OPTIMIZING GREEN FOOD ON MICE INDUSTRY: DETERMINING PERFORMANCE STRATEGY

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Abstract

The increasing emphasis on sustainability in global business ecosystems has transformed environmental responsibility from an ethical obligation to a strategic imperative. In the MICE (Meetings, Incentives, Conferences and Exhibitions) industry, eco-friendly food is crucial in reducing environmental impact and improving long-term competitiveness. However, the Indonesian MICE sector faces major challenges in implementing structured sustainability strategies, especially in food procurement and waste management. The lack of a standardized decision-making framework limits the industry's ability to optimize its sustainability efforts and creates a research gap in identifying the most impactful green food initiatives. Data was collected from 50 individual members of the Indonesian Event Association (IVENDO) representing event consulting, event management, hospitality and exhibition organization, as well as from three medium-sized companies affiliated with IVENDO and operating in the MICE sector. The results show that local and organic sourcing (LOS) is the highest priority (0.206), followed by storage optimization (SO) (0.138), sustainable packaging (SP) (0.129) and energy-efficient operations (EEO) (0.100). These results highlight the industry's preference for local partnerships, efficient food storage management and environmentally friendly operational concepts. While the study provides a structured approach to green food optimization, the focus on Indonesia and the limited sample size limit its applicability on a broader scale. However, the findings serve as a foundation for future research to expand datasets and explore blockchain-enabled supply chain transparency to ultimately improve sustainability and operational efficiency in the Indonesian MICE industry while strengthening its global impact.

Keywords: MICE industry, green food strategies, Analytic Hierarchy Process (AHP), sustainable event management, decision-making framework.

JEL Classification: L83, Q56

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1. Introduction

The Meetings, Incentives, Conferences and Exhibitions (MICE) industry has become a strong driver of global economic growth. According to recent industry analyzes, the global MICE market was estimated at 805 billion dollars in 2023 and is expected to reach 1,337.4 billion dollars by 2028, with an average growth rate of 10.7% (Allied Market Research, 2024). The sector provides around 26 million jobs worldwide and has a significant economic impact through ancillary industries such as hospitality, travel and catering (International Congress and Convention Association, 2023). Over the past five years, Indonesia has hosted several major events that have highlighted the country's commitment to sustainability, particularly in food sourcing and waste management. The 2022 G20 Summit in Bali, held at the Apurva Kempinski Bali Resort, was a notable example. This event not only aimed to revitalize the tourism sector in Bali after the pandemic, but also emphasized sustainable practices in operations. Similarly, the Jakarta Fashion and Food Festival (JFFF), held annually since 2004, promotes Indonesian culture through fashion and culinary arts, with recent events focusing on integrating sustainability into their programs. However, this rapid expansion has led to significant environmental issues, particularly

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in terms of resource consumption and waste generation, raising questions about the long-term sustainability of the industry.

Sustainability is a key strategic factor influencing business operations, stakeholder engagement and profitability in the MICE industry. Green food is not just a remedial measure in this context, but serves to redefine operational efficiency, customer expectations and corporate responsibility towards environmental issues. This shifting paradigm of sustainable business means that sustainability is not an external responsibility, but an integral part of value creation in the MICE industry. Recent studies by the Global Sustainable Tourism Council (GSTC) show that MICE events generate between 1.89 and 5.44 kg of waste, 35% of which is food (Global Sustainable Tourism Council, 2023). This data shows that the impact of food waste on the environment is very high, especially in terms of greenhouse gas emissions. Furthermore, in the EU, around 16% of total greenhouse gas emissions come from food systems (Zamudio et al, 2024). Previous research has shown that food waste at MICE events leads to a significant global environmental problem.

Therefore, the MICE industry is going through a paradigm shift and is focusing on environmentally friendly food as a strategic economic option and as a way of protecting the environment. Waste reduction initiatives, environmentally friendly catering methods, and sustainable food sources all support economic efficiency and environmental responsibility. As a crucial component of sustainable practices in the food industry is the increasing adoption of eco-friendly design and packaging in the sector. These initiatives are part of a broader movement towards internal environmental management and green production (Qin et al., 2021; Nath et al., 2022). Food transportation initiatives for emission reduction operate as part of complete green supply chain strategies. Practices showing better corporate success together with sustainability have a positive impact on both outcomes (Qin et al., 2021; Shahzad et al., 2024). Such initiatives help protect the environment by lowering negative environmental impacts and building trust with stakeholders, while creating competitive advantage and better brand reputation in conjunction with cost reductions. Redirecting wasted food to charity leads to both lower disposal costs and the development of social change programs.

The MICE industry hastens its sustainability drive through stakeholder demand along with changing governance structures. Leading industry figures along with event organizers respond to rising customer and legislative and client expectations about responsible event planning. The MICE industry is transforming its investment patterns because sustainability now serves as a sign of both profitability success and resilience (Hieker et al., 2024). The trend towards green methods is reinforced by the increasing emphasis on sustainability in venue selection criteria (Syafganti et al., 2024). The sector is demonstrating how sustainability and strategic business growth through green food practices are merging in its endeavor to drive this shift. Sustainability has shifted from being regarded as a trivial issue since it has become an essential business principle that strengthens operational results while boosting profits and reinforcing stakeholder partnerships with stakeholders in the MICE sector. The manuscript examines how sustainability transformed from an ethical necessity to an essential factor that ensures long-term business success and competitive advantage in the MICE industry.

