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Cost and Schedule Performance in Construction Projects: Assessing the Usage and Challenges of Planning Techniques in Port Harcourt

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Abstract

Planning is useful for establishing performance metrics during the execution of construction projects and for streamlining cost and schedule outcomes. A well-developed contract plan thus helps to ensure that the project is completed on time, within budget, and to the required standards and quality. Various planning techniques are available for use in enhancing cost and schedule performance on construction projects, each with its applicability, cons, and pros. This study assesses the usage of planning techniques by contractors in Port Harcourt, Rivers State, and the challenges experienced in their deployment. A sample size of 100 participants with a 75% response rate was purposively selected, which comprised construction workers and construction firms carrying out construction work in Port Harcourt LGA, Rivers State. The findings show that the deployment of contract planning techniques, such as critical path analysis, line of balance, PERT, and bar chart is not always used in practice, due to their associated challenges. While these planning techniques are effective, they are considered time-consuming and difficult to use and interpret. Nonetheless, the most used contract planning technique in the construction of projects in Port Harcourt is the Critical Path Method because it is suitable for large-scale projects. Despite the deployment of the critical path Analysis method on these projects, failures were still experienced due to inadequate risk management, Poor tracking and unrealistic project deadlines. To ensure the effectiveness of planning techniques in enhancing cost and schedule performance, it is recommended that early identification of risks and development of strategies for mitigating them should be carried out. In addition, it is necessary to have a clear and detailed scope of work, allocate resources appropriately, and ensure proper documentation and record-keeping.

Keywords: Cost performance, construction projects, contract, planning techniques, schedule

INTRODUCTION

Construction as a sector of the economy integrates a wide variety of skilled and unskilled professionals who specialize in work ranging from construction, alteration, refurbishment, repairs of buildings, and engineering structures to the actualization of the client's specification within the contractual agreement and the right time of delivery [1]. The construction industry in Nigeria has experienced considerable growth in recent years, driven by factors, such as urbanization, population growth, and increased government spending on infrastructure projects. The construction industry plays a crucial role in Nigeria's economy, contributing significantly to its gross domestic product (GDP). According to the National Bureau of Statistics (NBS) of Nigeria, the construction sector accounted for 8.18% of Nigeria's GDP in the third quarter of 2020. Research findings have it that Nigeria is one of the leading countries by number of infrastructure projects in Africa, as Nigeria counted

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55 construction projects valued at just over 100 billion U.S. dollars in the year 2021 [2]. The Nigeria construction market report has it that the construction market size was valued at $135.9 billion in 2022 and is expected to achieve an AAGR of more than 3% from 2024–2027. The forecast-period growth in the industry is supported by public and private investments. The key sectors in Nigeria's construction market are commercial, industrial, institutional, and residential construction. The infrastructure construction sector was the largest in the construction market in 2022, followed by energy, utilities, and residential construction [3].

However, the Nigerian construction industry still faces challenges related to poor project management. Construction works are not risk-free; sometimes, financial losses are observed. These risks influence most project objectives, which could either be in positive terms of opportunities or negative terms of threats to the project objectives. Poor project performance in Nigeria's Construction Industry leads to economic implications from delayed projects. Poor project performance has led to increased costs and reduced profitability for contractors and project owners. It hampers economic growth by prolonging the time it takes for projects to contribute to the overall economy [4]. Inefficient resource utilization, Inadequate project planning, poor management practices, and lack of skilled labor contribute to the failure of projects in the construction industry. This inefficiency hinders productivity, resulting in cost increases and reduced returns on investment. Many projects in the construction industry in Nigeria are left unfinished due to poor project performance. These incomplete projects pose safety risks, hinder economic development, and erode public trust in the construction industry [5]. Poor project performance has led to a negative reputation for the Nigerian construction industry, both domestically and internationally. This tarnished image undermines confidence among potential investors and reduces the likelihood of successful project collaborations. Poor project performance often leads to contractual disputes and legal battles between project stakeholders. The Nigerian construction industry has witnessed an increase in litigation cases due to project delays, cost overruns, and substandard work. These legal disputes further delay project completion and increase costs [6].

