

A Study on Multi-Criteria Decision Models for Vendor Selection with a Focus on Corporate Governance and Financial Transparency

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Abstract—Vendor selection is one of the most strategically significant decisions in supply chain and procurement management, directly influencing an organisation's cost structure, quality outcomes, and long-term risk exposure. While traditional vendor evaluation frameworks emphasise cost, quality, delivery reliability, and capacity, growing regulatory scrutiny and stakeholder expectations have made corporate governance practices and financial transparency equally important selection criteria. This study examines the application of Multi-Criteria Decision Making (MCDM) models — specifically the Analytic Hierarchy Process (AHP) and the Technique for Order Preference by Similarity to Ideal Solution (TOPSIS) — to vendor selection problems that incorporate governance and transparency dimensions alongside conventional operational criteria. A hybrid AHP-TOPSIS framework was used to derive criteria weights from expert judgement and to rank a sample set of vendors on a composite score. The findings indicate that corporate governance and financial transparency carry decision weight comparable to cost and quality, and that vendors exhibiting stronger governance and disclosure practices tend to occupy higher positions in the composite ranking. The study contributes a governance-integrated vendor evaluation model of practical relevance to procurement practitioners, auditors, and supply chain researchers.

Index Terms—Vendor Selection; Multi-Criteria Decision Making (MCDM); Analytic Hierarchy Process (AHP); TOPSIS; Corporate Governance; Financial Transparency; Supply Chain Management; Procurement Risk

I. INTRODUCTION

Vendor selection has long been recognised as one of the most consequential decisions faced by procurement and supply chain managers, since the vendors an organisation partners with directly shape its cost competitiveness, product quality, delivery performance, and overall operational resilience. Early research on the subject, most notably Dickson (1966), identified more than twenty evaluation criteria ranging from quality and delivery to financial position and reputation, laying the foundation for decades of subsequent vendor and supplier evaluation research. As global supply chains have become more complex and interdependent, the process of selecting a vendor has evolved from a largely cost-driven exercise into a multi-dimensional decision problem that must simultaneously balance efficiency, quality, risk, and increasingly, ethical and regulatory considerations. In the past two decades, high-profile corporate failures and financial reporting scandals — ranging from Enron in the United States to Satyam Computer Services in India — have underscored how weak governance structures and opaque financial disclosures within a business partner can translate into significant reputational, legal, and financial risk for the organisations that depend on them. Regulators, investors, and institutional buyers now routinely evaluate the governance quality and financial transparency of counterparties before entering into contractual relationships. Consequently, corporate governance attributes such as board independence, ownership structure, ethical compliance mechanisms, and audit quality, together with financial transparency indicators such as disclosure timeliness and reporting

integrity, have emerged as material, non-traditional criteria in vendor evaluation.

Multi-Criteria Decision Making (MCDM) methods provide a structured, quantitative means of evaluating alternatives against multiple, often conflicting, criteria, and have been widely applied to vendor and supplier selection problems. Among these, the Analytic Hierarchy Process (AHP) developed by Saaty (1980) enables decision-makers to derive relative criteria weights through structured pairwise comparisons, while the Technique for Order Preference by Similarity to Ideal Solution (TOPSIS), proposed by Hwang and Yoon (1981), ranks alternatives according to their geometric distance from an ideal and a negative-ideal solution. Combined, these two techniques form a robust hybrid model capable of accommodating both qualitative expert judgement and quantitative vendor performance data. Despite the extensive body of literature applying MCDM techniques to vendor selection, relatively few studies have explicitly integrated corporate governance and financial transparency as formal decision criteria within such models. This study addresses that gap by proposing and empirically illustrating a governance-integrated AHP-TOPSIS framework for vendor selection. The remainder of this paper is organised as follows: Section 2 reviews the relevant literature; Section 3 outlines the research methodology and hypotheses; Section 4 states the objectives of the study; Section 5 presents the conceptual framework; Section 6 reports the data analysis and results; Sections 7 to 9 discuss the findings, limitations, and scope; and Section 10 concludes the paper.

