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Net-Zero Carbon Event to Support Sustainable Tourism in Indonesia

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Abstract

This study aims to analyze the implementation of Net Zero Carbon Events (NZCE) principles at the Bali Nusa Dua Convention Center (BNDCC) and the Jakarta Convention Center (JCC) in supporting sustainable tourism. The study uses a mixed-methods approach. It combines qualitative interviews and participant observation with quantitative SWOT and IE matrix analysis. The results show that both venues have strengths in green infrastructure and renewable energy. However, they face challenges such as budget constraints and limited coordination between departments. External opportunities, including government support and technological innovation, can be leveraged to improve NZCE implementation. The findings suggest strategies such as diversification, stronger stakeholder collaboration, and enhanced human resource capacity. These strategies are important to support environmentally friendly and sustainable MICE events in Indonesia.

Keywords: Net Zero Carbon Events (NZCE), MICE, Sustainable Tourism, Green Infrastructure, SWOT Analysis, management event, carbon neutrality

A. Introduction

The Meetings, Incentives, Conferences, and Exhibitions (MICE) sector in Indonesia is experiencing significant growth, driven by the development of the tourism industry and the increasing demand for national and international business meetings. Major venues such as the Bali Nusa Dua Convention Center (BNDCC) and the Jakarta Convention Center (JCC) serve as strategic infrastructure within the MICE ecosystem and represent Indonesia's capacity to attract large-scale events. However, this growth carries significant environmental consequences, particularly from greenhouse gas emissions associated with venue energy consumption, participant mobility, event logistics, and waste generated during the event.

Net Zero Carbon Events (NZCE) offer a framework for reducing and managing emissions in line with global climate goals. In MICE, emissions primarily result from transportation, energy use, and waste, and without targeted interventions, large events can become significant "carbon hotspots."

Despite the growing movement in global convention centers, implementing low-carbon practices at the venue level still faces challenges: limited internal governance, gaps in integrating environmental targets into the event supply chain, and weak standards and accountability mechanisms (Mair & Laing, 2012; Mair & Laing, 2013). Similar issues are further complicated in the Indonesian context, where the implementation of the NZCE tends to face specific obstacles such as: (1) Fragmented regulations and green operational standards; (2) Uneven readiness of energy efficiency infrastructure and technology; (3) varying waste management and sorting capacities across cities/destinations; (4) Limited systems for carbon emissions data and reporting at events. As a result, the loss often stops at partial initiatives (e.g., plastic reduction) without an operational roadmap capable of measurably and consistently reducing emissions.

However, the existing literature still leaves a clear research gap. First, most MICE sector emissions research focuses on a global or event-centric perspective, while venue-based empirical evidence (venue-level readiness) in Indonesia remains limited. Second, many studies focus on eliminating emission sources and barriers but lack sufficient clarity in translating their findings into prioritized strategies, complete with implementation sequences and managerial guidance. Third, studies that systematically integrate internal venue factors (capabilities, systems, resources) and external factors (policies, markets, stakeholders, and supply chains) to develop NZCE strategies for large MICE venues in Indonesia are still rare.

To address this gap, this study examines the implementation of NZCE principles at two major venues, BNDCC and JCC, using a SWOT analysis approach. Specifically, it combines internal (strengths–weaknesses) and external (opportunities–threats) evaluation factors. Unlike previous studies, which tend to be descriptive, this study positions SWOT as a strategic tool to achieve three objectives: (1) to identify and analyze the internal and external factors influencing NZCE readiness at BNDCC and JCC; (2) to develop a sustainability

strategy for the venues using SO–WO–ST–WT combinations; and (3) to deliver strategic recommendations that can guide other MICE venues in Indonesia and the Asia-Pacific region with similar market characteristics.

This research aims to advance the strategic agenda for low-carbon MICE venues in Indonesia by providing actionable recommendations for implementing NZCE principles in energy, waste, materials, and logistics management. The findings offer practical guidance for venue managers developing targeted policies and collaborations, as well as for policy-makers seeking stronger governance and incentives. By delivering venue-specific insights, this study seeks to bridge discourse and execution on decarbonization in Indonesia's MICE sector.

B. Literature Review

Sustainability in the MICE Sector

The MICE sector in Indonesia is experiencing rapid development, in line with its significant growth in the tourism industry. Sustainability in this sector is a major concern, as global regulations regarding climate change and the environmental impacts of various industrial sectors become increasingly stringent. MICE is a sector that requires significant attention because its activities often generate substantial carbon emissions, including transportation, energy consumption, and event-related waste (Li et al., 2025).