2. Literature review

2.1 The Importance of Sustainability in the MICE Industry

The Meetings Incentives Conferences and Exhibitions (MICE) sector is experiencing significant growth while remaining central to the development of tourism and global economic growth, report Kim et al. (2022) and Mahmud et al. (2024). The rapid growth of the MICE sector has led to concerns about the sustainability of waste management and food consumption. Environmental sustainability in the MICE sector requires responsible purchasing and excellent waste control in combination with energy efficiency. Organizations organizing sustainable events are now focusing heavily on food sustainability. Organizations should adopt three sustainable measures in their operations - they need to reduce food waste, use eco-friendly packaging materials and source their supplies from local organic sources (Day, 2018). These sustainability measures reduce both environmental impact and guest satisfaction and better connect events to sustainability goals (Ahn and Pearce, 2013).

The MICE sector is adopting green food practices because they offer strategic commercial benefits and environmental responsibility while driving sustainable change. Green catering practices combined with waste reduction methods and sustainable purchasing can reduce costs and improve competitive positioning (Bowdin et al., 2011). Supporting sustainability practices for MICE events through governance and policy is at the forefront of research studies in several countries, including the USA, Canada and Australia (Kim et al., 2022). The Indonesian government recognizes that sustainability plays a crucial role in MICE decision-making processes for venue selection and meeting and conference planning (Syafganti et al., 2024).

2.2 Strategic Green Food Practices in the MICE Industry

According to Amuquandoh and Asafo-Adjei (2013) and Fatima and Elbanna (2023), green food practices are an essential element in reducing the environmental impact of MICE events and improving local economic development and corporate image. Sustainable food strategies consist of three key components that serve as a foundation:

1. Effectively reducing carbon emissions and supporting local agricultural markets is achieved by sourcing produce from both local soil and organic suppliers (Lozanski and Baumgartner, 2020). Such an operational approach ensures that environmentally friendly methods are used in food production in agriculture and supports global sustainability goals.
2. Large MICE events generate large amounts of food waste during catering. Waste reduction results from organized planning systems together with portion management and food donation programs based on the findings of FAOSTAT (2021) and Adams et al. (2021).
3. Optimization of food procurement through new technologies can be achieved through the use of artificial intelligence for smart inventory management and demand forecasting.
4. Caterers hosting events should minimize plastic waste by using eco-friendly materials and reusable packaging containers. Research confirms that eco-friendly packaging methods are crucial to achieving sustainability goals in event management (Qin et al., 2021; Shahzad et al., 2024).

According to Jeong and Jang (2010), incorporating such practices into the operations of the MICE sector solves environmental problems while improving stakeholder relations and international sustainability requirements as well as brand perception.

2.3 Review of Analytic Decision-Making in Green Food Practices

Making decisions for MICE events that prioritize sustainability requires an organized approach that integrates environmental, economic and social assessments. The Analytic Hierarchy Process (AHP) has been a popular tool in sustainability research since Saaty and Vargas introduced it in 1980 to help experts categorize green food tactics. Event planners use the AHP to evaluate sustainable practices by assessing activities involving waste management and local sourcing, as well as green food procurement. Research shows that AHP provides excellent results for achieving sustainability goals while effectively managing costs. Through this assessment, organizers can identify effective strategies between environmental and economic improvements (Joshi et al., 2020). Stakeholders should be involved in the decision-making processes, according to research, as this ensures both complete and functional sustainability measures (Arcese et al., 2015). Implementing AHP into the planning systems of MICE companies provides a systematic evaluation of sustainability initiatives to identify clear outcomes and build lasting business stability.

3. Methodology

The following section provides guidelines for selecting optimal measures according to the attributes of the support system in order to maximise the performance of green food in the MICE sector. Experts in the MICE sector (Meetings, Incentives, Conferences, and Exhibitions) use the AHP concept to identify and categorise green food initiatives. The Analytic Hierarchy Process (AHP) enables experts to structure decision-making processes through its hierarchical framework in which different alternatives are evaluated relative to their importance.

Data Collection

Fifty specialists within MICE industry field participated in interviews to obtain data for this research. The professionals from event consulting, venue management, hospitality and exhibition organization participated based on their membership in the Indonesian Event Association (IVENDO). The respondents have an average of nine years of experience. 32% of the respondents are women, who make up half of the population, compared to 68% male participants. Half of the fifty respondents are directors and the other half are managers and senior executives of the group. The study population is spread across the four sectors with ten hospitality professionals, ten exhibition organization professionals, fifteen venue managers and fifteen event consultants.

In addition to the 50 registered IVENDO members, three medium-sized companies with established and active MICE activities in Bali, Indonesia, were also included in the survey. The survey addresses (1) the current status of green food practices in the MICE industry, (2) the significance of particular strategies (such as local sourcing, waste reduction and sustainable catering) and (3) the opportunities and challenges in putting these strategies into practice.