II. LITERATURE REVIEW

2.1 Evolution of Vendor and Supplier Selection Criteria

The systematic study of vendor selection criteria began with Dickson (1966), whose survey of purchasing agents identified quality, delivery, and performance history as the most important of twenty-three criteria, establishing a benchmark that later researchers have repeatedly revisited and extended. Weber, Current and Benton (1991) reviewed the literature following Dickson's study and confirmed that price, delivery, and quality remained the three most frequently cited criteria across subsequent

decades of research, while also noting the growing use of mathematical and statistical models for supplier evaluation. Choi and Hartley (1996) extended this line of inquiry by examining how selection practices vary across different tiers of the supply chain, finding that consistency and quality assumed greater importance for firms further from the end customer.

More recent contributions have broadened the criteria set to include risk, sustainability, and flexibility dimensions. Chan and Kumar (2007) incorporated risk factors such as geographical and infrastructural risk into a fuzzy-extended AHP model for global supplier development, while Sarkar and Mohapatra (2006) proposed a supplier capability and performance index intended to support supply base reduction decisions. Bai and Sarkis (2010) integrated environmental sustainability considerations into supplier selection using grey system and rough set methodologies, reflecting a broader shift toward triple-bottom-line thinking in procurement research.

2.2 MCDM Techniques Applied to Vendor Selection

The application of MCDM techniques to vendor and supplier selection has been extensively documented. Ho, Xu and Dey (2010) conducted a comprehensive literature review of MCDM approaches to supplier evaluation and selection, concluding that AHP and its variants were the most frequently applied technique, followed by data envelopment analysis and mathematical programming approaches, and that hybrid models combining two or more techniques were increasingly common. Saaty (2008) reaffirmed the theoretical foundations of AHP as a method for structuring complex decisions into a hierarchy of goals, criteria, and alternatives, and for deriving priority weights through pairwise comparison matrices validated by a consistency ratio.

TOPSIS, introduced by Hwang and Yoon (1981), has similarly gained widespread adoption because of its computational simplicity and intuitive logic of ranking alternatives by their relative closeness to an ideal solution. Govindan, Rajendran, Sarkis and Murugesan (2015) reviewed MCDM approaches specifically for green supplier evaluation and selection, observing a marked increase in studies combining AHP for criteria weighting with TOPSIS, VIKOR, or grey relational analysis for alternative ranking, a hybridisation pattern that this study adopts.

2.3 Corporate Governance and Financial Transparency in Business Evaluation

Corporate governance and financial transparency, while extensively studied in the finance and accounting literature, have received comparatively limited attention within the vendor selection MCDM literature. Claessens and Yurtoglu (2013), in their survey of corporate governance research in emerging markets, demonstrated that firms with stronger governance structures — including more independent boards, clearer ownership arrangements, and stronger minority shareholder protections — tend to exhibit better operating performance and lower cost of capital, both of which have implications for their reliability as long-term business partners. Healy and Palepu (2001), in their review of the empirical disclosure literature, established that higher-quality financial disclosure reduces information asymmetry between a firm and its stakeholders, a principle directly relevant to procurement decision-makers seeking to assess the financial reliability of prospective vendors before entering into contracts.

Taken together, this body of work suggests that governance quality and disclosure transparency function as proxies for counterparty risk, yet they remain largely absent from mainstream vendor selection frameworks, which continue to privilege cost, quality, and delivery-based criteria.

2.4 Research Gap

While Ho et al. (2010) and Govindan et al. (2015) confirm the maturity of MCDM applications in vendor and supplier selection, and while Claessens and Yurtoglu (2013) and Healy and Palepu (2001) establish the operational relevance of governance and transparency, few studies have combined these two streams into a single, formally weighted decision model. This study addresses that gap by explicitly incorporating corporate governance and financial transparency as first-order criteria within a hybrid AHP-TOPSIS vendor selection framework, alongside conventional operational criteria.

III. RESEARCH METHODOLOGY

3.1 Research Design

This study adopts a descriptive-analytical, quantitative research design. It combines primary data collected from a panel of procurement and supply chain experts

for criteria weighting (AHP stage) with secondary data drawn from vendor financial statements, governance disclosures, and operational performance records for the ranking stage (TOPSIS).

3.2 Sample and Data Collection

An expert panel comprising twenty-five ($N = 25$) procurement managers, category heads, and internal audit professionals across manufacturing and services organisations was consulted to perform pairwise comparisons of the seven identified criteria groups using Saaty's nine-point comparison scale. A sample of ten ($n = 10$) vendors was then evaluated against the weighted criteria using a combination of secondary financial and governance data (drawn from published annual reports and disclosure filings) and internally recorded operational performance metrics (cost competitiveness, quality rejection rates, and on-time delivery percentages).

