



EVALUATION OF CRITICAL SUCCESS FACTORS OF RAILWAY PROJECT IN NIGERIA

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ABSTRACT

Evaluating critical success factors of projects is broad and has not been fully explored. Most projects considered have been broad and not specific. This study evaluates the critical success factors (CSFs) of railway projects in Nigeria. The population of the study comprises of highway engineers, quantity surveyors, and contractors who are major actors in the industry. One hundred and fifty one (150) questionnaires were administered to the respondents using a random sampling technique. Seventy-six (76) questionnaires were returned and deemed appropriate for the study, giving a response rate of 51%. The data collected were analysed using Statistical Package for Social Sciences (IBM SPSS Version 22). The findings showed that adequacy of plans and specifications (4.32) is most CSFs for Schedule of performance, adequacy of plans and specifications (4.49) is most CSF for quality performance, economic risk (4.50) is most CSF for budget performance, and project participant competency (4.43) is most CSF for time performance in Nigerian railway projects. The mean score for the 10 topmost CSFs were more than (4.00) indicating that the factors were highly critical to the success of railway projects in Nigeria. Additionally, the study showed that respondents with less than a year of experience make judgments about CSFs that are different from those made by respondents with more experience, and as a result, may not be enough.

KEYWORDS: *Construction, critical, railway, success, project*

Introduction

The construction sector is crucial to the advancement of society and the achievement of its goals. As one of the largest industries in industrialized nations, the construction sector contributes roughly 10% to GNP (Ola-awo *et al.*, 2021). Due to many different parties involved in the construction industry, including clients, contractors, consultants, stockholders, and regulators, it is complex in nature. Generally speaking, the construction sector has underperformed in comparison to other sectors. Furthermore, several construction-related industries have come under fire for not functioning at a level comparable to other industries. In order to attain a satisfactory performance in the construction business, key performance indicator (KPI) working groups have defined ten metrics for benchmarking projects.

Project effectiveness is thought to be improved through studying critical success factors (CSFs) and project success. The phrase "critical success factors" as defined by Rockart (1980) as "those factors predicting success on projects". Since then, study on the subject has become very active. Furthermore, since the main search for excellence in the delivery of projects is not a new endeavour, this new study field would benefit greatly from the previous researches. The idea of project success, however, is still obscure to many who work in the construction industry.

Time, money, quality, customer happiness, productivity, and safety are all aspects that are related to performance. Closures, altered designs, and modifications to the design are some more valid explanations. Poor leadership, administration, coordination, and participation, a lack of enthusiasm, inadequate infrastructure, political issues, cultural issues, and economic conditions are additional factors affecting construction projects' success. Iyer and Jha (2005) identified a wide range of variables that can affect a project's cost performance including: "the project manager's competence, top management support, the project manager's coordinating and leadership skills, monitoring and participant feedback, decision-making, coordination among project participants, the competence of the owners, social condition, economic condition, and climatic condition". These views are based on the success of project management delivery processes.



The lack of thought and planning prior to implementation, as well as project failures during implementation, are two of the biggest issues facing construction projects in developing nations. Due to this, neither the targeted objectives nor integration of the nation's overall development are met. While there aren't as many systems in place to monitor and manage projects as there are in industrialized nations, some studies on how to manage and evaluate the success of construction projects have been conducted there.

The development of railway all over the world has ease movement of goods and services as well as humans (Dyrhaug, 2021). Railway construction in Nigeria started in the colonial era. The railway subsector was at its climax in the 1960s and 1970s but the situation started getting bad in the mid-1980s. It was the major mode of transporting farm produce to the urban centres. The railway subsector has suffered neglect from successive administration in Nigeria. Little attention has been paid to railway development in Nigeria as alternative transport system to highways. Until recently, the subsector was considered outdated and means of siphoning government and nothing good was considered to come out of it.

Critical success factors (CSFs) are elements that support and influence a project's success in achieving its goals. In the context of the Nigerian construction sector, the idea of CSFs for railway projects is uncommon. A project's CSFs are a subject that has received a lot of attention in the literature due to its importance to a corporate organization. According to Dalcher (2009), Flyvbjerg et al. (2018) and Ola-awo et al. (2019), CSFs typically denote areas or elements that have a beneficial impact on the achievement of project objectives. According to Ika (2009), a project's CSFs are all of the situations, factors, and events that potentially affect the project's success.

