

A Critic-Promethee Ii-Based Barrier Analysis To Ethical Sourcing

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Abstract— Consumer values, investor scrutiny, regulatory obligations, and the need for resilient and sustainable supply chains (SCs) have made ethical sourcing a crucial part of strategy within the global market. Further, ethical sourcing aids in reviving the brand image and competitive capabilities. Nonetheless, firms encounter a variety of challenges when they seek to incorporate sustainable and ethical practices into their supply chains. Financial limitations around the implementation and maintenance of ethical standards, a lack of transparency due to intricate supply chain structures, inadequate regulatory frameworks, a lack of top management support over enforcing the necessary changes, a lack of consumer awareness and demand for ethically sourced products to incentivize firms to adopt ethical practices, geopolitical uncertainties, industry-specific hurdles etc. are merely a few of them.

In this pretext, research has been embarked on listing the barriers in the form of literature reviews, assessing the barriers within a specific context, or analyzing a specific barrier. Nevertheless, a dearth of research is observed with respect to comprehensively identifying, classifying, and determining barrier weights to rank strategies collated through governments, businesses, and all stakeholders, towards simultaneously addressing numerous barriers.

Hence, this study aims at identifying and categorizing an exhaustive set of barriers towards embracing ethical and responsible sourcing practices within supply chains through leveraging on the Nominal Group Technique (NGT) towards reaching expert consensus on grouping the barriers highlighted through the literature review into different categories, and a hybrid Multi-Criteria Decision-Making (MCDM) approach integrating CRITIC (Criteria Importance Through Intercriteria Correlation)-PROMETHEE II (Preference Ranking Organization Method for Enrichment Evaluation II) methods towards determining the empirical weights of the barriers for ranking and prioritization of strategies extracted from the literature to address the ethical sourcing barriers in a simultaneous fashion.

Keywords—Barrier Analysis, Ethical Sourcing, MCDM, Nominal Group Technique.

I. INTRODUCTION

In response to the convergence of growing investor demands, changing consumer values, stricter regulations, and the need to create sustainability and resilience within dynamic market environments, ethical sourcing has swiftly grown into a strategic imperative within global supply chains [1,2,3,4].

Initiatives for ethical sourcing are now acknowledged as essential for boosting and repairing brand reputation, increasing competitive capabilities, and cultivating public trust in addition to guaranteeing compliance [5,6,7].

Despite these advantages, companies that integrate responsible sourcing frequently face a variety of barriers, such as the financial burden of setting up and upholding ethical standards [4], the transparency of multi-tiered supply networks [6], the lack of regulatory infrastructure, the inconsistent support of top management, low consumer awareness, and changing customer preferences for products sourced ethically. Moreover, within the global supply chains that tend to be convoluted and interdependent, these barriers become more heightened by sector- or region-specific attributes and changing geopolitical environments [2, 8, 9].

Recent research efforts have mostly focused on identifying and characterizing such barriers in isolated or context-specific settings, concentrating on specific businesses, industries, or nations. Several literature reviews and empirical case studies fragment small parts of the challenge—either by mapping barriers for specific products or exploring a single constraint within niche markets [1,8,10].

Prominent research has highlighted the need for thorough synthesis and analysis of ethical sourcing barriers using multi-criteria approaches. There are noticeably few integrative frameworks that discern as well as assign relative weights for the barriers.

Additionally, such frameworks would also aid with prioritizing the strategic interventions that governments, corporations, and other stakeholders have uncovered through collaborative efforts to address the barriers in a concurrent manner [3, 4,6, 9].

The current study uses a rigorous mixed-method framework to address this gap. The process begins by undertaking a thorough literature review to compile known barriers, and then the barriers are finalized and categorized using the Nominal Group Technique (NGT), which is based on expert insights for group consensus [11].

Following finalization and classification, the study employs a hybrid Multi-Criteria Decision-Making (MCDM) approach [12, 13] that combines CRITIC (Criteria Importance Through Intercriteria Correlation) and PROMETHEE II (Preference Ranking Organization Method for Enrichment Evaluation II).

