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CHALLENGES OF FRONT-END LOADING IN CONSTRUCTION PROJECT DELIVERY

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Adopting a good pre-project planning or front-end loading method during the early stage of construction is important to the success of the project. However, most construction projects have failed as a result of poor project planning at their early stage. Based on this knowledge, this study assessed the challenges facing the use of front-end loading. The study adopted a quantitative survey approach and questionnaire was used to harness information on the objective of the study from construction professionals in Gauteng Province, South Africa. Data gathered were analysed using statistical tools such as percentage, mean score and standard deviation. Findings revealed that the major challenges affecting the use of front-end loading are inability to identify importance of the process, unreliable information during early project stages, insufficient time to thoroughly carry out the front-end loading process, indecisiveness or lack of knowledge by the client, and lack of structured project team during inception phases of the project. It is therefore recommended that the construction clients be made aware of the importance of front-end loading, while project team members should be introduced to the project from the early stage of the project.

Keywords: Front-end planning, Pre-project planning, Project Performance, Project success.

1 INTRODUCTION

Project Management refers to the application of acquired knowledge and the use of tools, techniques, and skills for project activities with the aim of meeting the project requirements (Project Management Institute 2012). With proper project management, project objectives are met through the integration and application of various processes such as planning, execution, monitoring and controlling, and closing. Planning has proven to be crucial in the successful delivery of any project. Planning makes it easy to understand how the project team intends to execute the work in a systematic manner, which will facilitate achievement of the project objectives. Furthermore, planning also improves ease of identification of the project risks. It is important to establish the manner in which the activities to be completed will be carried out as the process will indicate whether it will be possible, given the available resources. Wang and Gibson (2012) noted that the decisions made during the early planning phases of projects have a significant bearing on the final project performance.

Project performance has overtime been evaluated using a number of factors which may be sought after individually or combined. The timely completion, compliance with the quality requirements, compliance with the targeted budget and the client's satisfaction are the factors, which are used to determine project success. Unfortunately, construction project delivery in developing countries, South Africa included, has failed in most cases to deliver construction projects that perform to the set performance criteria. Most construction projects are delivered way over budget and far beyond the stated completion time. This is not including the frequent client and end-users dissatisfaction, failure to meet health and safety standards and sustainability

criteria. In South Africa, Emuze (2011) observed that it is rare for the dream of construction clients to come to reality due to the poor performance of the construction industry. There is no doubt that many of these construction projects executed in these developing countries failed to reach their full potential as a result of inadequate pre-project planning also known as front-end loading, during conceptualisation (Morris 2005).

As a result of the complexity of construction project and the need to deliver projects successfully, it has become important to implement a process which will facilitate effective decision making to prepare for the engineering and construction process which follows pre-planning (Sherif and Price 1999). Andersson and Rosenberg (2012) and Gibson and Pappas (2003) have noted that front-end loading has a significant contribution to project success. It is essential where meeting project objectives are concerned. According to Shlopak *et al*. (2014), front-end loading also referred to as pre-project planning, front-end planning, programming, schematic design or design development, is regarded as the foundation that needs to be created to ensure predictable and efficient project delivery. According to the Construction Industry Development Board (CIDB) (2016), the adoption of a robust front-end loading is crucial to the successful delivery of any project. However, in most construction projects the front-end loading phase is the phase where minimal or no emphasis is invested (Construction Industry Institute, 2012). Moreover, Edkins *et al*. (2013) have noted that the front-end of project management practice is very often poorly understood and thus, inconsistent from project to project and also between industries. The practice is consequently confused, and this is as a result of lacking effective, clear and adequate guidance concerning it. Front-end loading is the most important point in the lifecycle of a project as the decisions, which are made during this phase of the project, have impact on the final project schedule and cost which are adopted as performance indicators on most construction projects (Son *et al*. 2015).