Research by Gonçalves et al. (2025) shows that several global conference centers have begun implementing measures to reduce waste and improve energy efficiency. However, progress is still limited to certain areas and does not yet encompass a holistic approach to phasing out. Conversely, research by Zanella et al. (2025) emphasizes the importance of implementing Net Zero Carbon Events (NZCE) principles in the MICE sector to reduce the carbon footprint through more efficient resource management.

Carbon Footprint Reduction in the MICE Sector

MICE, as a sector involving high mobility and intensive energy use, must focus on reducing its carbon footprint. According to Buathong & Lai (2017), the main sources of carbon emissions in the MICE sector are participant transportation, event energy consumption, and waste management. Research by Trisnayoni et al. (2022) also noted that although energy management has been implemented in some locations, many venues still face challenges in managing waste generated during MICE activities. Several global conference centers have adopted the NZCE principles, leading to the use of renewable energy sources and significant reductions in energy consumption (Raman et al. 2025).

Challenges in Implementing Sustainability in MICE Venues

Research by Hardini et al. (2024) found the main challenge for sustainability in Indonesia's MICE sector. Weak policies and limited understanding among event managers and service providers are key issues. Without clear regulations, many organizers are reluctant to implement more

radical sustainability practices. Concerns about costs and complex logistics also contribute. Research by Wee et al. (2021) shows that many event organizers in Indonesia recognize the importance of sustainability. However, they often lack the resources or information to implement eco-friendly practices. One example is the lack of effective waste management systems at many MICE venues. This results in high volumes of unmanaged waste.

SWOT Analysis in the Sustainability of the MICE Sector

A SWOT (Strengths, Weaknesses, Opportunities, and Threats) analysis is a useful tool for assessing internal and external factors that influence the implementation of desired practices in the MICE sector. A SWOT analysis identifies a venue's strengths (such as resources), weaknesses (limitations), opportunities (potential growth areas), and threats (external risks). According to research by Wijaya et al. (2020), using a SWOT analysis can help identify a venue's strengths and weaknesses in the tourism sector, as well as the opportunities and threats present in the external environment. This is crucial for designing effective and practically implementable strategies.

A SWOT analysis also enables venue managers to identify specific challenges they face and to design solutions tailored to local conditions. For example, BNDCC and JCC can leverage their strengths, such as existing infrastructure, to transition to renewable energy and improve waste management, while identifying threats related to regulations or the costs of implementing new technologies.

MICE Sustainability Policies and Regulatory Frameworks

Implementing clear, supportive policies is crucial for success in the MICE sector. According to research by Sun et al. (2024), countries that have implemented more stringent policies, such as tax incentives or subsidies for the use of environmentally friendly technologies, have made significant progress in reducing the MICE sector's carbon footprint. Research by Sharma et al. (2025) suggests that policies that support sustainability, such as mandating the use of environmentally friendly materials and reducing greenhouse gas emissions, will be instrumental in driving faster change. Therefore, it is crucial for the Indonesian government to develop clearer and more detailed policies to support the management of environmentally friendly MICE events in the future (Li et al., 2025).

C. Research Methods

This study employed a mixed-methods approach, combining qualitative and quantitative methods to yield comprehensive results. Qualitative data, including in-depth interviews and participant observation, accounted for 70% of the total data and explored respondents' perceptions of the research issues. Meanwhile, 30% of the quantitative data was collected through questionnaires and analyzed using statistical methods, specifically IFAS and EFAS, to assess relationships among variables.

The study was conducted at two prominent MICE venues in Indonesia: the Bali Nusa Dua Convention Center (BNDCC) and the Jakarta Convention Center (JCC), both of which have committed to implementing Net Zero Carbon Events (NZCE) principles. These venues were selected based on their role as models in the MICE sector. The study spanned seven months, from December 2024 to July 2025, to ensure data collection covered a wide range of operational and policy aspects.

For data collection, a case study method allowed researchers to gather evidence from multiple sources. Primary data were collected through in-depth interviews with 10 key informants, including venue managers, MICE event organizers, and climbing experts. Participant observation provided firsthand insights into the poverty principles at the two venues. Secondary data was obtained through a literature review and analysis of official documents related to NZCE in the MICE industry.

The data analysis methods used included qualitative and quantitative analysis. For the qualitative data was applied to identify themes emerging from the interviews and observations. This approach enabled researchers to engage in in-depth discussions about the implementation of NZCE strategies in the field. Meanwhile, data was analyzed using a SWOT matrix to assess the strengths, weaknesses, opportunities, and threats affecting sustainability implementation, with the results used to formulate more appropriate strategies.

The sample in this study consisted of 99 respondents selected through saturation sampling, including event organizers and organizers at the BNDCC and JCC. This technique was used because the relatively small population allowed for sampling of the entire population. Qualitative informants were selected purposively, based on their relevance and experience in managing MICE events in line with NZCE principles.