The survey was conducted through online channels such as: (1) Professional networking sites like LinkedIn, (2) industry-specific groups and forums, (3) email invites to industry professionals, and (4) direct contact with event management firms. The study employed a structured questionnaire, which made data processing simpler and replies more consistent. Because it is more effective, produces a bigger sample size, and guarantees data collecting consistency, this approach was chosen over interviews. The questionnaire's items were taken from earlier research on organizational structures, career development, and the allocation of human resources in the event sector.

Research flow

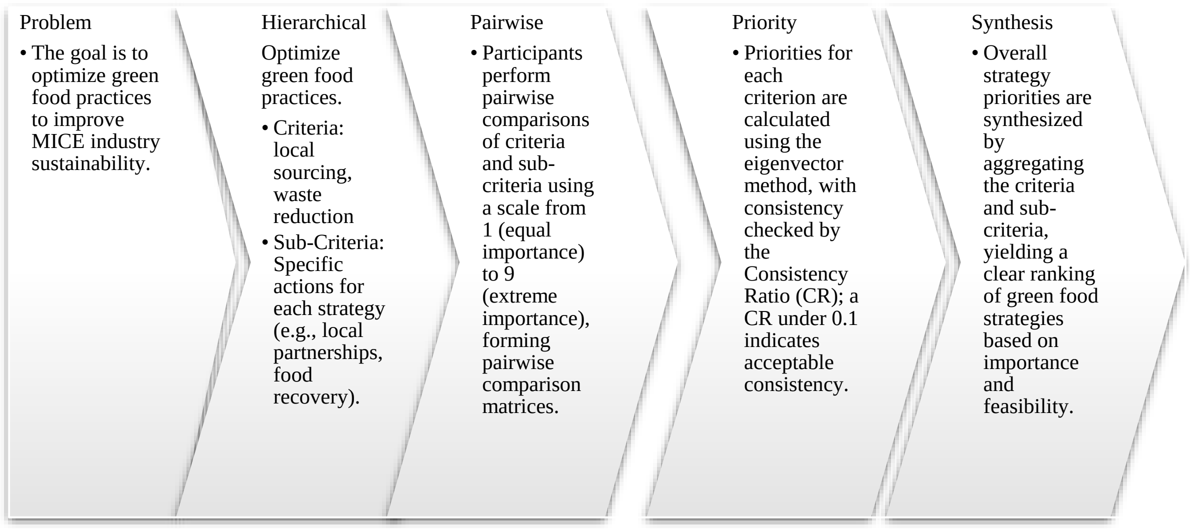

Figure 1. Research Stage

Source: Author's visualization based on Saaty and Vargas (1980)

Figure 1 shows how AHP provides a structured decision-making framework by breaking down complex decisions into smaller, more manageable pieces. The methodology follows these steps:

Stage 1. Identifying problem

The difficulties that tourism companies face in their performance improvement strategies consist of several important aspects. Finding suitable strategies to increase the attractiveness of destinations in the tourism sector is a challenge. Each destination has its own characteristics and at the same time is in intense competition with each other. The identification of suitable strategies remains essential, as they should make a destination stand out from other destinations. The creation of sufficient tourism infrastructure faces many obstacles during the development process. Investments need to be made in tourism facilities to increase their quality and capacity and to provide better services to tourists. The sustainability of the environment and the protection of culture are critical issues that require immediate action. Tourism management must prioritize environmental and cultural protection as part of its responsibility to maintain sustainable tourism operations. A strategic solution must be implemented through comprehensive methods aimed at improving the performance of tourism operations.

Stage 2. Defining Criteria

The definition of essential criteria is fundamental to the AHP methodology in order to select a strategy based on variables that influence support systems in the tourism industry. This research uses Table 1 to explain the indicators that measure certain elements that influence the performance of support systems in the tourism industry.

Table 1. The Definition of Green Food Variable

Indicator	Code	Definition
Local and organic sourcing	(LOS)	The factor of procuring ingredients from local farmers and organic producers within a defined radius to reduce carbon footprint and support local economies.
Waste management system	(WMS)	The systematic approach to reducing, tracking, and processing food waste, including composting programs and donation partnerships.
Energy efficient operations	(EEO)	The implementation of energy-saving practices and equipment in food preparation, storage, and service areas.
Sustainable packaging	(SP)	The use of eco-friendly, biodegradable, or reusable packaging materials for food service and transportation.
Menu engineering	(ME)	The strategic design of menus incorporating seasonal ingredients, plant-based options, and portion optimization to minimize environmental impact.
Supply chain transparency	(SCT)	The traceability and documentation systems that track food sources, transportation methods, and handling processes.
Water conservation	(WC)	The implementation of water-saving practices in food preparation, cleaning, and service operations
Storage optimization	(SO)	The efficient management of food storage facilities to minimize spoilage and maximize resource utilization.
Quality assurance	(QA)	The standards and procedures ensuring food safety while maintaining sustainable practices.
Carbon footprint monitoring	(CFM)	The systemic tracking and reduction of greenhouse gas emissions related to food procurement, preparation and service

Source: Author's own elaboration based on variable

The definition of AHP criteria should include an evaluation of their significance and their effect on tourism industry performance and development. The set criteria functions as fundamental standards for evaluating and determining the best suitable alternative strategies. The support system indicators arrive at Figure 2 through this hierarchical model structure.