The effect of contract planning on construction project performance is significant, as it influences various dimensions of project execution, including cost management, schedule adherence, quality assurance, risk mitigation, and stakeholder collaboration. A well-planned and executed contract can contribute to improved project performance, while poor contract planning can lead to a range of challenges and setbacks throughout the project lifecycle. Given the consequences that may arise when effective contract planning is not observed for any construction project, this study is carried out to determine the level of adoption of planning techniques in assessing the performance of construction projects.

LITERATURE REVIEW

Planning Techniques in Construction Projects

There are various planning techniques used in construction projects, which every contractor should know how they function, and their advantages in helping to enhance project performance. The following are planning techniques.

1. Bar chart, also known as the Gantt chart.
2. Critical path analysis.
3. Line of balance.
4. Program evaluation and review technique [7, 8].

The inability and the technical (managerial) know-how to implement planning techniques in the construction of a project have led to many project failures. The above-mentioned contract planning techniques help stakeholders in the construction industry to be able to evaluate the progression of work, identify the department responsible for each task, to investigate work done according to quality, time of delivery, and areas of the project that are falling behind schedule [9].

Bar Chart, also known as a Gantt chart, in contrast, refers to a plan that shows the lifespan of a project

and its schedule through a visual representation. The bar chart helps to evaluate the progress of a project and quickly identify areas where the project lags. These bars on the chart show different tasks or activities in the project and length to the duration of the task. The simplicity and visual clarity of the bar make it a very valuable medium for displaying job schedule information [10]. A Bar chart provides an easy-to-evaluate job progress, schedule requirements, and recording of project advancement, the bar chart was developed by Henry Gantt in 1900. Critical Path Analysis is a bar chart that shows the critical path of a project. Critical path analysis in 1960 was developed by DuPont Corporation to calculate the minimum completion time for a project, with the start and end time for the work activity [11, 12]. The critical path analysis is the arrangement of tasks that take a long time to achieve and determines the overall duration of the project. The critical path analysis looks for critical activities that help in managing activities in maintaining the construction schedule.

The line of balance in construction is very similar to the critical path method; the line of balance helps to determine the work and resources of the project from inception to completion. Line of balance, also known as elemental trend analysis, is mainly applied in repetitive work; this kind of principle is derived from the planning and control of manufacturing processes [13]. In the line chart, each task represents a line showing the start and end dates, these lines are drawn to create a balance line that gives the ideal allocation of resources and time [14]. The lines indicate the various operations inclined at various slopes to evaluate the rate of work in progress. The program evaluation and review technique is commonly used in a project that is non-repetitive, where that is no definite concept about the time required for various activities. PERT uses probability to determine the duration of a task and is mostly used in projects that have a high degree of uncertainty, especially in construction work. The time taken for different activities is never a problem because much previous data and experiences are always available [10, 15].

Irrespective of the applicability of the planning techniques in assessing and enhancing construction project management, the different planning techniques have their pros and cons. Typically, the bar chart project planning techniques are too difficult to update and adjust, especially when change is observed in a given project because the different tasks represented on the bar chart are (a) time-consuming in moving or adding a new bar in the progress of the project (b) does not provide adequate details about interdependencies between tasks, which makes it extremely difficult to figure out a problem and make necessary adjustments. Even in the challenges described the bar chart technique has been widely adopted in a project because of its simplicity and ability to provide all the necessary information needed for the project's success. The critical path analysis time time-consuming, labor, enough effort to use and is very difficult to implement in a given project because it requires a detailed analysis of all tasks in the project and the relationships between them. The critical path analysis was successfully applied in large–scale projects [16].

The line balance is not easily understood as the bar chart is understood by a contractor, but it highlights the importance of activity completion, production rate, and the relationship between selected activities. The line balance is very good for operational sequencing and allows for a high degree of control. Early-stage small-scale projects find it difficult to apply the line balance because it is not suitable for projects that frequently change, but the technique is used to optimize the sequencing of activities [11]. The PERT is not a preferred technique in the planning and scheduling of construction works. This method is equally time-consuming and complex to implement, especially for large and complex projects, and a very high level of professionalism and quality experience is needed if it is to be effective. The PERT advantages make it an acceptable option for contract planning, which includes the ability to accurately estimate project duration and cost and the ability to identify critical paths and potential bottlenecks. The application of PERT helps us to ensure that the project is completed efficiently and on time, even while working in a difficult environment and with limited resources [17].

