

Developing a Sustainability Index for Hotels and Resorts in Malaysia: A Hybrid Delphi–AHP Approach

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Abstract: This study proposes a context-specific sustainability index for hotels and resorts in developing countries (e.g., Malaysia), aligning with the United Nations' Sustainable Development Goals. The proposed index consists of five dimensions: social, economic, environmental, resilience, and governance. Using the Delphi method and the Analytical Hierarchy Process, a finalised index with 119 indicators was established. Findings show that governance is the most significant dimension, followed by economic, resilience, social, and environmental. This study paves the way for a comprehensive sustainability index, aiding hotel practitioners in assessing sustainability levels and assisting global tourism policymakers in crafting effective strategies to promote responsible practices.

Keywords: Hotel and resorts sustainability index, social, economic, environmental, resilience, governance, hybrid Delphi-AHP approach, sustainable development goals

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Introduction

The hotel industry is responsible for 1% of global carbon emissions due to its energy-intensive operations, substantial water usage, waste generation, and transportation needs (United Nations Climate Change, 2018). As outlined in the Paris Agreement on Climate Change, the hotel industry is required to achieve a 66% reduction in greenhouse gas emissions per room annually by 2030 and a 90% reduction by 2050 compared to the levels recorded in 2010 (Sustainability Hospitality Alliance, 2017). The recent COVID-19 pandemic brought sustainability to the forefront and sparked higher public interest in global issues, including climate change, food wastage, and water scarcity (Galvani et al., 2020). The rise in demand for sustainable and eco-friendly products marks a profound shift in consumer behavior as a result of the pandemic, placing Environmental, Social, and Governance (ESG) values as the top priority in purchasing decisions (Frey et al., 2023). A similar trend can also be observed in the tourism and hospitality industry. According to Booking.com's *Sustainable Travel Report* (2023), 76% of the respondents intended to travel more sustainably the following year, with 43% of them willing to pay extra to support sustainable travel products. In terms of lodging choices, 65% of the respondents expressed a desire to stay at accommodations with sustainable certifications or labels. Meanwhile, 59% of those surveyed plan to filter out lodgings without sustainability certifications in their upcoming bookings.

In response, many international hotel chains, such as Hilton, Marriott, and Hyatt Groups, have implemented various sustainable practices. These include reducing single-use plastics, recycling discarded soap, launching food waste prevention campaigns, obtaining sustainability certificates, and using renewable energy sources like solar and wind energy. (Bianco et al., 2023; Fox, 2021). Such practices not only appeal to a growing market of eco-conscious consumers, enhancing brand loyalty and compliance with environmental regulations, but also fortify the hotel's risk management by lessening dependence on external resources (Wang et al., 2021). Additionally, sustainability initiatives boost employee morale and retention, aligning with their values and further solidifying the hotel's long-term stability and success (Sourvinou & Filimonau, 2018). Nevertheless, hotels in the Asia-Pacific region still lag behind Europe and North America in terms of sustainability efforts, which may hinder them from reaping the associated benefits (Hotels-Asia, 2022).

Introduced in 1999, the “Malaysia: Truly Asia” slogan continues to characterise Malaysia as the country prepares for the upcoming Visit Malaysia Year 2026. This tagline captures the exceptional distinctiveness and allure of Malaysia, portraying it as an exceptional tourist destination where the rich tapestry of Asian cultures, traditions, colours, and flavours come together (Ramli, 2024). With nearly 29 million international arrivals in 2023, Malaysia has become the most popular tourist destination in Southeast Asia (Phong, 2024).

In Malaysia, the hospitality and tourism industry serves as the driving force behind economic growth and socio-economic development, contributing 6% to the country's gross domestic product (GDP) and constituting 23% of national employment (3.5 million jobs). Additionally, it ranks as the third-largest component within the service industry (Kutty, 2024). However, a recent hotel sustainability benchmarking study by Cornell shows that hotels in Malaysia not only generate more carbon emissions per occupied room, but also have higher energy and water consumption compared to many other countries (CBRE, 2023). Therefore, like other Asian countries, hotels in Malaysia are facing mounting pressure from governments and other authorities to minimise their environmental impact (Hotels-Asia, 2022).

Although it is still early stages, the Asia-Pacific hotel industry is showing an increasing commitment towards ESG and sustainability initiatives (CBRE, 2022). For instance, the Frangipani Resort and Spa in Langkawi, Malaysia has implemented a 100% All-Natural Filtration System that utilises aquatic plants for wastewater treatment (Hussein, 2021). However, hoteliers in the Asia-Pacific region are grappling with challenges such as a lack of in-house sustainability expertise, inconsistent and unvalidated data, as well as difficulty in finding robust sustainability performance indicators to monitor the progress of their sustainable practices against goals (Hotels-Asia, 2022).

As Duric and Topler (2021) noted, existing sustainability indices for hotels and resorts have limitations and lack standardisation, a situation attributed to geographical variations. For instance, sustainability indices in developed countries often reflect their advanced stages of development and technological progress, characterised by mature regulatory frameworks and heightened awareness of environmental and social issues (Kim et al., 2018). In contrast, developing nations like Malaysia may struggle with limited financial and human resources as well as lower sustainability awareness (Oriade et al., 2021).

Moreover, tropical regions like Malaysia face unique environmental challenges, including high humidity, heavy rainfall, and intense heat, which affect sustainable practices in energy consumption, water management, and building design (Dibene-Arriola et al., 2021). For example, in Malaysia's tropical climate, Leadership in Energy and Environmental Design's (LEED) energy efficiency focus, designed for temperate climates, is less relevant due to different cooling needs. In fact, LEED's preference for glass facades can increase heat gain and air-conditioning demand in hot, humid conditions.

Additionally, LEED's water efficiency guidelines may not adequately address tropical challenges like heavy rainfall and waterlogging. Furthermore, the costs associated with obtaining LEED certification, including both direct and indirect expenses to meet strict standards, can be burdensome for developers in a developing economy like Malaysia. The stringent standards set by LEED may be too advanced for Malaysia at its current stage of sustainability development, posing an additional challenge for widespread adoption.

Moreover, most of the existing indices focus predominantly on social, economic, and environmental dimensions of sustainability, neglecting resilience and governance. However, the importance of these overlooked aspects was emphasised at a United Nations World Tourism Organization (UNWTO) forum in Jeddah, highlighting their roles as key drivers for post-pandemic recovery (UNWTO, 2022). For the hospitality industry, incorporating governance is essential to ensure ethical operations and regulatory compliance (Abdullah, 2018), while integrating resilience is vital for preparing the industry to effectively respond to and recover from various crises, thus solidifying its long-term sustainability (Estiri et al., 2022).

While creating a universally applicable set of sustainable tourism indicators is impractical due to the vast diversity in tourism operations and geographical contexts, there exists ample knowledge enabling establishments to measure impacts and navigate the challenge of data insufficiency for informed decision-making (Miller & Torres-Delgado, 2023). Therefore, several scholars (e.g., Duric & Topler, 2021; Navarro et al., 2019) have called for future researchers to develop a context-specific sustainability index for hotels and resorts. In heeding this call and addressing the United Nations' Sustainable Development Goals (SDGs), the objective of this research is twofold: firstly, to develop a set of indicators forming the sustainability index, and secondly, to evaluate the significance of each indicator in determining the sustainability of hotels and resorts in developing countries (e.g., Malaysia).

Literature Review

Sustainable Tourism and Indicators in the Hotel Industry

The tourism and hospitality industries, recognised by the World Travel and Tourism Council (WTTC), World Tourism Organization (WTO), and Earth Council, play a crucial role in creating substantial economic value and spearheading environmentally and economically sustainable business practices (Abdou et al., 2020). Recent years have seen global hospitality organisations responding to the responsible business movement, adopting more environmentally and socially responsible approaches to their operations (Fonseca & Carnicelli, 2021).

UNWTO (2024) defined sustainable tourism as the consideration of present and future social, economic, and environmental impacts, in addressing the needs of the environment, visitors, industry, and host communities. Sustainability, in this context, encompasses social, economic, and environmental pillars to achieve a balanced and sustainable outcome (Duric & Topler, 2021). Sustainability indicators contribute to evaluating and monitoring tourism progress in terms of sustainable development, assisting policymakers and stakeholders in making informed decisions (Kristjánsdóttir et al., 2018).

Existing Sustainability Frameworks and Standards in the Hotel Industry

In recent years, various tools, approaches, and assessment frameworks have emerged globally to measure sustainability in the hotel industry (Blancas et al., 2018). Examples include the Triple Bottom Line framework (Bastas & Liyanage, 2018), US green building certification (LEED), Global Sustainable Tourism Council Criteria (GSTC) (Stecker & Hartmann, 2019), European Union Eco-Management and Audit Scheme (EMAS) (Rocchi, 2017), Green Star scheme (Spenceley, 2018), UK Building Research Establish Environmental Assessment Method (BREEAM) (Abokhamis Mousavi et al., 2017), Earth Check (Khatter et al., 2019), Global Reporting Initiative (GRI) (Sörensson & Jansson, 2016), Environmental, Social and Governance (ESG) (Bae, 2022), and ISO 14001 (Jayashree et al., 2016), which are used for sustainability measurement.

