Critical success factors and performance of completed construction projects at National Social Security Fund, Nairobi City County, Kenya

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ABSTRACT

This paper aims to examine the effect of selected factors that link to completion of NSSF construction projects and how they are influenced by the various critical factors. The main objective was to establish the critical success factors and their effects on performance of construction projects. Four theories namely Game theory, Principal-Agent theory, Construction Management, and Soft Value Management (SVM) theory served as the foundation for this research. Descriptive research design was employed for data collection, analysis, presentation and interpretation. The target population was 512 stakeholders from six complete commercial and residential projects. Purposive sampling was used to select 84 participants for the study. Semi-structured questionnaires were used in the study to collect data. The data was analyzed using SPSS whereby descriptive and inferential statistics were used. The results show that the R-square value was 0.282 and R was 0.531. An analysis of variance (ANOVA) was significant at p=0.001 with an F statistic of 9.961 indicating that the model used was fit for the data. The data also revealed that client variations (p = 0.05), financial availability (p = 0.047) and construction disputes (p = 0.001) are statistically significant determinants affecting performance of NSSF construction projects. Main findings of the study demonstrate that the key critical success factors used in this study affected the performance of NSSF completed construction projects either positively or negatively. The study recommends that companies should adhere to the principles that safeguard project management to adequately manage the critical factors and ultimately minimize project delays.

Introduction

The construction sector seems to be a very competitive as well as complex industry at a global perspective. According to (Mashwama et al., 2017) the overall capacity and value of the construction market globally on annual basis stood at $3200 billion. It has been documented that the construction sector faces various issues that relates mainly to time, cost, quality, as well as safety (Mashwama et al., 2017). Notably, despite many developing economies within the Sub-Saharan Africa (SSA) having sufficient natural resources, majority lack technical, financial abilities as well as appropriate policies that would help them utilize these resources efficiently in the construction industry. This study helps to highlight the various key elements that affect, how well, building projects function within the SSA region.

Critical Success Factors (CSF) in construction projects always vary depending on the region, particular operative environment, and various policies alongside required legal limitations. This reveals that such typical set of factors are not common across all countries (Gunduz & Yahya, 2018). Further attempt towards determination of various critical success factors is still progressive, and is given different approach by different scholars. The Kenya Economic Survey (2017) and KNBS (2019), anticipated the construction market to record an annual growth of approximately 6 percent within the next decade, therefore, making Kenya stand as the leading market for construction projects within the sub-Saharan Africa. The purpose of this research study was to establish the effect of critical success factors on construction projects performance at NSSF in Nairobi City County, Kenya. The issue of delays within the construction sector is considered a major global phenomenon and the construction projects at NSSF are no exception. Majority of the projects consumes time and energy than scheduled, with most construction companies lacking the ability to accomplish the projects within the assigned time. Further, most of these construction companies fail to deliver to the required standards in terms of quality (Ronoh, 2020).

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Different studies have examined the existing management practices that influence project performances (Odeck, 2014). For instance, for a project to succeed, time and cost are critical factors to consider. Ronoh (2020) indicates that in Kenya 9 out of 10 projects experience issues on performance such as cost overruns. Studies having closest similarity with the primary goal of this study is to address the issue while emphasizing important success elements influencing sustainability integration on the management of construction projects (Banihashemi et al., 2017; Sfakianaki, 2019). In his study, Sfakianaki (2019) focuses on evaluating the available literature with respect to CSFs applicable in sustainable construction through a review of the most pertinent papers such as Emerald, Elsevier as well as Wiley. On the other hand, Banihashemi et al., (2017) provides a number of CSFs and narrows down to the context of developing countries, therefore, delivering the findings as a conceptual model. The presence of scarce data, information alongside gaps in studies, presents a clear problem on the quality of information as pertains CSFs impact on construction projects. This research study, therefore, strived to make-up for the information gap by researching the performance of finished construction projects and key success criteria at National Social Security Fund, Nairobi City County, Kenya. The study settled on NSSF completed construction projects due to the fact that NSSF as a parastatal has heavily delved in multi-billion development of houses within the real estate and commercial sectors in Kenya and present more technological as well as logistical problems in the process of construction. This is likely to reveal most of the critical success factors and causes of delays in comparison to other types of projects within the construction industry.

This paper is organized as follows: First part introduces the background information on the research, a second part is a literature review with theoretical and empirical studies that shed a light on linkage between theory and practice. The third part is research and methodology. Then the analysis and findings of the study, including discussions and implications. Finally, this paper concludes with key points, recommendations, future research directions and limitations.