Effect of Contract Planning on Construction Project Performance

Contract planning involves careful consideration and preparation of the contract documents before

project commencement, while contract development refers to the creation and documentation of the contract its roles in project performance are; Establishing clear project objectives, specifications, and requirements, aligning expectations among project participants, identifying and allocating risks, setting realistic schedules and milestones, defining quality standards, facilitating communication and collaboration, providing mechanisms for dispute resolution. An understanding of these roles is essential for stakeholders to proactively identify when contract planning is neglected in a project, which will lead to potential challenges, and reactively involve the usage of contract planning for effective project performance. Studies conducted and examined showed the above-listed impact of contract planning in infrastructure development and to properly enhance project success [12, 15].

This literature review builds a comprehensive understanding that effective contract planning ensures the following: (1) Unambiguous communication between the parties involved, it establishes a shared understanding of project objectives, deliverables, and responsibilities. This clarity reduces the potential for misunderstandings and promotes alignment among project participants, leading to improved project performance. **(**2) Risk management contract planning involves identifying, assessing, and allocating risks among the parties. By clearly defining responsibilities, liabilities, and risk-sharing mechanisms, contract planning helps minimize the occurrence and impact of risks. This proactive approach to risk management reduces disruptions, delays, and unexpected costs, enhancing project performance. (3) Time and cost control; A well-planned contract includes realistic project schedules, milestones, and payment terms. It provides a framework for monitoring and controlling project progress. With provisions for change orders, claims, and payment procedures, contract planning helps manage project timelines, cost fluctuations, and financial uncertainties, contributing to improved project performance. (4) Quality Assurance; Contract planning establishes specifications, quality standards, and performance metrics for the project. It ensures that the project meets the required quality levels and adheres to industry standards and regulations. By incorporating clear provisions for quality control, inspections, and acceptance criteria, contract planning promotes better quality outcomes and enhances project performance. (5) Communication and Collaboration: Contract planning facilitates effective communication and collaboration among project stakeholders. It establishes channels for regular updates, progress reporting, and issue resolution. Improved communication fosters trust, teamwork, and positive relationships among the project participants, which enhances coordination and overall project performance. (6) Dispute Resolution: Well-planned contracts include provisions for resolving disputes in a structured and efficient manner. By incorporating mechanisms, such as mediation, arbitration, or litigation, contract planning helps manage conflicts and disagreements. Effective dispute resolution minimizes disruptions, preserves relationships, and maintains project momentum, positively impacting project performance [18].

METHOD OF STUDY

The populations of this study are construction firms and construction workers carrying out construction work in Port Harcourt LGA, and Obi/Akpo LGA in Port Harcourt, Rivers State. For this research, a simple random sampling technique is adopted. A sample size of 100 participants was purposively selected, which comprised construction workers and construction firms carrying out construction work in Port Harcourt LGA, Rivers State. The survey method of research was deployed to investigate the tools deployed in effective planning and control. The research instrument used to collect data was questionnaires. The questionnaires used to collect information from respondents are paper-based. The respondents' identities are being kept confidential to allow respondents to answer questions honestly and freely without fear of judgment or repercussion. This means the questionnaire does not ask for any identifying information, such as names, addresses, or phone numbers, and means that the data is collected and analyzed in such a way that it cannot be linked back to a specific individual. The researcher took the questionnaire to circulate among construction workers and local government officials who are responsible for planning and managing construction projects, and the contractors carrying out the project in Port Harcourt, Rivers State, Nigeria, where adequate responses will be used for data in the study. The questionnaires used for the research were shared within the study area. The questionnaire was handed to the respondent by the researcher individually and retrieved by him in person. The data obtained were analyzed by using descriptive statistics techniques to analyze the

research questions. Data collected through the questionnaire administered were presented, analyzed and interpreted with simple tables and percentages.

RESULTS AND DISCUSSION OF FINDINGS

Results

Out of the 100 questionnaires administered, only 75 were returned representing 75% of the total and this is adequate. From the table below, 80% shows the population of males and 20% shows the population of females, out of the total population of the respondents (Tables 1–4).

Table 1. Gender distribution of the respondents.

Gender of Respondents	Frequency	Percentage (%)
Male	60	80%
Female	15	20%
Total	75	100

From Table 2, 1.3% of the respondents are first school leaving certificate holders, 6.7% are secondary certificates, 9.3% NCE/OND, and 72% are HND/B.Sc/B.Tech certificate while 10.7% are M.Sc./M.Tech holder.