In defining front-end loading, although there are variations in the definitions, they ultimately allude to the same notion. The definitions all highlight the importance of great planning at the very front-end of the project and also the importance of keeping the planning in this phase consistent from initial endorsement up until a decision has been made to continue with the physical construction work (Williams and Samset 2010). Morris (2011) simply described front-end loading as the preliminary/emergence phase of the project. Saputelli *et al*. (2008) described front-end loading as a methodology whose main objective is focused on capital project planning. According to the Construction Industry Institute (2012), front-end loading is a process, which is aimed at attaining maximum project success through the gathering of information with regards to any risk that may be associated with the execution of the project.

Merrow (2011) emphasised that the front-end loading process continues until complete authorisation of the viability of the project has been established and capital has been fully granted. According to Laufer and Tucker (2006), the planning phase of construction projects seeks to identify whether or not it is viable to commit any resources to the project. The planning of construction projects consumes a significant amount of resources and it, therefore, becomes concerning when construction projects fail to reach their full success potential. The construction planning process identifies goals, which need to be achieved and through efficient planning techniques implemented, aims at satisfying these goals. In addition, Wang and Gibson (2012) emphasised that the decisions made by the project team members during this early stage of the project are of great significance and may determine the outcome of the project. Green and Perry (2008) noted that the level of front-end loading and project performance are directly proportional and the relationship can be examined through the overall project costs. Integration of the project times minimises later changes to the project and these minimal changes are significant because

they determine the overall costs, improve adherence to the project schedule plan, and also improve the operability.

Considering the poor delivery of construction projects with respect to set project objectives, and the obvious importance of project pre-planning, it is therefore important to critically evaluate the challenges of front-end loading in the delivery of construction projects in South Africa. This is done with a view of improving construction project delivery in the country through adequate planning process.

2 METHODOLOGY

This study assessed the challenges of front-end loading in the delivery of construction projects in South Africa. The study was conducted in Gauteng province based on the availability of a large number of construction organisations and projects within the province. A quantitative survey approach was adopted for the study with information gathered from construction professionals directly involved in the delivery of construction projects within the study area. These professionals include architects, construction managers, civil and structural engineers, project managers and the quantity surveyors. Questionnaire was adopted as the instrument for data collection due to its ease of usage and the ability to cover a wide range of respondents (Tan 2011). The questionnaire used was designed in two sections and was administered to the identified professionals based on their convenience and willingness to partake in the survey. The first section of the questionnaire sort answers to questions relating to the background of the respondents, while the second section addressed the objectives of the research, which was to assess the challenges facing the proper implementation of front-end loading on construction projects. A total of 60 questionnaires were conveniently distributed, with 44 deemed fit for analysis upon return. The remaining 16 were dropped due to inaccurately filling and omission of answers to important questions. This 44 analysed questionnaire represents 73% of the distributed questionnaire and was considered adequate for analysis.

In analysing the data gathered, information on the respondent's background was analysed using percentage, while mean score and standard deviation (SD) were used to analysed data gathered the challenges of the use of front-end loading. These challenges were ranked from the highest mean score down to the lowest. However, where two variables have the same mean score the variable with the lowest SD was ranked first as suggested by Field (2005). The reliability of the questionnaire used was tested using the Cronbach alpha test. The Cronbach alpha test gives a measure of the inward consistency of a test or scale and it ranges between 0 and 1 (Tavakol and Dennick 2011). The greater the score the more reliable the generated scale is, however, the indicated score of 0.7 and above is said to be an acceptable reliability coefficient but lower thresholds are sometimes used in the literature (Santos 1999). Cronbach's alpha value of 0.825 was derived. Since these alpha values are above the recommended 0.7 it, therefore, follows that the adopted research instrument is reliable.

3 FINDINGS AND DISCUSSIONS

3.1 Background Information

The analysis of the background information of the respondents shows that the most prominent professionals were the Project Managers (27.3%) followed by the Quantity Surveyors (25.0%) and Construction Managers (22.7%). The least represented were the Engineers (13.6%) and Architects (11.4%). In terms of highest level of education attained, findings revealed that most respondents (34%) held bachelor's degree, followed by honours degree (29.5%) and a national

diploma (22.7%). In addition, the average years of respondents working experience within the built environment was assessed. The result revealed that the highest range of working experience is between 11 and 20 years (34.1%), this is followed by 6-10 years (31.8%), and 1-5 years (29.5%). Only a few respondents (4.5%) have a working experience of over 20 years. From the result, it is evident that the identified population for the study is adequately represented, with a considerable amount of education attained to be able to understand and interpret the questions posed in the study. Also, there is a considerable high amount of years of working experience among the respondents. Thus, the answers received from the respondents can be relied upon as these would have been given based on the understanding of happenings within the South African construction industry.