This study focused on several key variables: risk mitigation related to carbon emissions and poverty; policies; inter-institutional collaboration; and challenges in human resource and technology management. Using a mixed-methods approach, the study aimed to disseminate the implementation of NZCE at both MICE venues. It also sought to provide strategic recommendations to support sustainable tourism development in Indonesia.

D. Result and Discussion

Description of the Research Area

Opened in 2011, the Bali Nusa Dua Convention Center (BNDCC) is located in the premium resort area of Nusa Dua, Bali. Designed to support the tourism industry and MICE activities, BNDCC features modern, large-capacity facilities, including multipurpose halls, VIP rooms, and meeting rooms for a range of international and national events. The complex also offers comprehensive tourism infrastructure, including 4- and 5-star hotels, a golf course, a shopping mall, and direct beach access. BNDCC also implements energy-efficiency and waste-management practices and offers event support services, including catering, technical support, and security. Several major

events have been hosted at BNDCC, including the ASEAN Summit, the IMF-WBG, and Miss World.

The Jakarta Convention Center (JCC) was inaugurated in 1992 and is located in Senayan, Jakarta. It has become an icon of MICE Indonesia, hosting over 10,000 events, from international conferences to concerts. The JCC boasts a large-capacity multi-purpose hall, technical support, catering, and security services. The JCC is committed to sustainability through energy efficiency, air quality management, waste management, and the use of environmentally friendly products. The JCC is also integrated with public transportation and participates in biodiversity conservation. Events previously hosted at the JCC include the Non-Aligned Movement Summit, the Asian Games, and the World Islamic Economic Forum.

Factors Inhibiting the Implementation of Net Zero Carbon Events (NZCE) Principles at the BNDCC and JCC

This study identified key factors inhibiting the implementation of Net Zero Carbon Events (NZCE) at BNDCC and JCC, particularly in five NZCE action areas. Obstacles include issues with renewable energy, waste management, accessibility, and partnership strategies. The primary challenge is reliance on fossil fuels, especially coal-fired electricity. Although both venues have adequate electricity infrastructure, the use of renewable energy is limited by insufficient land and high investment costs, particularly for solar panels needed for cooling. While measures such as LED lighting and automatic sensors have been implemented, insufficient automation remains to reduce excessive energy consumption, particularly in temperature and lighting settings. Furthermore, air management is also a challenge. Some air-saving technologies have been implemented, such as automatic faucets and efficient watering systems, but their adoption is not uniform across the venue.

Table 1. Implementation of NZCE Energy Efficiency at BNDCC and JCC

Aspect	BNDCC	JCC
LED lighting	Used throughout the area, reducing energy consumption by 30–40%	Used in most areas, potential for upgrade with full LED and automatic control
HVAC system	HVAC zoning with environmentally friendly refrigerants (R-32/R-290), reduces energy consumption by 20–30%	Central HVAC, energy-intensive, inflexible in cooling load management
Double Facade	Using a double facade for passive cooling, reducing the cooling load by 15–25%	Not using double facade, requires renovation to increase efficiency
Escalator Motion Sensor	Used to reduce energy consumption by 30–40%	Used to reduce energy consumption by 30–40%
Energy Consumption	Calculate electricity	Calculate the power

Aspect	BNDCC	JCC
Calculation	consumption for all types of events	consumption for only a specific exhibition

Source: Researcher Observation (2025)

Table 1 illustrates significant differences in the implementation of Net Zero Carbon Events (NZCE) principles between BNDCC and JCC with respect to energy efficiency. BNDCC, the newer building, has adopted more modern technologies, including full LED lighting, HVAC zoning, and a dual facade to reduce energy use. Meanwhile, JCC, the older building, still uses an energy-intensive central HVAC system and limited LED lighting in some areas. While both venues use motion sensors on escalators to reduce energy consumption, BNDCC is more comprehensive in calculating energy consumption for different event types. This suggests that BNDCC is more integrated with environmentally friendly technologies, whereas JCC still has significant potential to improve energy efficiency.

Table 2. Implementation of NZCE Air Conservation at BNDCC and JCC

Aspect	BNDCC	JCC
Wastewater Treatment	Used an integrated wastewater treatment plant that supports a closed loop water cycle	Relying on internal wastewater treatment, focus on greywater for cooling towers and plant watering
Air Tap Sensor	Used automatic sensors to prevent waste	Not using automatic faucet sensor
Reduction of Linen Use	Reduce linen usage to reduce washing frequency	Does not include reduced use of linen
Water Consumption Calculation	Calculate air consumption for all types of events	Calculating specific air consumption for exhibitions
Used of Reverse Osmosis (RO)	Used RO for high quality drinking water	Used RO for clear water for ice maker
Utilization of Household Wastewater	Used to irrigate gardens, reducing the demand for clean water	Used for irrigation and cooling towers, saving more air