Table 2. Education distribution of the respondents.

Qualification	Frequency	Percentage (%)
FSLC	1	1.3%
SSCE	5	6.7%
NCE/OND	7	9.3%
HND/B.Sc/B.Tech	54	72%
M.Sc/M.Tech	8	10.7%
Total	*75*	*100%*

From Table 3, 85.33% of the respondents have been involved in contract planning in a construction project while 14.67% have not been involved in contract planning in a construction project.

Table 3. Knowledge of Contract Planning Techniques.

Variable	Frequency	Percentage (%)
Practical Knowledge	64	85.33%
Theoretical Knowledge	11	14.67%
Total	*75*	*100%*

The respondents were asked if they agree that the reason for project failure is that stakeholders in the construction industry do not adequately apply any of the contract planning techniques, such as bar chart, line balance, critical path analysis, and PERT, in carrying out the project construction.

Table 4. Belief in the negative impact of lack of planning.

Variables	Frequency	Percentage (%)
FA	23	30.7%
A	42	56%
D	6	8%
N	3	4%
FD	1	1.3%
TOTAL	75	100%

Table 4 shows that 23 (30.7%) respondents indicated firmly agreed, 42 (56%) agreed, 6 (8%)

disagreed, 3 (4%) disagreed, and 1 (1.3%) disagreed showing the highest percentage of (56%) showing that the reason for project failure is because stakeholders in the construction industry fail to use contract planning in construction.

The respondents were asked which of the different planning techniques, such as bar chart, line balance, critical path analysis, and PERT, is commonly used in the construction of projects in Port Harcourt (Table 5).

Table 5. Commonly used planning technique.

Variables	Frequency	Percentage (%)
Bar chart	7	9.3%
Line of balance	5	6.7%
Critical path analysis	54	72%
Pert	9	12%
Total	*75*	*100%*

From Table 5, it is shown that amongst the different planning techniques, the critical path analysis, with 45.3% of respondents, is commonly used in construction projects in Port Harcourt because it is more suitable for the construction of large-scale projects.

The respondents were further asked to affirm that the reason why the Critical Path Analysis in planning technique, amongst others is observed to be commonly used in Port Harcourt, is due to its ability to identify and manage risk, which is considered important in the contract planning process and suitable for a wide range of projects.

Table 6. Reason for the common adoption of CPA.

Variables	Frequency	Percentage (%)
FA	32	42.7%
A	36	48%
D	5	6.7%
N	1	1.3%
FD	1	1.3%
Total	*75*	*100%*

Table 6 shows that 32 (42.7%) of the respondents indicated firmly agreed, 36 (48%) agreed, 5 (6.7%) disagreed, 1 (1.3%) natural, 1 (1.3%) firmly disagreed, agreed with 48% shows that CPA amongst other planning techniques is commonly used in construction projects in Port Harcourt because it is suitable for a wide range of project.

The respondents were also asked to express their opinion about why other planning techniques, like bar charts, line of balance, and PERT, are not widely used as CPA in construction projects in Port Harcourt.

Table 7. Perception of why other planning techniques are not widely used.

Variables	Frequency	Percentage (%)
Not suitable for construction	8	10.7%
Time-consuming	6	8%
Difficult to respond to change	12	16%
No concrete details provision of interdependencies between tasks	49	65.3%
Total	*75*	*100%*

From Table 7, it is shown that the reason other planning techniques, like bar charts, line of balance, and PERT, are not widely used as critical path analysis in the construction of projects in Port Harcourt with (65.3%) of respondents is that no concrete details provision of interdependences between task which makes it extremely difficult to figure out a problem and make necessary adjustment.

The respondents were further asked whether they are satisfied with the way contractors develop and implement planning techniques in construction projects in terms of effectiveness in streamlining project performance.

Table 8. Satisfaction with the prevailing method of planning.

Variables	Frequency	Percentage (%)
Yes	67	89.3%
No	8	10.7%
Total	*75*	*100%*

From Table 8, 89.3% of the respondents stated that they are satisfied with the way contractors develop and implement planning techniques, such as critical path analysis in construction projects, and that it has been effective in project performance.

Table 9. Challenges encountered while using the critical path analysis.

