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A review of construction project performance estimators

Abstract

This paper did a survey of literature on construction project performance. The industry's consensus on construction project performance estimators are well validated by these literatures as time, cost and quality. The findings showed that poorly performing construction projects are characterized by cost and time overruns as evident in high cost of construction, low quality work and time escalations. Research attempts in the industry to respond to these negative impacts on performance have yielded results in terms of precision predicting models for contingency applications and the stationary identification of cost overrun attributive factor.

Keywords: project performance, cost overruns, time escalation, quality project, impacts, project management

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Introduction

There seems to be a consensus amongst construction management researcher that construction project performance is estimated by time, cost and quantity indices. However such estimation parameters have remained a subject of controversy in the construction industry amongst clients, contractors and Consultants. The performance estimation introspection stems from the need of stakeholders in the industry's attempt to review the pre-contract plans and procedures versus the post construction assessment with the attendant aim of addressing value for money. Research in the construction industry have directed and mustered efforts towards diffusing construction project performance inhibitors by inventing and canvassing different procurement options towards an efficient construction project performance. According to Dissanayaka & Kumaraswamy.,[1] time, cost, quality target and participants satisfaction, are the main for measuring the overall success of construction projects. Pitagorsky.,[2] noted that a successful project satisfies its client and sponsors with an outcome that achieves objectives within time and cost constraints, maintain and promotes harmonious relationships among the project stakeholders. Further, Oladapo.,[3] submitted that a project is considered successful when it is completed on time, within cost and to the required quality standard and a project that does not meet any of these objectives is considered to have failed.

Literature background

However, the success of a project depends on a number of factors such as project complexity, contractual arrangement and relationship between project participants, the competency and ability of the consultants. Chual et al.,[4] identified proper contractual arrangement as one of the important success factors for construction projects. This implies that engagement of competent contractor should enable clients and the project team members achieve the objectives set for the project. Cheung et al.,[5] also note that selecting a competent contractor is paramount to successful delivery of construction project. Therefore the competence of any contractor in terms of its technical, financial, managerial capabilities and experience reflects heavily on the performance of the project, in terms of cost, time and quality. Construction projects have unfortunately been characterized by lack of performance not only in Nigeria but Worldwide. For instance Kharbanda & Pinto.,[6] report that the sydney Opera House project in Australia has its budget escalated from seven million Australian dollars to one hundred and seven million Australian dollars and the construction time four years to fourteen years as a result of awarding the project to a contractor who lacks proper organization and his decision power was irreparably weak. Moreover, Kaming et al.,[7] identity contractors lack of geographical and protect type experience as well as non-familiarity with local regulations as the prime variable of cost overruns in construction projects. On the other hand it takes a lot of experienced contractors to utilize their initiatives to imbibe good planning techniques in order to conquer the menace of delay in construction project delivery. In most cases, an extensive delay beyond budgeted time limit is one of the wicked problems the construction world is facing in the past years.[8]

Project cost performance

Project cost performance is used to show whether the project adhere to the agreed budget. It is importance because resources are often limited and cost overruns are to be avoided. Project cost performance according to Odusami.,[9] is measured in terms of cost overrun i.e. final; sum minus initial contract sum divided by the initial contract sum multiplied by 100. According to Kometa, Olowolaiye & Harris.,[10] project with percentage cost overrun above 20% is regarded as a poor project in terms of cost performance project that lie between 10% and 20% regarded as average project I terms of cost performance, while project whose percentage cost overrun fall below 10% is regarded as an outstanding project.

Project time performance

Monitoring Project time is one of the many challenges for project participants. Time monitoring seeks to assess how well the project adheres to the planned schedule over a period of time. Therefore schedule or time performance is calculated in terms of the percentage increase in the actual completion period over planned completion

period. i.e. the difference between the actual completion time and planned completion time multiple by 100. Those projects whose percentage delay falls below 10% is regarded as an outstanding in terms by time or schedule performance, those that falls between 10% to 20% is regarded as average project while those above 20% is regarded as poor project.[10]

Project quality performance

Project quality performance measure seeks to ensure that projects achieve the quality standard set out in the contract. Quality of a project can be measured in terms of conformance with stated specification and this can be difficult at times to measures because it is subjective. However, some authors have come up with some objective measures of project success. Pinto & Stevin.,[11] proposed 12 – factor model of project success, which was later referred to as project implementation profile, five of these meters are project related (1) time (2) cost (3, 4, 5) performance, while seven are client related (6, 7, 8) use (9) satisfaction (10, 11, 12) effectiveness.