Notable systems for the hotel sector include the European Eco-Label (Duglio et al., 2017), British Green Tourism Business Scheme (Mihalic, 2016), Canada Green Key Eco-rating System (Prud'homme & Raymond, 2016), Green Key (Rambodagedara et al., 2015), Ecotourism Australia, Taiwan Green Mark Hotel, and Corporate Social Responsibility (CSR). Despite these efforts, flaws persist, as the lack of a globally acknowledged definition of sustainability and challenges in assessing sustainability levels are prevalent (Asmelash & Kumar, 2019). Existing indicators, while useful, fall short of providing a comprehensive assessment (Kristjánsdóttir et al., 2018).

Several arguments against current sustainability measurement tools have been presented. For instance, Ferreira Quilice et al (2018) identified barriers to the GRI reporting model, including a lack of integrated indicators, internal organisational focus, non-holistic approaches, and credibility gaps. Similar critiques apply to the Triple Bottom Line (TBL), cited as a complex and sometimes misunderstood tool, leading to resource wastage and maintenance difficulties (Srivastava et al., 2021). In contrast, hotel companies excelling in ESG performance are shown to be more resilient and prudent in their investments (Chen et al., 2022), emphasising the importance of integrating ESG into management plans.

Su and Chen (2020) also advocated for including the governance dimension in a sustainability index for improved financial performance and societal benefit. The geographical focus of many applications highlights the need for context-specific indicators, reinforcing the motivation for this study to focus on the Malaysian context, addressing diverse sustainability challenges within different countries (Navarro et al., 2019). To align with the UN's SDGs, specifically Goals 8, 9, and 12, this research emphasises the importance of tailoring sustainability measures to each country's unique conditions.

Approaches and Models Used in Measuring and Monitoring Sustainability in the Hotel Industry

A comprehensive review of the literature reveals various instruments, systems, and models that are available to measure and monitor sustainability in tourist destinations (Wang et al., 2021). For instance, the Sustainable Hotel Development Model (SHBM), adopted by six hotels in Northern Cyprus, gauges sustainability in hotel buildings through the environmental, socio-cultural, and economic pillars, using the LEED certification (Abokhamis Mousavi et al., 2017). While effective for small- and large-scale hotels, SHBM, focusing on the three main sustainability pillars, requires further modification for a comprehensive assessment.

Another theoretical framework integrating Loyalty Chain Staged Theory and Perceived Hotel Performance of Green Management links water-saving and energy conservation to customers' attitudinal loyalty (Han et al., 2019). These factors are considered in sustainability indicators for the study, emphasising their impact on customer loyalty formation. Environmental characteristics and artistic representation in marketing contribute to hotel sustainability, as seen in a model combining Attention Restoration Theory, Triple Bottom Line (TBL), and Eye Tracking Analysis Technique (Wang et al., 2021). Integrating sustainability initiatives into marketing, particularly focusing on energy and water conservation, proves effective in differentiating hotels and adding value to environmental protection. Despite current approaches, challenges persist in assessing and monitoring sustainability locally and globally (Kapera, 2018). Traditional sustainability frameworks typically focus on the three main pillars: social, economic, and environmental, rendering sustainability indices incomplete. Therefore, to achieve a more comprehensive sustainability index, this study seeks to address this research gap by incorporating new dimensions such as resilience and governance into the index.

Sustainability Dimensions

Social

Social sustainability within the hotel industry focuses on long-term benefits for visitors, local communities, and employees, emphasising stakeholder engagement and performance measurement in relation to these groups (Duric & Topler, 2021; Legrand, 2021). This approach categorises guests, community, and employees as primary beneficiaries. Special attention to guests, particularly those with disabilities, highlights the importance of inclusivity and accessibility, addressing challenges that exclude people with disabilities from travel benefits (Kamyabi & Alipour, 2022). Enhancing service attributes for guests with mobility challenges, as suggested by Bazazo et al. (2017), reflects a commitment to social sustainability, ensuring a barrier-free, inclusive hospitality experience for all guests.

Furthermore, hotels' social responsibility extends to supporting local communities and economies, often through collaborative efforts with communities, government

bodies and NGOs, although the local community's voice may sometimes be overlooked (Alipour et al., 2019; Islam et al., 2021; Wang et al., 2021). Hotels acknowledge employees' critical role in innovation and competitiveness, vital for sustainability and success (Wang et al., 2021). Thus, investing in employee satisfaction through training, development programs, and wellness initiatives, alongside fair employment practices, equal opportunities, and diversity promotion, is key to achieving social sustainability in the industry (Ahmed et al., 2021; Sajjad et al., 2018).

Economic

Economic sustainability is critical for the profitability and continuity of businesses, impacting society and economies at various levels (Wang et al., 2021). Achieving this requires addressing stakeholder interests, fostering innovation, and cultivating a reputation as environmental-friendly establishments (Alipour et al., 2019). Additionally, customer satisfaction, which is vital for business success, is influenced by perceived value, service quality and customer acquisition costs (Wang et al., 2021), and in turn, influences guest loyalty (Abdou et al., 2020) and the hotel's online reputation (Deng & Zhou, 2022). Effective management of these aspects is essential for enhancing hotel performance and meeting the evolving demands of environmentally conscious consumers (Njoroge et al., 2019).

Hotels contribute to economic sustainability by integrating local businesses into their operations, creating jobs, and respecting local food traditions, which bolsters their reputation and supports local economic growth (Saura et al., 2018; Wang et al., 2021). Financial performance, measured through profitability indicators like return on investment (ROI) and return on assets (ROA), as well as comprehensive financial assessments—including profit margin, average room rate (ARR), average occupancy rate (AOR) (Mucharreira et al., 2019), economic value added (EVA), and total revenue per employee (TRPE)—support long-term goals and business sustainability (Jurigová et al., 2017). Incorporating effective marketing strategies significantly contributes to increasing sales, further reinforcing the comprehensive approach necessary for economic sustainability in the hospitality industry (Duric & Topler, 2021).

Environmental

Environmental sustainability in the hotel industry hinges on the collaboration of all stakeholders, including employees, guests, the community, and management, recognising the influential role of each group in fostering change (Cvelbar et al., 2022). Employee environmental training, guest and community awareness, and management's long-term commitment are essential to overcoming the often short-sighted financial prioritisation by some stakeholders (Prince & Ioannides, 2017; Wang et al., 2021). To mitigate substantial environmental footprint, hotels must

adopt comprehensive sustainable practices, including green procurement (Trišić et al., 2021), effective waste management (Wang et al., 2021), and strategies for reducing water and energy consumption (Duric & Topler, 2021), alongside initiatives aimed at minimising carbon emissions (Toshima et al., 2021).

Improving indoor air quality through reduced VOC usage and effective monitoring ensures healthier environments for guests, highlighting the impact of air quality on guest satisfaction and health in the hotel industry (Chang et al., 2021; Park et al., 2021; Zanni et al., 2021). In response to the growing demand for environmentally conscious travel options, hotels are increasingly offering green products and services, including biodegradable items and eco-friendly packaging (Alipour et al., 2019; Pulido-Fernández et al., 2019). Achieving environmental sustainability also involves obtaining green certifications (Lee et al., 2018), displaying environmental credentials (Gupta et al., 2019), and continuously enhancing environmental management practices to bolster the hotel's brand reputation, financial performance, and guest loyalty towards eco-friendly accommodations (Lee et al., 2018).

Resilience

Effective management of resources during crises, such as the recent COVID-19 pandemic, significantly enhances organisational resilience in the hotel industry (Ivkov et al., 2019). Streamlining manpower through cross-functional training and maintaining a minimal yet efficient workforce allows for continuous operations and substantial cost savings, ensuring business resilience (Kumar, 2021). Further, financial preparedness, including robust financial reserves, liquidity (Setthachotsombut & Sua-iam, 2020), and insurance coverage against natural disasters, is crucial for overcoming uncertainties and fostering economic resilience (Lee et al., 2021).

Resilience and sustainability are interdependent yet distinct concepts (The Organisation for Economic Co-operation and Development [OECD], 2022). Sustainable development focuses on satisfying current needs without jeopardising the ability of future generations to meet their own needs requiring environmental conservation, economic growth and social development (United Nations, 2022). Strategies for sustainability generally consider current trends and forecasts, and involve planning actions necessary to shape economic activities for long-term success. In contrast, resilience emphasises on the ability to withstand and recover from disruptions or shocks, highlighting the importance of adaptive capacity and risk management not fully covered by other sustainability dimensions.