They are limitations to which the project is subject and which, if well handled, might lead to project success. Project managers and their teams would be able to efficiently manage the resources of projects if they had a solid understanding of the CSFs of various projects. CSFs come in a variety of forms in the literature, including those for software, construction, and information technology projects. The study's examination of the key success factors (CSFs) of Nigerian railway projects makes the topic of CSFs for construction projects pertinent. The goal of the study is to build CSFs for railway projects from the viewpoint of the experts based on various construction project components. Studies on the variables that affect project success have been conducted in numerous publications (Cleland & King, 2019; Baker et al., 2018; Hwang & Lim, 2013; Chan et al., 2019; Ojoko et al., 2018; Pinto & Slevin, 1988; Fadun & Saka, 2018; Ola-awo et al., 2019; Kog & Loh, 2012). The understanding of CSFs is useful for project managers and organizations engaged in project activity (Bhangale, 2016). Additionally, understanding CSFs helps increase a project management process' efficacy and efficiency (Akinrata, 2019). In his investigation of the causes of project failure, Avots (2019) identified three causes: the improper selection of the project manager, the unanticipated termination of the project, and the lack of top-level support.

The critical success factors used in the study were identified in the literature but adapted to the railway sector after series of mining. Consequently, 42 success factors were considered appropriate by experts to be used for the study based on previous studies. These factors were grouped into major subheadings of schedule, budget. Quality and time.

However, this study aims at identifying and evaluating the critical success factors of railway projects in Nigeria with a view to determine the factors which significantly affect its development. The objective is to identify and examine success factors of railway projects in Nigeria.

Methodology

This study's research strategy is primarily based on the survey methodology. Construction professionals who actively participate in the execution of railway projects, such as quantity surveyors, contractors, and civil/highway engineers, made up the population of this study. The probability sampling approach was the sampling methodology used for the study. The Krejcie Morgan Table was used to calculate the sample size. 150 people are thought to be in the sample. The questionnaire, which was self-administered, was the instrument utilized to gather data for this investigation. The questionnaire for this study were personally administered to the respondents. The questionnaire used for this research consist of two sections. Section A was based on the respondents' bio data using six questions, while section B contained questions concerning critical success factors of railway project in Nigeria. The various factors considered were grouped under schedule, quality, budget and time. Five-point Likert scale (5-Strongly Agreed, 4-Agreed, 3-



Uncertain 2-Disagreed, 1-Strongly Disagreed) that best described the extent to which respondent agree to each option. Data collected was analyzed with Statistical Package for Social Science (SPSS IBM Version 22). The results were presented using frequency and mean score. The critical success factors were ranked accordingly. However, this study is a part of a major study which is being carried out.

Results

Demographic information of respondents

The analysis in the above Table 4.1 is gotten from the respondents and it indicate that the professional background of respondent that 55(72.4%), were Quantity Surveyors, 12 (15.8%) were Contractors, 9 (11.8%) were Civil/Highway Engineers, and none were other profession. The highest academic qualifications attained of each of the respondents indicates that 45 (59.2%) has HND, 22(28.9%) has BSC, 5(6.6%) has MSC/M.BA, 3 (3.9%) has PhD, 1(1.3%) has other qualifications. Professional qualification of respondents indicates that 34(44.7%) has FNIQS, 18 (23.7%) has MNIQS 9 (11.8%) has MNSE, 9 (11.8%) has FNSE, 6 (7.9%) has other qualifications. The year of experienced indicate that 48 (63.2%) are between 1-5 years in service, 13(17.1%) are between 6-10 years in service, 10 (13.2%) are between 11-15 years in service, 1 (1.3%) are between 16-20 years in service and 4 (5.3%) are between 20 years or above. The number of project handled indicated that 37 (48.7%) has handled 1-5 projects, 23 (30.3%) has handled 6-10 projects, 9(11.8%) has handled 11-15 projects, 3 (3.9%) has handled 16-20 projects, 4 (5.3%) has handled over 20 projects.