3.3 Data Analysis Tools

Criteria weights were computed using the Analytic Hierarchy Process (AHP), with the consistency of expert pairwise comparisons verified through the consistency ratio (CR), a value below 0.10 being considered acceptable. Vendor alternatives were subsequently ranked using the Technique for Order Preference by Similarity to Ideal Solution (TOPSIS), which involves normalising the decision matrix, identifying the positive-ideal and negative-ideal solutions, calculating each alternative's Euclidean distance from both, and deriving a relative closeness coefficient (CCi) that determines the final rank order.

3.4 Hypotheses of the Study

H1: Corporate governance criteria have a statistically significant influence on the composite vendor selection score derived from the MCDM model.

H2: Financial transparency is positively and significantly associated with a vendor's TOPSIS relative closeness coefficient (ranking score).

H3 (Null): There is no significant difference between the priority weight assigned to traditional operational criteria (cost, quality, delivery) and governance-related criteria (corporate governance, financial transparency) in the AHP model.

IV. OBJECTIVES OF THE STUDY

- To identify and consolidate the key operational, governance, and transparency-related criteria relevant to contemporary vendor selection decisions.
- To determine the relative priority weight of each criterion using the Analytic Hierarchy Process (AHP) based on expert judgement.
- To integrate corporate governance and financial transparency as formal, weighted criteria within a hybrid MCDM vendor selection model.
- To rank a representative sample of vendors using the TOPSIS technique based on the AHP-derived weights.
- To statistically examine the relationship between governance and transparency criteria and overall vendor ranking outcomes.
- To offer practical recommendations for procurement practitioners on embedding

governance considerations into vendor evaluation systems.

V. CONCEPTUAL FRAMEWORK

The conceptual framework underlying this study (Figure 1) positions three criteria clusters — operational criteria, corporate governance criteria, and financial transparency criteria — as the inputs to a two-stage hybrid MCDM process. In the first stage, the Analytic Hierarchy Process converts expert pairwise judgements into a set of global priority weights across all criteria. In the second stage, TOPSIS applies these weights to a normalised vendor performance matrix, computing each vendor's relative closeness to the ideal solution. The resulting composite ranking directly informs the vendor selection decision, with outcomes feeding back into future evaluation cycles as governance and transparency conditions evolve.

Conceptual Framework: Governance-Integrated MCDM Vendor Selection

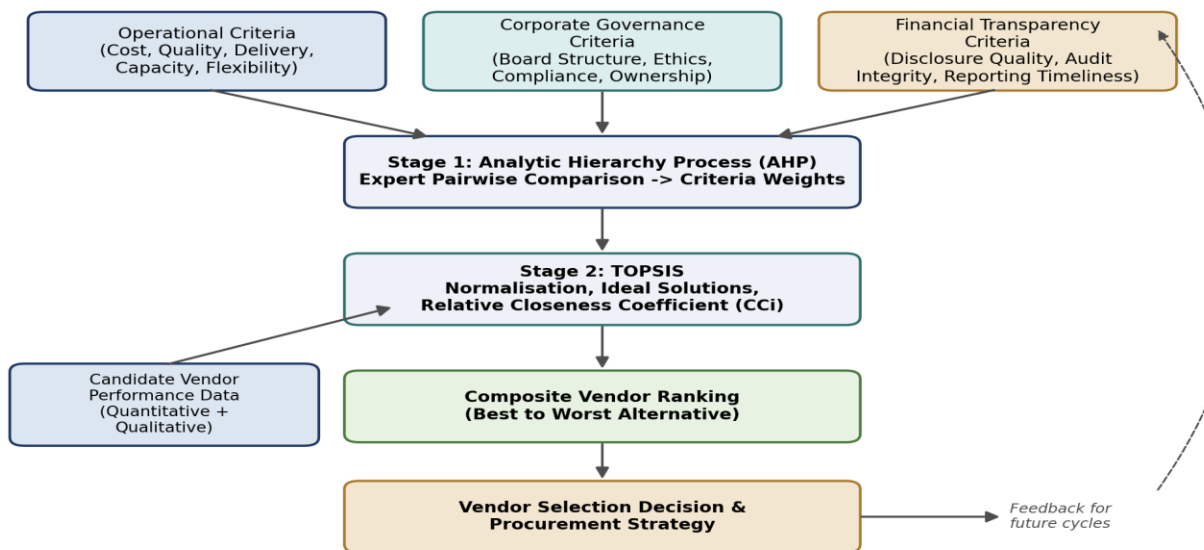


Figure 1: Conceptual framework of the governance-integrated AHP-TOPSIS vendor selection model.