Figure 2. Hierarchy Model of Support System Facilities Indicators
Source: Author's visualization based on AHP hierarchy model

Stage 3. Weight calculation

The AHP method was used to determine the weighting values. Table 2 shows the pairwise comparison matrices for each telecommunication indicator and the other elements while the AHP method was applied for the weighting process.

Table 2. Pairwise Comparison Matrix

Indicator	LOS	WMS	EEO	SP	ME	SCT	WC	SO	QA	CFM
LOS	1	5	5	5	5	5	7	5	7	3
WMS	3	1	3	1	0.33	3	3	2	3	0.75
EEO	1	1	1	2	3	3	3	5	3	0.75
SP	2	3	3	1	3	3	3	0.33	5	5
ME	0.33	3	3	0.33	1	3	3	0.33	5	0.33
SCT	3	1	3	3	0.33	1	0.33	0.2	3	0.75
WC	0.14	0.33	0.33	0.33	0.33	3	1	0.14	3	0.33
SO	0.75	3	3	3	3	5	5	1	7	3
QA	0.33	0.33	0.33	2	3	3	1	3	1	0.14
CFM	0.33	3	3	0.14	3	3	3	2	5	1

Source: Author's own results based on data analysis

Among all AHP components the Pairwise Comparison Matrix operates as the dominant element. The matrix examines existing elements' relative priority of the available elements by comparing their importance or preference during an evaluation process. The decision maker performs pairwise assessments between all possible pairs of criteria when creating a pairwise comparison matrix. Each entry in the matrix reflects how important the decision maker considers each pair of items to be evaluated. The number scale between 1 and 9 indicates the relevance level through pairwise comparisons (Murmu et al., 2019). The scale for pairwise comparisons determines how relevant the criteria are to each other. The scales contain definitions for each value according to the following description:

1 - Equal importance: each component makes an equal contribution to the goal.
3 - Moderate importance: one component has a little higher significance than the other.
5 - High importance: one component is far more crucial than the other.
7 - Very strong importance: one element is strongly favored over the other.
9 - Extreme importance: one element is overwhelmingly more important than the other.
2, 4, 6, 8 - Intermediate values: used to express compromises between the above judgments.

After performing the Pairwise Comparison Matrix, the normalization matrix is calculated by dividing the results of the pairwise comparison matrix for each indicator by the number of sums of the individual indicator columns. The results of the normalization matrix can be found in Table 3. The next step is to calculate the weight resulting from each row of indicators divided by the number of indicators, namely 10. The results of the calculation of the weighting of the individual indicators can be seen in Table 4.

Table 3. Normalization Matrix for Green Food Variable

Indicator	LOS	WMS	EEO	SP	ME	SCT	WC	SO	QA	CFM	SUM
LOS	0.08	0.24	0.20	0.28	0.23	0.16	0.24	0.26	0.17	0.20	2.061
WMS	0.25	0.05	0.12	0.06	0.02	0.09	0.10	0.11	0.07	0.05	0.916
EEO	0.08	0.05	0.04	0.11	0.14	0.09	0.10	0.26	0.07	0.05	1.002
SP	0.17	0.15	0.12	0.06	0.14	0.09	0.10	0.02	0.12	0.33	1.292
ME	0.03	0.15	0.12	0.02	0.05	0.09	0.10	0.02	0.12	0.02	0.713
SCT	0.25	0.05	0.12	0.17	0.02	0.03	0.01	0.01	0.07	0.05	0.780
WC	0.01	0.02	0.01	0.02	0.02	0.09	0.03	0.01	0.07	0.02	0.303
SO	0.06	0.15	0.12	0.17	0.14	0.16	0.17	0.05	0.17	0.20	1.380
QA	0.03	0.02	0.01	0.11	0.14	0.09	0.03	0.16	0.02	0.01	0.625
CFM	0.03	0.15	0.12	0.01	0.14	0.09	0.10	0.11	0.12	0.07	0.926

Source: Author's own results based on data analysis

Stage 4. Weighting Ranking

Strategy Prioritization Based on the calculated weights, green food strategies are ranked according to their feasibility and impact. This prioritization helps decision makers to focus on the most effective sustainability measures for the MICE industry. Table 4 shows the ranking of the indicators:

Table 4. Weighting Indicator of Green Food Variable

Code	Weight	Ranking
LOS	0.206	**1**
SO	0.138	**2**
SP	0.129	**3**
EEO	0.100	**4**
CFM	0.093	**5**
WMS	0.092	**6**
SCT	0.078	**7**
ME	0.071	**8**
QA	0.062	**9**
WC	0.030	**10**

Source: Author's own results based on data analysis

Stage 5. Validation

The final step in the AHP process is the calculation of the consistency value, which ensures that the Pairwise Comparison Matrix is reliable and logical. Several key terms are used to measure consistency: λmax (maximum eigenvalue), Consistency Index (CI), Random Index (RI) and Consistency Ratio (CR).