Source: Researcher Observation (2025)

Table 2 shows the differences in air conservation approaches between BNDCC and JCC in implementing the NZCE. BNDCC has an integrated wastewater treatment system that supports a closed air cycle, allowing air reuse for various purposes, while JCC relies on internal treatment, focusing on greywater for watering plants and supplying cooling towers. BNDCC uses automatic sensor technology on water taps to reduce waste, while JCC has not yet adopted this. BNDCC also reduces linen use for certain events, saving air and energy, while JCC has not implemented a similar policy. Both venues measure air consumption, but BNDCC measures it more broadly across all

event types, while JCC focuses on exhibitions. In terms of reverse osmosis (RO) use, BNDCC focuses on reducing bottled water use, while JCC uses it for ice. BNDCC's greywater use is more focused on irrigation, while JCC uses it for cooling towers, providing a greater impact on air conservation.

Table 3. Implementation of NZCE Waste Management at BNDCC and JCC

Aspect	BNDCC	JCC
Waste Separation	Separate trash bins for organic and non-organic throughout the area	Separate trash bins only in public spaces
Hazardous Waste Management	B3 waste storage facilities comply with standards, in collaboration with certified transporters	There are no special facilities for B3 waste
Plastic Reduction	Use of water dispensers, glass bottles, and pouring water to reduce single-use plastics	Focus on waste separation, no plastic reduction policy
Waste Counting	Waste counting for all types of events, carried out routinely	Waste counting is only for certain exhibitions
Organic Waste Composting	Internal composting of organic waste, producing compost fertilizer	Relying on vendors for composting
Paper Digitization	Reducing paper usage through event digitalization (electronic invitations, QR codes)	Some events still use a combination of printed and digital tickets.
Local Material Procurement	Using local materials for decoration and operations	No mention of use of local materials
Collaboration with Recycling Vendors	Collaborate with waste management vendors for further recycling	Collaborate with landfill vendors for sorting and recycling

Source: Researcher Observation (2025)

Table 3 highlights marked contrasts in waste management between the BNDCC and the JCC. The BNDCC enforces systematic waste segregation across all event zones, adheres to consistent hazardous and toxic waste protocols, and implements a defined plastic reduction strategy through dispensers and glass bottles. Additionally, the BNDCC composts organic waste internally and maintains comprehensive waste accounting for all event categories. It also curtails paper consumption through digital processes and favors local materials for decoration. In contrast, the JCC restricts waste segregation to public areas, lacks a cohesive plastic reduction initiative, and tracks waste only at select exhibitions. Both venues partner with recycling vendors, but their scope and waste management strategies differ significantly.

Table 4. Implementation of NZCE Food and Beverage Management at BNDCC and JCC

Aspect	BNDCC	JCC
Source of Raw Materials	70% local and organic raw materials	The percentage of local raw materials is not stated.
Packaging	Do not use plastic packaging	Use compostable containers
Further Food Distribution	Working with food banks to distribute excess food	There is no similar policy
Tableware	Using reusable plates and cutlery	Using reusable plates and cutlery
Utilization of Food Waste	Food waste is used as animal feed	Food waste is processed by landfill vendors
Eco Enzyme Processing	Eco enzyme processing from kitchen waste	There is no eco enzyme policy
Residue Utilization	Coffee grounds and tea leaves as soil fertilizer	There is no policy on the use of residues

Source: Researcher Observation (2025)

Table 4 illustrates the differences in food and beverage management at BNDCC and JCC. BNDCC implements a policy of using 70% local and organic ingredients and avoids plastic packaging, replacing it with more environmentally friendly compostable materials. BNDCC also collaborates with food banks to distribute excess food, reducing food waste and providing social benefits. Furthermore, BNDCC utilizes food waste for animal feed and produces eco-enzymes from kitchen waste, while JCC does not have a similar policy. Both venues use reusable tableware, which helps reduce single-use waste. BNDCC also utilizes coffee grounds and tea leaves as soil fertilizer, while JCC does not have a food waste utilization policy.

Table 5. Implementation of NZCE Access to Transport at BNDCC and JCC

Aspect	BNDCC	JCC
Electric Vehicle Facilities	Providing electric vehicles and charging stations	There are no electric vehicle facilities or charging stations.
Shuttle Bus	Regional shuttle bus that connects the venue with surrounding hotels	Event-based shuttle buses, depending on the event organizer
Public Transportation Access	Far from major public transportation, dependent on shuttles and taxis	Close to public transportation infrastructure (TransJakarta, subway)
Bicycle Access	Has integrated bicycle and pedestrian paths	There are no dedicated bicycle facilities, only pedestrian paths.
Walking Infrastructure	Pedestrian path in the Nusa Dua area	An underground tunnel connects the venue to nearby hotels.

