

THE INFLUENCE OF MONITORING AND EVALUATION PRACTICES ON THE PERFORMANCE OF ENERGY CONSERVATION PROJECTS: A STUDY OF THE AUTOMOBILE INDUSTRY IN NAIROBI CITY COUNTY, KENYA

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ABSTRACT

Background: Effective Monitoring and Evaluation (M&E) is critical for the success of energy conservation projects, yet its application in the automobile industry in developing economies remains underexplored. This study investigated the influence of M&E practices on the performance of energy conservation projects within the automobile industry in Nairobi City County, Kenya.

Methods: A descriptive research design was employed, targeting 120 energy conservation projects. A stratified random sample of 92 respondents, including project managers, technical experts, government regulators, and employees, was selected. Primary data was collected using structured questionnaires and analyzed using both descriptive and inferential statistics (multiple regression) with SPSS Version 25.

Results: The study found that M&E practices—specifically the planning

process ($\beta = 0.779$, $p < 0.05$), technical expertise ($\beta = 0.751$, $p < 0.05$), stakeholder involvement ($\beta = 0.764$, $p < 0.05$), and management participation ($\beta = 0.709$, $p < 0.05$)—had a statistically significant positive influence on project performance. The regression model explained 78.4% of the variance in project performance (Adjusted $R^2 = 0.784$).

Conclusion: The study concludes that robust M&E systems are indispensable for enhancing the performance of energy conservation initiatives in the automotive sector. It recommends early and inclusive stakeholder engagement, investment in technical capacity building, strong managerial leadership, and the adoption of data-driven, flexible planning to improve project outcomes.

Key words: Monitoring and Evaluation, Project Performance, Energy Conservation, Automobile Industry, Kenya, Project Management.

INTRODUCTION

The global imperative for energy conservation has intensified, driven by climate change concerns and the pursuit of sustainable industrial practices. The automobile industry, characterized by high energy consumption, is a focal point for these conservation efforts. The success of such initiatives is heavily dependent on structured Monitoring and Evaluation (M&E) systems, which enable project teams to track progress, identify challenges, and make informed, adaptive decisions (Crawford & Bryce, 2019).

In Kenya, the automobile industry, concentrated in Nairobi County, has begun adopting energy-saving measures. However, reports indicate significant underperformance, with projects delivering, on average, 40% less than initial energy-saving projections (EPRA, 2022). This performance gap is often attributed to weak M&E frameworks, limiting the sector's ability to achieve its energy efficiency and sustainability goals (Macharia, Gathiaka, & Ngu, 2022). While the role of M&E is well-documented in general project management literature, there is a scarcity of empirical research linking specific M&E practices to the performance of energy

conservation projects within the unique context of the automobile industry in developing economies like Kenya. This study, therefore, sought to fill this gap by examining the influence of four key M&E practices—planning process, technical expertise, stakeholder involvement, and management participation—on the performance of energy conservation projects in Nairobi's automobile industry.

LITERATURE REVIEW

Theoretical Framework

The study was anchored on four theories:

Theory of Change (Weiss, 1995): Informed the planning process variable, emphasizing the need for a logical pathway from project inputs to desired energy-saving outcomes.

Resource-Based View (Barney, 1991): Supported the technical expertise variable, positing that internal skills and knowledge are strategic assets for competitive advantage and project success.

Stakeholder Theory (Freeman, 1984): Underpinned the stakeholder involvement variable, highlighting that engaging all affected parties is crucial for project legitimacy and performance.

Contingency Theory (Fiedler, 1964): Anchored the management participation variable, suggesting that effective leadership must adapt to the specific contextual challenges of energy projects.

Emperical Review

Previous studies have established positive links between individual M&E components and project performance. For instance, strategic planning has been shown to enhance financial and operational outcomes (George, Walker, & Monster, 2019), while technical capacity significantly improves project execution (Ngaira & Malenya, 2019). Similarly, stakeholder engagement is correlated with timely completion and quality (Njagi, 2020), and management involvement in Total Quality Management drives organizational performance (Pambreni et al., 2019). However, a consolidated investigation of these variables within the niche of automotive energy conservation in Kenya was identified as a critical research gap.

RESEARCH METHODOLOGY

Research Design

This study adopted a descriptive research design, which was suitable for describing the characteristics of the variables and establishing relationships between them.