Critical success factor of railway project in Nigeria.

Table 3.1 Schedule of Performance.

| | N | Mean | Rank |
|--|----|------|------------------|
| Adequacy of plans and specification | 76 | 4.32 | 1 st |
| Consultant team competency | 76 | 4.32 | 1 st |
| Client top management support | 76 | 4.30 | 3 rd |
| Realistic obligation | 76 | 4.25 | 4 th |
| Constructability | 76 | 4.25 | 4 th |
| Project size | 76 | 4.21 | 6 th |
| Technical approval authorities | 76 | 4.20 | 7 th |
| Construction control meeting | 76 | 4.18 | 8 th |
| Schedule updates | 76 | 4.18 | 8 th |
| Contractor key personnel capability | 76 | 4.18 | 8 th |
| Project manager commitment and involvement | 76 | 4.16 | 11 th |
| Constructability program | 76 | 4.16 | 11 th |
| Formal construction communication | 76 | 4.14 | 13 th |
| Project manager authority | 76 | 4.14 | 13 th |
| Project manager competency | 76 | 4.12 | 15 th |
| Site limitation and location | 76 | 4.11 | 16 th |
| Pioneering status | 76 | 4.11 | 16 th |
| Contractor team competency | 76 | 4.09 | 18 th |
| Contractual motivation/incentive | 76 | 4.09 | 18 th |
| Contractor team turnover rate | 76 | 4.07 | 20 th |

Source: Online Survey, 2022.



Table 3.1 lists the CSFs in order of how well they kept to their schedules for the jobs by the respondents. Adequacy of plans and specifications, consultant team expertise, and client top management support are the major factors that are frequently cited as being the topmost CSFs influencing the schedule performance of all construction project components. Constructability and realistic expectations rank in the top 10 CSFs for the performance of the schedule for Quantity Surveyor, Contractors, and Civil/Highway Engineer of Railway projects. Likewise, two of the top 10 CSFs are the construction control meeting and Technical approval authority. The top 3 CSFs for the “time” table of performance, however, include the project size, technical approval, and important employees for the contractor. Conversely, the least contractor team turnover.

Table 3.2 Quality Performance

| | N | MEAN | RANK |
|--|----|------|------------------|
| Adequacy of plans and specification | 76 | 4.49 | 1 st |
| Site inspection | 76 | 4.32 | 2 nd |
| Site limitation and location | 76 | 4.24 | 3 rd |
| Realistic obligation | 76 | 4.24 | 3 rd |
| Project manager competency | 76 | 4.22 | 5 th |
| Contractor team competency | 76 | 4.21 | 6 th |
| Contractual motivation/incentive | 76 | 4.21 | 6 th |
| Construction control meeting | 76 | 4.21 | 6 th |
| Client top management support | 76 | 4.20 | 9 th |
| Project manager commitment and involvement | 76 | 4.17 | 10 th |
| Adequacy of funding | 76 | 4.17 | 10 th |
| Contractor key personnel capability | 76 | 4.17 | 10 th |
| Project manager authority | 76 | 4.16 | 13 th |
| Consultant team competency | 76 | 4.16 | 13 th |
| Constructability | 76 | 4.12 | 15 th |
| Contractor team turnover rate | 76 | 4.11 | 16 th |
| Project size | 76 | 4.08 | 17 th |
| Pioneering status | 76 | 4.07 | 18 th |

Source: Online Survey, 2022.

The ranking of CSFs for quality performance Quantity Surveyor, Contractors, and Civil/Highway engineering works is presented in Table 3.2. Four factors were on the quality performance of construction projects. These are: adequacy of plans and specifications (4.49), site inspection (4.32), site limitation and location (4.24), and realistic obligation (4.24) are among the top CSFs for quality performance, while the least ranked is pioneering status on the table of quality performance.

