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Overview of the Practical Application of Essential Planning Tools in Nigerian Construction Process

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ABSTRACT

A well-planned, carefully monitored and controlled project has impact on its performance and profitability. Yet, most Nigerian contractors are accused of the inability to plan project according to contractual requirements. This study therefore reviewed existing researches onconstruction planning tools in Nigeria and conducted interviewsto determine the practices of their application in construction processes. It was concluded that not all contractors use planning tools and the few that use the tools, choose the Gantt chart due to its simplicity. It was also concluded that the cost of applying other tools is a militating factor. Training on the application and importance of construction planning tools is therefore recommended to enhance its application for more effective construction management.

Keywords: Construction Process, Gantt chart, Planning Tools, Practical Application, Nigeria

INTRODUCTION

All construction projects are unique, involve several stages, activities, complex methods, stakeholders and require huge expenditure, hence the need for proper planning. Planning, which is a function of management responsible for defining the work to be managed and provide the basis for other management functions is needed for achieving construction projects (Bello, Adekunle and Ogunsanmi, 2012). A good construction plan forms the basis for developing the budget and schedule for work. Ogunde and Fagbenle (2013) stated that construction planning is essential element in the management and execution of construction projects and involves the definition of work tasks and their interactions, as well as the assessment of required resources and expected activity durations. Bello, Adekunle and Ogunsanmi (2012) describe construction project planning as the overall coordination and control of a construction project from inception to completion with the aim of meeting a client's requirements in order to produce a functionally and financially viable project that will be completed on time, within authorized cost and to the required quality standard.

Harris and McCaffer,(2013) noted thatin the developed countries, contractors have embraced planning because the results of a well planned, carefully monitored and controlled contract directly impacts on performance and profitability of the contract and the company. Nonetheless, Nigerian indigenous contractors (NICs') are considered unproductive due to their inability to plan projects adequately according to contractual requirements, thus, preventing the Nigerian construction industry (NIC) from meeting the construction needs of the country (Inuwa, Wanyona and Diang, 2014).Oladiran and Adenuga (2007) also attributed the failure to complete projects on time and within estimated cost and quality to lack to project planning and control.

Inuwa, Wanyona and Diang'a (2014) described planning as a systematic device to develop, on a continuing basis, specific courses of action towards a desired objective or goal in the most effective, efficient and economic manner. Hendrickson, Zozaya-Gorostiza, Rehak, Baracco-Miller and Lim (1986)stressed that construction planning is an essential and challenging activity in the management and execution of construction projects,which involves the choice of technology, the definition of work tasks, the estimation of the required resources and durations for individual tasks, and the identification of any interactions among the different work tasks.

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This study therefore, through literature review takes a look at the practical application of planning tools in the Nigerian construction industry. Some contractors were also interviewed to enhance the validity of the study.

OBJECTIVE OF PLANNING IN CONSTRUCTION

According to Passenheim (2009), planning is a fundamental tool in project management used in meeting project scope, time and cost. Construction project planning includes defining the work tasks, sequence of work, construction methods, roles and responsibilities of those involved and planning the resources to ensure the completion of work within stipulated time, budget, scope and specified quality.

The objectives of planning are:

1. To forecast the resource requirements of people, material and equipment.
2. To forecast the financial requirements.
3. To provide a suitable control tool against which progress can be measured.
4. To minimize the unproductive time of both men and machine.
5. To find the time required for completing the project.
6. To establish the time for delivering the materials required.

CONSTRUCTION PLANNING TOOLS

According to Neale and Neale (1994), four tools are basically used in construction planning: the bar chart, line of balance, network analysis and linear programming.There are also other tools such as the physical models in two and three dimensions, and computer models (Neale and Neale, 1994).

Bar Chart

The bar chart, whichis also known, as the Gantt chart is everybody's favorite. It is easy to draw, easy to understand and does not require high managerial skills. It is best used for straight forward well-understood construction work, with simple relationships between activities (Neale and Neale, 1994). Its main disadvantages are that changes in plan require extensive redrafting and it does not clearly the sequential relationship between activities.

Line of Balance

Line of balance is graphical technique that issuitable for projects that involving multiple and similar units, such as residential housing. The x-axis represents time and the y-axis represents the number of units (or the extend of work). Sloping lines represent the activities of the project and the gradient of the line indicates the rate of production.

Its disadvantages are:

1. Unlike the bar chart, it is not readily understood.
2. One operation has to be completed before the commencement of another.

Linear Programme (Time Changing Chart)

This is a tool for decision making under certain situations. It is a specialized technique for linear work and like the line of balance, is a simple two-dimensional graphical technique that shows only a limited amount of information and a limited degree of complexity (Neale and Neale, 1994).

Network Analysis

According to Neale and Neale (1994), network analysis is a powerful, logical and analytical technique that is most effective when used for complicated projects, especially those with external constraints

and complex interrelationships. It is based on drawing the logical relationships between construction operations, and establishing which operations have the most crucial effects on the project duration.