1. λmax (Maximum Eigenvalue)
   - Represents the relative dominance of the largest eigenvalue in the Pairwise Comparison Matrix.
   - Used to calculate CI and CR to assess the matrix's consistency.
   - The closer λmax is to the number of criteria (n), the more consistent the matrix.

2. Consistency Index (CI)
   - Measures the deviation from perfect consistency in the pairwise comparisons.
   - Calculated using the formula: CI = λmax – n / n – 1.
   - A lower CI value indicates a more consistent comparison matrix.
3. Random Index (RI)
   - Serves as a benchmark for evaluating the calculated CI.
   - RI values are predetermined based on the number of criteria (n) from standard reference tables.
   - The RI value helps compare CI to a random consistency scenario.
4. Consistency Ratio (CR)
   - Determines the overall acceptability of the matrix's consistency.
   - Calculated using the formula: CR= CI/RI.
   - If CR ≤ 0.1, the matrix is considered consistent; otherwise, adjustments are required.

Table 5. Consistency Results

Consistency Results	Value
λmax	10.54
Consistency Index (CI)	0.060
Random Index (RI)	1.49
Consistency Ratio (CR)	0.04

Source: Author's own results based on data analysis

In Table 5, the calculated CR value is 0.04, which fulfils the threshold (≤ 0.1) and confirms that the pairwise comparisons are consistent. After determining the weights for each indicator, the weights of the sub-indicators are calculated using the same AHP method, as shown in Table 6. The sub-indicators were determined using a systematic approach that combines the following:

a) Comprehensive literature review on green food practices in the MICE industry and global sustainability frameworks.
b) Expert consultation with MICE professionals, sustainability consultants and catering managers to ensure feasibility and impact on the industry.
c) When AHP attempts to produce data-driven selection results based on logical validity it employs pairwise comparison matrices to organize and rank sub indicators.

The identified sub-indicators gained dependability and applicability through this multi-level approach that creates a solid base to enhance green food strategies in the MICE industry.

Table 6. Consistency Results

Indicator	Code	Weight	Sub indicator	Weight
Local and organic sources	LOS	0.206	Local farmer partnership	0.45
			Seasonal product integration	0.32
			Organic certification compliance	0.23
Waste management system	WMS	0.092	Food waste tracking	0.48
			Composting program	0.32
			Donation partnership	0.20
Energy efficient operations	EEO	0.100	Equipment efficiency	0.48
			Peak usage management	0.32
			Energy usage protocols	0.20
Sustainable packaging	SP	0.129	Bio gradable material	0.55
			Reusable container system	0.30
			Packaging reduction strategies	0.15
Menu engineering	ME	0.1335	Seasonal menu planning	0.42
			Plant based options	0.33
			Portion optimization	0.25
Supply chain transparency	SCT	0.071	Source traceability	0.42
			Digital tracking system	0.33
			Supplier verification	0.25
Water conservation	WC	0.030	Water usage monitoring	0.40
			Efficient cleaning system	0.35
			Water recycling program	0.25
Storage optimization	SO	0.138	Temperature control system	0.45
			Inventory management	0.35
			Space utilization	0.20
Quality assurance	QA	0.071	Food safety standard	0.42
			Sustainability certification	0.33
			Quality control procedures	0.25
Carbon foodprint monitoring	CFM	0.093	Emission tracking	0.45
			Transport impact assessment	0.35
			Energy usage monitoring	0.20

Source: Author's own research based adopted from AHP guidelines

The analysis of green food optimization in the MICE sector provides several important insights into the successful integration of sustainability into food service operations. The Analytic Hierarchy Process (AHP) helped identify optimization priorities by providing strategic direction to industry practitioners.

4. Results

Researchers have conducted analyses on the application of the Analytic Hierarchy Process (AHP) approach in optimizing performance strategy for the travel and tourism sector, which are discussed in this section. The support system variables used in this research provide valuable information needed to determine and prioritize methods that will improve the performance of the tourism sector. The researcher utilized these methods during this research to achieve his objective.

4.1 Key Findings on AHP Analysis

The AHP survey of green food practices in the MICE sector provided important information on the key areas for implementing sustainability. The results show a high level of reliability in the pairwise comparisons, with a consistency ratio (CR) of 0.04 - well below the criterion of 0.10 (Saaty and Vargas, 1980).

Local and Organic Sources (LOS) had the highest weighted criterion (0.206), demonstrating their critical role in sustainable food practices. This outcome is in line with the findings of Lozanski and Baumgartner (2020), who emphasized that the use of organic and locally sourced ingredients significantly reduces the carbon footprint associated with food transportation while promoting regional agriculture. Kim et al. (2022) noted a „paradigmatic shift towards sustainability" in the MICE sector, where environmental responsibility has emerged as a strategic corporate value, which is reflected in the prioritization of LOS.