In response to the recent COVID-19 challenges, Malaysia implemented policy measures such as financial aid, tax deferrals, and upskilling programs under the National Tourism Policy 2020-2030 to enhance industry resilience, emphasising the importance of effective communication and health guideline compliance (Idris, 2022; Setthachotsombut & Sua-iam, 2020). In this respect, leadership, organisational

support, and strategic training are essential for the sustainability and resilience of the tourism sector (Ahmed et al., 2021; Duric & Topler, 2021).

A tourism business or destination that is economically viable, environmentally sustainable, and beneficial to the community is more resilient to adversity. This creates a positive feedback loop where a stable and sustainable environment reduces future shocks, essential for maintaining sustainability efforts (Pacific Asia Travel Association [PATA], 2022). Recognising resilience as a separate dimension allows for specific policies and investments in areas like infrastructure and crisis management training, enhancing the industry's capacity to recover from disruptions (Estiri et al., 2022). Given tourism businesses' reliance on global value chains and many small and medium-sized enterprises (SMEs), resilience is crucial for managing risks and ensuring stability amid vulnerabilities in this complex and fragmented sector (OECD, 2022).

By fostering pro-environmental behaviours, implementing risk management strategies, and promoting collaboration among stakeholders, managers can build a culture of resilience and sustainability (Fang et al., 2020; Ivkov et al., 2019). This approach also facilitates the creation of dedicated resilience metrics and indicators, offering deeper insights into organisational readiness and adaptive capabilities. Engaging employees and interns in sustainability practices further strengthens organisational resilience, preparing the industry for future challenges (Kapoor et al., 2023).

Ultimately, embedding resilience into corporate values and daily operations promotes a proactive mindset, ensuring long-term sustainability and readiness for future challenges (Fang et al., 2020). Without resilience, maintaining sustainability efforts would be impossible, as disruptions in any part of the value chain affect the entire tourism ecosystem, underscoring the necessity of a distinct resilience dimension (OECD, 2022).

Governance

Corporate governance significantly influences the tourism industry by ensuring effective decision-making, risk minimisation, and financial performance enhancement, ultimately supporting industry and economic growth (Deng & Zhou, 2022). Governance is a cornerstone of sustainability, providing the structure within which environmental, social, and economic objectives can be aligned and achieved. Unlike other dimensions, governance encompasses the policies, systems, and processes that ensure accountability, transparency, and ethical behaviour across the organisation (Deng & Zhou, 2022). These elements are critical for maintaining public trust and stakeholder confidence, which are fundamental to sustainable operations.

Although governance plays a crucial role in aligning the interests of shareholders and stakeholders, research limitations in tourism-related sectors challenge the thorough evaluation of governance effectiveness (Li & Singal, 2022). In Malaysia, the application of sustainable practices in hotels encounters obstacles due to inadequate

government support, insufficient regulation, and a lack of sustainability awareness, underscoring the urgency for more targeted sustainability efforts (Yusoff, 2019). These challenges highlight the necessity of robust governance frameworks to drive compliance, enforce regulations, and foster a culture of sustainability.

Additionally, governance addresses the need for effective information disclosure. Greater disclosure by tourism companies improves transparency, reduces information asymmetry, decreases investor uncertainty, and increases credibility and investment (Andrikopoulos et al., 2016). This highlights the importance of disclosure governance and warrants further research.

Further, governance ensures compliance with legal and ethical standards, which is critical for maintaining the industry's reputation and avoiding legal pitfalls (Deng & Zhou, 2022). In addition to corporate governance, stakeholder governance emphasises balancing stakeholder interests with profit maximisation, employing CSR to foster sustainable practices, enhance company performance, and improve stakeholder relations. However, implementing CSR faces challenges like high costs and the absence of effective measurement systems (Nik Azman et al., 2018). Strong governance frameworks facilitate transparency and accountability, essential for positive public perception and trust. Transparency, supported by standards like GRI, enhances public trust, while accountability ensures professional issue resolution by expert committees (Abdullah, 2018).

Moreover, effective governance frameworks encourage innovation by creating a supportive environment for developing and implementing new ideas. This is crucial for adapting to changing market conditions and evolving sustainability challenges (Deng & Zhou, 2022). Governance also ensures fairness through board diversity and adherence to regulations, promoting equity and inclusiveness within the industry (Abdullah, 2018).

Recognising governance as a distinct dimension within the sustainability index acknowledges its unique and comprehensive role in shaping sustainable practices. It addresses the need for dedicated attention to the systems and processes that uphold ethical standards, regulatory compliance, and stakeholder trust, which are not fully captured by the social, economic, environmental, or resilience dimensions (Deng & Zhou, 2022). Furthermore, governance mechanisms can influence and be influenced by both internal and external factors, underscoring the complexity and importance of governance in achieving sustainable outcomes (Deng & Zhou, 2022). Therefore, governance deserves to be a standalone dimension to ensure a holistic approach to sustainability that integrates all aspects of responsible management and strategic planning.

Proposed Conceptual Framework and Index

Figure 1 shows the conceptual framework of this study. The proposed sustainability indicators that derive a sustainability index were formed with the integration of existing indices, theories, models and approaches (e.g., Alipour et al., 2019; Deng

& Zhou, 2022; Duric & Topler, 2021; Ivkov et al., 2019; Kim et al., 2022; Wang et al., 2021).

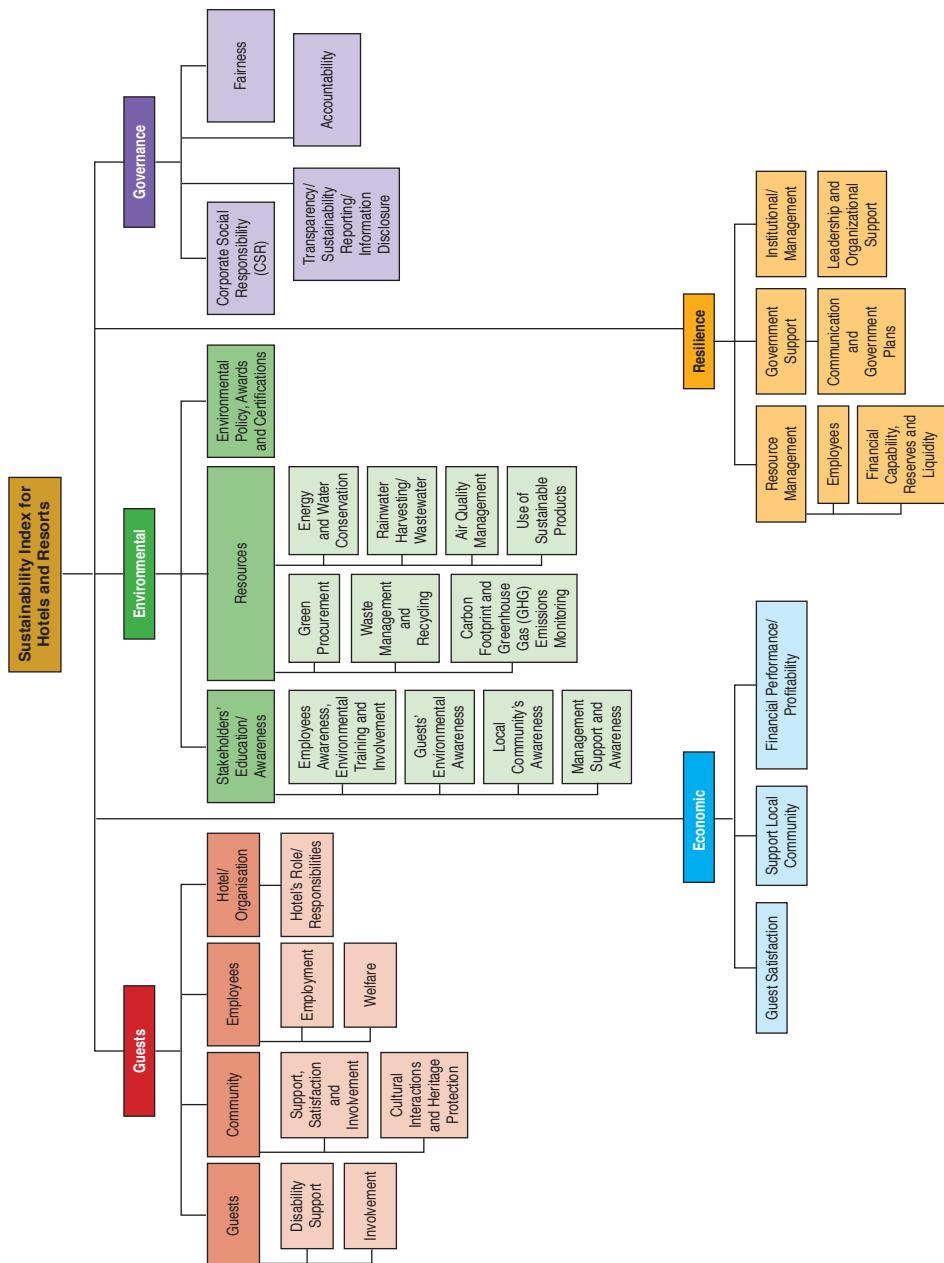


Figure 1. Proposed conceptual framework

Methodology

Research Design

This study employed the Delphi method to identify the sustainability indicators that derives a sustainability index. Despite Delphi being primarily qualitative, it can also incorporate quantitative aspects through expert opinions gathered via questionnaires (Kim et al., 2022). Subsequently, Analytical Hierarchy Process (AHP) was employed to assess the relative importance of these indicators, a widely used approach in studies related to tourism sustainability (Kim et al., 2022).