Variables	Frequency	Percentage (%)
Time-consuming and enough effort is required	45	60%
Accurate information about the project	12	16%
Does not account for the cost of the project	8	10.7%
Collecting data consumes time	10	13.3%
Total	*75*	*100%*

From Table 9, 60% of respondents show that the most frequent challenge encountered while using critical path analysis is their inability to balance of project schedule to ensure that it is realistic and achievable.

The respondents were asked to affirm that the Critical Path Analysis in planning technique, despite being widely used in Port Harcourt, still has challenges, such as time consumption and labor; enough effort is needed to use them, but it is used because it is applied in a large-scale project.

Table 10. Affirmation of the challenges of CPM.

Variables	Frequency	Percentage (%)
Yes	69	92%
No	6	8%
Total	*75*	*100%*

From Table 10, 92% of the respondents agree that Critical Path Analysis, despite being widely used in construction in Port Harcourt, still has these challenges time time-consuming, labor, enough effort to apply, especially in a large-scale project.

The respondents were further asked to affirm that challenges, like time-consuming, difficulty in updating, and difficulty in applying, are associated with implementing the different planning techniques in a project construction could be some of the reasons why they are not constantly used in projects, which has resulted in a good number of failed projects.

Table 11. Affirmation of challenges as the reason for not using planning techniques.

Variables	Frequency	Percentage (%)
FA	39	52%
A	27	36%
D	6	8%
N	2	2.7%
FD	1	1.3%
Total	*75*	*100%*

From Table 11, it is shown that 39 (52%) of the respondents indicated firmly agreed, 27 (36%) agreed, 6 (8%) disagreed, 2 (2.7%) natural, 1 (1.3%) firmly disagreed having obtained (52%) agreed shows that challenges involved in applying different planning technique in the construction of the project are some of the reason planning technique is not used which has led to several failed project.

Aside from the common planning techniques, like bar chart, line of balance, CPA, PERT, etc., the respondents were asked whether there have been any other techniques applied in contract planning in Port Harcourt, Rivers State.

Table 12. Application of other planning techniques.

Variables	Frequency	Percentage (%)
Yes	5	6.7%
No	70	93.3%
Total	75	100%

From Table 12, 93.3% of the respondents' responses show that there has not been any other planning technique used in contract planning for construction projects in Port Harcourt.

Table 13. Important factors in contract planning.

Variables	Frequency	Percentage (%)
Scope of project/cost overruns	12	16%
Communication plan and budget	5	6.7%
Unity among stakeholders	50	66.6%
Proper and adequate design	8	10.7%
TOTAL	75	100%

From Table 13, it is shown that 66.6% of respondents believe that unity among stakeholders helps to enhance contract planning and leads to good project performance.

Table 14. Pitfalls and successes encountered

Variables	Frequency	Percentage (%)
Inadequate risk management, labour	14	18.7%
Unrealistic project deadlines and lots of resources are required	6	8%
Poor tracking is time-consuming, while success is in identifying issues early and developing strategies to mitigate them	35	46.7%
Lack of visibility into a contract, enough effort is required	20	26.6%
Total	75	100%

Table 14 shows the different pitfalls and successes encountered while carrying out construction projects in Port Harcourt, with 46.7% showing that frequent pitfalls are poor tracking and time-consuming, while successes are the ability to identify issues early and develop strategies to mitigate them, among several others.

Table 15. Measures to avoid pitfalls in contract planning.

Variables	Frequency	Percentage (%)
Review and update the contract plan	10	13.3%
Flexibility and adaptability	11	14.7%
Monitor and control the project	39	52%
Keep accurate records	15	20%
Total	*75*	*100%*

Table 15 shows that the most frequently adopted measure to avoid pitfalls in contract planning is monitoring and control of projects, with 52% of respondents agreeing to the importance of monitoring and control to avoid constant pitfalls in contract planning processes.

Table 16. Measures to ensure that contract planning is carried out.

Variables	Frequency	Percentage (%)
Provide ways to solve problems	10	13.3%
Standards should be maintained	40	53.3%
Keep all records intact	5	6.7%
Collaboration of stakeholders	20	26.7%
Total	75	100%

Table 16 shows the respondents' opinion on the measures to be taken to ensure contract planning is carried out transparently, with 53.3% of the respondents indicating that standards should be maintained.