With a value of 0.138, Storage Optimization (SO) was rated as the second most significant criterion. This shows that effective stock management is increasingly recognized as a crucial element of environmentally friendly event planning. The significance of SO is consistent with previous studies on food waste reduction, which have found that inventory management and organized planning are important tactics for reducing waste in large catering operations (FAOSTAT, 2021; Adams et al., 2021).

Sustainable Packaging (SP) ranked third with a weighting of 0.129, confirming the assertions of Qin et al. (2021) and Shahzad et al. (2024) that environmentally friendly packaging strategies are critical to achieving sustainability goals in large-scale event management. SP's high ranking demonstrates the industry's commitment to reducing plastic waste through biodegradable materials and reusable container systems.

Energy Efficient Operations (EEO) received a weighting of 0.100, placing it in fourth place. This moderate ranking indicates that while energy efficiency is important, the industry sees food-specific sustainability measures as a more urgent priority. This finding is consistent with Bowdin et al.'s (2011) observation that sustainable procurement and waste reduction initiatives contribute more directly to cost efficiency and competitive advantage in the MICE sector.

Interestingly, Water Conservation (WC) received the lowest weighting (0.030), suggesting that it is considered less important compared to other sustainability measures. This result contrasts with some sustainability frameworks, but may reflect the particular context of food-related practices in the MICE industry, where water consumption is less visible or seen as less influential than other factors.

4.2 Primary Strategic Elements

Based on the AHP analysis and supported by the literature review, four primary strategic elements emerge that are essential for the implementation of green food practices in the MICE industry:

1. Local and Organic Sourcing Strategy: with the highest weight (0.206), this strategy should focus on developing partnerships with local farmers (underweight 0.45), integrating seasonal produce (underweight 0.32) and adhering to organic certification (underweight 0.23). As Amuquandoh and Asafo-Adjei (2013) and Fatima and Elbanna (2023) have found, these practices not only reduce the environmental footprint, but also promote local economic growth and improve the reputation of the company. Event organizers should prioritize the creation of sustainable supply chains that connect local producers with MICE venues.

2. Efficient Storage and Inventory Management: Storage Optimization (0.138) emerged as a critical element, with temperature control systems (underweight 0.45) being particularly important. This aligns with research on food waste reduction, where proper storage and inventory management were identified as key strategies to minimize waste (Adams et al., 2021). To improve food shelf life and reduce spoilage, MICE venues should invest in inventory management systems and modern storage technologies.

3. Use of Sustainable Packaging: this factor, which has a weighting of 0.129, prioritizes reusable container systems (sub-weighting 0.30), followed by biodegradable materials (sub-weighting 0.55). According to Qin et al. (2021), the use of eco- friendly packaging significantly reduces the amount of

plastic waste generated at large events. MICE planners need to phase out single-use plastic and implement a thorough packaging policy that prioritizes biodegradable and reusable alternatives.

4. Energy and Resource Efficiency: this strategic element, which combines Carbon Footprint Monitoring (0.093) and Energy Efficient Operations (0.100), focuses on emissions tracking (underweight 0.45) and equipment efficiency (underweight 0.48). The research proves that Jeong and Jang (2010) correctly identified that companies benefit from adopting sustainable practices through improved brand perception and compliance with international sustainability standards. Emissions from food preparation and service in MICE venues should be tracked through established tracking systems that aim to reduce emissions while utilizing energy efficient catering equipment.

The AHP method according to Joshi et al. (2020) is extremely valuable in finding appropriate trade-offs between spending and sustainability goals along with provides hierarchical management tools for MICE sustainability decisions. Event planners should adopt sustainable food preparation practices that focus on crucial components to support the economy and environment for the MICE sector to survive in the long term.

4.3 Strategic Performance Strategy of Green Food

The AHP generates precise instructions to develop a complete strategic performance framework for green food practices in MICE sector. Operable plans use the weighted criteria to create systems which maintain efficient operation while reducing environmental effect.

4.3.1 Integrated Supply Chain Approach

Current evidence shows that the combination of supply chain elements requires immediate action, as both supply chain transparency (SCT 0.078) and local and organic sourcing (LOS 0.206) are highly valued. The research by Syafganti et al. (2024) confirms that sustainable decisions in the MICE sector play an important role, especially in the selection of the venue and in the preparation of the event. The introduction of direct links with farmers and digital tracking by MICE organizers leads to transparent sustainable food supply chain management (underweight 0.45 and 0.32).

Kim et al. (2022) states that sustainable practices in MICE events strongly depend on appropriate governance in addition to policy development. Policy frameworks that mandate minimum local sourcing along with organic certification compliance should form this unified approach. The introduction of provenance traceability systems would support MICE venues to monitor and verify compliance with sustainable standards (underweight 0.48 for SCT), leading to a higher level of trust among stakeholders and better accountability.