This advanced approach has been more widely acknowledged within the literature on sustainability for its ability to ascertain weights for conflicting barriers, allowing strategies from industry and academic research to be ranked and prioritized based on their capacity to address multiple challenges concurrently [3,5].

Combining these methods guarantees a thorough analytical process that is in line with the intricate realities that contemporary supply chains face and makes it easier to create practical, fact-based recommendations for practitioners and decision-makers.

The following section outlines the research schema developed for this study, which includes expert elicitation, barrier categorization, and multi-criteria ranking to aid replication and real-world application.

II. RESEARCH FRAMEWORK

Figure 1 (Appendix A) presents the proposed framework for study. The study was planned in five phases. Phase I concentrates on identification of ethical sourcing barriers from the literature, followed by Phase II- wherein Nominal Group Technique (NGT) would be employed towards reaching consensus on barrier categorization, as it uses a highly structured process involving face-to-face real-time interactive discussions with immediate feedback between experts in contrast to Delphi that involves multiple rounds of anonymous surveys towards reaching a consensus [14]. Table 1 below portrays a brief profile of the expert panel.

Table 1 Brief Profile of the Expert Panel

ID	Expert Profile	Exp (in Years)
DM1	Operations Professional with hands-on experience on different facets of the Supply Chain.	20
DM2	A Supply Chain Professional and an associate professor	25

	from a reputed university in the UK.	
DM3	A Supply Chain Professional and a Professor from a reputed university in the UK.	30
DM4	A Supply Chain Professional and an associate professor from a reputed university in UAE	25
DM5	CEO of a logistics firm in India	31

Figure 2 (Appendix A) demonstrates the NGT Process.

Within the first stage of NGT, participants are given an overview of the subject and asked to participate in a ten-minute "silent generation of ideas." In a "Round Robin" structure, each member is then asked to present one of their ideas to the group during the second round. Until every suggestion is listed, a facilitator records and presents each one, typically on flip chart paper. To avoid redundancy or provide explanation, these concepts are then briefly explored in the third stage. In the fourth and last stage, participants rate and vote on the ideas that the group has listed.

Consequently, within Phase III- strategies for coping up with the barriers would be identified through a literature analysis. Likewise, within Phase IV- CRITIC MCDM would be embraced to arrive at the empirical weights for the barriers. The CRITIC method is a statistically validated technique for determining the relative weights or significance of criteria based on their correlations. The correlation matrix, which shows the correlations between pairs of criteria, is examined using statistical techniques. By evaluating the strength and direction of these connections, the CRITIC approach computes the criteria weights. The CRITIC approach lowers the possibility of subjective biases by giving decision-makers a quantitative estimate of criterion relevance through statistical analysis [15]. Thereupon, within Phase V -PROMETHEE II MCDM would be deployed towards ranking the strategies based on their potential towards addressing the barriers in an integrated fashion.

The PROMETHEE has been a method for identifying the best alternative following the analysis of certain criteria. Within a multi-criteria evaluation, this approach serves as a means of establishing order. To rank them, it manages the assessment and selection of options, based on specific standards. Additionally, using PROMETHEE within multicriteria decision making yields a precise result with numerous criteria. There are multiple extensions for PROMETHEE. Nonetheless, PROMETHEE II has been employed in the evaluation of this study, because it provides a thorough ranking for the alternatives based on expert preferences [16].

A concise summary of the research associated with underlining barriers to ethical sourcing would be discussed within the following section.

III. RELATED STUDIES

Recent journal articles have explored ethical sourcing barriers more extensively, with evidence highlighting that supply chains within a broad spectrum of sectors and regions are impacted by persistent institutional, financial, and operational constraints. Lack of

transparency, high expenses, supply chain complexity, regulatory flaws, and low management support are some of the main themes. The literature review that follows uses recent studies to outline the primary barriers found, adhering strictly to scholarly citation and synthesis.