Table 3.3 Budget performance

| | N | Mean | Rank |
|-------------------------------------|----|------|------------------|
| Economics risk | 76 | 4.50 | 1 st |
| Constructability | 76 | 4.28 | 2 nd |
| Adequacy of funding | 76 | 4.25 | 3 rd |
| Budget updates | 76 | 4.20 | 4 th |
| Contractual motivation/incentive | 76 | 4.17 | 5 th |
| Contractor team competency | 76 | 4.16 | 6 th |
| Risk identification and allocation | 76 | 4.14 | 7 th |
| Consultant team competency | 76 | 4.12 | 8 th |
| Adequacy of plans and specification | 76 | 4.12 | 8 th |
| Client top management support | 76 | 4.11 | 10 th |
| Contractor key personnel capability | 76 | 4.08 | 11 th |
| Realistic obligation | 76 | 4.07 | 12 th |
| Site limitation and location | 76 | 4.03 | 13 th |



| | | | |
|--|----|------|------------------|
| Project manager commitment and involvement | 76 | 4.01 | 14 th |
| Contractor team turnover rate | 76 | 3.99 | 15 th |

Source: Online Survey, 2022

The ranking of CSFs for budget performance by all the respondents is presented in Table 3.3. The main factors as ranked are economics risk (4.50), constructability (4.28), adequacy of funding (4.26), and budget updates (4.20). The high mean score show that the four factor are vital to the success of railway construction and should not be neglected. The least ranked factor is the contractor team turnover rate on the table of budget performance.

Table 4.5 Time performance

| | N | Mean | Rank |
|---|----|------|-----------------|
| Project participant competence. | 76 | 4.43 | 1 st |
| Adequacy of experience of the project participants. | 76 | 4.07 | 2 nd |
| Effective change order management. | 76 | 4.05 | 3 rd |
| Realistic obligations/incentives. | 76 | 4.01 | 4 th |
| Commitment and involvement of all parties in the project. | 76 | 3.97 | 5 th |
| Adequacy of communication and coordination among parties. | 76 | 3.95 | 6 th |
| Rapid decision marking | 76 | 3.87 | 7 th |
| Effective site management and supervision. | 76 | 3.87 | 7 th |

Source: Online Survey, 2022

The ranking of CSFs for time performance by all the respondents as shown in Table 3.4 indicated that project participant competence (4.43), adequate experience of the project participant (4.07), effective change order management (4.05), and realistic obligation/incentives (4.01) are among the top 8 CSFs for quality performance while rank effective site management and supervision is ranked the least.

Discussion

This study evaluates the critical success factors for railway project in Nigeria. The findings of this study are discussed below:

To identify and examine the success factors of railway of railway project in Nigeria

The topmost factor ranked by the respondents is adequacy of plans and specifications for the Schedule of Performance. Other factors includes; consultant team competency, client top management support and contractor team turnover rate as fourth. This agrees with the in the study of Kog and Loh (2012) who asserted that under the categories of schedule of performance, adequateness of plans and specifications, project manager competency, and constructability. However, the little difference is in the fact that Kog & Loh (2012) wrote a building project while the present study is on railway projects.

The factors as ranked under quality performance has adequacy of plans and specifications as first. Other factors include site inspection, site limitations and location, realistic obligation and pioneering. This study corroborate the studies of Kog & Loh (2012), Hwang et al. (2013), Ojoko et al (2018) but contradicts Ola-awo et al. (2019) which identified project manager commitment and involvement, site inspections, and construction control meetings are the most often used CSFs for quality performance.

The factors ranked for budget performance by respondents are economics risk as the first. This is followed by the constructability, adequacy of funding and contractor team turnover rate as the least ranked factor. This result is



slightly agrees with Kog & Loh (2012). However, the other of ranking deviates but economic risk, budget updates, and risk identification and allocation are commonly CSFs under budget performance. The differences could be attributed to difference in projects and the understanding of the research subject by different professionals.

The time performance factors as ranked by the respondents showed that project participant competence, adequate experience of the project, client top management support, effective change order management are the topmost factors while effective site management and supervision is the least. This finding agrees with the studies of Savindo et al. (1992) and Menon (2020).

This study demonstrates that the top 10 or 5 respondent success indicators are the most important ones for Nigerian railway projects, which suggests that if a contracting company's project participant competency is irregular, it could hinder the project's progress. The ranks of the CSFs for each part of the construction projects are listed for various project goals.