Source: Researcher Observation (2025)

Table 5 shows the differences in the implementation of environmentally friendly transportation access between BNDCC and JCC. BNDCC provides electric vehicles and charging stations to support zero-emission transportation and has a shuttle bus area connecting the venue to hotels in Nusa Dua. Meanwhile, JCC, which is closer to public transportation such as TransJakarta and the subway, provides direct access for participants using lower-emission modes. BNDCC has integrated bicycle and pedestrian paths, enhancing zero-emission mobility, while JCC provides only pedestrian access via an underground tunnel connecting the venue to nearby hotels. These differences reflect the challenges BNDCC faces in providing sustainable transportation access, given its location farther from mass public transportation.

Solutions to Mitigate Barriers to the Implementation of Net Zero Carbon Events (NZCE) Principles at the BNDCC and JCC

The implementation of Net Zero Carbon Events (NZCE) principles at the BNDCC and JCC faces policy, technical, and behavioral barriers. Mitigation solutions include developing more detailed energy-efficiency regulations, using recycled materials, reporting carbon emissions, and offering fiscal incentives to organizers who reduce emissions. On the technical side, solutions include investing in solar energy, installing a Building Management System (BMS), and using low-emission transportation. Intensive stakeholder education and the use of emissions-sharing tools based on international standards are crucial. Financial support through public-private partnerships and green financing is also needed to encourage investment in green technologies and ensure the transition to more sustainable events.

Table 6. Mitigation Efforts of BNDCC and JCC Venue Management

Action Area	Short Term (2025)	Medium Term (2025-2035)
Efficient Use of Clean and Renewable Energy	Informing energy consumption data to organizers as a standard	Using KWH meter to monitor energy consumption data
	Establish energy baselines and reduction targets	Create progress reports on energy efficiency and the transition to renewable energy
	Using LED lights	
	Planning the procurement of renewable energy from third parties	Procurement of renewable energy from third parties
	Working together for temperature guidelines.	Renewable energy development at the venue
Implementation of Zero Waste	Establish a process for measuring waste at events	Create waste data reporting standards for events.
	Provide full recycling options in public areas	

Action Area	Short Term (2025)	Medium Term (2025-2035)
	Utilize sustainable equipment and work with organizers to promote sustainable solutions	
Sustainable Food Supply and Food Systems	Raising awareness of food emission reduction	Food waste sorting, composting and donation are mandatory.
	Sustainable food procurement and waste reduction in contracts	Don't enter into contracts with high minimum guarantee amounts.
	Composting facilities	Infrastructure investment for food waste management
		Considering sustainable menus and local suppliers
Use of Low Carbon Logistics and Carbon Offsets	Development of local supplier networks for sustainable equipment procurement	Optimizing storage facilities at the venue
	Provide incentives for the use of on-site equipment	Install charging stations for electric vehicles (EVs)
	Provides a list of sustainable transportation from local governments	Providing low-carbon vehicles at the venue (such as forklifts)

Source: Researcher Observation (2025)

Efforts to mitigate technical and infrastructure barriers to implementing NZCE principles at the BNDCC and JCC include short- and medium-term solutions. In the short term, they are focusing on LED lighting, renewable energy procurement, and energy consumption monitoring. In the medium term, they plan to develop renewable energy at the venues and report on progress towards emissions reductions. They will also mandate food waste sorting, donations, and improved waste management, and will prioritize the use of electric vehicles and sustainable transportation. These solutions also include raising awareness through staff training, as well as collaboration among government, academia, and the private sector to support the green transition in the MICE sector. With these steps, the BNDCC and JCC can become role models in organizing low-carbon events and support Indonesia's 2060 decarbonization target.

Net Zero Carbon Events (NZCE) to Support Sustainable Tourism

The results of the SWOT analysis conducted at the Bali Nusa Dua Convention Center (BNDCC) and the Jakarta Convention Center (JCC) focused on identifying internal and external factors influencing the implementation of Net Zero Carbon Events (NZCE). These findings provide an overview of the strengths, weaknesses, opportunities, and threats at both MICE venues in the context of implementing NZCE principles and strategic

planning. Data collection was conducted through questionnaires distributed to 99 respondents, comprising BNDCC venue managers, JCC venue managers, and MICE event organizers held at BNDCC and JCC. The following is the SWOT analysis and its categorization:

Table 7. SWOT Analysis of the BNDCC and JCC Venues

Code	Categorization of Indicators	Description Based on Indicators
Strengths1	Infrastructure and use of renewable energy, energy efficiency	Use of the latest energy and environmentally friendly technology efficiently
Strengths2	Effective desire training	Regular training related to the desires that equip human resources
Strengths3	Strategic planning and long-term commitment	The desired planning is structured with adequate budget allocation
Strengths4	Waste management and selection of environmentally friendly suppliers	Efficient waste management with environmentally friendly suppliers
Strengths5	Performance monitoring	Regularly monitor its continuity
Strengths6	Leadership and integrity	Strong and consistent leadership in implementing desired policies
Weakness1	Coordination and collaboration between departments	Coordination between departments is not optimal in the implementation of NZCE
Weakness2	Budget limitations for sustainable programs	Limited budgets hinder the development of green infrastructure
Weakness3	Unintegrated planning focus on low carbon events	Planning still lacks low carbon event pressure
Weakness4	Unequal dependence on technology	Environmentally friendly technology is not yet evenly distributed throughout the venue area
Weakness5	Evaluation of desires that are not well structured	The evaluation of desires is not well structured
Weakness6	Limited HR training	Desire training is still limited to some staff
Weakness7	Dependence on vendors who are not environmentally friendly	Some vendors do not fully support it yet
Opportunity1	Market trends and social awareness	Global awareness of expectations opens up opportunities for sustainable venues
Opportunity2	Government Support	Government policies and incentives support the implementation of NZCE
Opportunity3	Partnership and collaboration	Collaboration with low-emission

Code	Categorization of Indicators	Description Based on Indicators
		transportation and accommodation providers
Opportunity4	Technological innovation	Green technology and logistics efficiency open up opportunities for energy savings
Opportunity5	Community and stakeholder support	Communities and stakeholders support environmentally friendly events
Opportunity6	Waste management	Waste management and reduction of single-use materials supports the NZCE
Threat1	Costs and resource limitations	High investment in green technology is a barrier
Threat2	Policy uncertainty and bureaucracy	Regulatory uncertainty and bureaucracy hamper the implementation of the NZCE
Threat3	Dependence on vendors that do not support desires	Vendors who do not yet support it are hindering NZCE
Threat4	Economic and market fluctuations	Economic fluctuations can reduce the priority on desires
Threat5	Adoption of new technologies and periodic evaluation	Delays in technology implementation and unstructured evaluation
Threat6	Delays in transmission of information and communication	Delays in communication policies hamper NZCE implementation

Source: Researcher Observation (2025)

The SWOT analysis of BNDCC and JCC in Table 7 shows key strengths in implementing Net Zero Carbon Events (NZCE) principles, such as environmentally friendly infrastructure, energy efficiency, dedicated human resource training, and long-term commitment. However, weaknesses include budget constraints, suboptimal interdepartmental coordination, and reliance on uneven technology. In terms of opportunities, both venues can capitalize on market trends supporting sustainable events, government support, and partnerships with low-emission transportation providers and local suppliers. However, external threats, such as the high cost of green technology, policy commitments, and reliance on vendors who have not yet committed to the program, could hinder progress towards the NZCE goal.

Internal Factor Analysis (IFAS) and External Factor Analysis (EFAS)

Table 8. Internal Factor Analysis Strategy (IFAS)

Code	Strengths Indicator	Weight	Ratings	Score
Strengths1	Infrastructure and use of renewable energy, energy efficiency	0.25	4	1.00
Strengths2	Effective desire training	0.20	4	0.80
Strengths3	Strategic planning and long-term commitment	0.20	4	0.80
Strengths4	Waste management and selection of environmentally friendly suppliers	0.15	4	0.60
Strengths5	Performance monitoring	0.10	4	0.40
Strengths6	Leadership and integrity	0.10	4	0.40
	Total Strengths	1.00		4.00
Code	Weakness Indicator	Weight	Ratings	Score
Weakness1	Coordination and collaboration between departments	0.25	3	0.75
Weakness2	Budget limitations for sustainable programs	0.30	3	0.90
Weakness3	Unintegrated planning focus on low carbon events	0.15	4	0.60
Weakness4	Unequal dependence on technology	0.10	3	0.30
Weakness5	Evaluation of desires that are not well structured	0.10	4	0.40
Weakness6	Limited HR training	0.05	3	0.15
Weakness7	Dependence on vendors who are not environmentally friendly	0.05	4	0.20
	Total Weaknesses	1.00		3.30
	Total Strengths – Total Weakness			0.70

Source: Researcher Observation (2025)

Table 8 shows that BNDCC and JCC have significant strengths in implementing Net Zero Carbon Events (NZCE) principles, particularly related to green infrastructure and renewable energy use, which received the highest score (Strengths 1) with a total score of 1. This indicates that green technology is a key asset for both venues' operations. However, regarding leadership and integrity (Strengths 6), they have a lower score (0.40), indicating a more limited contribution to the desired outcome. On the weakness side, budget constraints for the desired program (Weakness 2) received the highest score (0.90), indicating that financial constraints are a major challenge in developing green infrastructure and environmentally friendly technologies. Meanwhile, limited human resource training (Weakness 6) received the lowest score (0.150), but this is considered less significant compared to budget challenges. Overall, this analysis indicates that although BNDCC and JCC have strengths in infrastructure and renewable energy, budget and human resource capacity improvements need to be prioritized to achieve optimal desired outcomes and implement the NZCE principles.