Prior to full-scale distribution, a pilot study involving three individuals from the targeted group assessed questionnaire comprehension, clarity, and the time required for completion (Asmelash & Kumar, 2019). This pilot study played a crucial role in refining the questionnaire by confirming its validity and efficiency in meeting research objectives, with no modifications needed. Inclusion of pilot study data in the final sample bolstered the study's validity and reliability, as supported by Ruel et al. (2016) as well as Bowers (2015).

Sampling Method and Data Collection Procedure

As the Delphi method relies on group judgment rather than statistical samples, we employed purposive sampling, selecting qualified experts with in-depth knowledge of relevant issues (Lee et al., 2021). Specifically, we selected hotels and resorts in Malaysia based on two criteria: (1) hotels and resorts with a rating from 1 to 5 stars and, (2) establishments licensed under the Ministry of Tourism, Arts and Culture (MOTAC). Consequently, any hotels and resorts not licensed by MOTAC were excluded from consideration. To fulfil the research objective of creating a practical sustainability index, targeted respondents should include not only hoteliers but also other key stakeholders, addressing the research gap (Liu et al., 2018). Hence, targeted respondents were categorised to minimise bias: (1) hotel sustainability experts, such as General Managers, Hotel Managers, HR Managers, Sustainability Managers, etc., from shortlisted hotels; (2) members of hotel associations like the Malaysian Association of Hotels (MAH).

Delphi survey studies, not requiring sample representativeness for statistical purposes, typically involve 7 to 26 participants depending on its heterogeneous (5 to 10 per professional group from different disciplines) or homogeneous nature (15 to 30 respondents from the same discipline) (Lee et al., 2021). Therefore, this study aimed for 30 responses. A weblink to the online questionnaire was disseminated to the targeted respondents through emails and professional networking sites such as LinkedIn. At the end of data collection, a total of 30 usable questionnaires were gathered, with 25 responses from hotel and resort managers and 5 from members of MAH.

As Table 1 shows, the majority of the respondents were males (73.3%), aged between 31 and 40 years (40%), and held a bachelor's degree or above (60.01%). They occupied various roles, including General Managers (30%), Hotel Managers, Training Managers, Sustainability Managers, HR Director/Manager (10% for each category), and other managerial positions (30%). Most respondents (63.33%) had over six years of experience in their current role. In terms of hotel star ratings, half of the respondents were from 5-star hotels, followed by 4-star hotels (33.33%), and 3-star hotels (6.67%).

Table 1. Respondents' demographic and work profiles

Respondents	Frequency (n = 30)	Percentage (%)
Gender		
Male	22	73.33
Female	8	26.67
Age Group		
21 - 30	0	0
31 - 40	12	40
41 - 50	10	33.33
51 - 60	8	26.67
Education Level		
Lower secondary	1	3.33
Upper secondary	0	0
Diploma	11	36.67
Degree	8	26.67
Masters	8	26.67
PHD	2	6.67
Current Position		
General Manager	9	30
Hotel Manager	3	10
HR Director	1	3.33
HR Manager	2	6.67
Training Manager	3	10
Sustainability Manager	3	10
Others	9	30

Table 1. (con't)

Respondents	Frequency (n = 30)	Percentage (%)
Years of Working Experience in Current Role		
< 1 year	1	3.33
1 – 2 years	1	3.33
3 – 4 years	4	13.33
5 – 6 years	5	16.67
> 6 years	19	63.33
Star Rating		
1 star	0	0
2 stars	0	0
3 stars	3	6.67
4 stars	10	33.33
5 stars	17	50

Measurement

The questionnaire was developed and adapted from past literature, focusing on five dimensions, and was subsequently modified to suit the context of this study (Refer Appendix A). A 10-point Likert scale was used to rank the sustainability indicators based on dimensions, with 1 being unimportant and 10 being extremely important.

Data Processing and Analysis Techniques

Data was coded and processed using Microsoft Excel for its familiarity, versatility, and user-friendliness, allowing for efficient data management. This choice proved effective in interpreting, converting, and synthesising the gathered data into simple and understandable information, given the study's specific context that does not require specialised AHP software (Stofkova et al., 2022).

Figure 2 shows the process involved in the Delphi study. Following the three-round practice recommended by Kim et al. (2022), this study achieved a 100% response rate in the first round and 86.67% (26 responses) and 90% (27 responses) in the second and third rounds, respectively. Consensus, defined as $\geq 85\%$, was reached for each indicator, showcasing a high level of agreement among respondents aligning with most researchers referring to the percentage agreement as a sum score for interpretation (Bastas & Liyanage, 2018). The study successfully concluded in the third round, rendering a fourth round unnecessary.

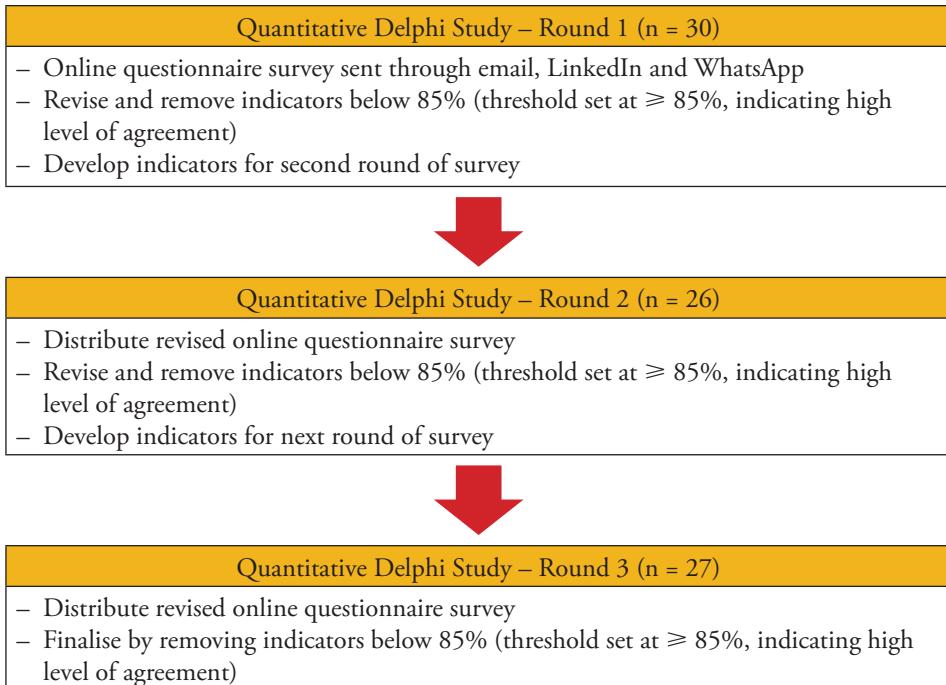


Figure 2. Delphi study process

In applying the Analytic Hierarchy Process (AHP) for our study, the third-round responses were tabulated and the average scores for each indicator were calculated (Refer Figure 3). Using these averages, we constructed a pairwise comparison matrix for all five sustainability dimensions (Refer Table 2 for Governance as an example) by calculating reciprocal values, setting diagonals to 1, to assess the relative importance of the indicators. This matrix was then normalised to derive the weights for the indicators. These weights then facilitated the construction of a priority matrix (PM).

Table 2. Pairwise comparison matrix for governance

Indicators	GOV 1	GOV 2	GOV 3	GOV 4	GOV 5	GOV 6	GOV 7	GOV 8	GOV 11	GOV 12	GOV 13	GOV 14	GOV 15
GOV 1	1	0.88	0.85	0.90	0.88	0.86	0.85	0.90	0.88	0.87	0.88	0.93	0.93
GOV 2	1.13	1	0.85	0.90	0.88	0.86	0.85	0.90	0.88	0.87	0.88	0.93	0.93
GOV 3	1.18	1.18	1	0.90	0.88	0.86	0.85	0.90	0.88	0.87	0.88	0.93	0.93
GOV 4	1.12	1.12	1.12	1	0.88	0.86	0.85	0.90	0.88	0.87	0.88	0.93	0.93
GOV 5	1.13	1.12	1.13	1.13	1	0.86	0.85	0.90	0.88	0.87	0.88	0.93	0.93
GOV 6	1.16	1.16	1.16	1.16	1.16	1	0.85	0.90	0.88	0.87	0.88	0.93	0.93

Table 2. (con't)

Indicators	GOV 1	GOV 2	GOV 3	GOV 4	GOV 5	GOV 6	GOV 7	GOV 8	GOV 11	GOV 12	GOV 13	GOV 14	GOV 15
GOV 7	1.18	1.18	1.18	1.18	1.18	1.18	1	0.90	0.88	0.87	0.88	0.93	0.93
GOV 8	1.12	1.12	1.12	1.12	1.12	1.12	1.12	1	0.88	0.87	0.88	0.93	0.93
GOV 11	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1	0.87	0.88	0.93	0.93
GOV 12	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1	0.88	0.93	0.93
GOV 13	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1	0.93	0.93
GOV 14	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1	0.93
GOV 15	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1
Total	14.59	14.32	13.97	13.85	13.55	13.16	12.77	12.84	12.49	12.12	11.92	12.30	12.20

A consistency check was performed by calculating the largest eigenvalue (λ_{max}) of the PM, and then the consistency index (CI) [CI = $(\lambda_{\text{max}} - n) / (n - 1)$] and the consistency ratio (CR) [CR = CI / RI], using the random index (RI) values from Hayrapetyan (2019), to ensure the reliability and accuracy of the results. The calculation of λ_{max} involved averaging the PM divided by the priority vector (PV). This consistency check, aiming for a CR value of ≤ 0.1 , as recommended by Kim et al. (2022), confirmed the consistency and validity of the analysis, eliminating the need for further calculations. This rigorous process was replicated for all five dimensions under the study.