Financial and Resource Limitations

Given that promoting fair labor, environmental responsibility, and auditing raises operating costs in comparison to less responsible approaches, many articles attribute cost and resource constraints as a primary barrier. Although there are possibilities for long-term savings, the initial outlay for moral behavior frequently deters widespread adoption, particularly when there are immediate financial constraints [17, 18, 19, 20].

Insufficient degree of Transparency

Monitoring the ethical and provenance of raw materials, labor practices, and environmental impact turns more difficult as supply chains become more globalized. In situations where supplier networks are extensive and opaque, multiple tiers and diverse regulatory environments create an environment where unethical sourcing can go undetected [21, 22, 23].

Institutional and Regulatory Concerns

One persistent issue, particularly within developing and transitional economies, is weak regulatory frameworks. The effectiveness of ethical sourcing initiatives is weakened by a lack of public policy alignment, a lack of enforcement, and disjointed institutional mandates. These challenges are made worse by low accountability and limited stakeholder involvement [24, 25, 26, 27].

Corporate Culture and Managerial Commitment

Studies show that ethical sourcing is not fully integrated into executive priorities, and top management's lack of commitment is often cited. Responsible sourcing is still heavily influenced by organizational culture, perceived return on investment, and alignment with stakeholder expectations or corporate values [25, 28, 29, 30].

Supply Chain Resilience and Risk Management

Supply disruptions, trade disruptions, and geopolitical unpredictability make it difficult to uphold ethical standards, requiring procurement teams to strike a balance between ethics, quality, and cost. Certain regional contexts, especially those in Africa and South Asia, are also plagued by resource shortages and compartmentalized stakeholder relations [21, 31, 32, 33, 34].

Challenges pertinent to measuring the Environmental and Social benefits

Wider adoption is hampered by the challenge of quantifying the social and environmental advantages of ethical sourcing. Although consumer demand is growing, it may not always support the premium pricing needed to maintain ethical supply chains, and business executives frequently find it difficult to demonstrate the impact and return on investment of ethical initiatives [24, 35, 36, 37].

Unique Sectoral Challenges

The undersupply of sustainable raw materials, complicated quality control, and risks associated with outsourced production and supply are some of the unique challenges faced by sectors like apparel, fashion, construction, and healthcare. Further, Ethical quandaries

in product sourcing arise from the conflict between cost, quality, speed, and accountability in NGO-led health procurement [38, 39, 40, 41, 42].

Although ethical sourcing has emerged as a key component of contemporary supply chain management, reflecting the increasing demands of consumers and regulators for sustainability, justice, and openness. However, when trying to incorporate sustainable and ethical practices into their supply chains, firms encounter a multitude of challenges.

IV. HYBRID MCDM ALGORITHM

CRITIC Algorithm:

Criteria Importance Through Inter-criteria Correlation, was introduced by [43]. It falls under the objective weighing MCDM methods, wherein the objective weights of relative importance are determined based on the contrast of intensity and conflicts contained within the structure of the decision-making problem. The objective MCDM methods stand superior subjective MCDM methods such as Analytical Hierarchy Process (AHP), Simple Multi-Attribute Rating Technique (SMART), as the weights are evaluated objectively using statistical means instead of solely depending on subjective inputs from the experts.

Step 1: Formulation of Decision Matrix

$$Max\{f_1(a), f_2(a), f_3(a), \dots, f_m(a), a \in A\}$$

Step 2: Normalization of Input Matrix

$$x_{aj} = \frac{f_j(a) - f_j^-}{f_j^+ - f_j^-}, \text{ wherein}$$

f_j^+ ideal value and f_j^- – non – ideal value

Step 3: Evaluation of the Standard Deviation for the Normalized Matrix

$$x_j = \{x_j(1), x_j(2), \dots, x_j(n)\}$$

Step 4: Establishing the Symmetric Matrix, based on the linear correlation coefficient between the criteria measure of the conflict generated by the criterion.

$$\Sigma_{k=1}^m (1 - r_{jk})$$

Step 5: Estimation of Criteria Information C_j

$$C_j = \sigma_j \times \Sigma_{k=1}^m (1 - r_{jk})$$

Step 6: Measure of Conflict created by w_j

$$w_j = \frac{C_j}{\Sigma_{k=1}^m C_k}$$

PROMETHEE II Algorithm:

PROMETHEE (Preference Ranking Organization Method for Enrichment Evaluation) outranking approach was introduced by Brans in the year 1982 at a conference hosted by the University Laval, Québec, Canada [44]. The method defines a channel towards determining order within multi-criteria assessments [45]. Further, it promotes the evaluation of alternatives based on pre-defined benchmarks, with a final objective of ranking the alternatives. Additionally, PROMETHEE has several extensions. However, PROMETHEE II has been employed within the study as it fosters “complete/comprehensive ranking” through evaluation of “net flow” (benefits minus the drawbacks) for each of the alternative, promoting definitive “linear ranking” in comparison to other PROMETHEE methods that only provide partial ranking of alternatives. Thus, the method provides a more thorough and realistic approach to decision-making, by offering a complete ranking while effectively handling the complexity present in many real-world applications [46]. PROMETHEE II is facilitated through a sequence of steps, as illustrated below [16]:

Step 1: Standardization of the Decision Matrix

$$R_{ij} = \frac{[x_{ij} - \min(x_{ij})]}{[\max(x_{ij}) - \min(x_{ij})]}$$

For beneficial criteria, wherein (i=1...m; j=1...n);

$$R_{ij} = \frac{[\max(x_{ij}) - x_{ij}]}{[\max(x_{ij}) - \min(x_{ij})]}$$

For non-beneficial criteria, wherein (i=1...m; j=1...n)

Step 2: Ascertain the i^{th} alternative's evaluation differences from the other alternatives

$$D = R_{aj} - R_{bj}$$

Step 3: Evaluation of the Preference Function:

$$p_{j(a,b)} = 0, \text{ if } R_{aj} \leq R_{bj}$$

$$p_{j(a,b)} = D, \text{ if } R_{aj} \geq R_{bj}$$

Step 4: Evaluation of the Aggregate Preferences:

$$\pi(a, b) = \frac{[\sum_{j=1}^n w_j \times p_{j(a,b)}]}{\sum_{j=1}^n w_j}$$

Wherein, w_j represents the criteria weights defined within the CRITIC method.

Step 5: Evaluation of the entering (negative) outranking flow φ^+a and the exiting (positive) outranking flow

$\varphi^+ = \frac{1}{m-1} \times \sum_{b=1}^m \pi(a, b), (a \neq b),$ wherein m represents the number of alternatives being ranked.

$\varphi^- = \frac{1}{m-1} \times \sum_{b=1}^m \pi(b, a), (a \neq b),$ wherein m represents the number of alternatives being ranked.

Step 6: Determination of the net outranking flow for each of the alternatives:

$$\varphi(a) = \varphi^+(a) - \varphi^-(a)$$

Step 7: Evaluation of final ranking of alternatives based on $\varphi(a)$ values.

V. RESULTS AND DISCUSSION

The study of relevant literature on barriers for Ethical Sourcing implementation resulted in a comprehensive list of challenges for expert review. However, the NGT led to the addition of technological barriers to the existing list of barriers and consequently contributed to the classification of the barriers into meaningful categories as depicted within Table 2 (Appendix B).

Consequently, recent research studies emphasized the importance of collaborative efforts from organizations, governments, and other stakeholders towards developing integrated strategies that foster progressive changes across the supply chains to effectively overcome barriers to ethical sourcing. The strategies thus identified based on the literature, are as outlined below:

Multi-Stakeholder Collaboration and Engagement (S1)

Multi-stakeholder initiatives (MSIs) stand prominent towards overcoming the barriers to ethical sourcing, because they bring together a variety of stakeholders, such as corporations, non-governmental organizations, governments, and communities, to foster trust, establish shared goals, and facilitate coordinated action. By making it easier to prioritize concerns collectively and build sector-specific tools and procedures that reach above and beyond minimal regulatory norms, these initiatives elevate the bar for ethical

conduct across industries. Moreover, to overcome fragmented governance and supply chain challenges, such cooperative forums also facilitate knowledge exchange, cooperative problem-solving, and capacity building [47, 48, 49].