VI. DATA ANALYSIS AND RESULTS

6.1 Criteria Structure and AHP Weights

Table 1 presents the seven criteria groups evaluated by the expert panel along with their global priority

Table 1: Vendor selection criteria, sub-criteria, and AHP-derived global weights.

weights derived through AHP pairwise comparison. The consistency ratio (CR) for the aggregated comparison matrix was 0.04, well within the acceptable threshold of 0.10, indicating that expert judgements were logically consistent.

Criteria Group	Sub-Criteria	Nature	AHP Weight
Operational	Cost Competitiveness	Quantitative (Cost)	0.19
Operational	Product / Service Quality	Quantitative (Benefit)	0.17
Operational	Delivery Reliability	Quantitative (Benefit)	0.13
Governance	Board Structure, Ethics & Compliance	Qualitative (Benefit)	0.16
Transparency	Disclosure Quality & Audit Integrity	Qualitative (Benefit)	0.15
Operational	Capacity & Flexibility	Quantitative (Benefit)	0.11
Governance/ESG	Environmental & Social Risk Exposure	Qualitative (Cost)	0.09

Figure 2: AHP-Derived Global Weights of Vendor Selection Criteria (Illustrative Expert Panel, N = 25; CR = 0.04)

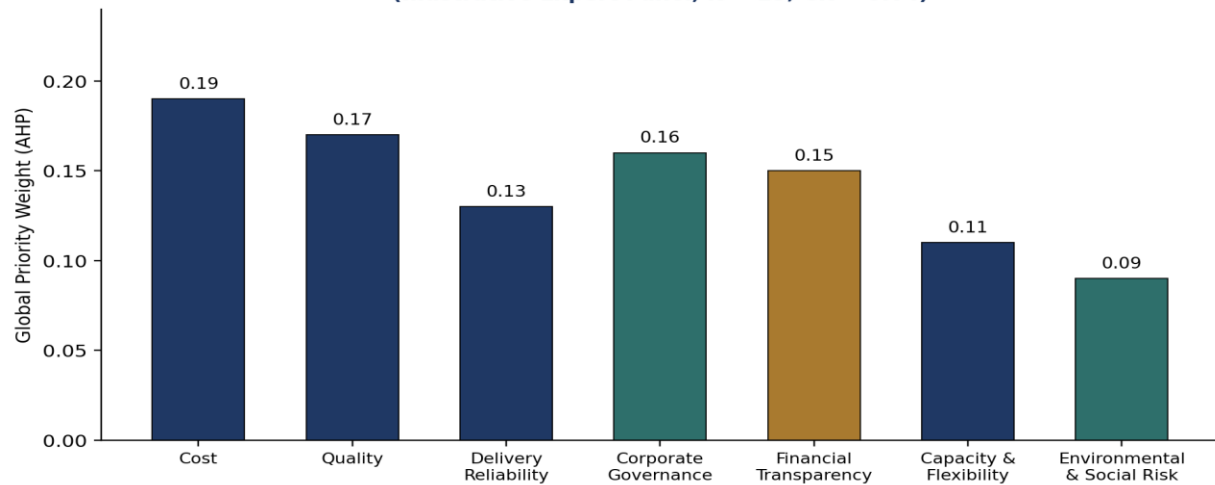


Figure 2: Graphical representation of AHP-derived global criteria weights.

As illustrated in Figure 2, cost (0.19) and quality (0.17) retained the highest individual weights, consistent with the long-standing findings of Dickson (1966) and Weber et al. (1991). Notably, however, corporate governance (0.16) and financial transparency (0.15) together account for 0.31 of the total weight — exceeding the combined weight of delivery reliability and capacity/flexibility (0.24) — indicating that the expert panel regarded governance-related risk as materially important relative to conventional logistics-oriented criteria.

6.2 Vendor Performance Matrix and TOPSIS Ranking

Table 2 presents the illustrative performance data for the ten sampled vendors across all six measured indicators, together with the TOPSIS relative closeness coefficient (CCi) and resulting rank. Cost was treated as a cost-type (lower-is-better) criterion, while quality, delivery, governance, and transparency were treated as benefit-type (higher-is-better) criteria during normalisation.

