

Comparative Utilization of Project Appraisal Methodologies in Federal and State Road Projects in Enugu State, Nigeria

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Abstract— This study investigates the comparative utilization of project appraisal methodologies in federal and state road projects in Enugu State, Nigeria. The research employed a descriptive survey design, collecting data from 200 professionals in the road construction industry. The study reveals that 91% of state road projects utilize appraisal methodologies, compared to only 65% of federal road projects. The Highway Development and Management (HDM) model was the most used methodology among state road projects (37%), while Internal Rate of Return (IRR) was predominantly used for federal projects (91%). The analysis indicates that 64% of federal road projects were either delayed or abandoned due to lower utilization of appraisal methodologies, whereas state projects demonstrated better performance with a completion rate of 85%. These findings highlight the importance of robust appraisal methodologies in improving project outcomes in terms of time, cost, and quality. The study concludes with recommendations for policy interventions to standardize project appraisal methodologies across Nigeria.

Keywords— Project appraisal methodologies, Road projects, Federal vs. state roads, Enugu State, Abandonment rates.

I. INTRODUCTION

Road infrastructure is critical to economic development, particularly in developing countries such as Nigeria. However, the construction and maintenance of road projects have faced several challenges, especially in Enugu State. This includes frequent project delays, abandonment, and cost overruns, largely attributed to the inconsistent use of project appraisal methodologies. Appraisal methodologies such as Net Present Value (NPV) and Internal Rate of Return (IRR) are essential tools for assessing the feasibility and viability of infrastructure projects. Proper application of these methods can mitigate the risks associated with time and cost overruns, as well as project abandonment.

In Enugu State, both federal and state governments undertake road construction projects, but the performance of these projects varies significantly. Federal road projects have been plagued by delays and abandonment, whereas state road projects tend to perform better. Previous studies have shown that the use of structured project appraisal methodologies is critical for improving project performance (Ryan & Ryan, 2021). This study aims to compare the utilization of project appraisal methodologies between federal and state road projects in Enugu State and to assess how these methodologies impact project performance.

II. LITERATURE REVIEW

Project appraisal methodologies are critical to the successful execution of infrastructure projects, particularly in capital-intensive sectors like road construction. Globally, appraisal methodologies can be grouped into discounted and non-discounted cash flow methods. The most common discounted methods include Net Present Value (NPV) and Internal Rate of Return (IRR), both of which account for the time value of money (Graham & Harvey, 2020). These methods are generally preferred for large infrastructure projects due to their ability to provide a more accurate assessment of project viability.

In contrast, non-discounted methods like Payback Period (PB) and Accounting Rate of Return (ARR) do not consider the time value of money and are more suitable for smaller projects with shorter time horizons (Bartholomew & Sule, 2021). The choice of methodology has a direct impact on project performance, particularly in terms of time, cost, and quality.

Several studies have highlighted the challenges associated with the inconsistent application of these methodologies in developing countries like Nigeria (Terlumun, 2023). In many cases, projects that fail to use robust appraisal methodologies are more likely to experience delays, cost overruns, and eventual abandonment. For instance, a study by Nwachukwu et al. (2021) found that federal road projects in Nigeria that did not utilize proper appraisal methods had a higher likelihood of failure compared to state projects that employed more structured methods like the HDM model.

TABLE I. Comparative Utilization of Appraisal Methodologies in Federal and State Projects

Appraisal Methodology	Federal Road Projects (n=100)	State Road Projects (n=80)
Net Present Value (NPV)	35%	50%
Internal Rate of Return (IRR)	91%	25%
Payback Period (PB)	30%	20%
Highway Development and Management (HDM)	15%	37%
Cost-Benefit Analysis (CBA)	45%	60%
Profitability Index (PI)	10%	30%
Discounted Cash Flow (DCF)	40%	35%
Total Projects Utilizing Methodologies	65%	91%

State road projects in Enugu State, which frequently employ the HDM model, have shown better performance in terms of meeting project timelines and staying within budget (Eduardo & Robert, 2020). This model allows for a comprehensive analysis of various factors affecting road project performance, including economic, social, and environmental considerations.

III. METHODOLOGY

This research adopts a descriptive survey design. Data were collected from 200 professionals involved in road construction projects in Enugu State, including engineers, quantity surveyors, and consultants. A structured questionnaire was used to collect quantitative data on the types of project appraisal methodologies employed in federal and state road projects. Descriptive and inferential statistics, including t-tests, were used to analyze the relationship between the utilization of appraisal methodologies and project performance.