APPLICATION OF CONSTRUCTION PLANNING TOOLS IN NIGERIA

In 2003, Anyawu in his research "Project Management and the Project Manager: A strategy for addressing the problem Building and Infrastructural Collapse in Nigeria", stated that public building projects in executors in Nigeria do not give much importance to planning and scheduling of building projects. He pointed that out as a reason why scheduling plans are hardly adopted in any public building project and where they are applied, it is always the bar chart irrespective of the complexity of the building project. He attributed the preference of using the chart to its simplicity.

In 2007, Idoro and Olalusi conducted a research on the Effects Contract Programming on Project Performance in Nigeria and discovered that Nigerian contractors depend mainly on bar charts as programming tools. Their findings also showed that bar chart, which, is the simplest technique, is the most used technique. Network analysis ranked second while line of balance ranked last. The research also revealed that project programming is done manually. Their conclusion was that the existing practice couldn't achieve meaningful and effective planning. They call for a change in contract programming practices and recommend the use of network analysis and computer programming software.

Adebowale and Oluboyede in 2010 researched on Network Analysis and Building Construction: Implications for Timing and Costing of Activities. The research did the analysis of the impact of timing and costing of stages in the building process on building collapse. They employed both critical path method (CPM) and project evaluation and review technique (PERT) for the analysis. The activities underwent crashing of both time and cost, this paved way for paved way for the determination of critical path. Further analysis revealed that the shortest possible time for the completion of the analyzed building project was 55days instead of the expected duration 92days. This implies that through proper scheduling of activities, the expected completion time was reduced by 37days. The additional cost associated with the reduction in time was eight hundred and thirty thousand Naira (N830,000.00), which increased the initial expected cost required to complete the project from three million, two hundred thousand Naira (N3,290, 000.00) to four million, one hundred and twenty thousand Naira (N4, 120,000.00). They concluded that adherence to the minimum possible time to complete a specific part of building process will check the effects of building collapse in Nigeria; although that might not be the only antidote, but when incorporated to building plans could make a difference. They therefore recommended the adoption of network analysis tools into project plans at the onset of work activities.

The result of an investigation on Project Management using Critical Path Method (CPM): A Pragmatic Study", carried out by Aliyu in 2012 revealed that the use Gantt chart in project planning has continued to increase as a source of last resort in spite of its severe limitations for ineffective project management and delivery. He concluded that although CPM has gained widespread commendation and acceptance in the developed countries, the technique is yet to gain any appreciable acceptance for implementation of public projects in Nigeria. He added that professionals and executors of public projects have remained conscientiously to the Gantt chart.

Ogunde and Fagbenle did the assessment of the Effectiveness of Planning Techniques and Tools on Construction Projects in Lagos State, Nigeria in 2013 and examined the awareness of professionals in the construction industry of the various types of planning techniques and tools used on construction sites. They also assessed the effectiveness of planning techniques and tools selected construction sites

in Lagos State and identified the factors affecting the choice of planning techniques and tools towards effective and efficient delivery of projects. The study showed that bar chart, critical path network, visualization using simulation clips and probabilistic pert analysis are the most known and used techniques on sites. The researchers came up with a conclusion that there is low awareness of the functional use of construction planning tools and techniques, and recommended that construction tools and techniques should be applied in all building projects. They also recommended regular adequate training of professionals on the effectiveness and improvement in information technology in the construction industry especially in project planning.

A study by Ibrahim, Daniel and Ahmad in 2014 to investigate the application of project planning techniques in construction procurement by Nigerian Indigenous Contractors revealed that the NICs inappropriately apply project planning techniques. They found out that virtually sixty seven percent (67%) of the contractors they studied used only barchart in planning project operations, while thirty three percent (33%) of the contractors did not use any planning tool. None of the contractors used computer software/application packages in planning. This revealed that some contractors do not use planning techniques and those that apply it, do that inappropriately. According to the authors, several authors admitted that bar chart is only suitable for activity scheduling and trending, but not appropriate for planning building projects, except when used as a complement to critical path method (Ibrahim, Daniel and Ahmad, 2014).

Inuwa, Wanyona and Diang'a (2014) also investigated NICs' application of project planning techniques in constructionprojects procurement in Northern Nigeria. The study targeted medium and large Indigenous contractors in the northern geo-political zones of Nigeria. The research result showed that some NICs use their central administration instead of their project managers to plan their projects operations, non-application of project planning techniques by majority of the NICswho apply it, and non-adoption of ICT in projects planning.

CONCLUSION

The paper reported the application of planning tools in construction processes in Nigeria through a review of literature on works carried out on similar researches. From the findings of the studies mentioned above, it can therefore be concluded that the application of construction planning tools in the industry though gaining acceptance, is still very minimal. The Gantt chart, due to its simplicity is the most used tool for planning where planning tools are employed. It can also be concluded that the low knowledge of the application of the tools attribute to their lack of utilization in the industry despite their benefits.

Although it was not indicated in the reviewed literatures, it was inferred from the interviews that along with the poor knowledge of application of the tools, cost is also a contributing factor to the hindrance of usage of the construction planning tools in Nigeria.

Training of professional on project planning tools is therefore recommended in order to achieve maximum performance in construction.

Contractors should also realize that by using efficient planning tools, they would achieve lesser overall project cost.

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