Regulatory Frameworks and Standards (S2)

Governments play a crucial role in establishing legally binding standards by enacting laws such as the EU Corporate Sustainability Due Diligence Directive, which sets minimum standards for supply chain due diligence. Legislation by itself, however, is insufficient; governments must collaborate with other stakeholders to support resource allocation for compliance assistance, promote voluntary initiatives, and ensure policy coherence. Particularly in developing nations where institutional flaws are prevalent, public-private partnerships and discussion forums aid with coordinating corporate sustainability objectives with legal frameworks while ensuring equitable enforcement procedures [50, 51, 52, 53, 54].

Enhanced Organizational Commitment (S3)

Organizations aiming at addressing ethical sourcing barriers need to incorporate sustainability into their fundamental business plans and governance frameworks. Towards establishing quantifiable objectives, securing involvement from all-tiers of management, funding employee and supplier training and capacity-building, including transparent reporting systems, and leveraging technologies for enhanced visibility and traceability. Further, cultivating stronger supplier relationships through prioritizing cooperation over strict compliance encourages ongoing advancements within social and environmental norms [55, 56].

Leveraging Technology and Innovation (S4)

Recent technological advances offer significant enablers to address enduring issues like effect quantification and supply chain opacity. Real-time verification, data sharing, and risk detection across intricate global supply networks are made possible by blockchain, artificial intelligence, and digital platforms, thereby enhancing accountability and transparency. Additionally, technology integration reduces supply chain complexity through fostering enhanced communication [57, 58].

Capacity Building and Supplier Development (S5)

Success relies on emphasizing engagement and capacity building—training suppliers to fulfil ethical standards and offering technical support and mentorship—instead of cutting relations with non-compliant vendors. This cooperative mindset builds resilience, fortifies supplier networks, and encourages shared accountability for sustainable results [37, 59, 60].

Ethical Benchmarks (S6)

Development of ethical benchmarks and transparent reporting mechanisms fosters quantification of benefits and moreover facilitates customer engagement through awareness campaigns [61].

The twelve ethical sourcing barriers (B1-B12) and six strategies (S1-S6) are then used within the CRITIC method as “Criteria” and “Alternatives” respectively, towards determining the objective weights for each of the criterion i.e., barrier, using the steps defined within the section 4. The assessment of the CRITIC method is facilitated through a “Five Point Likert Scale” as depicted within Table 3 (Appendix B). Additionally, Table 4 (Appendix B) illustrates the “Decision Makers Assessment” (i.e., Decision Matrix). Besides, expert evaluations were used to populate the decision matrix, ensuring logical alignment

between remedial measures and their efficacy in reducing specific barriers. Further, the results derived based on steps 2-6 within the CRITIC method are as depicted within Table 5 to Table 8 (Appendix B) respectively.

Consequently, the criteria weights w_j derived from the CRITIC method are fed into the PROMETHEE II method towards ranking of the strategies S1-S6 (i.e., the alternatives) following the steps defined within section 4. The outcomes from the PROMETHEE II are outlined within the Table 9 (Appendix B).

VI. CONCLUSIONS, IMPLICATIONS AND FUTURE DIRECTIVES

By methodically identifying, categorizing and prioritizing barriers using NGT and the CRITIC-PROMETHEE II hybrid MCDM, this study promotes ethical sourcing and provides a fresh approach for stakeholders to deal with complex challenges within the supply chain. Further, targeted strategy ranking is made possible using empirical barrier weights, which close the gap between theoretical understanding and real-world application across complex global markets.

The CRITIC technique was employed within the study to derive the objective weights for the criteria, i.e., barriers (B1–B12), while the PROMETHEE II method was used to rank the alternatives, i.e., strategies (S1–S6) based on their ability to address the ethical sourcing barriers. As a result, the CRITIC emphasizes the significance of barrier B4 (Insufficient Regulatory Enforcement) by awarding it with the highest weight of 15.14%. Besides, according to PROMETHEE II, the strategy S4 (Leveraging Technology and Innovation) was awarded with the highest priority based on its capability to simultaneously address multiple ethical sourcing barriers.