Target Population and Sampling

The target population was 120 energy conservation projects in Nairobi's automobile industry. Using Yamane's (1967) formula at a 95% confidence level, a sample size of 92 respondents was determined. A stratified random sampling technique was used to select participants from four strata: project managers (n=23), technical experts (n=31), government regulators (n=15), and employees (n=23).

Data Collection and Analysis

Primary data was collected using structured questionnaires with Likert-scale questions. A pilot study ensured the instrument's reliability, yielding a Cronbach's Alpha of 0.725. Data was analyzed using SPSS Version 25. Descriptive statistics (means, standard deviations, frequencies) summarized the data, while multiple regression analysis was used to test the relationship between the independent and dependent variables. The regression model was specified as:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon$$

Where Y = Project Performance, X_1 = Planning Process, X_2 = Technical Expertise, X_3 = Stakeholder Involvement, X_4 = Management Participation.

RESEARCH FINDINGS AND DISCUSSION

Response Rate and Demographic Information

The study achieved a 96.7% response rate. The majority of respondents were highly educated (47.2% held bachelor's degrees) and experienced (44.9% had over 10 years of work experience), ensuring the quality of responses.

Descriptive Statistics

Respondents agreed that the M&E practices were present in their organizations, with aggregate mean scores of 4.28 (Planning), 3.90 (Technical Expertise), 3.94 (Stakeholder Involvement), and 4.06 (Management Participation). However, the perceived performance of the energy projects was neutral (Mean = 3.45), indicating a gap between M&E efforts and actual outcomes.

Regression Analysis

The model was significant ($F = 47.433$, $p = 0.004$) and explained 78.4% of the variance in project performance (Adjusted $R^2 = 0.784$). All four variables had a significant positive effect:

- Planning Process ($\beta = 0.779$, $p = 0.002$)
- Technical Expertise ($\beta = 0.751$, $p = 0.002$)
- Stakeholder Involvement ($\beta = 0.764$, $p = 0.002$)
- Management Participation ($\beta = 0.709$, $p = 0.003$)

The resulting regression equation was:

$$\text{*Project Performance} = 0.659 + 0.779(\text{Planning}) + 0.751(\text{Technical Expertise}) + 0.764(\text{Stakeholder Involvement}) + 0.709(\text{Management Participation})\text{*}.$$

DISCUSSION OF FINDINGS

The findings confirm that effective M&E practices are vital drivers of project performance. A structured planning process ensures resources and timelines are realistic, mitigating risks from the outset. Technical expertise enables the adoption and troubleshooting of energy-efficient technologies, directly impacting savings. Stakeholder involvement fosters ownership, reduces resistance, and mobilizes necessary support. Finally, active management participation ensures strategic alignment, provides resources, and maintains project momentum. These results align with and extend the findings of Kerzner (2018), Jha (2020), and other scholars cited in the literature review.

CONCLUSION AND RECOMMENDATIONS

Conclusion

The study concludes that Monitoring and Evaluation practices are not merely administrative functions but strategic imperatives for the success of energy conservation projects in the automobile industry. The synergistic effect of robust planning, skilled personnel, engaged stakeholders, and committed leadership significantly enhances a project's ability to achieve its energy-saving, cost-reduction, and timeliness objectives.

Recommendations

Based on the findings, the following recommendations are proposed:

For Project Planning: Integrate data analytics for baseline assessment and goal setting. Adopt flexible, phased project plans that allow for adaptive management based on continuous M&E data.

For Technical Expertise: Develop specialized training programs in energy-efficient technologies for the automotive sector. Foster collaborations with technical institutions and create mentorship programs to build in-house capacity.

For Stakeholder Involvement: Establish clear and continuous communication channels with all stakeholders, including government agencies, community members, and employees. Conduct workshops to align expectations and incorporate feedback throughout the project lifecycle.

For Management Participation: Senior management should champion energy conservation goals, linking them to corporate strategy. They should empower project teams with decision-making authority and utilize digital M&E tools for real-time oversight and support.

Suggestions for further Research

Future studies could explore the 21.6% of variance unexplained by this model by investigating other factors such as organizational culture, external policy environments, or supply chain dynamics. A similar study could also be replicated in other industrial sectors or geographical regions to enhance the generalizability of the findings.

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