluz Construction Company. The primary and secondary source of data was used to evaluate the cause and effect relationship between the predicator variable and criteria variable in the study. The sample selected for this study consisted of thirty (30)mid level management staff of the company. The respondents were managers and staff from IT, Accounts, Human resources, engineering and operation departments. In pursuit of the study objectives, the research instruments used was a structured and non-disguised questionnaire with close-ended questions, designed from review of related literature of which primary data was sources from. And secondary data was sources from the project execution and performance records kept by the M & J Company in respect to the construction projects there are embarking on.Since the study seeks to evaluate the effect relationship between the independent and dependent variables, the researcher, used chi-square to test hypothesis1, and then used regression analysis and Pearson product moment correlation to test hypothesis 2 and 3 respectively at 0.05% level of significance.
Decision rule for hypothesis one:reject the null hypothesis if the cal> tab.
Decision rule for hypothesis two and three: reject the null hypothesis if the level of significance associated with the predicator variable is less than 0.05%.

4. Data Presentation, Analysis and Discussion of Results

Table 4.1.1: Respondents view on the effect of a clear project mission on project success in M & J Construction Company

Statement	**SA**	**A**	**U**	**SD**	**D**	**Total**
A clear project mission provide a suitable way/direction for the management team and by so doing, enhances proper planning that leads to successful implementation and execution of the project						
Top level managers	7					7
Business level manager	5	3			2	10
Tactical Level managers	9	2		1	1	13
Total	**21**	**5**		**1**	**3**	**30**
Percentage (%)	**70**	**16.7**		**3.3**	**10**	**100%**

Source: Field Survey 2011

KEY:SA = Strongly Agree,A = Agree, U = Undecided,D = Disagree, SD = Strongly Disagree

From the table, 21 staffs representing 70% of the respondents strongly agree that a clear project mission provides a suitable way to the management team/contractors which enhances properplanning and execution of project in M & J Company while 5 staffs representing 16.7% of respondents agree to the assertion. None of the respondent was undecided, 1and 3 staffs representing 3.3% and 10% respectively strongly disagree and disagrees to the effect of a clear project mission on project success in M & J Construction Company as contained in the table above.

Table 4.1.2: Record of the relationship between top management supervision, project planning and project success

Stage of project	**Top Management support (extra hours of supervision in a week)**	**Project planning (% accuracy in charting a timing activity %)**	**Project success (earliest completion time)**
1	4	30	7
2	8	60	12
3	6	40	10
4	8	70	13
5	13	90	18
6	13	90	16
7	12	80	14
8	15	90	17
9	16	95	18
10	20	97	21

Source: Extract from project execution and performance records in M &J 2011.

The data from table 4.1.2 was used to address objective two and three of the study. From the table above, it shows the relationship between two variables, the top management supervision and project success, then the project planning and project success. But objective two is first to be discuss.

The top management support (measured in terms of extra hours of supervision by top management) has a significance effect on project success which (measured in terms of its earliest completion time). At the 10^{th} stage of the project, where top management put in extra 20 hours of supervision, the activities at the stage were completed 21 days earlier than the actual completion time. The same as at stages 9 and 8 where top management put 16 and 15 extra hours of supervision, activities completed 18 and 17 days respectively earlier than the actual completion time. Hence, where the top management put in the least hour of supervision at the 1^{st} stage of the project, the activities at that stage were completed only 7 days earlier than the actual completion time. This means that the top management supervision has a significant effect on the project success in M & J Company. To investigate the possible relationship between the two variables that both relate to the same "event", a scatter plots (also called scatter diagrams) will be drawn. And it is demonstrated below:

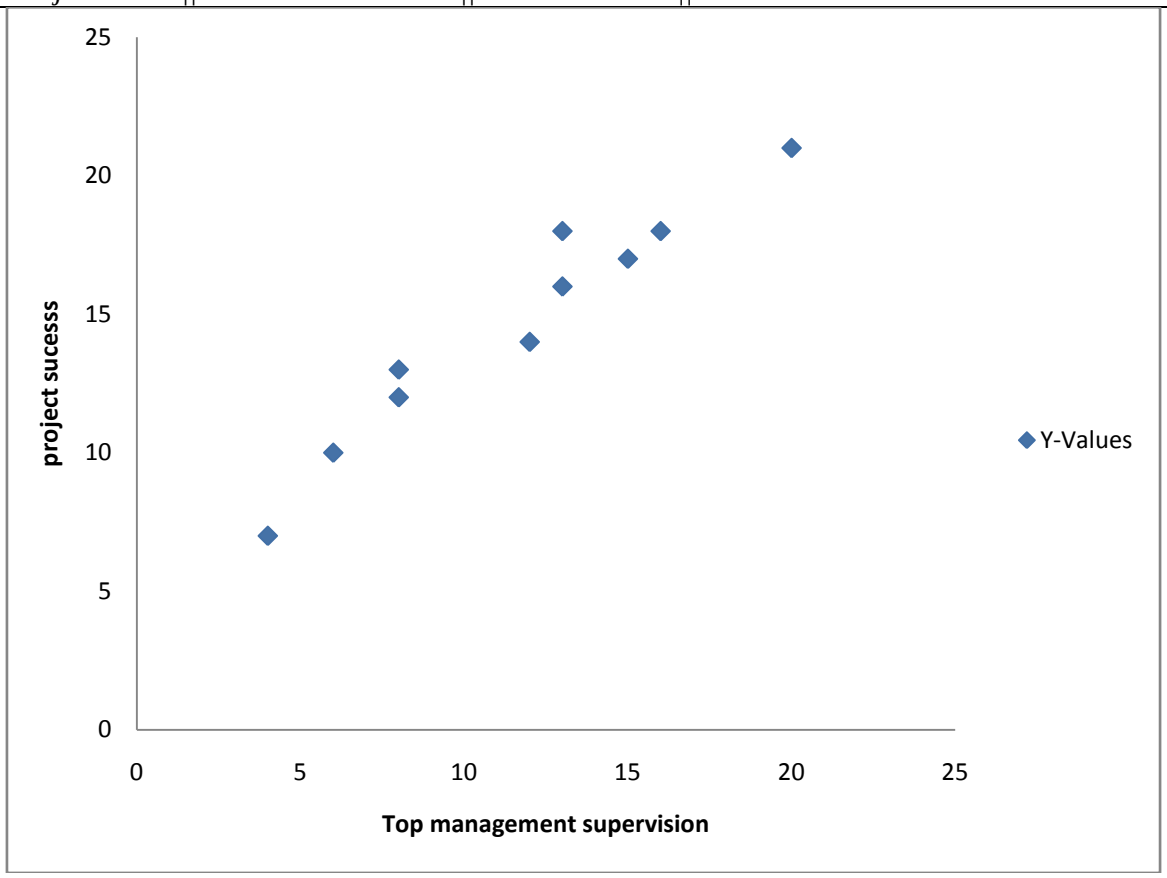


Fig. 4.2.1:Scatter plot showing the effect of top management supervision on project success

The chart above has two variables, the response variable denoted by "y" which measure the outcome of the study and also referred to as the dependent variable. The other is explanatory variable denoted by "x" and also referred to as independent variable. The overall pattern shows cluster and the points cluster in a band, running from lower left to upper right, showing that there is a positive correlation. The strength of association is strong because the more the points cluster closely around the imaginary line of best fit, the stronger the relationship that exists between the two variables. This shows that the higher the amount of extra hours the top management put into supervision, the earlier the project completion time (project success).

NB: 4.2.1 Scatter plots is used to discuss the test of hypothesis (H_{o2}) in 4.2.

With respect to objective three, table 4.2.1 describe the nature of relationship between project planning positively influence the success of M & J construction projects. When the percentage of project planning precision level of stage 10 was 97% the activities at the stage of the project were completed 21 days earlier than the actual completion time. In stages 8 and 9, the percentage timing was 90% and 95% respectively, and the project activities were completed on the 17 and 18 days earlier, which indicates that whenever the company's plan/schedule their project activities accuracy, they will come up with a successful project effect in which the completion time to the project will be in earliest. But in stage 1, where the percentage planning precision level was lowest at 30%, the project were completed only 7 days earlier than the actual completion time showing that the level of project plan that any put in determines the project success of the company . The scatter plot is done here, to investigate the nature of relationship between the two variables and it is stated below:

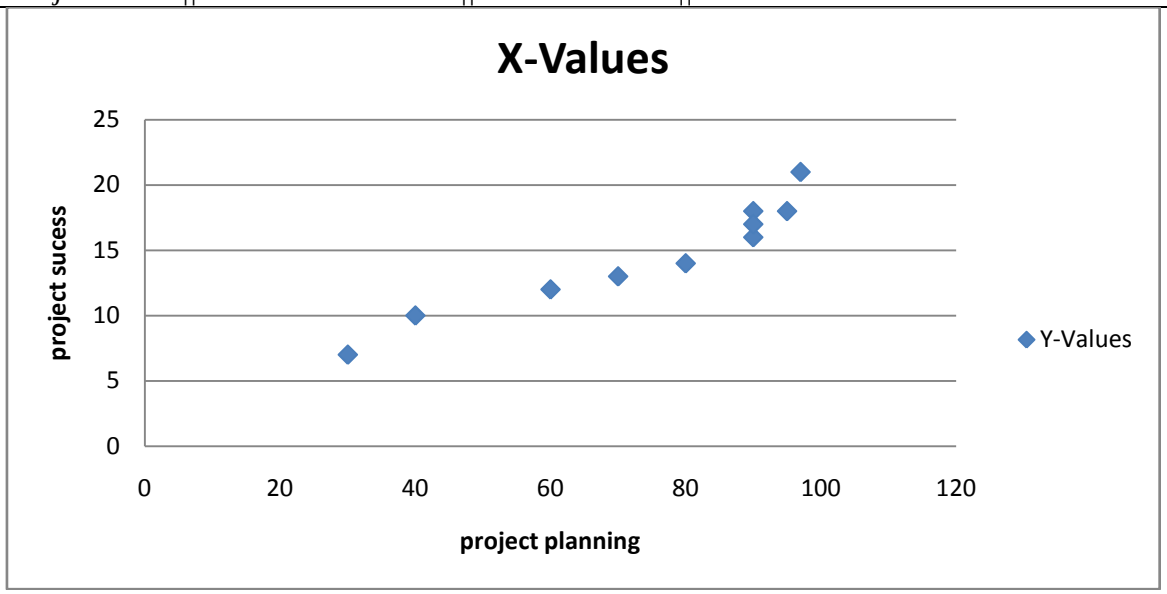


Figure 4.2.2: Relationship between project planning and project success of M & J Company Abakaliki.

The above graph shows that there is a strong positive relationship between the two variables. It has a positive correlation and the graph is linear. There is a straight line showing how "y" increases as 'x' increases as in the objective two scatter plot. Showing that the higher the percentage project planning precision level, the earlier the project completion time (Project success).
NB: Table 4.2.2 scatter plots is also used to discuss hypothesis (H_{O3})

4.2 Test of Hypotheses

Ho1: Clear project mission has no effect on project success in M & J Construction Company, Abakaliki.

χ_c^2 = 4.49, $\chi_{t=2.73}^2$

These values are gotten using chi-square statistical analysis since the value of $\chi_c^2 > \chi_t^2$, we reject the null hypothesis and conclude that clear project mission have effect on project success in M & J Company, Abakaliki (See Appendix 1).

H_{o2}: Top management supervision has no effect in project success in M & J Construction Company.

To determine the effect of top management supervision on project success in M & J company the least square regression line model is used, a straight line that describe how y changes as x changes. The least square regression line is represented by the equation: PREDICTED Y = a + bX where the slope b and intercept a are calculated as $b = \frac{SDy}{SDx}$, a = $\overline{Y} - b\overline{X}$. See (Appendix two) where Y = project success (dependent variable) is 1.135, a = 3, b = 1 being the slope of the chart and X = the independence variable which is 0.83.The graph is linear i.e. simple. The line of best fit in the scatter plot is a straight line passing through the two points (7,4) and (16,13) with the other points equally distributed at the both sides of the line, 4 on each side. There is a positive correlation from the scatter plot showing that (if x increases, y increases). This implies that as top management supervision increases, more project success is acquired. Therefore, the study concludes that top management supervision has a great effect on the project success in M & J Company, so we reject the null hypothesis.

Ho_3: There is no significant relationship between project planning and project success M & J Abakaliki.

Here, correlation coefficient, "r" and the coefficient of determination, "r^{2}" were used to test whether there is a relationship between the project planning and project success in M & J Company "r" measures the strength and the direction of a linear relationship between the two variables. And r^2 represents the percentage of the data that is the closest to the line of best fit which measures how well the regression line represents to data. The linear correlation coefficient is also called Pearson product moment correlation coefficient which the formula was used, and results (see Appendix) shows that project planning and project success are positively correlated. This indicatesrelationship betweenx and yvariables in such a way that as values for x increases, values for y also increase. The degree to which x and y rise and fall together is 95.7 or 96% significant at 0.00 as in correlation

table. Since r is 95.7, then $r^2 = (95.7)^2$=9216, which means that 92.3% of the total variation in Y can be explained by the linear relationship between x and y (as described by the regression equation). The other 7.7% of the total variation in Y remains unexplained because if the regression lines passes exactly through every point on the scatter plot, it would be able to explain all of the variation. The further the line is away from the points, the less it is able to explain. In overall, since the level of significant (0.00) of the relationships between project planning and project success is less than 0.05 significance, we rejects the null hypothesis and conclude that there is a relationship between project planning and project success in M & J Construction Company and the relationship is positive at 96%.