Further, the CRITIC method enhances reliability over subjective approaches within barrier analysis for ethical sourcing through defining objective weights thru intercriteria correlations. Equally, the PROMETHEE II's outranking, aids with providing an unambiguous strategy priority, enabling businesses to overcome regulatory deficiencies, financial limitations, and transparency gaps while fostering resilience. Thus, the study enables policymakers and businesses within developing economies, by incorporating stakeholder consensus from NGT and encouraging sustainable practices in the face of industry-specific and geopolitical challenges.

Nevertheless, the research study might be further improved, through enhancing the integrated model with fuzzy CRITIC-PROMETHEE to deal with the uncertainties within a dynamic supply chain. Also, the study might be further strengthened using longitudinal case studies to validate the efficacy of mitigation strategies. Similarly, within multi-stakeholder scenarios, integrations with other MCDM tools might be investigated, with a special emphasis on top-management involvement and consumer awareness.

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Appendix A: Figures

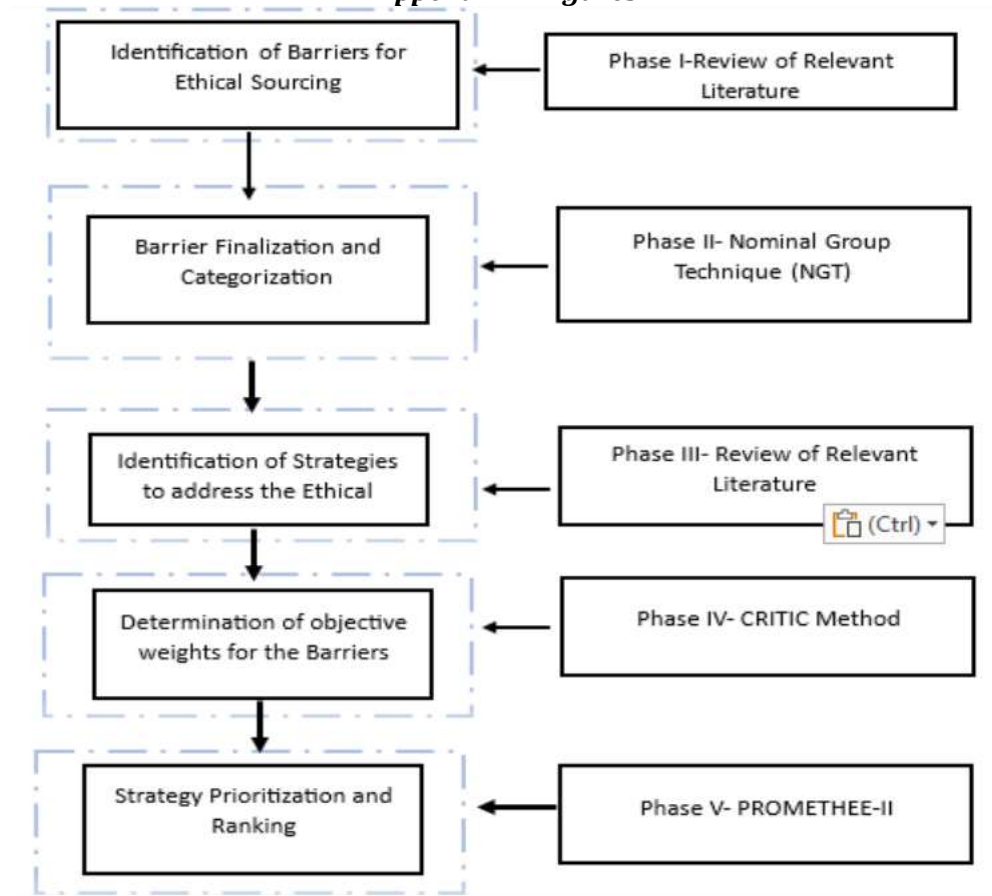


Figure 1: Research Schema



Figure 2: NGT Process, adapted from (Mullen et al., 2021).