**Literature Review**

This section provides a review of previous scholarly works/literature from other authors. There is also presentation of the theoretical review, empirical review, literature gaps and ultimately conceptual framework.

**Theoretical and Conceptual Background**

The Game Theory was founded by Borel in 1921, and subsequently John Von Neuman advanced it through the publishing of his first paper on the theory in 1928 (Samuelson, 2016). The theory explains the underlying factor concerning decision-making alongside related strategies especially in scenarios where parties depend on each other, and the results of conflict and competition acting as the unifying factor. Peaceful conflict resolution ensures avoidance of such aspects as non-compensable disputes. These disputes entail suspension of projects, therefore, causing significant loss to both the project owners and the contractors (Samuelson, 2016). Game theory in such a case provides necessary tools required for conflict resolution within the construction industry and links to the objective; determination of how much construction litigation affects how well NSSF construction projects operate after completion. In this study, the theory is based on some key constructs that entail the calculation/costing of projects from available funds, strategic interactions, timely coordination as well as utility. The theory helped in defining the various stakeholders or agents involved in the construction projects and the nature of interactions.

The Principal-Agent Theory was propagated by Michael Jensen of Harvard and William in 1970s. The incorporation of this theory to management of construction projects tend to focus on information asymmetry, whereby there is a possibility of one of the two parties being highly likely to be considered as compared to the other. In this theory, the existing relationship between the parties requires high level of personal interest of each party. There is always the assumption that the collaboration amongst the various project participants gears towards achievement of as a specific objective. However, the existence of individual interests at times results into instances of potential conflict of interests amongst parties involved (Gong et al., 2017). The contractor, however, may adopt opportunistic behaviors that could easily derail the whole project. For instance, the case where the contractor possibly delays work process owing to existing difficulties in supply of materials but does not fully disclose such information to the client. The scenario can also apply on the client’s side.

In this study, the theory’s contribution lies in the recognition and assessment of risks as introduced by the project stakeholders. The constructs that underlies the theory include; claims, conflict resolution as well as legal processes. This involves risk assessment and identification of appropriate processes that could be utilized to mitigate these risks. Risk mitigation, therefore, helps improve performance through optimization of stakeholder goals. The theory linked to the first study objective; to establish how client variations influence the results of completed NSSF construction projects in Nairobi City.

Radosavljevic and Bennett (2012) developed the theory of Construction Management with the objective of looking into the level of efficiency in construction projects. The theory involves development of a construction management model that uses various differentiated methodologies for ensuring perfect completion of building and construction projects. The management of construction projects requires taking responsibility for each stage while providing measure of efficiency of each step. Such process ensures the achievement of the intended objective with the theory emphasizing the importance of analyzing failure or success of factors that influence project completion (Njiru, 2018). This theory links to the study objective on the premise of use of resources, quality and ultimate client satisfaction. In the event that the NSSF construction projects require quality and client satisfaction, then the theory of construction management provides for the need of checking the construction project’s critical success factors.
Soft value management (SVM) theory was proposed by Al-Yamni and Price (2006) and is applicable when developing plans on the reduction of negative impact that the project may incur during implementation process (Leung et al., 2014). Provision of a clarity on the ways in which project should be done leads to minimization of negative effects, hence a successful project. For verification purposes, soft value management simply represent one of the ways of conceptualizing value management in construction projects (Leung et al., 2014). The SVM theory is applicable in this study as regards to examination of the various critical success factors and how to minimize their negative effects such as cost, client variations, therefore, ensuring successful completion of projects (Leung et al., 2014).

**Empirical Review and Hypothesis Development**

Tayeh, Salem, Abu Aisheh & Alaloul (2020) carried out a study on the factors that influence the performance of the various construction developments in the Gaza Strip. The researchers used project owners, consultants as well as contractors, as the three key groups of research participants. In this case, the survey results indicated that all the participants were in agreement concerning most important factors that influence project performance. These included project delays attributable to such activities as road closure and occurrence of natural calamities. The challenges determined the level of utilization of required resources such as raw materials and human resources. However, the study did not clearly capture the entire group of factors, therefore, could not easily be applicable for universal purposes.