AHP Process													
Step 1:	Tabulate data from Round 3												
Step 2:	Construct pairwise comparison matrix												
Step 3:	Normalise pairwise comparison matrix												
Step 4:	Construct priority matrix (using pairwise comparison matrix)												
Step 5:	Check consistency												
Step 6:	Overall priority vector (PV)/ Weightage												

Figure 3. Step-by-step AHP process

Results and Discussion

Discussion of the Findings (Delphi Study)

Initially, there were 139 potential indicators across social (45), economic (19), environmental (39), resilience (21), and governance (15) dimensions (Refer Table 3). After the first round, ten indicators (social: 4, environmental: 3, resilience: 1, governance: 2) were removed as they fell below the threshold set at $\geq 85\%$. In the subsequent rounds, eight social indicators and two indicators (social: 1, resilience: 1) were removed, resulting in a total of 119 indicators (Refer Appendix B).

The findings highlighted the most crucial social indicators as “provides training to enhance employees’ knowledge and skills” (SOC 29) and “provides safe working conditions and safety equipment” (SOC 32), both with a high level of agreement at 91.85%. These results underscore the industry’s recognition of investing in human capital as essential for fostering a sustainable work environment and ensuring employee well-being, thereby enhancing employee satisfaction and retention. For economic indicators, respondents emphasised the importance of “having short, mid, and long-term economic goals” (ECO 10) for sustainability, with a sum score of 92.96%. This strategic focus on economic planning highlights the role of goal-setting in driving sustainable financial practices within hotels, promoting financial stability and long-term viability.

The environmental indicator “promote environmental information/education to raise guests’ environmental awareness” (ENV 2) was considered of the highest significance at 94.44%. This emphasises the potential impact of educational initiatives in shaping guest behaviour towards environmental conservation, contributing to enhanced sustainability practices and guest satisfaction aligning with global sustainability goals. Additionally, resilience and governance indicators such as “clear vision is communicated to employees” (RES 10) at 95.19% and “comply with food safety acts and regulations to protect consumer rights [Food Regulations 1985, Food Act 1983, Hazard Analysis Critical Control Point (HACCP)]” (GOV 15) at 93.33% were identified as of the utmost importance. These findings underscore the critical role of clear communication and regulatory compliance in enhancing organisational resilience and governance frameworks within hotels, ensuring operational efficiency and legal compliance.

Table 3. Total number of indicators

Survey Rounds	Ori	R1	R2	R3
Indicators				
Social	45	41	33	32
Economic	19	19	19	19
Environmental	39	36	36	36
Resilience	21	20	20	19
Governance	15	13	13	13
Total Indicators (except dimensions)	139	129	121	119
Removed Indicators		10	8	2

In the first round of Delphi, “tactile paving” (84.33%) and “special assistance (e.g., butler service, etc.)” (81.33%) were deemed less significant, contrary to Bazazo et al.

(2017) who highlighted their importance for social inclusion. Similarly, “researchers and universities’ involvement in R&D” (84.67%) was seen as an insignificant sustainability contributor, opposing Ahmed et al. (2021). These discrepancies suggest differing perspectives on the practical impact and resource allocation for social inclusion and research collaboration within the hospitality industry, guiding resource allocation and strategic planning.

The removal of “consultation with the local community” (83.33%) for new services suggests these actions are viewed as too resource-intensive without clear sustainability benefits. This reflects a cautious approach among hoteliers towards community engagement strategies that may require significant resources and commitments, influencing community relations and strategic partnerships. Three environmental indicators, “recycle guests’ leftover soap to utilise as laundry detergent,” at 82.33% “establish a donation program such as food leftovers and linen donations to charities,” at 84.33% and “install greenhouse gas monitoring systems,” at 83.67% were omitted in the first round. These exclusions highlight challenges in implementing resource-intensive environmental initiatives, balancing potential benefits against operational costs and feasibility considerations, guiding environmental management practices and investment decisions.

The resilience indicator “retain minimal employees to save costs” at 82.33% was removed in the first round. This exclusion suggests that hoteliers may perceive this strategy as a standard cost-saving measure rather than a distinctive marker of sustainability. This indicates a strategic shift towards broader resilience-building strategies that prioritise long-term organisational stability over short-term cost reductions, influencing workforce management and organisational resilience strategies.

In the governance dimension, two indicators, “disclose detailed annual reports containing details of sustainability implementations and accomplishments achieved” at 80% and “public sustainability reporting” at 84.67% were excluded during the first round. This surprising finding challenges conventional wisdom within the sustainability literature, where transparency and public reporting are typically seen as fundamental to enhancing organisational accountability and stakeholder trust (Grosbois & Fennell, 2022).

The exclusion of these indicators raises critical questions about the current state of sustainability practices in Malaysian hotels. It suggests that despite global trends advocating for transparent reporting as a cornerstone of sustainable business practices, there may be significant barriers and misconceptions among hoteliers in Malaysia. One plausible explanation could be a perceived lack of expertise or resources such as scientific and technological support for monitoring, among hotel management to effectively produce and disseminate comprehensive sustainability reports (Ahmed et al., 2021; Weng & Smith, 2018). This notion is supported by

the observation that sustainability reporting might be viewed more as a regulatory obligation rather than a strategic tool for improving sustainability performance and stakeholder engagement.

From a theoretical standpoint, these findings underscore the importance of context-specific approaches to sustainability governance. They suggest that while international standards and best practices advocate for transparency, the practical implementation of these principles can vary significantly across different socio-economic and cultural contexts. This discrepancy highlights the need for tailored strategies and capacity-building initiatives aimed at enhancing sustainability reporting capabilities within the Malaysian hospitality sector.

Practically, the study's findings urge policymakers and industry leaders to reconsider their approach to promoting sustainability reporting among hotels. Collaborative efforts involving governmental support, industry associations, and academic institutions could play a pivotal role in bridging knowledge gaps and providing necessary resources for sustainability education and training. Initiatives aimed at simplifying reporting frameworks, providing technological infrastructure, and offering financial incentives for transparent reporting could facilitate broader adoption of transparent reporting practices among Malaysian hotels, thereby enhancing accountability and driving continuous improvement in sustainability performance.

In the second Delphi round, eight social indicators were removed, including physical accessibility features such as “designated parking spaces” (84.62%), “ramps” (82.31%), “visual and audible floor indicators” (83.85%), “wide doors, corridors, turning spaces” at 83.85% and “easy to reach wardrobes with pull-down coat hangers” at 78.85%, alongside “disability awareness training for employees” (82.31%). This suggests a perceived low impact on sustainability, worsened by economic concerns prioritising return on investment over disability inclusion actions (Cloquet et al., 2017). Furthermore, indicators like “participation in volunteering or fundraising” (83.47%) and “hotel sustainability committees evaluating tourist impact on local social issues” (83.47%) were excluded, reflecting the complex challenges in quantifying the sustainability impact of such initiatives on local communities.

One social indicator, “provides equal opportunity to the minority (employees with disabilities/special needs)” at 84.07% was removed and could be tied to concerns of practicality and feasibility of ensuring equal opportunities for the hotel industry, where it is a labour-intensive workplace that requires substantial human involvement to fulfil guests' requirements. This may be challenging to strategise or achieve. One resilience indicator, “rearrange manpower to reduce costs” at 84.44% was also removed in the third round, as it may be seen as a standard cost-saving measure rather than a distinctive marker of sustainability.

The Delphi process facilitated a comprehensive examination of potential sustainability indicators, leading to the exclusion of those tentatively deemed insignificant by the hoteliers. The industry leaders' input highlighted potential considerations such as practicality, feasibility, and perceived impact on sustainability metrics. However, these potential reasons are not conclusively established and represent varied interpretations within the industry, requiring ongoing discussion on refining the sustainability index for hotels and resorts.