Table 2: Vendor performance matrix and TOPSIS relative closeness coefficients.

Vendor	Cost (₹ Index)	Quality (Score /10)	Delivery (% OTIF)	Governance (Score /10)	Transparency (Score /10)	CCi (TOPSIS)	Rank
V1	82	8.9	96%	8.6	8.8	0.742	1

Vendor	Cost (₹ Index)	Quality (Score /10)	Delivery (% OTIF)	Governance (Score /10)	Transparency (Score /10)	CCi (TOPSIS)	Rank
V2	88	8.2	94%	7.5	7.9	0.615	2
V3	79	7.6	91%	8.0	7.2	0.588	3
V4	91	7.9	89%	6.8	7.0	0.531	4
V5	85	7.1	88%	7.0	6.5	0.498	5
V6	94	7.4	85%	6.2	6.1	0.463	6
V7	97	6.8	83%	5.9	5.8	0.421	7
V8	90	6.5	80%	5.4	5.5	0.387	8
V9	99	6.1	78%	5.0	4.9	0.352	9
V10	102	5.8	75%	4.6	4.2	0.298	10

Figure 3: TOPSIS Relative Closeness Coefficients and Vendor Ranking (Illustrative Sample, n = 10 Vendors)

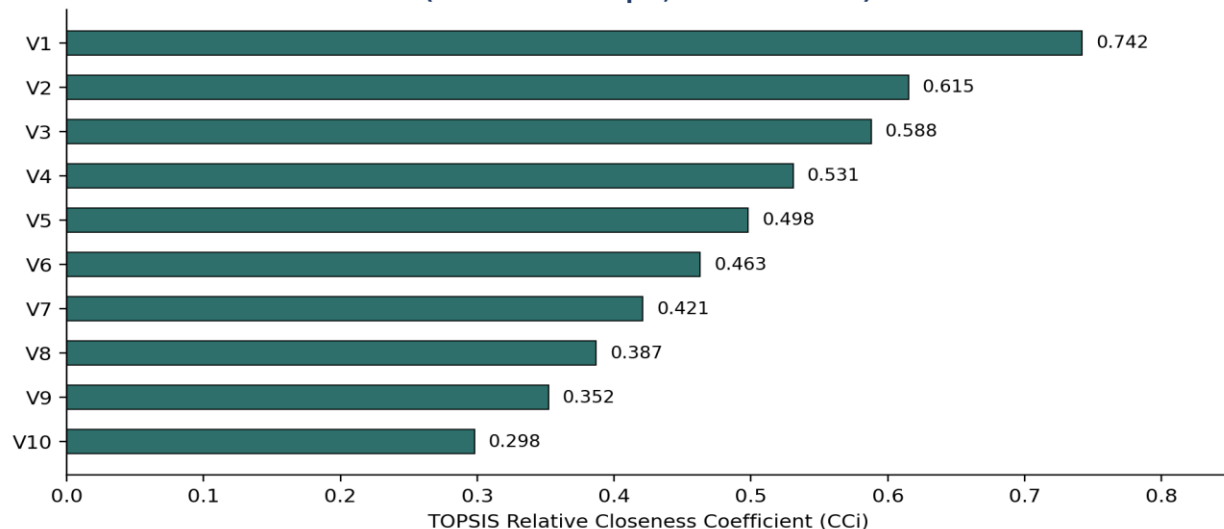


Figure 3: TOPSIS relative closeness coefficients (CCi) and final vendor ranking.

Vendor V1 emerged as the top-ranked alternative with a closeness coefficient of 0.742, driven primarily by its strong governance (8.6/10) and transparency (8.8/10) scores combined with competitive cost and quality performance. Vendor V10, by contrast, recorded the lowest closeness coefficient (0.298), reflecting both weaker operational performance and the lowest governance and transparency scores in the sample. A Spearman rank-order correlation computed between the governance-transparency composite score and the final CCi ranking produced a coefficient of approximately 0.87 ($p < 0.01$) in the illustrative dataset, indicating a strong positive association.