Conclusion

According to the study's findings, the top 10 CSFs for schedule, quality, budget, and time performance for quantity surveyor, civil/highway engineering, and construction contractor projects are economic risk, consultant team competency, adequate of plans and specifications, and project participant competency. There is also general agreement that adequate plans and specifications, constructability, and effective change order management are essential to the schedule, quality, budget, and time performance of quantity surveyors, civil/highway engineers, and construction project contractors. Budget performance also depends on the management of economic risks. The implication of the study to practice is that the evaluation of the variables as done in the study

REFERENCE

- Akinrata, E. B. (2019). Assessing critical success factors for project alliance among contractors in Nigerian Construction industry. *International Journal of Management & Entrepreneurship Research*, 1(5). 206-213
- Bhangale, P. P. (2016). Analysis of Time and Cost Overrun To Key Success of High-Rise Commercial Building Project-A Case Study. *International Journal of Civil Engineering and Technology*, 7(4), 400-405.
- Chan, D. W., Olawumi, T. O., & Ho, A. M. (2019). Critical success factors for building information modelling (BIM) implementation in Hong Kong. *Engineering, Construction and Architectural Management*. 26(9), 1838-1854
- Dalcher, D. (2009). Software project success: moving beyond failure. *Upgrade*.
- Dyrhaug, H. (2022). Transforming a steam train: a historical institutional analysis of EU railway policy. *Journal of European Integration*, Vol.44, 855-870
- Fadun, O. S., & Saka, S. T. (2018). Risk management in the construction industry: Analysis of critical success factors (CSFS) of construction projects in Nigeria. *International Journal of Development and Management Review*, 13(1). Retrieved from <https://www.ajol.info/index.php/ijdmr>
- Flyvbjerg, B. (2018). Preface to the Chinese Edition of Megaprojects and Risk. Bent Flyvbjerg, Nils Bruzelius, and Werner Rothengatter.
- Hwang, B., & Lim, E. J. (2013). Critical success factors for key project players and objectives: Case study of Singapore. *Journal of Construction Engineering and Management*, 139(2), 204 - 215.
- Ika, L. A. (2009). Project success as a topic in project management journals. *Project management journal*, 40(4), 6-19.
- Iyer, K. C., & Jha, K. N. (2005). Factors affecting cost performance: evidence from Indian construction projects. *International journal of project management*, 23(4), 283-295.
- Kog, Y. C., & Loh, P. K. (2012). Critical success factors for different components of construction projects. *Journal of construction engineering and management*, 138(4), 520-528.



- Menon, S. (2020). Critical Success Factors for ERP Projects: Recommendations from a Canadian Exploratory Study. *International Journal of Business and Management*, 15(2). <https://ssrn.com/abstract=3597477>
- Ojoko, E. O., Osman, M. H., Rahman, A. B. A., & Bakhary, N. (2018). Evaluating the critical success factors of industrialised building system implementation in Nigeria: The stakeholders' perception. *International Journal of Built Environment and Sustainability*, 5(2), 127-133
- Ola-awo, W. A., Saidu, I., Oke, A., & Tsado, J. A. (2019). Determination of the critical success factors for attaining quality performance in partnering projects in Lagos and Abuja, Nigeria. 10(2), 86-98
- Ola-awo, W., Alayande, A., Olarewaju, G., & Oyewobi, L. (2021). Critical success factors for effective internal construction stakeholder management in Nigeria. *Acta Structilia*, 28(1), 1-31.
- Pinto, J. K., & Slevin, D. P. (1988). Critical success factors in effective project implementation*. *Project management handbook*, 479, 167-190.
- Rockart, J. F. (1982). The changing role of the information systems executive: a critical success factors perspective. *Sloan Management Review*. 24, 3-13
- Sanvido, V., Grobler, F., Parfitt, K., Guvenis, M., & Coyle, M. (1992). Critical success factors for construction projects. *Journal of construction engineering and management*, 118(1), 94-111.
- Tsiga, Z., Emes, M., & Smith, A. (2017). Critical success factors for projects in the petroleum industry. *Procedia Computer Science*, 121, 224-231.