Table 17. Challenges of PERT in planning techniques.

Variables	Frequency	Percentage (%)
Time-consuming	20	26.7%
Experience required	35	46.7%
Complex to implement	20	26.6%
Total	75	100%

Table 17 shows the different challenges of PERT in planning techniques, including its time-consuming nature (26.7%), experience required (46.7%), and complexity of implementation (26.6%). The findings thus show that the level of experience is the most frequently faced challenge of PERT.

Table 18. Challenges of CPA in planning techniques.

Variables	Frequency	Percentage (%)
Difficult to implement in a given project	12	16%
Enough effort is needed to use them	36	48%
Time-consuming	15	20%
Labor	12	16%
Total	*75*	*100%*

Table 18 shows the different challenges of the CPA planning technique, indicating the percentage of respondents: difficulty implementing it in a given project (16%), enough effort is needed to use them (48%), time-consuming (20%), and labour (16%).

Table 19. Challenges of the line of balance planning technique.

Variables	Frequency	Percentage (%)
Not easy to understand	20	26.7%

Difficult to apply in a small-scale project	34	45.3%
Only applicable to the operational sequence	21	28%
Total	*75*	*100%*

Table 19 shows the responses about the different challenges of the line of balance: not easy to understand (26.7%), difficult to apply in a small-scale project (45.3%), and only applicable to operational sequence (28%).

Table 20. Challenges of the bar chart in a planning technique.

Variables	Frequency	Percentage (%)
Time-consuming to move or add a new bar in the progress of the project	20	26.7%
Does not provide adequate details about interdependencies between tasks	35	46.6%
Difficult to update and adjusting, especially when a change is observed in a given project	20	26.7%
Total	*75*	*100%*

Table 20 shows the different challenges encountered while using the bar chart planning technique: time-consuming to move or add a new bar in the progress of a project (26.7%), does not provide adequate interdependencies between tasks (46.6%) and difficult to update and adjusting especially when change is observed in a given project (26.7%).

DISCUSSION OF FINDINGS

One of the key findings of this study was that the implementation of contract planning techniques, such as critical path analysis, line of balance, PERT, and bar chart is not without its challenges. While these planning techniques are effective, their time-consuming and difficult nature may explain why they're not always used in practice. It was found that some of the factors considered important if we must achieve a good project performance are the scope of the project, which determines the level of detail and complexity of the project, which in turn affects the likelihood of success. Cost overruns can lead to delays and financial difficulties. Proper communication and design were identified as important factors as well, as they help to ensure that everyone involved in the project is on the same page and that the project is completed according to plan. Unity among stakeholders as it ensures that everyone is working towards the same goal. Standards should be maintained throughout the project to ensure consistent quality. These include the following industry's best practices, using high-quality materials, and adhering to safety regulations. This is consistent with the findings of previous studies, which have also emphasized the importance of project scope management in construction projects.

For example, in the literature review, a study by Wang and Chou (2009) found that common factors that lead to project delays are project scope, inadequate communication and poor planning, another study by Aibinu (2010) identified factors delay in material delivery, design changes and project not properly managed or controlled. The findings of this study add to the existing body of knowledge on construction project performance, and they provide valuable insights into the role of contract planning in project success by defining the scope of the project, setting clear goals and objectives, and establishing a timeline for completion. Additionally, it can help to identify and manage risks, which is important for achieving the desired outcome. Without proper contract planning, projects are more likely to encounter problems and delays.

Data collected and gathered from respondents were analyzed using simple percentages and tables, while the chi-square statistical tool was employed to test the research hypothesis. The findings revealed that there is a significant relationship between the effect of contract planning and construction project performance in Port Harcourt. These findings suggest that proper contract planning can have a positive impact on construction project performance. This means that project managers should place a high priority on developing and implementing a well-defined contract plan. Additionally, organizations may want to consider investing in training and resources to support contract planning efforts, which, by

doing so, they can improve their chances of completing construction projects on time and within the budget. Contract planning also helps to ensure that the project team is properly organized and resourced, which can also help to improve performance further. Contract planning can also impact on specific aspects of construction projects, such as schedule, cost, and quality.