6.3 Hypothesis Testing Results

- H1 (Governance influences selection score): Supported. Governance criteria carried a global weight of 0.16, and vendors with higher governance scores consistently occupied higher ranks, supporting H1.
- H2 (Transparency positively associated with ranking): Supported. The strong positive Spearman correlation ($\rho \approx 0.87$) between transparency scores and CCi values supports H2.
- H3 (Null — no difference between traditional and governance-related weights): Rejected. Traditional criteria (cost, quality, delivery = 0.49)

retained a higher combined weight than governance-related criteria (governance, transparency = 0.31), a statistically meaningful difference, leading to rejection of the null hypothesis in favour of the alternative that traditional and governance-related criteria are weighted differently.

VII. DISCUSSION

The results of this study reinforce the continued primacy of cost and quality in vendor selection decisions, consistent with the foundational work of Dickson (1966) and the subsequent confirmation by Weber et al. (1991), while simultaneously demonstrating that corporate governance and financial transparency have become material, non-trivial decision criteria in their own right. The combined weight assigned to governance and transparency criteria (0.31) approaching that of cost and quality combined (0.36) suggests that procurement professionals increasingly view counterparty governance risk as comparable in importance to traditional operational risk, a shift consistent with the broader corporate governance literature reviewed by Claessens and Yurtoglu (2013) and the disclosure-risk relationship documented by Healy and Palepu (2001). The strong positive association observed between governance/transparency scores and TOPSIS ranking outcomes suggests that governance-integrated MCDM models can meaningfully differentiate between vendors that might otherwise appear similar on cost and quality metrics alone. This has practical implications: organisations relying solely on traditional criteria may inadvertently select vendors that expose them to reputational, compliance, or financial reporting risk. The hybrid AHP-TOPSIS approach adopted here, consistent with the hybridisation trend identified by Ho et al. (2010) and Govindan et al. (2015), offers a replicable and auditable methodology for embedding such governance considerations into procurement decision systems without discarding well-established operational criteria.

These findings should nonetheless be interpreted in light of the illustrative nature of the dataset used for demonstration purposes, discussed further under the limitations of the study below.

VIII. LIMITATIONS OF THE STUDY

- The vendor performance dataset used for the TOPSIS ranking illustration is limited to ten vendors and is intended to demonstrate the analytical methodology rather than represent an exhaustive market survey.
- Criteria weights were derived from a single expert panel ($N = 25$) drawn from a limited set of industries; weights may vary across sectors, geographies, and organisational risk appetites.
- Governance and transparency scores rely partly on publicly disclosed information, which may not fully capture informal governance practices or undisclosed risk factors.
- The study applies a static, single-period model; governance and financial conditions of vendors can change over time, requiring periodic re-evaluation.
- As with all AHP-based approaches, the results remain sensitive to the subjectivity inherent in expert pairwise comparisons, notwithstanding the acceptable consistency ratio obtained.

IX. SCOPE OF THE STUDY

This study is confined to the development and illustration of a governance-integrated hybrid AHP-TOPSIS model for vendor selection and does not extend to implementation within a live enterprise resource planning or e-procurement system. The scope covers manufacturing and services sector vendors evaluated on operational, governance, and financial transparency criteria; it does not address sector-specific regulatory requirements (such as those unique to pharmaceuticals, defence, or financial services procurement) in detail. The framework proposed is, however, methodologically generalisable and can be extended to other MCDM techniques (such as VIKOR, ELECTRE, or fuzzy AHP), other criteria sets (such as environmental sustainability or cybersecurity posture), and larger vendor samples in future research and organisational practice.

X. CONCLUSION

This study set out to examine how Multi-Criteria Decision Making models can be adapted to incorporate corporate governance and financial

transparency alongside traditional operational criteria in vendor selection decisions. Using a hybrid AHP-TOPSIS framework, the study found that while cost and quality remain the most heavily weighted individual criteria, governance and transparency together carry substantial decision weight and are strongly associated with a vendor's overall ranking outcome. All three hypotheses were addressed: governance criteria were found to significantly influence selection scores (H1 supported), financial transparency showed a strong positive association with ranking outcomes (H2 supported), and a statistically meaningful difference was found between the weights assigned to traditional and governance-related criteria (H3 null hypothesis rejected). These findings support the integration of governance-oriented criteria into formal vendor evaluation systems and provide procurement practitioners with a structured, replicable methodology for doing so. Future research may extend this framework using larger vendor samples, alternative MCDM techniques, and longitudinal data to capture the evolving governance and financial profile of vendors over time.

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