4.3.2 Circular Economy Model

The combined effect of Waste Management System (WMS) with a value of 0.092 and Storage Optimization (SO) with a value of 0.138 and Sustainable Packaging (SP) with a value of 0.129 shows how MICE events implement a circular economy model for the food service industry. This method focuses on reducing waste and optimizing resource efficiency while covering the entire life cycle of food, from purchase to disposal. As FAOSTAT (2021) and Adams et al. (2021) have noted, organized food waste planning and tracking (underweighting 0.48 for WMS) is essential for reducing waste in large catering operations. To ensure that food resources are used as efficiently or as well as possible, the circular economy model would include food waste tracking systems, composting initiatives (sub-weight 0.32 for WMS) and donation partnerships (sub-weight 0.20 for WMS).

In this case, the framework of packaging strategies would consist of reusable container systems (sub-weight 0.30 for SP) and biodegradable materials (sub-weight 0.55 for SP). According to Shahzad et al. (2024) and Qin et al. (2021), these eco-friendly packaging options are crucial for achieving sustainability goals in the management of large-scale events. By reducing food spoilage and maximizing purchase quantities, temperature control systems (underweight 0.45 for SO) and inventory management (underweight 0.35 for SO) would further increase resource efficiency.

4.3.3 Technology-Enabled Sustainability

The combination of Carbon Footprint Monitoring (CFM, 0.093), Energy Efficient Operations (EEO, 0.100) and Quality Assurance (QA, 0.062) shows how crucial technology is for improving sustainability performance. According to Bowdin et al. (2011), cost efficiency and competitive advantage are two benefits of sustainable practices in the MICE sector. MICE venues can benefit economically and environmentally by adopting technology for food safety standards (sub-weight 0.48 for QA), emissions tracking (sub-weight 0.45 for CFM) and equipment efficiency (sub-weight 0.48 for EEO). Although menu planning is not ranked first, the moderate weighting (ME, 0.071) shows that it is still an important component of technology-enabled sustainability. AI-driven meal planning solutions that consider environmental impact and nutritional value can maximize plant-based options (underweight 0.33 for ME) and seasonal menu planning (underweight 0.42 for ME).

This technology-enabled strategy supports the findings of Ahn and Pearce (2013), who found that sustainable efforts improve attendee satisfaction while reducing their negative impact on the environment. MICE venues should adopt digital tools to monitor sustainability reports that provide transparent visibility of energy consumption and carbon emissions, as well as food quality ratings to more closely link sustainability to the event experience.

4.3.4 Performance Measurement and Continuous Improvement

The assessment of the sustainability performance of MICE food services depends on the AHP analysis method, which provides a reliable assessment with a CR value of 0.04. According to Arcese et al. (2015), the decision-making process requires multiple stakeholders to develop practical sustainable programs. Regular stakeholder input must be incorporated into the performance evaluation plan while generating quantitative indicators from weighted evaluation criteria.

The creation of Key Performance Indicators (KPIs) must focus on the three most heavily weighted criteria, including the percentage of locally sourced ingredients (LOS), proportion and food waste decrease (WMS) and biodegradable packaging proportion (SP). Regular monitoring and comparison of the developed KPIs with industry benchmarks and best practices will enable continuous further development.

According to Day (2018), green food solutions are an important component of sustainable event design, which supports the performance measurement approach. To demonstrate their commitment to sustainability, MICE organizers need to set specific performance targets that help identify innovation opportunities and performance improvements.

The strategic performance plan for green food in the MICE industry must integrate supply chain management with circular economy principles and technological capabilities, as well as ongoing performance assessments. The strategic framework enables MICE organizers to run sustainable food businesses that benefit both the economy and the environment as it integrates all aspects and follows AHP analysis to prioritize.

4.4 Implementation Challenges and Opportunities

The AHP analysis reveals both obstacles and potentials for the implementation of key green food practices in the MICE industry.

4.4.1 Challenges

Supply chain reliability and seasonal availability are affected by the importance of local and organic sources (LOS, 0.206). The MICE sector is open all year round, which can lead to conflicts between event schedules and regional growing seasons, as Mahmud et al. (2024) mention. In addition, the comparatively low weight of supply chain transparency (SCT, 0.078) suggests that in the absence of strong traceability systems, it may be difficult to confirm the veracity of organic and local claims.

A possible discrepancy in the circular economy strategy is highlighted by the significant difference between the lower value Waste Management System (WMS, 0.092) and the high priority Sustainable Packaging (SP, 0.129). According to Qin et al. (2021), sustainable packaging initiatives can encounter implementation problems if they are not integrated into all-encompassing waste management strategies.

The low score for water conservation (WC, 0.030) suggests that sustainable food practices may have a blind spot. According to Day (2018), water use in food production and preparation is still an significant environmental criterion, even though it received little weight in the AHP study.

4.4.2 Opportunities

There are a lot of chances for waste reduction and technical innovation because of the high emphasis on Storage Optimization (SO, 0.138). According to the AHP results, spending money on cutting-edge storage technology could solve the food waste problems noted by FAOSTAT (2021) and have a major positive impact on sustainability.

Energy management is becoming more widely acknowledged as a sustainability lever, as seen by the moderate weighting of Carbon Footprint Monitoring (CFM, 0.093) and Energy Efficient Operations (EEO, 0.100). This supports the findings of Bowdin et al. (2011) findings that sustainable practices contribute to cost efficiency and are a way to present green food initiatives as both environmentally responsible and economically beneficial.