Appendix B: Tables

Table 2 Ethical Sourcing Implementation Barriers

Sr.no	Barriers	Category	References
B1	High Implementation Costs	Economic	[17, 18, 19, 20]

B2	Complex and Opaque Supply Chains	Inter-Organizational	[21, 22, 23]
B3	Supply Chain Disruption Risks		[21, 31, 32, 33, 34]
B4	Insufficient Regulatory Enforcement	Regulatory/Legal/Policy	[24, 25, 26, 27]
B5	Limited Top-Management Commitment	Intra-Organizational	[25, 28, 29, 30]
B6	Low Stakeholder Engagement		[62]
B7	Difficulty in Measuring Impact		[17, 24, 35, 36, 37]
B8	Resistance to Change		[17, 21]
B9	Limited Consumer Awareness and Demand	Knowledge	[17, 30, 63]
B10	Sector Specific Challenges	Sectorial	[21, 38, 39, 40, 41, 42]
B11	Legacy Information Systems	Technological	[64]
B12	Infrastructural Deficiencies		[65]

Table 3 Five Point Scale

Scale	Interpretation
1	Very Low Effectiveness
2	Low Effectiveness
3	Moderately Effective
4	Highly Effective
5	Very High Effectiveness

Table 4 Decision Makers Assessment (Decision Matrix)

Alternative s	Criteria	B 1	B 2	B 3	B 4	B 5	B 6	B 7	B 8	B 9	B1 0	B1 1	B1 2
	S1	3	5	4	3	4	5	4	4	4	4	3	4
	S2	2	4	3	5	3	3	3	2	3	5	2	3

	S3	3	3	4	3	5	4	3	5	3	4	3	3
	S4	4	5	5	3	3	4	5	3	4	4	5	4
	S5	4	4	4	3	4	4	3	4	3	3	3	4
	S6	2	3	2	4	4	3	3	3	4	3	2	2
	Best	4	5	5	5	5	5	5	5	4	5	5	4
	Worst	2	3	2	3	3	3	3	2	3	3	2	2

Table 5 Normalized Decision Matrix and Standard Deviation

	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12
S1	0.50	1.00	0.67	0.00	0.50	1.00	0.50	0.67	1.00	0.50	0.33	1.00
S2	0.00	0.50	0.33	1.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.50
S3	0.50	0.00	0.67	0.00	1.00	0.50	0.00	1.00	0.00	0.50	0.33	0.50
S4	1.00	1.00	1.00	0.00	0.00	0.50	1.00	0.33	1.00	0.50	1.00	1.00
S5	1.00	0.50	0.67	0.00	0.50	0.50	0.00	0.67	0.00	0.00	0.33	1.00
S6	0.00	0.00	0.00	0.50	0.50	0.00	0.00	0.33	1.00	0.00	0.00	0.00
σ	0.4472	0.4472	0.3443	0.4183	0.3764	0.3764	0.4183	0.3496	0.5477	0.3764	0.3651	0.4082

Table 6 Symmetric Matrix Illustrating the Linear Correlation

	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12
B1	1.00	0.50	0.87	0.80	0.00	0.59	0.53	0.43	0.00	0.30	0.82	0.82
B2	0.50	1.00	0.65	0.27	0.59	0.59	0.80	0.21	0.41	0.30	0.61	0.82
B3	0.87	0.65	1.00	0.69	0.09	0.69	0.69	0.37	0.00	0.17	0.88	0.87
B4	0.80	0.27	0.69	1.00	0.48	0.79	0.43	0.80	0.22	0.48	0.65	0.59
B5	0.00	0.59	0.09	0.48	1.00	0.29	0.48	0.89	0.24	0.41	0.24	0.22
B6	0.59	0.59	0.69	0.79	0.29	1.00	0.48	0.63	0.24	0.06	0.49	0.76
B7	0.53	0.80	0.69	0.43	0.48	0.48	1.00	0.11	0.65	0.16	0.87	0.59
B8	0.43	0.21	0.37	0.80	0.89	0.63	0.11	1.00	0.17	0.38	0.17	0.23
B9	0.00	0.41	0.00	0.22	0.24	0.24	0.65	0.17	1.00	0.24	0.33	0.00