A detailed study by Mhando (2017) of high-rise buildings in Kenya revealed that 69 percent of the construction projects reports occurrence of client variations especially within the private sector. Sunday (2010) re-affirms that the issues that concerns changing plans or scope by clients is usually seen as one of the factors that basically contributes towards what triggers disparities within the construction sector, specifically in Iran and Seychelles respectively. Other studies share the same view, pointing out that client errors are the major reasons why variations and omissions happen in projects such as construction. Such factors as changes in specifications, changes in planning alongside non-compliance design issues provides major issues surrounding client variations in Singapore construction projects (Tayeh et al., 2020). A study by Wang, Ford, Chong & Zhang (2018) on what leads to development of Chinese building projects used questionnaire surveys to establish the primary causes of construction delays. The results which were specific to Chinese constructions revealed the two unique causes as client demands for unreasonable capital to be paid upfront and difficulties in making indemnity claims. However, the study failed to capture the client variations that could be generalized globally and specifically to African set-up since it only focused on Chinese construction projects. Ganbat, Chong, Liao & Lee (2019) conducted a review focusing on addressing issues related to risks in international construction projects. The study applied a cross-systematic approach to identify Building Information Modeling risks, analysis of risks as well as management techniques required. The results of the study provided various practical references that pertain to industry players that are key to future risk management and development within projects. Study by VO, Nguyen & Nguyen (2020) focused on disputes in managing projects in the Vietnam’s construction industry. The study considered construction disputes as a common feature within the construction industry revealing the existence of some level of confusion amongst construction professionals, such as conflict and dispute, since such terms are applicable interchangeably especially within the construction sector. Further, Tolson (2013) in his study argues that dispute arises in the event that a claim or compensation request is presented is denied. The various disputes surrounding a construction project occurs at different phases of any project, for instance, some arise from financing processes, alongside contractual agreements (Tolson, 2013). A study by Hasanazadeh, Esmaeili, Gad & Gransberg (2018) on how owner’s decisions alongside dispute influences the performance of projects, was conducted using an empirical study. Analysis of data was done to identify any statistically significant differences between disputes and performance. The results indicated that projects procured through appropriate qualifications had low records on disputes and vice-versa. In this case, appropriate selection steers various success factors that eventually determines smooth project completion and performance. Charezejhi, Chai, Md Yusof, Chong & Looy (2017) in their study focused on building information modeling as a way of mitigating construction conflicts. The study objective was to propose building information model as a way of controlling conflicts before occurrence of disputes. The results reveal that BIM promotes high level networking on collaboration and coordination from project initiation to completion. The study provides details not only on dispute management but also on its elimination, which provides one of the essential elements that determines efficiency of the construction projects.

Prasad, Vasugi, Venkatesan & Bhat (2019) conducted an analysis concerning delay causes and prevention measures in construction projects in India. The authors conducted a study to compare on a design build and design bid-build projects where survey was applicable by use of semi-structured questionnaire. The findings indicated that financial-related disputes were the primary reasons for project delays in construction. The study provided a detailed comparison on the various delay causes in construction projects and solutions that would be beneficial in identifying critical success factors influencing project performance. Wanjau (2015) studied the various factors influencing the project completion within the building industry in Kenya, and used descriptive survey as the design. However, in this study, there was no clear guidance on the means of measuring the results from the building project. The study recommended that organizations should provide clarity concerning measurement of any building project. The project managers should be aware of various efficient project management techniques that eventually lead to efficient completion of projects. However, it is difficult for the project management to stop a project from coming to completion while they provide the necessary incentives.

A study by Seboru (2015) on cost overruns in construction projects in Kenya reveal that contractors encounter financial issues during different phases of construction project. Wafula (2017) noted that significant amount of funds allocated for construction projects by the government usually ends up being misappropriated, therefore, hurting the pace of development. The fund issue always arises
during construction because the contractors usually settle dues for work in progress and receive their pay after project completion. Such aspect requires that contractors should have sufficient funds capable of off-setting project bills. It is necessary that the various projects undergo design phase to ensure proper allocation of resources including proper scheduling. In another study Muturi & Oguya (2016) conducted a study on road construction projects within the Arid and Semi-Arid Land in Kenya. The study revealed the various factors influence project outcome and performances; such factors included project finance, the level of competency of the contractor as well as disputes that explains 83 percent of the existing variance in performance of construction projects.