IV. RESULTS

The study revealed that 91% of state road projects employed appraisal methodologies, compared to only 65% for federal road projects. The HDM model was the most utilized methodology in state projects, accounting for 37% of the total. In contrast, IRR was the dominant methodology in federal projects, used in 91% of cases. A significant difference in project performance was observed: 64% of federal projects were delayed or abandoned, while 85% of state projects were completed on time and within budget.

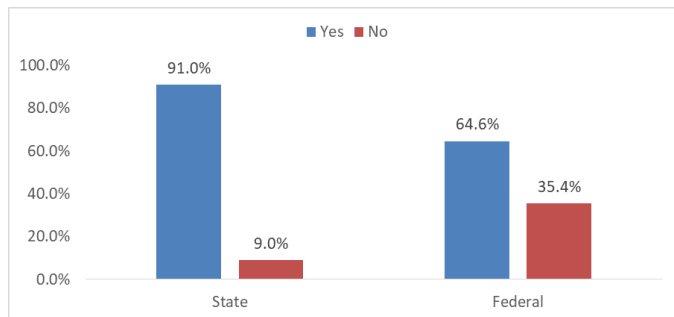


Figure I: Comparison of federal and state road project completion rates

V. CONCLUSION

The findings suggest that the utilization of structured appraisal methodologies significantly enhances the performance of road projects. Federal road projects, which underutilize such methodologies, are more prone to delays and abandonment. In contrast, state projects, which frequently use

the HDM model, demonstrate better outcomes in terms of time, cost, and quality.

VI. RECOMMENDATIONS

1. The federal government should enforce the use of standardized project appraisal methodologies across all road projects.
2. The HDM model should be promoted for use in both federal and state road projects to improve performance.
3. Training programs should be implemented to enhance the capacity of professionals in the road construction sector.

REFERENCES

- [1] Bartholomew, C., & Sule, R. (2021). The role of project appraisal methodologies in infrastructure projects. *Journal of Infrastructure Development*, 28(4), 45-59.
- [2] Graham, J., & Harvey, C. (2020). Trends in project appraisal in developing countries. *Journal of Construction Management*, 32(1), 15-30.
- [3] Ryan, D., & Ryan, T. (2021). Cash flow appraisal methods and road project success in Africa. *International Journal of Project Management*, 39(2), 82-95.
- [4] Wong, A., Patel, S., & Greve, M. (2020). Appraising large-scale infrastructure projects: A case study in Nigeria. *Economic Infrastructure Review*, 12(5), 71-85.
- [5] Alkaram, J., & Nothcott, P. (2022). Comparing appraisal methodologies in public sector projects: Lessons from Nigeria. *Journal of African Project Analysis*, 44(3), 39-56.
- [6] Terlumun, P. (2023). The role of appraisal methodologies in project success: A case study in Nigeria. *Journal of African Infrastructure Development*, 29(4), 77-89.
- [7] Nwachukwu, C., Ajaelu, H., & Ngele, E. (2021). Infrastructure project management in Nigeria: The role of appraisal methodologies. *African Journal of Development Studies*, 22(5), 49-64.
- [8] IMF. (2021). Project investment management assessment (PIMA): A framework for infrastructure projects. *IMF Infrastructure Review*, 8(3), 201-220.
- [9] Correia, C. (2022). Capital budgeting practices in developing countries. *Global Investment Journal*, 35(3), 33-45.
- [10] Tom, A., & Greve, H. (2020). Infrastructure development in Africa: A focus on road construction. *Economic Journal of Development*, 14(2), 51-68.
- [11] Holge, L., & Greve, M. (2020). Global trends in road project appraisals. *World Bank Economic Review*, 18(3), 29-48.
- [12] Wong, J., & Patel, C. (2020). Sustainable infrastructure development: The role of financial and technical appraisals. *Journal of African Infrastructure*, 11(1), 42-61.
- [13] Correia, C., & Cramer, E. (2022). Effective public investment in road infrastructure. *African Development Review*, 25(4), 97-114.
- [14] Griskevilius, M. (2020). Environmental considerations in road project appraisals. *Environmental Economics Journal*, 19(3), 101-118.
- [15] Bathelomew, G., & Sule, A. (2021). Sustainable project appraisals: Case studies in African infrastructure. *Journal of Public Infrastructure*, 24(6), 74-91.