5. Conclusions and recommendations

The study concluded that critical success factor relating to project implementation is the most important step towards project success in construction organization. If these factors are well developed and utilized, the organization will be determining its achievement and guarantee a timely completion of its project.

The following recommendations are made based on the findings of the study;

(a) Manager should always consult experienced and qualified stakeholders who have the skills and technical know-how to effectively communicate the project objectives to the team members.

(b) Efforts should be made by management in proper planning, putting into consideration the unforeseen factors that may bring about unnecessary obstacle or delay on the process of carrying out the project.

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APPENDIX I

Contingency table for testing hypothesis one

f_o	f_e	f_{o-f_e}	$(f_o - f_e)^2$	$\frac{(f_o - f_e)^2}{f_e}$
7	5.0	2.0	4	0.8
5	7.0	-2	4	0.6
3	1.7	1.3	1.7	1.0
2	1.0	1.0	1.0	1.0
9	9.1	-0.1	0.01	0.001
2	2.2	-0.2	0.04	0.02
1	0.4	0.6	0.36	1.0
1	1.3	-0.3	0.09	0.07
Total				χ_c^2**= 4.49**

APPENDIX 2

Hypothesis 2: Least square table

X	4	8	6	8	13	13	12	15	16	20
Y	7	12	10	13	18	16	14	17	18	21

X	**Y**	**X=X-$\bar{x}$**	**Y=Y-$\bar{y}$**	**x^2**	**xy**	**y^2**
7	4	-7.6	-7.5	57	57.76	56.25
12	8	-2.6	-.35	9.1	6.76	12.25
10	6	-4.6	-5.5	25.3	21.16	30.25
13	8	-1.6	-3.5	5.6	2.56	12.25
18	13	3.4	1.5	5.1	11.56	2.25
16	13	1.4	1.5	2.1	1.96	2.25
14	12	-0.6	0.5	-0.3	0.36	0.25
17	15	2.4	3.5	8.4	5.76	12.25
18	16	3.4	4.5	15.3	11.56	20.25
21	20	6.4	8.5	54.4	40.96	72.25
146	115			182	160.4	220.5

If Y is dependent variable, the required line is

$$Y = \left(\frac{\sum xy}{\sum xy^2}\right)x = \left(\frac{182}{160.4}\right)x = 1.135x$$

If X is dependent variable the required line is

$$X = \left(\frac{\sum xy}{\sum xy^2}\right)y = \left(\frac{182}{220.5}\right)y = 0.83y$$

The slope = $\frac{\Delta Y}{\Delta X} = \frac{Y_2 - Y_1}{X_2 - X_1} = \frac{13-4}{16-7}$

$\frac{9}{9}$ = 1 slope

Than a = $\bar{y}$- b$\bar{x}$ = 15 (1(12)

The equation Y = a + b X (1.135) = 3 + 1(0.83)

APPENDIX 3

X	7	12	10	13	18	16	14	17	18	21
Y	30	60	40	70	90	90	80	90	95	97

Pearson Product-moment table for testing hypothesis three

X	**Y**	**X=X-$\bar{x}$**	**Y=Y-$\bar{y}$**	x^2	xy	y^2
7	30	-7.6	-44.2	57.76	335.92	1953.64
12	60	-2.6	-14.2	6.76	36.92	201.64
10	40	-4.6	-34.2	21.16	157.32	1169.64
13	70	-1.6	-4.2	2.56	6.72	17.64
18	90	3.4	15.8	11.56	53.72	249.64

16	90	1.4	15.8	1.96	22.12	249.64
14	80	-0.6	5.8	0.36	-3.48	33.64
17	90	2.4	15.8	5.76	37.92	249.64
18	95	3.4	20.8	11.56	70.72	432.64
21	97	6.4	22.8	40.96	145.92	519.84
$\sum_{x=\frac{146}{10}}$ **$\overline{X}$ = 14.6**	$\sum_{y=\frac{742}{10}}$ **$\overline{Y}$ = 74.2**			**$\sum x^2$= 160.4**	**$\sum_{xy}$863.8**	**$\sum y^2$= = 5077.6**

$r = \frac{\sum xy}{\sqrt{(\sum x^2)(\sum y^2)}} = \frac{863.8}{\sqrt{(160.4)(5077.6)}} = \frac{863.8}{902.5}$ = 0.957 :- 95.5 or 96 %