Table 9. External Factor Analysis Strategy (EFAS)

Code	Opportunity Indicator	Weight	Ratings	Score
Opportunity1	Market trends and social awareness	0.20	4	0.80
Opportunity2	Government Support	0.20	4	0.80
Opportunity3	Partnership and collaboration	0.15	4	0.60
Opportunity4	Technological innovation	0.25	4	1.00
Opportunity5	Community and stakeholder support	0.10	4	0.40
Opportunity6	Waste management	0.10	4	0.40
	Total Opportunity	1.00		4.00
Code	Threat Indicator	Weight	Ratings	Score
Threat1	Costs and resource limitations	0.20	4	0.80
Threat2	Policy uncertainty and bureaucracy	0.20	4	0.80
Threat3	Dependence on vendors that do not support desires	0.15	4	0.60
Threat4	Economic and market fluctuations	0.25	4	1.00
Threat5	Adoption of new technologies and periodic evaluation	0.10	4	0.40
Threat6	Delays in transmission of information and communication	0.10	4	0.40
	Total Weaknesses	1.00		4.30
	Total Opportunities – Total Threaths			-0.30

Source: Research Results (2025)

Table 9 shows that technological innovation (Opportunity 4) is a key opportunity for the BNDCC and JCC in implementing Net Zero Carbon Events (NZCE), with the highest score being 1. Green technologies, such as logistics efficiency software and energy-efficient lighting, can reduce carbon footprints and long-term operational costs, while enhancing the competitiveness of event venues. However, waste management (Opportunity 6) with a score of 0.40 indicates that, while important, waste management remains a low priority and requires a more systematic approach to achieve the NZCE standards holistically. As a key threat, economic and market fluctuations (Threat 4), with a score of 1, indicate their vulnerability to global economic changes that could reduce sustainability budgets, hindering investment in green infrastructure. Delays in policy communication (Threat 6), although scoring lower (0.40), can also hinder the implementation of sustainability strategies. To achieve the NZCE, the BNDCC and JCC need to develop strategies that combine technological innovation with risk mitigation, such as addressing economic fluctuations and waste management, and plan responses to market and policy changes.

Strategy Analysis for Net-Zero Carbon-Based MICE Venues

Table 10. IE Matrix (Internal - External)

IFE / EFE	High IFE & High EFE (3.66 - 5)	High IFE & Moderate EFE (2.3 - 3.65)	High IFE & Low EFE (1 - 2.22)
High IFE (Strength) (3.66 - 5)	Quadrant I - Grow and Build	Quadrant II - Hold and Maintain	Quadrant III - Harvest or Divest
Moderate IFE (2.3 - 3.65)	Quadrant IV - Grow and Build	Quadrant V - Hold and Maintain	Quadrant VI - Harvest or Divest
Low IFE (Weakness) (1 - 2.22)	Quadrant VII - Hold and Maintain	Quadrant VIII - Harvest or Divest	Quadrant IX - Harvest or Divest

Source: Research Results (2025)

Based on the IE Matrix results in Table 10, BNDCC and JCC are in Quadrant IV, with IFE values of 3.65 and EFE values of 4.15, indicating a "Grow and Build" strategy position. This indicates that both venues have internal strengths, such as green infrastructure, efficient use of renewable energy, and good waste management, as well as significant external opportunities, such as government regulatory support and increasing market preference for sustainable practices. The recommended strategic steps are to focus on growth and development by strengthening internal strengths, utilizing green technology, and improving human resource capacity. This study provides important theoretical contributions by developing the study of hunting strategies in the MICE industry, extending transfer theory through the transfer of green resource integration and operational innovation, and suggesting an adaptive approach to the dynamics of the MICE industry in Indonesia.

Identification Strategy Based on SWOT Quadrant Matrix

Based on the SWOT quadrant mapping results, BNDCC and JCC are in Quadrant II (S–T), indicating that both venues have relatively strong internal strengths but face external threats that could hinder sustainability and competitiveness. These strengths are reflected in their international reputations, infrastructure capacity and completeness, and experience in hosting large-scale events. However, both venues face external pressures, including rising demands for global sustainability standards, market expectations for low-carbon events, and reputational and destination-competitive risks if the decarbonization agenda is not adequately integrated. The implication of the S–T position is the need for a diversification strategy that leverages internal strengths to respond to external threats, including through innovation in low-carbon infrastructure and

services, strengthening energy and waste management, integrating Net Zero Carbon Events principles into operational and procurement policies, and developing strategic partnerships with stakeholders to accelerate the sustainability transition.