B10	-	0.30	0.30	0.17	0.48	-	0.41	-	0.06	0.16	-	0.38	-	0.24	1.00	0.00	0.11
B11	0.82	0.61	0.88	-	0.65	-	0.24	0.49	0.87	0.17	0.33	0.00	1.00	0.67			
B12	0.82	0.82	0.87	-	0.59	-	0.22	0.76	0.59	0.23	0.00	0.11	0.67	1.00			

Table 7 Measure of Conflict

	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	$\sum_{k=1}^m (1 - r_{jk})$
B1	0.00	0.50	0.13	1.80	1.00	0.41	0.47	0.57	1.00	1.30	0.18	0.18	7.54
B2	0.50	0.00	0.35	1.27	1.59	0.41	0.20	1.21	0.59	0.70	0.39	0.18	7.39
B3	0.13	0.35	0.00	1.69	1.09	0.31	0.31	0.63	1.00	0.83	0.12	0.13	6.59
B4	1.80	1.27	1.69	0.00	1.48	1.79	1.43	1.80	1.22	0.52	1.65	1.59	16.24
B5	1.00	1.59	1.09	1.48	0.00	0.71	1.48	0.11	1.24	1.41	1.24	1.22	12.57
B6	0.41	0.41	0.31	1.79	0.71	0.00	0.52	0.37	0.76	1.06	0.51	0.24	7.09
B7	0.47	0.20	0.31	1.43	1.48	0.52	0.00	1.11	0.35	0.84	0.13	0.41	7.24
B8	0.57	1.21	0.63	1.80	0.11	0.37	1.11	0.00	1.17	1.38	0.83	0.77	9.96
B9	1.00	0.59	1.00	1.22	1.24	0.76	0.35	1.17	0.00	1.24	0.67	1.00	10.24
B10	1.30	0.70	0.83	0.52	1.41	1.06	0.84	1.38	1.24	0.00	1.00	0.89	11.18
B11	0.18	0.39	0.12	1.65	1.24	0.51	0.13	0.83	0.67	1.00	0.00	0.33	7.05
B12	0.18	0.18	0.13	1.59	1.22	0.24	0.41	0.77	1.00	0.89	0.33	0.00	6.93

Table 8 Estimation of the Criteria Information C_j and the measure of Conflict created by the Criterion w_j

	σ	$\sum_{k=1}^m (1 - r_{jk})$	C_j	w_j	Percentage w_j
B1	0.45	7.54	3.37	0.08	7.52
B2	0.45	7.39	3.30	0.07	7.37
B3	0.34	6.59	2.27	0.05	5.06
B4	0.42	16.24	6.79	0.15	15.14

B5	0.38	12.57	4.73	0.11	10.54
B6	0.38	7.09	2.67	0.06	5.95
B7	0.42	7.24	3.03	0.07	6.75
B8	0.35	9.96	3.48	0.08	7.76
B9	0.55	10.24	5.61	0.12	12.50
B10	0.38	11.18	4.21	0.09	9.38
B11	0.37	7.05	2.57	0.06	5.74
B12	0.41	6.93	2.83	0.06	6.31
44.865				1	

Table 9 PROMETHEE II Ranking of Strategies

	Leaving Flow, ϕ^+	Entering Flow, ϕ^-	Net Outranking Flow, ϕ	Alternative Ranking
S1: Multi Stake Holder Collaboration & Engagement	0.26	0.10	0.166	2
S2: Regulatory Frameworks & Standards	0.23	0.29	-0.064	5
S3: Enhanced Organizational Commitment	0.19	0.20	-0.018	3
S4: Leveraging Technology & Innovation	0.31	0.13	0.172	1
S5: Capacity Building and Supplier Development	0.14	0.20	-0.056	4
S6: Ethical Benchmarks	0.12	0.32	-0.200	6