Discussion of the Findings (Analytical Hierarchy Process [AHP])

Social

The study highlights the critical importance of social sustainability in the Malaysian hotel industry, particularly emphasising community initiatives (SOC 43) and training staff on natural and cultural heritage preservation (SOC 45) as key priorities with highest weights, each at 0.0351 (Refer Table 4), aligning with Ahmed et al. (2021) as well as Deng and Zhou (2022). These findings underscore the specific emphasis within the Malaysian context on nurturing community relationships and preserving cultural heritage as integral components of social sustainability. This focuses on specific social sustainability indicators which mirror the global emphasis on CSR practices noted in developed countries like Spain and Portugal, albeit with nuanced regional variations in how CSR is implemented and prioritised such as facility adaptations for disabled individuals and encouraging charitable contributions by customers, as highlighted by Suárez-Cebador et al., (2018). This contextualises Malaysian practices within the broader international CSR framework, illustrating both shared goals and region-specific strategies.

Practically, these insights suggest that Malaysian hotels can enhance their social sustainability by prioritising community engagement programs and integrating cultural heritage preservation into their operational frameworks. By investing in training programs that educate staff about natural and cultural heritage, hotels can foster a more sustainable organisational culture while simultaneously meeting CSR expectations. Moreover, these initiatives can contribute to positive brand perception and strengthen community ties, potentially leading to increased guest satisfaction and loyalty.

Bridging the insights from developed regions to the context of developing countries, including Nigeria and Ghana, we observe a universal acknowledgment of sustainability's foundational pillars. Similar to the emphasis on social sustainability in Malaysia, these countries highlight the crucial roles of enhanced management practices, a sustainability-oriented organisational culture, community-centric initiatives, and the bridging of skills and awareness gaps among industry professionals (Oriade et al., 2021). This comparative analysis underscores the global imperative

for a multifaceted approach to sustainability, tailored to the unique socio-economic contexts of each country.

In conclusion, the study not only deepens our understanding of social sustainability within the Malaysian hotel sector, but also offers practical guidance for hoteliers and policymakers. By emphasising community engagement and talent development in heritage preservation, Malaysian hotels can align with global CSR standards while addressing local socio-economic needs. This dual approach not only enhances the industry's sustainability profile but also fosters inclusive growth and resilience in the face of global challenges.

Table 4. Weights of social indicators

Indicators	PV/ Weight
SOC 3	0.0277
SOC 4	0.0279
SOC 8	0.0281
SOC 12	0.0283
SOC 13	0.0286
SOC 14	0.0289
SOC 15	0.0292
SOC 17	0.0295
SOC 19	0.0297
SOC 20	0.0300
SOC 21	0.0296
SOC 23	0.0306
SOC 24	0.0304
SOC 25	0.0307
SOC 27	0.0308
SOC 28	0.0311
SOC 29	0.0308
SOC 30	0.0314
SOC 31	0.0320
SOC 32	0.0313
SOC 33	0.0314
SOC 34	0.0321
SOC 35	0.0330

Table 4. (con't)

Indicators	PV/ Weight
SOC 36	0.0327
SOC 37	0.0328
SOC 38	0.0330
SOC 40	0.0342
SOC 41	0.0344
SOC 42	0.0349
SOC 43	0.0351
SOC 44	0.0347
SOC 45	0.0351

Economic

This study highlights the paramount importance of TRPE (ECO 18) at 0.0590 and effective marketing strategies (ECO 19) at 0.0571 for enhancing hotel sustainability and financial performance, while lesser importance is placed on ECO 2 and ECO 1 (Refer Table 5). These findings emphasise the critical need for financial stability and marketing that resonates with sustainable practices and local culture, as supported by Wang et al. (2021) and Gálvez et al. (2017). The study also points to a surprising undervaluation of customer loyalty and service quality within the industry, implying a gap in recognising how these elements contribute to economic sustainability. This suggests a narrow perception of sustainability, viewed mainly through an environmental lens, with insufficient awareness of its economic implications, despite evidence like the effectiveness of social media in engaging audiences (Clark et al., 2021), which could enhance both customer loyalty and economic outcomes. These findings challenge the traditional emphasis on environmental aspects of sustainability, highlighting the need for a more balanced approach that integrates economic dimensions more comprehensively.

Moreover, by revealing these nuanced priorities, the study contributes to a deeper understanding of how different sectors of the hospitality industry perceive and prioritise sustainability metrics. The emphasis on TRPE and effective marketing strategies underscores their potential as pivotal drivers, not only for environmental sustainability but also for economic viability and competitive advantage in the global market. Understanding these dynamics can assist hotel managers and policymakers in developing targeted strategies that align sustainability goals with long-term financial health and guest satisfaction. This aligns with current trends where sustainable practices are increasingly seen as integral to brand reputation and customer loyalty in the competitive hospitality sector (Gálvez et al., 2017).

Comparatively, while developed countries like Portugal integrate sustainability into their core business for long-term gains, as noted by Calisto et al. (2021), developing countries tend to focus on short-term profitability and cost reduction. This distinction underlines the varied strategic approaches to economic sustainability in the global hotel industry. In contexts with financial constraints, long-term economic sustainability can become a secondary concern, illustrating the diverse financial and strategic priorities between developed and developing nations and highlighting the need for a balance between immediate financial objectives and commitments to long-term sustainability.

Table 5. Weights of economic indicators.

Indicators	PV/ Weight
ECO 1	0.0471
ECO 2	0.0478
ECO 3	0.0484
ECO 4	0.0489
ECO 5	0.0496
ECO 6	0.0506
ECO 7	0.0509
ECO 8	0.0520
ECO 9	0.0523
ECO 10	0.0516
ECO 11	0.0534
ECO 12	0.0536
ECO 13	0.0539
ECO 14	0.0553
ECO 15	0.0566
ECO 16	0.0558
ECO 17	0.0559
ECO 18	0.0590
ECO 19	0.0571

Environmental

The study highlights the importance of sustainable building and infrastructure (ENV 38) at 0.0316 and using local materials (ENV 39) at 0.0311 as significant for environmental sustainability (Refer Table 6). Sustainable building and infrastructure,

promoting water and energy-saving features, are crucial for reducing environmental impact and attracting eco-conscious travelers, enhancing hotel competitiveness. This is supported by Wang et al. (2021), who emphasised the benefits of sustainable practices for brand image, community relations, and economic strength, including the use of local materials to lower carbon footprints and support local economies. These findings underscore the critical role of sustainable infrastructure in driving environmental sustainability within the hospitality sector.

Comparing environmental sustainability efforts in Malaysia and India, two developing countries, the study reveals both countries' unique yet complementary strategies towards energy efficiency and sustainable building, reflecting their commitment to global sustainability trends and the need for context-specific solutions (Prakash et al., 2022). India prioritises energy-saving and advanced technologies, while Malaysia focuses on eco-friendly designs and local resources. Both strategies aim to lower carbon emissions and boost economic growth. This comparative analysis highlights the contextual adaptability of environmental sustainability practices across diverse socio-economic landscapes, emphasising the importance of localised strategies in achieving global sustainability objectives. The experiences of these developing nations highlight opportunities for collaboration and cross-learning in pursuit of sustainable development goals.

Developed countries, like Spain and Portugal, demonstrate the influence of regulatory frameworks and societal expectations in adopting advanced sustainable technologies, including renewable energy and zero-waste policies (Suárez-Cebador et al., 2018). This differs from the approach in developing countries, which may focus on initiatives with immediate operational cost benefits and guest perception impacts, rather than addressing broader environmental challenges. These insights underscore the global disparity in sustainability practices within the hospitality industry and advocate for a more inclusive approach to environmental sustainability that considers both immediate and long-term impacts.

By highlighting the significance of sustainable building and the use of local materials in environmental sustainability efforts, this study contributes to advancing the discourse on sustainable infrastructure within the hospitality sector. It provides empirical evidence of how these practices can enhance environmental performance and competitive advantage for hotels.

The findings suggest that hotels, especially in developing countries like Malaysia and India, should prioritise sustainable building designs and the use of local materials to align with global sustainability goals. These practical steps not only reduce environmental footprints but also enhance brand reputation and community relations, thereby supporting long-term economic growth and resilience in the hospitality sector.

Table 6. Weights of environmental indicators.