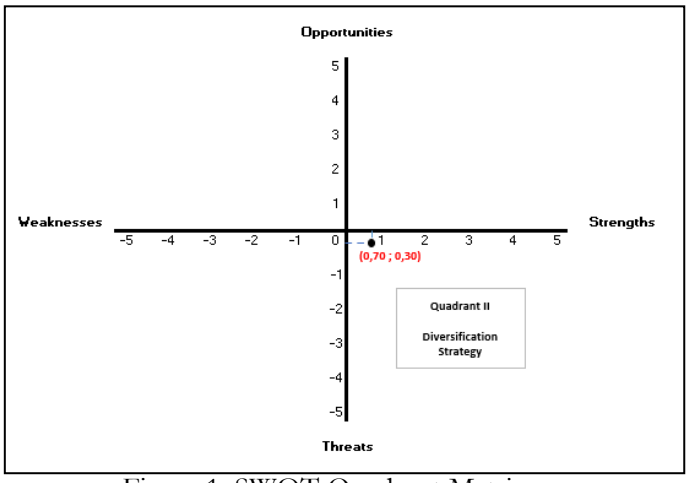


Figure 1. SWOT Quadrant Matrix
Source: Research Results (2025)

These findings align with previous research that highlights strategic transformation and multi-stakeholder collaboration as key to enhancing the resilience and competitiveness of MICE venues amid stricter demands (Nonet et al., 2022; Magnusson et al., 2024; Zanella et al., 2025; Yoon & Wang, 2023; Kulvijit & Teerakunpisut, 2025). The Quadrant II (ST) strategy utilizes BNDCC and JCC's international reputation, infrastructure, and event-hosting experience to address external threats, including rising global standards, shifting market preferences toward low-carbon events, reputational risks, and intensified environmental competition for MICE delegates.

The implementation of the diversification strategy is carried out through the development and differentiation of low-carbon MICE services (e.g., NZCE-based event packages), innovation and improvement of infrastructure and utilities that support energy efficiency and transition (energy audits, optimization of cooling and lighting systems, utilization of renewable energy), and strengthening waste and material management governance through mandatory sorting policies, reduction of single-use materials, and substitution of environmentally friendly materials. In addition, the ST strategy includes integrating requirements into operational SOPs and vendor/organizer cooperation contracts, establishing a green supplier ecosystem and vendor assessment mechanisms, and strengthening multi-stakeholder collaboration with governments, industry associations, and technology providers to accelerate the implementation of NZCE practices. To maintain credibility and accountability, this strategy also prioritizes the development of an event emissions measurement, reporting, and verification (MRV) system, enabling consistent monitoring of decarbonization performance and serving as the basis

for decision-making and increased venue competitiveness in the global MICE market.

D. Conclusion

Recommended strategies are: (1) foster interdepartmental collaboration to align sustainability efforts, (2) implement comprehensive waste management programs, and (3) maximize the use of renewable energy. Together, these strategies specifically target the identified challenges and help achieve NZCE goals while supporting sustainable tourism in Indonesia.

This study has several limitations. The observation period at both venues was short and may not reflect long-term NZCE implementation. Respondents were only venue managers and event organizers, so perspectives from visitors or local communities were not included. Also, limited data on newer green technologies made it hard to fully assess their potential at both venues.

Future research should include event attendees and local communities to get a fuller picture of NZCE's impact on sustainable tourism. More in-depth research is needed on the use of advanced green technologies, such as innovation-based renewable energy and low-emission transport. Future studies could also compare MICE venues in Indonesia with those in other countries. This would help identify best practices and measure NZCE's economic impact on the MICE sector.

E. Conflict of Interest

No competing interests, whether financial, institutional, or personal, have influenced the conduct of this research or the development of this manuscript. The authors conducted the study objectively and independently, and confirm that there are no circumstances that could be perceived as affecting the impartiality of the research findings and conclusions.

F. Declaration of AI Use

ChatGPT (OpenAI) was employed during the development of this manuscript as a supporting tool for brainstorming research ideas and assisting in the presentation of research data. Its application helped the authors explore relevant research perspectives and arrange data into a more systematic and understandable form. Nevertheless, the research methodology, field observations, interviews, data processing, SWOT analysis, strategic formulation, and interpretation of findings remained under the authors' direction and responsibility. The authors carefully reviewed the AI-assisted contributions and assume full accountability for the content, accuracy, and scholarly integrity of this publication.

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