### Table 1: Summary of Literature Review

<table>
<thead>
<tr>
<th>Author (year)</th>
<th>Topic</th>
<th>Results</th>
<th>Research gap</th>
<th>Contribution to the current research study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adan (2012)</td>
<td>The Impact of technical officers on the performance of CDF</td>
<td>The independent variable technical officers exhibits a statistically significant relationship the CDF performance</td>
<td>There was no clear indication that competency positively impacted on the performance of the project</td>
<td>This shows that presence of skilled manpower influences the success of the project</td>
</tr>
<tr>
<td>Usman, Kamau, and Mireri, (2014)</td>
<td>The project performance at conception in the Building Industry in Abuja, Nigeria</td>
<td>The result reveals that the initial stage that concerns principles of success provides a significant factor concerning project performance. In this case, such principles should be considered for efficient delivery to clients.</td>
<td>There was no clear indication revealing that the nature of performance of a project depends on the initial stage principles’ applicable for project success, which is a significant factor.</td>
<td>The various activities undertaken at the initial stages of the project provide key factors that ensures the project success.</td>
</tr>
<tr>
<td>Oyalo (2015)</td>
<td>The various characteristics that influences the completion various projects funded by the CDF in Kangundo Constituency</td>
<td>Leadership had a great influence on the CDF projects outcomes.</td>
<td>There was no clear indication that the involvement of MPS in the CDF projects led to the projects’ failure.</td>
<td>It is important to identify client variations before the start of the project. This would ensure the success of project to be realized</td>
</tr>
<tr>
<td>Njiru (2018)</td>
<td>Practices Surrounding Project Management and their Implementation within Nairobi City County, Kenya.</td>
<td>Strategies of communication showed a positive statistical correlation with Implementation of projects.</td>
<td>The study did not clearly indicate role of communication strategies in minimizing potential disputes.</td>
<td>Clarity in communication would help in reducing the level of construction disputes</td>
</tr>
<tr>
<td>Seboru (2015)</td>
<td>The cost overruns in construction projects in Kenya</td>
<td>Contractors encounter financial issues during different phases of construction project</td>
<td>The study did not show whether the project underwent through the design phase</td>
<td>It is key that projects undergoes all initial stages to ensure proper allocation of resources including proper scheduling.</td>
</tr>
<tr>
<td>Wanjau (2015)</td>
<td>The various factors that impacts on building project completion in Kenya</td>
<td>The results reveal the importance of organizations in providing clarity concerning measurement of any building project.</td>
<td>There was no clear guidance on the means of measuring the results from the building project</td>
<td>There is need for awareness on the various efficient project management techniques that guarantee successful completion of projects.</td>
</tr>
</tbody>
</table>

### Source: Author

### Research and Methodology

This study adopted descriptive research design (Zikmund, et al., 2013). This is because the descriptive technique allows for an elaborate description of the phenomenon under study (Simiyu, 2013).

This study targeted six completed NSSF construction projects both commercial and residential namely Social Security Complex in Upper Hill that houses its headquarters offices in Nairobi, Nyayo Estate Embakasi, Milimani Flats along statehouse road, and Hazina
Estate in South-B, View Park Towers and Bruce House (Human Resource NSSF, 2020). The population was stratified and comprised of 527 stakeholders directly involved with construction projects (Human Resource NSSF, 2020).

The study incidentally comprised of a small population of 6 NSSF projects, therefore, there was no need for sampling for this study. The stratum comprises of the six National Social Security Fund’s commercial and residential projects as aforementioned. The people working on NSSF building projects served as the unit of observation, and the projects themselves served as the unit of analysis. In order to gather quantitative data, self-administered questionnaires were used. The figure 1 represents the study’s conceptual framework. In the conceptual framework and literature review project performance is the dependent variable, and it is measured using time and quality criterion. The independent variables include client variations, availability of funds and construction disputes. The conceptual framework is a representation of the relationship between the independent and dependent variables.

Inferential statistics were used in the study to determine how much the performance of construction projects at the National Social Security Fund in Nairobi, Kenya, was impacted by critical success factors. The sections below shows the results of the Model Summary, ANOVA, and Regression Coefficients. The table 2 results, the \( R^2 \) = 0.28 taken as a set, the predictors of project performance (DIP, CV and FA) accounts for 28 percent of the variance in project performance. \( R^2 \) measures the proportion of the dependent variables variance that the Independent variables can explain collectively.

The ANOVA table 2 results tests whether the value of the \( R^2 \) is significantly more than zero, in this case \( p=0.000 \). The regression model was statistically significant at 95% confidence level (\( F (3,76) = 13.2, p= 0.001, R^2 = .28 \)). Thus, the significance value of 0.001, which is < 0.05, is an indication that the independent variables used in the study provided data that could adequately predict the essential elements and the effect on the project performance. The ANOVA value was substantial enough to back up the model's goodness of fit in describing the variation in the outcome variables.