Indicators	PV/ Weight
ENV 1	0.0253
ENV 2	0.0254
ENV 3	0.0255
ENV 4	0.0258
ENV 5	0.0257
ENV 6	0.0259
ENV 7	0.0262
ENV 8	0.0263
ENV 9	0.0266
ENV 10	0.0264
ENV 13	0.0265
ENV 14	0.0266
ENV 15	0.0266
ENV 16	0.0267
ENV 17	0.0270
ENV 18	0.0274
ENV 19	0.0271
ENV 21	0.0275
ENV 22	0.0279
ENV 23	0.0282
ENV 24	0.0281
ENV 25	0.0282
ENV 26	0.0283
ENV 27	0.0288
ENV 28	0.0290
ENV 29	0.0288
ENV 30	0.0289
ENV 31	0.0288
ENV 32	0.0293
ENV 33	0.0291
ENV 34	0.0293
ENV 35	0.0295

Table 6. (con't)

Indicators	PV/ Weight
ENV 36	0.0298
ENV 37	0.0306
ENV 38	0.0316
ENV 39	0.0311

Resilience

The study underscores the importance of digitalisation and technology in the hospitality sector (RES 21) at 0.0568, highlighting the critical role of innovations like mobile check-in/out and smart room controls. Leadership training (RES 20) at 0.0565 (Refer Table 7) is also emphasised as pivotal for guiding hotels toward sustainable practices. Insights from Le and Phi (2020) validate the need for digital adaptation training, while Ahmed et al. (2021) stress the importance of effective leadership in fostering a sustainability-focused culture. These findings underscore the transformative potential of technological integration and leadership development in advancing sustainability agendas within the hospitality sector.

However, this study points to a general undervaluation of financial preparedness within the industry, evidenced by the lower significance of RES 4 (0.0491) and RES 3 (0.0486), suggesting a focus on immediate operational costs over long-term strategic investments for sustainability. This highlights a gap in prioritising financial resilience as a foundational element for long-term sustainability planning, contrasting with the emphasis on digital and leadership initiatives.

Comparing these insights with challenges in developing regions, such as Santiago and Valparaiso, Chile reveals common obstacles like financial constraints, human resource limitations, and insufficient supplier collaboration, which hinder resilience building in the hospitality industry (Alonso-Almeida et al., 2017). Despite these challenges, the critical need for skilled leadership and professional development in sustainability practices emerges as a consistent theme. This comparison illustrates the global relevance of enhancing digital literacy and leadership capabilities to overcome sector-specific challenges in sustainability.

The findings underscore the importance of adopting a holistic approach that integrates digital innovation, leadership development, and strategic financial planning to foster sustainability in developing countries' hospitality sectors. Tailored strategies addressing diverse economic and environmental contexts are essential for overcoming sustainability challenges, positioning these regions for long-term resilience and competitive advantage in the global hospitality landscape. Practical implications include the need for tailored training programs and strategic investments

in technology, leadership, and financial preparedness to enhance sustainability outcomes across diverse economic and environmental contexts.

Table 7. Weights of resilience indicators.

Indicators	PV/ Weight
RES 3	0.0486
RES 4	0.0491
RES 5	0.0496
RES 6	0.0500
RES 7	0.0505
RES 8	0.0507
RES 9	0.0509
RES 10	0.0509
RES 11	0.0516
RES 12	0.0530
RES 13	0.0549
RES 14	0.0538
RES 15	0.0537
RES 16	0.0543
RES 17	0.0547
RES 18	0.0551
RES 19	0.0556
RES 20	0.0565
RES 21	0.0568

Governance

The study identified governance factors, particularly risk management committees (GOV 13) at 0.0839 and internal audits (GOV 12) at 0.0828, as critical to enhancing hotel sustainability and governance processes (Refer Table 9), echoing Abdullah's (2018) findings. Hotels are advised to strengthen their governance frameworks to improve sustainability, focusing on management efficiency, ethical practices, and compliance, through clear policies, staff training, and dedicated teams for regular risk assessments and audits. These findings underscore the transformative potential of robust governance frameworks in enhancing sustainability outcomes within the hospitality sector.

Comparing governance practices between two developing countries, Malawi and Malaysia, reveals both countries recognising the influence of internal and external factors on sustainability governance, despite their different challenges. Malawi faces issues with inconsistent enforcement and limited regulatory capacity (Mzembe et al., 2018), while Malaysia benefits from a structured approach emphasising risk management and audits (Abdullah, 2018). This comparative analysis highlights the contextual adaptability of governance practices across different socio-economic environments, emphasising the need for tailored approaches to governance in fostering sustainability.

The analysis extends to Pakistan, showing that strong governance leads to better sustainability outcomes through accountability and compliance (Sajjad et al., 2018). Developed nations, in contrast, demonstrate advanced sustainability reporting and stakeholder engagement, a practice less common in developing countries due to skill and focus gaps (Abdullah, 2018; Uyar et al., 2019). Moreover, this highlights the critical need for improved sustainability reporting especially in Malaysia, emphasising the importance of not only fostering sustainability practices internally, but also transparently communicating these initiatives to external stakeholders. These insights underscore the importance of capacity-building initiatives and stakeholder engagement in enhancing governance practices and sustainability reporting within the hospitality sector.

This overview suggests that hotels in developing nations must adopt context-specific strategies that balance internal initiatives with external pressures. Highlighting the need for robust governance, industry education, and talent development is essential to improve operational efficiency and sustainability reporting. These efforts are pivotal for enhancing hotels' reputations and ensuring their long-term success in contributing to sustainable development in the hospitality sector.

By highlighting the role of governance factors such as risk management committees and internal audits, this study contributes to the evolving discourse on sustainability governance in the hospitality sector. It provides empirical evidence of how robust governance frameworks can drive sustainability initiatives, offering practical insights for hotels seeking to enhance their operational efficiency and compliance with sustainability standards.

The findings suggest that hotels in developing nations should prioritise strengthening governance structures, investing in staff training, and fostering transparent communication to improve sustainability reporting. These practical steps are essential for enhancing reputational resilience and long-term sustainability in the global hospitality industry.

Table 8. Weights of governance indicators.

Indicators	PV/ Weight
GOV 1	0.0685
GOV 2	0.0698
GOV 3	0.0718
GOV 4	0.0724
GOV 5	0.0740
GOV 6	0.0765
GOV 7	0.0789
GOV 8	0.0781
GOV 11	0.0804
GOV 12	0.0828
GOV 13	0.0839
GOV 14	0.0812
GOV 15	0.0818

Conclusion

Conclusion and Theoretical Implications

This study has successfully developed a comprehensive sustainability index tailored for Malaysian hotels and resorts, encompassing social, economic, environmental, resilience, and governance dimensions through rigorous methodologies like the Delphi Method and AHP. The inclusion of governance as the most critical dimension, aligned with insights from UNWTO (2022), Deng and Zhou (2022), and Li and Singal (2022), underscores its pivotal role in sustainability assessments within the hospitality sector. Additionally, the emphasis on resilience, as advocated by Ivković et al. (2019), Kumar (2021), and Lee et al. (2021), further enriches the theoretical landscape by addressing contemporary challenges and expectations in hotel sustainability.

By identifying and validating 119 indicators across these dimensions, this research contributes significantly to the theoretical frameworks of sustainability assessment in hospitality. It not only directly responds to recent scholarly calls for their inclusion (resilience and governance), but also expands existing frameworks and introduces new categories and sub-dimensions that reflect the diverse operational contexts of hotels in developing countries, particularly in Malaysia. This theoretical advancement provides researchers with a nuanced understanding of sustainability in the hotel industry, paving the way for further studies on integrating governance and resilience dimensions into broader sustainability strategies.

Furthermore, the development of this sustainability index serves as a foundational framework adaptable to similar socio-economic and environmental contexts across the ASEAN region. It offers theoretical insights that are transferable to other developing countries facing comparable sustainability challenges in their hospitality sectors, thereby promoting regional sustainability initiatives aligned with global best practices.

Ultimately, the development of this sustainability index marks a significant step forward in providing developing countries within the ASEAN region with a detailed, context-specific framework, serving as a potential springboard for enhancing sustainability practices. This endeavour not only aligns with the specific conditions and challenges of these countries, but also paves the way for the creation of more resilient and governance-focused sustainability strategies in the hospitality sector.

Practical Implications

The proposed sustainability index offers practical guidance for hotel industry leaders in formulating and implementing effective sustainability strategies. At an operational level, hotels can utilise this index to systematically track and improve their sustainability performance. By setting benchmarks and monitoring key performance indicators (KPIs) identified in the index, hotels can identify areas for improvement and enhance their environmental, social, and economic impacts.

Practically, the index facilitates sustainability audits and assessments that help hotels optimise resource management practices, reduce operational costs, and minimise environmental footprints. This includes implementing energy-saving measures, enhancing waste management, and promoting sustainable procurement practices throughout the supply chain. Moreover, the index supports hotels in achieving sustainability certifications and enhancing their appeal to eco-conscious travelers, thereby boosting competitiveness in the global tourism market.

Hotel leaders are encouraged to integrate the sustainability index into their strategic planning processes, leveraging it to engage stakeholders, including guests, employees, and local communities. By transparently communicating their sustainability initiatives and achievements through the index, hotels can build trust and loyalty among stakeholders while contributing positively to local socio-economic development.

Acknowledging the varied capacities and resources within the hospitality industry, particularly in developing countries, hotel leaders should consider tailored support mechanisms. These could include capacity-building programs, training initiatives, and collaborative platforms that facilitate knowledge exchange and best practice sharing among hotels. Such initiatives are crucial for overcoming implementation challenges and ensuring the long-term sustainability of hotel operations.

