Strategic Integration of AI in Project Planning: A BOCR-AHP Framework

Authors:

Kumar Chinmay, MBA with BA, University of Pittsburgh

Dr Elena Rokou, University of Pittsburgh

Highlights

- Introduces a BOCR-AHP framework for selecting AI tools and deployment stages.

- Evaluates AI adoption in project planning with operational and strategic insights.

- Highlights scalability and adaptability for high-tech environments.

- Addresses key risks like technological obsolescence and compliance.

- Incorporates expert judgments and empirical data for robust decision-making.

Abstract

Artificial Intelligence (AI) is revolutionizing project planning by enabling predictive analytics, automation, and scenario simulation. This paper introduces a Benefits-Opportunities-Costs-Risks (BOCR)-Analytic Hierarchy Process (AHP) framework for evaluating and selecting AI tools and optimal deployment stages. By systematically addressing organizational priorities, this approach ensures that AI adoption aligns with strategic goals, mitigates risks, and enhances overall project planning efficiency. Empirical findings and expert inputs validate the framework's applicability.

Keywords

Artificial Intelligence, BOCR, AHP, Project Planning, High-Tech Environments.

Introduction

The adoption of Artificial Intelligence (AI) in project management is transforming traditional processes. Predictive analytics, dynamic resource allocation, and automation offer organizations unprecedented capabilities to improve planning precision and operational efficiency (Taboada et al., 2023). However, challenges arise in selecting appropriate tools and determining deployment stages, particularly in dynamic and high-tech environments. This study introduces a BOCR-AHP framework to address these challenges, providing a systematic approach to align AI adoption with strategic and operational goals.

Literature Review

The BOCR methodology has been widely used for multi-criteria decision-making in complex scenarios (Tchangani, 2015). Recent research emphasizes the integration of AI in project management, highlighting its role in risk management and performance tracking (Shang et

al., 2023; Taboada et al., 2023). Jarrahi (2018) underscores the need for human-AI collaboration, which balances strategic thinking with data-driven insights. These studies provide foundational insights that inform the development of the proposed framework.

Hypotheses/Objectives

This study hypothesizes that a BOCR-AHP framework enables systematic evaluation of AI tools and deployment stages. The primary objectives are to align AI adoption with organizational priorities, optimize resource utilization, and mitigate associated risks.

Research Design/Methodology

The proposed framework employs the BOCR methodology, integrated with the AHP, to evaluate AI tools. Key criteria include operational efficiency, scalability, and risk mitigation. Expert judgments and empirical data inform the evaluation process. Consistency indices validate the decision matrices, ensuring the reliability of outcomes (Petrillo et al., 2023).

Proposed Model

Strategic Objectives

The framework is guided by the following strategic objectives:
1. Operational Efficiency: Enhance productivity through streamlined processes.
2. Scalability: Ensure the AI tools can handle increased workloads and adapt to growth.
3. Strategic Alignment: Support the organization's long-term objectives with AI adoption.

Alternatives

Three key alternatives were evaluated for AI integration in project planning:
- Predictive Analytics: Focus on scenario modeling to anticipate risks and optimize resource allocation.
- Automation Tools: Reduce manual planning tasks such as scheduling and dependency management.
- Hybrid AI Systems: Combine multiple AI techniques for comprehensive decision support.

BOCR Analysis

- Benefits: Improve operational efficiency, enhance scalability, and align with strategic goals (Tchangani, 2015).
- Opportunities:** Foster innovation, adapt to market demands, and secure a competitive advantage (Petrillo et al., 2023).
- Costs: Account for implementation expenses, ongoing operational costs, and cultural adjustments.
- RisksAddress security vulnerabilities, compliance challenges, and technological obsolescence (Bouzarour-Amokrane & Tchangani, 2012).

Results/Model Analysis

Analysis of the BOCR framework reveals that tools prioritizing scalability and operational efficiency are most effective for high-tech project environments. Risk mitigation measures,

such as addressing technological obsolescence, are critical for long-term success. The framework facilitates informed decision-making, ensuring alignment with organizational goals.

Conclusions

This study presents a robust BOCR-AHP framework for AI adoption in project planning. By addressing critical challenges in tool selection and deployment, the framework ensures alignment with strategic goals while mitigating risks. Future research should explore the framework's application in diverse industries and integrate advanced analytics for real-time decision-making.

Limitations

The reliance on expert judgments may introduce subjective biases. Additionally, the framework's validation is limited to specific organizational contexts. Further research is required to generalize its applicability across diverse industries.

Key References

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