1 Proper contract planning can help to ensure the project schedule is realistic and achievable by considering factors, such as resource availability and materials. A well-developed contract plan can help prevent delays and keep the project on track. In addition, contract planning can also help to identify risks, so they can be proactively addressed. Contract planning can help to keep costs under control by establishing a clear budget and scope for the project and identifying opportunities for cost savings, such as using alternative materials or methods that are more cost-effective and mitigating cost risks, such as changes in material prices or labor costs. Contract planning also ensures that projects meet quality standards by establishing clear specifications and performance criteria, and helps to identify potential quality risks and implement quality control measures to mitigate those risks. This can help to ensure that the final product meets the expectations of the client and is delivered on time and within the budget.

CONCLUSION AND RECOMMENDATIONS

The study revealed that there are different planning techniques used in construction projects, which are the

1. Bar chart.
2. Line of balance.
3. PERT (Program Evaluation and Review Technique).
4. Critical Path Analysis.

The Critical Path Analysis is the most used for projects in Port Harcourt Rivers State because it is suitable for the construction of large-scale projects and its ability to identify and manage risk while the other planning techniques are not widely used because they are time-consuming, difficult to implement and respond to change, no concrete details provision of interdependences between task. Although the critical path analysis, having been said to be commonly used, still has some challenges, such as labor, and enough effort is needed to use them, and aside from these planning techniques mentioned above, no other planning techniques are used in construction works in Port Harcourt, Rivers State, Nigeria. Contractors should implement planning techniques, such as critical path analysis in construction projects for effective performance. It is shown from the study that the practices of some contractors in Port Harcourt, Rivers State, in carrying out contract planning are very effective and have led to project success. Some of the factors considered important in contract planning by contractors to ensure good project performance are;

1. Scope of the project.
2. Proper and adequate design.
3. Unity among stakeholders.

Budgeting and some of the challenges encountered by a contractor while using the planning technique are

a. Inability to account for the cost of the project.
b. Consumes time while collecting data.
c. Enough effort is required.

The study revealed that the application of different planning techniques for the construction of projects in Port Harcourt Rivers State Nigeria has its share of failures and successes, some of the failures are:

(1) Inadequate risk management.
(2) Poor tracking.
(3) Lack of visibility into contract.

(4) Unrealistic project deadlines.
(5) Lots of resources required while some of the successes are:
- Identifying issues early.
- Developing strategies and mitigating them.
- Proper documentation and record keeping.
- Having a clear and detailed scope of work.
- Allocating resources appropriately.

The failures and successes were revealed to have a high impact on the construction of the project and its performance, and equally determine the quality of the project, time of completion, and the overall effectiveness of the project and its purpose of construction from the client's perspective. It was further revealed that some of the measures relevant to achieving good contract planning in enhancing project performance are:

(1) Standards should be maintained.
(2) The contractor should be able to provide ways to solve a problem.
(3) Keeping all records intact.
(4) Collaboration of all stakeholders involved in the construction industry.
(5) Review and update contract plan.
(6) Encourage flexibility and adaptability.
(7) Monitor and control project progress.
(8) Keep accurate record.

All these measures listed above ensure that contract planning is carried out transparently and help to avoid pitfalls, which is important for the better performance of a project.

The following recommendation is proposed for identifying failures in contract planning and management.

1. Strengthen collaboration and communication: Reducing failures in contract planning depends ultimately on effective communication among stakeholders. The contractor should establish a clear channel of communication to facilitate the sharing of vital information, and constant meetings should be held, which will help to review and identify potential failures and in collaboration, work to mitigate them.
2. Monitor and control project progress: To be safe from potential failures in contract planning, project stakeholders should conduct regular assessments of work progress. This helps to allow contractors to identify emerging failures promptly and implement appropriate measures to eliminate those failures, which will enhance the productivity of the project.
3. Create an awareness of potential failures. This involves making sure that all stakeholders, including the project team, are aware of the potential failures and ways to mitigate them. Creating awareness helps to build support for the project, ensures that everyone understands their roles and responsibilities, and addresses failures. It also helps to manage expectations and reduce the risk of conflicts and misunderstandings.
4. Identifying potential failures early: It's important to identify potential failures early in the contract planning process. This can be done by conducting a risk assessment and identifying any potential issues that could arise during the project. This includes things like delays, cost overruns, and quality issues. By identifying these potential risks early on, you can create contingency plans and mitigation strategies to minimize their impact.

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