The findings also suggest that the independent variables are reliable indicators of construction project performance. The study also
used regression Coefficient values to establish the individual influence of the independent variables to construction performance. The results are as shown in table 4.

Table 4: Coefficient Values

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>t</th>
<th>Sig.</th>
<th>Collinearity Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Std. Error</td>
<td>Beta</td>
<td></td>
<td>Tolerance</td>
</tr>
<tr>
<td>(Constant)</td>
<td>2.912</td>
<td>.454</td>
<td></td>
<td>6.414</td>
<td>.000</td>
</tr>
<tr>
<td>CV</td>
<td>.171</td>
<td>.161</td>
<td>.192</td>
<td>1.062</td>
<td>.050</td>
</tr>
<tr>
<td>FA</td>
<td>.055</td>
<td>.198</td>
<td>.051</td>
<td>.279</td>
<td>.047</td>
</tr>
<tr>
<td>DIP</td>
<td>.484</td>
<td>.099</td>
<td>.496</td>
<td>4.894</td>
<td>.000</td>
</tr>
</tbody>
</table>

The final equation was \( Y = 2.912 + .171 (X_1) + .055 (X_2) + 0.484 (X_3) \) whereby; \( X_1 = \text{Client Variation}, X_2 = \text{Funds Availability} \) and \( X_3 = \text{Construction Dispute} \). The equation demonstrated that the three independent factors had a positive influence on the dependent variable. The results suggest that project performance increases by 0.171 for every unit change in client variation, indicating a favorable influence on NSSF project performance. Further, for every unit increase in availability of funds, the project performance increases by 0.055. Finally, for every unit increase in construction dispute, there is 0.484 improvement in project performance.

The study conducted a correlational analysis to investigate any links between the specific critical success factors and the NSSF construction performance, the Pearson correlation coefficient (r) was used as shown in table 4. The client variation (CV) had a very strong positive significant relationship with construction performance, \( r = .804, p = .0001 \). It also revealed that financial availability had a moderately positive significant effect on firm performance with \( r = .360 \) and \( p = .0001 \), further, construction disputes had a weak positive significant relationship with construction performance \( r = .141, p = .012 \).

Table 5: Correlation Results

<table>
<thead>
<tr>
<th>Correlations</th>
<th>PFM</th>
<th>CV</th>
<th>FA</th>
<th>DIP</th>
</tr>
</thead>
<tbody>
<tr>
<td>PFM Pearson Correlation</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>80</td>
<td>80</td>
<td>80</td>
<td>80</td>
</tr>
<tr>
<td>CV Pearson Correlation</td>
<td>.804**</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>.000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>80</td>
<td>80</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FA Pearson Correlation</td>
<td>.360**</td>
<td>.437**</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>.000</td>
<td>.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>80</td>
<td>80</td>
<td>80</td>
<td></td>
</tr>
<tr>
<td>DIP Pearson Correlation</td>
<td>.141*</td>
<td>.125*</td>
<td>.268**</td>
<td>1</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>.012</td>
<td>.026</td>
<td>.000</td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>80</td>
<td>80</td>
<td>80</td>
<td>80</td>
</tr>
</tbody>
</table>

Conclusions

The study concluded that the key essential parameters in the performance of NSSF completed construction projects included client variations, funds availability and construction disputes. These key factors showed a statistically significant positive relationship with NSSF construction project performance. In this case, a construction project that takes too long to complete might not be done well since it will deteriorate and require additional funds. If the schedule is followed, the desired quality will probably be obtained. Since project duration might hinder ongoing funding of a project, a good project should be completed within the agreed time range to avoid diluting quality. The quality of the entire project may suffer if the project's cost is too high since work may be sacrificed in an effort to reduce it. However, focus needs to be placed on key critical success factors from this study such as construction disputes in order to guarantee the successful completion of construction projects. The study recommends that top management should allocate enough resources to the building projects. In this case, for quality results, timely availability of cash, supplies, and equipment is essential including adhering to the principles that safeguard project management to minimize the occurrences of client disputes.

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Conflicts of Interest: The authors declare no conflict of interest.

References


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Nyangwara, P. O. & Datche, E. (2015). Factors affecting the performance of construction projects:


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