3.2 Challenges of Front-End Loading in the South African Construction Industry

The challenges of the use of front-end loading in the South African construction industry was assessed by presenting respondents with some list of challenges identified from the review of literature. Respondents were asked to rank these challenges based on their level of significance using a scale of 1 to 5, with 5 being very high, and 1 being not significant. The result in Table 1 shows the ranking of these challenges as perceived by the respondents. From the Table, it is evident that all the 10 assessed challenges have a mean value of above average of 3.0. This means that to a considerable extent, respondents believe that these challenges are affecting the use of front-end loading in the study area. Chief of these challenges are inability to identify importance of the process with a mean score of 4.09, unreliable information during early project stages with a mean score of 4.07, insufficient time to thoroughly carry out the front-end loading process with a mean score of 3.89, indecisiveness or lack of knowledge by the client with a mean score of 3.89, and lack of structured project team during inception phases of the project with a mean score of 3.86.

Table 1. Challenges of Front-End Loading.

Challenges	Mean	SD	Rank
Inability to identify the importance of the process	4.09	1.273	1
Unreliable information during the early project stages	4.07	1.228	2
Insufficient time to thoroughly carry out the front-end loading process	3.89	1.224	3
Indecisiveness or lack of knowledge by the client	3.89	1.146	4
Lack of structured project team during inception phases of the project	3.86	1.047	5
Insufficient budget to carry out the front-end loading process	3.70	1.231	6
Insufficient knowledge on the process by the project team	3.70	1.407	7
The uncertainty of project schedule	3.59	1.317	8
The uncertainty of project budget	3.55	1.130	9
The uncertainty of project delivery method	3.41	1.263	10

The dynamic and complex nature of construction projects plays a part in increased project risk and ultimately promotes automatic project failure. However, with sufficient planning the risk may be reduced and lead the projects towards better performance. In addition, great expertise and broad understanding of construction are required to lead the construction project as it facilitates improved project performance. The findings imply that project managers need to use their expert knowledge to advise both their clients and the project team on the importance of the front-end loading process. Moreover, they need to utilise their role to guide the clients in applying processes, which will facilitate the best possible project outcome. Findings of this study further corroborate Cleland and Ireland (2010) submission that front-end loading is not adequately

carried out because most clients fail to identify the importance of the process and very quickly wants to see progress in the project. The findings also affirm Cooper (2008) assertions that construction projects fail because of the lack of planning in the pre-project phases, poor leadership, and unreliable data. Consequently, the Independent Project Analysis (2002) stated that it is important to develop a structured team and manage the transition of the team members during the different phases of the project. Findings of this study show that as a result of lack of structured project team, most projects fail to employ proper front-end loading.

4 CONCLUSION

Based on the findings of the study, it is concluded that the major challenges affecting the use of front-end loading are inability to identify importance of the process, unreliable information during early project stages, insufficient time to thoroughly carry out the front-end loading process, indecisiveness or lack of knowledge by the client, and lack of structured project team during inception phases of the project. Thus, there is the need to increase clients' knowledge of the process of front-end loading and their understanding of its importance. Introduction of project team members to the project from the early stage is also crucial, as this will give a good view and understanding of the project from the outset and also help improve communication within the project team.

Findings of this study contribute to the body of existing knowledge as it shows the major challenges facing the use of front-end loading for construction projects. The findings will go a long way in assisting construction participants in understanding the need for adopting this process in the delivery of successful construction projects, and the challenges they need to avoid in order to effectively adopt this system. Although this study contributes significantly to the body of literature emanating from South Africa, its findings cannot be generalised as it was conducted in a single province within the country. Thus, further studies can be conducted in order regions of the country in order to get a wider view of the topic and also to compare result.

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