Research responses to poor project performance

The industries search for highly positive construction project performance has gained the acceptance of the use of value management study in most mega projects in line with SAVE (2007) frame work. The SAVE frame work on project management has continued to gain currency in the industry following its appeals to most clients. Basically the SAVE framework requires that: a systematic application of recognized techniques which identifies the functions and provide the necessary functions to meet the require performance of esteem value, cost value and exchange value (AACE 2012).[12] In the view of Awo-Osgie, the construction industry is plagued with the problem of non-compliance with contract procedures in the selection and evaluation of contractor's bid either at pre or post contract administration stages. This often impact negatively on the project performance. The attendant consequences are often high cost of construction, low quality work and project time overrun. Two of these performance indices are direct mandates of SAVE'S objectives. According to Awo-Osagie failure to achieve targeted time, budgeted cost and desired quality results in various unexpected negative impacts on the project's performance. They factored mostly that the procedure for the contract award, is intrinsically linked to such performance failure. Also, risk infested construction projects are vulnerable to underperformance with respect to the three (3) parametric estimators of project performance. As a way of dilating risk impacts for enhanced project performance Egwunatum,[13] had suggested a parametric covariance estimation model;

$=1\ldots\ldots.k$

$=1\ldots\ldots.k$

$\neq \alpha = 1, \ldots\ldots k$

In terms of the crude , partial crude, coefficient of correlation and survival life span of a conceded project . Cost and time indeterminacy have continued to spark debate in academia and within the learned societies in the construction industry. The helplessness of stakeholders has led to the strengthening of contingency sum clauses in conditions of contract as a way of diffusing the inherent failures of poor project performance. Yet cost and time overrun in construction projects as an indicator of poor project performance continues unabated. Egwunatum & Oboreh.,[14] holds that the subsisting methods of deriving contingency sum are no longer fashionable in terms of appropriateness, construction items representativeness, global procurement methods and international financing rules. Consequently they averred that the parameters of time and cost in construction projects dilates to zero at project completion and taken as scalar products were modelled as orthogonal function with items representativeness that vanishes (zero) at completion as;

In the works of Olawale & Sun,[3] the recurring helplessness of research efforts towards decimating cost and time of construction project delivery failure was resonated in their presentation, that despite the availability of various control techniques and project control software, many construction projects still do not achieve their cost and time objectives. They posited that research effort has only been central to the investigation of causes rather than factors inhibiting effective control of project. But Egwunatum & Akpokodje.,[15] attempted the iteration of a static point of the fluidized reasons/ causes of cost over run in construction project using a weighted logarithmic model for the stationary point as;

= weight value, RII=relative importance index, weighed geometric mean.

The Olawale & Sun.,[3] study precipitated 90 Mitigating measures against top five leading factors of design changes, risk/uncertainties, in accurate evaluation of project time/duration complexities and non-performance of sub contractors. Against this backdrop, a confine point of what causes over runs in construction projects was them identified by the vacuum between inexperience project management factor and low skilled manpower factor used in construction projects. In between the non use of skilled manpower and improper project management factor to close the vacuum suggests that poor project performance will continue indefinitely.[16]

Conclusion

In the ensuing literature examined above, there seems to be a general agreement that of all the three (3) variables for measuring project performance, time and cost seem to be a central pointer, the other, quality been a subjective parameter require a psychological appraisal. But time and cost overruns in themselves are direct consequences of in exhaustive and inept construction project performance. A re-examination of the industries practice on contract award procedure becomes inevitable hereon.

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Conflicts of interest

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