The combination of Menu Engineering (ME, 0.071) and Quality Assurance (QA, 0.062), although further down the rankings, provides opportunities to differentiate and enhance the participant experience. As Ahn and Pearce (2013) noted, sustainability initiatives can strengthen the link between environmental responsibility and event satisfaction, creating marketing advantages for forward-thinking MICE organizers.

4.5 Recommendations for Industry Practitioners

Based on the results of the AHP analysis and the strategic elements identified, the following recommendations are proposed for MICE industry practitioners:

1. Prioritize local sourcing networks: given the high weighting of LOS (0.206), establish formal partnerships with local farmer cooperatives to ensure a consistent supply of seasonal and organic produce. This is in line with Lozanski and Baumgartner's (2020) focus on reducing carbon footprint through local sourcing.
2. Invest in smart storage technologies: The significant weighting of SO (0.138) indicates that the implementation of IoT-enabled temperature control systems and inventory management solutions should be prioritized. These investments support the findings of Adams et al. (2021) regarding the importance of structured planning in waste reduction.
3. Adopt biodegradable packaging standards: With SP ranking third (0.129) and biodegradable materials being the most underweighted (0.55), develop and implement comprehensive packaging standards that progressively replace traditional plastics. Research on eco-friendly packaging techniques by Shahzad et al. (2024) supports this suggestion.
4. Integrate energy and carbon management: The use of integrated energy management and carbon monitoring systems is justified by the combined weighting of EEO (0.100) and CFM (0.093). According to Jeong and Jang (2010), these programs guarantee compliance with sustainability criteria while enhancing brand image.
5. Create multidisciplinary sustainability groups: The different weighting of criteria shows that green food implementation requires collaboration. To ensure thorough implementation, create cross-functional teams of procurement, operations and sustainability experts as recommended by Arcese et al. (2015) for stakeholder engagement.

4.6 Future Direction

The AHP analysis points to several directions for the future development of green food practices in the MICE industry:

1. Technology Integration: There is increasing potential for technical solutions in the field of sustainability, as evidenced by the modest weighting of the technology-related criterion (EEO, 0.100; CFM, 0.093). To solve the verification issues mentioned by Kim et al. (2022), future studies

should look into how cutting-edge technologies like blockchain might improve supply chain transparency (SCT, 0.078) and traceability in local sourcing (LOS, 0.206).

2. Holistic Water Management: Given the low WM score of 0.030, there is a need for increased understanding of the part water plays in sustainable food systems. As suggested by Day (2018) future projects should integrate water conservation with higher ranking goals like energy efficiency and local sourcing to develop more holistic sustainability approaches.
3. Standardized Sustainability Metrics the AHP analysis's dependable consistency ratio (CR = 0.04) shows how important organized decision-making is for sustainability planning. Building on this basis, the sector ought to create uniform sustainability indicators and reporting guidelines that complement the paradigm shift toward sustainability outlined by Kim et al. (2022) and correspond with the weighted criteria discovered in this study.
4. Policy Development: According to Syafganti et al. (2024), governance and policy are essential accelerate sustainability in MICE events. Going forward, industry-specific policies should be developed that incentivize the adoption of the highest rated green food practices, particularly local sourcing (LOS, 0.206) and sustainable packaging (SP, 0.129).

5. Conclusions

In this study, the Analytic Hierarchy Process (AHP) was used to optimize sustainability strategies for green food practices in the MICE industry. A high reliability consistency of 0.04 was achieved. The analysis revealed a clear hierarchy of priorities, with Local and Organic Sources (0.206) emerging as the highest priority, followed by Storage Optimization (0.138), Sustainable Packaging (0.129) and Energy Efficient Operations (0.100), while Water Conservation received the lowest rank (0.030). These results demonstrate four key strategic elements: integrated supply chain approaches, circular economy models, technology-enabled sustainability and continuous performance measurement.

The research makes new contributions by providing a quantitative framework specifically for green food practices in the MICE industry, developing a hierarchical decision-making model that aligns environmental impact with operational feasibility, and proposing a comprehensive strategic performance framework that links environmental responsibility with business benefits. This fills a gap in the existing literature, where catering is often considered a secondary consideration in event planning. At the same time, it demonstrates how sustainability initiatives can contribute to both environmental and business objectives.

Even though this research is mainly focused on the Indonesian MICE industry, it has made a useful contribution. The study provides valuable knowledge on green food strategies, but remains limited by the specific circumstances in Indonesia. The research findings may have limited transferability to other international MICE markets as these markets have different challenges in sourcing, waste management and sustainability processes. The study uses a small sample of three medium-sized enterprises together with fifty members of IVENDO to collect data and this methodology may not represent the full range of Indonesian MICE market participants.

The study provides researchers with important insights for the development and expansion of sustainable event management practices. Future research on sustainability practices needs to assess these practices through increased evaluation of various industry participants in different event sizes. Advanced blockchain analysis of gaps in the supply chain will enable better food transparency that supports both sustainability initiatives and operational performance improvement. Future research based on existing findings will help the global MICE industry to develop sustainable and impactful event management strategies.

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