Furthermore, policymakers are urged to recognise the transformative potential of the sustainability index as a universal digital tool applicable across diverse hospitality settings. Collaboration with industry stakeholders, governmental bodies, researchers, and technology developers can streamline the index into an accessible digital interface, setting standardised sustainability metrics and benchmarks. Financial support from policymakers can accelerate the alignment of the index with real-world sustainability challenges and facilitate the adoption of this tool, catalysing widespread sustainability improvements across the hotel industry. Pilot projects conducted by future researchers can test the index's real-world applicability, allowing for necessary adjustments before broader implementation and playing a key role in data collection and validation, addressing data limitations for scalability.

In conclusion, by bridging theoretical insights with practical applications, the sustainability index not only advances academic understanding, but also empowers hotels to enact meaningful sustainability measures. Its implementation in Malaysia sets a precedent for regional collaboration and knowledge exchange within ASEAN countries, fostering a collective approach towards sustainable tourism development. This initiative underscores Malaysia's leadership in promoting sustainability within its tourism sector and serves as a model for neighbouring nations striving to enhance their hospitality sustainability efforts.

Limitations and Future Research Directions

Expanding the scope of future research to include 1 to 2-star hotels is recommended. The current study only gathered data from 3 to 5-star hotels, potentially limiting the relevance of the sustainability index to lower-rated establishments. Recognising the significance of these budget-conscious hotels, further exploration is needed to understand their distinct sustainability perspectives influenced by factors such as budget constraints, limited resources, and variations in awareness and education.

To enhance the practicality of the sustainability index, future researchers could test the applicability of the indicators in a diverse range of hotels, including 1 to 2-star establishments. They could implement the index in these hotels and measure their sustainability performance levels using set metrics. This comprehensive approach will enable researchers to identify specific areas for improvement and assess the effectiveness of the sustainability index in different contexts. This study lays the foundation for a sustainability index but acknowledges its nascent stage. Future researchers could determine precise criteria for each indicator, constructing a comprehensive scorecard intended for implementation in hotels and resorts. This scorecard will be invaluable for impartially assessing and rating sustainability performance, serving as a checklist or scorecard for auditors or certification bodies.

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Appendix A: List of proposed sustainability indicators included in the questionnaire, their sources, and corresponding UN SDGs addressed.

Dimensions	Categories	Sub-Dimensions	Potential Indicators	SDGs	Sources
Social	Guests	Disability Support	SOC 1 Designated parking spaces for disabled guests SOC 2 Ramps for disabled guests or visitors as alternative routes SOC 3 Easy to reach door handles/ handrails (lift & bathroom) SOC 4 Easy to reach lift buttons with braille SOC 5 Tactile paving SOC 6 Visual and audible indication of floors SOC 7 Wide doors, corridors, turning spaces SOC 8 Wheelchairs SOC 9 Easy to reach wardrobes with pull-down coat hangers SOC 10 Employees trained in disability awareness SOC 11 Special assistance (butler service and etc)	16	Abdou et al., 2020; Sajjad et al., 2018
		Involvement	SOC 12 Guests' frequency of participation/ involvement in sustainability activities	17	
	Community	Support, satisfaction and involvement	SOC 13 Community's partnership/cooperation towards the implementation of hotel's sustainability initiatives SOC 14 Community's support towards the implementation of hotel's sustainability initiatives SOC 15 Community's satisfaction through hotel guests that increases local business profits SOC 16 Participation in volunteering work or fundraising with hotels	3 & 9	

Appendix A. (con't)

Dimensions	Categories	Sub-Dimensions	Potential Indicators	SDGs	Sources
			<p>SOC 17 Local community is ensured to have their voices heard and rights respected when hotels develop projects that affects their safety, quality of life and well-being</p> <p>SOC 18 Researchers and universities involvement in R&D innovation</p>		
		Cultural interactions and heritage protection	<p>SOC 19 Hotel's responsibility in protecting the cultural and historical heritage</p> <p>SOC 20 Hotel's responsibility in managing and maintaining cultural resources</p> <p>SOC 21 Cultural interactions of locals with tourists (e.g., local dishes, cultural events)</p> <p>SOC 22 Consult with the local community before launching new goods or services that are based on their identities or traditions to ensure authenticity of tourists' experience</p> <p>SOC 23 Educate the public by developing informative systems that convey information about the heritage and esteemed culture</p>	11 & 12	
	Employees	Employment	<p>SOC 24 Provides equal opportunity regardless of religion, beliefs, race and ethnicity</p> <p>SOC 25 Provides equal opportunity regardless gender and sexual orientation</p> <p>SOC 26 Provides equal opportunity to the minority (employees with disabilities/special needs)</p> <p>SOC 27 Promotes workplace diversity and inclusion</p> <p>SOC 28 Practices gender equality</p>	5, 8, 10 & 16	

Appendix A. (con't)

Dimensions	Categories	Sub-Dimensions	Potential Indicators	SDGs	Sources
		Welfare	SOC 29 Provides training to enhance employees' knowledge and skills SOC 30 Develop professional development programs SOC 31 Provide salaries that comply with local regulations SOC 32 Provide safe working conditions and safety equipment SOC 33 Establish and adhere to occupational health & safety standards SOC 34 Record health and safety incidents and investigate accordingly SOC 35 Provides health and wellness programs SOC 36 Collect employees' satisfaction surveys/feedback SOC 37 Protect employee rights are adhered to such as employees provident fund (EPF), social security for work accidents, insurance, healthcare plans, maternity/paternity benefits, people with special needs SOC 38 Employees' contributions are recognized and rewarded	1, 3, 4, & 8	
	Hotel/ Organizaiton	Hotel's Role/ Responsibilities	SOC 39 Hotel's sustainability committee to assess and evaluate the impact of tourists on local social issues SOC 40 Good relations/ partnerships with local bodies SOC 41 Support from all levels of government and NGOs in hotel sustainability SOC 42 Hotels' partnership/ cooperation with NGOs and other local bodies	8, 10 & 17	

Appendix A. (con't)

Dimensions	Categories	Sub-Dimensions	Potential Indicators	SDGs	Sources
			SOC 43 Hotels/organizations' participation/involve ment in sustainability initiatives contributing to the community SOC 44 Developing local talents in achieving qualifications for local workforce SOC 45 Train staff about the importance of protecting natural and cultural heritage of local area		
Economic		Guests' Satisfaction	ECO 1 Provides excellent service quality to guests to guarantee guests' loyalty ECO 2 Establish customer loyalty programs to guarantee long-term economic profit ECO 3 Continuously identifying trends, demands, threats and risks through innovation ECO 4 Gather and manage guests' feedbacks ECO 5 Actively manages negative online reviews/internet word of mouth	9	Mtapuri et al., 2021; Wang et al., 2021
		Support Local Community	ECO 6 Employ local employees ECO 7 Support local products ECO 8 Source from local suppliers ECO 9 Engage and integrate business opportunities with local businesses	2, 8, 10, & 12	
		Financial Performance/ Profitability	ECO 10 Have short, mid and long-term economic goals ECO 11 Growing profitability of assets (ROA) on long-term basis ECO 12 Stable return on investment (ROI) ECO 13 Stable profit margin	8 & 11	

Appendix A. (con't)

Dimensions	Categories	Sub-Dimensions	Potential Indicators	SDGs	Sources
			ECO 14 Stable average room rate (ARR) ECO 15 Stable average occupancy rate (AOR) ECO 16 Reduce operational costs ECO 17 Growing economic value added (EVA) ECO 18 Stable total revenue per employee (TRPE) ECO 19 Effective marketing strategies		
Environmental	Stakeholders' Education/ Awareness	Employees, guests, community, management (2.4.3.1 – 2.4.3.4)	ENV 1 Conduct environmental training to raise employee awareness ENV 2 Promote environmental information/education to raise guests' environmental awareness ENV 3 Conduct environmental campaigns/ initiatives to raise local community awareness ENV 4 Engage and garner stakeholder support ENV 5 Encourage guests' participation in green practices implemented by hotels (Eg: linen and towel reuse program)	4, 11, 12, &17	Alipour et al., 2019; Duric & Potočnik Topler, 2021
	Resources	2.4.3.2.1 – 2.4.3.2.7	ENV 6 Practice green procurement ENV 7 Collect organic kitchen wastes for soil composting ENV 8 Purchase goods made of recycled materials ENV 9 Purchase food and cleaning supplies in bulk ENV 10 Separate wastes using coloured bins and clearly labelled containers for recycling ENV 11 Recycle guests' leftover soap to utilize as laundry detergent		

Appendix A. (con't)

Dimensions	Categories	Sub-Dimensions	Potential Indicators	SDGs	Sources
			<p>ENV 12 Establish a donation programme such as food leftovers and linen donations to charities</p> <p>ENV 13 Utilize durable products instead of disposable products</p> <p>ENV 14 Provide guests with signage to encourage the practice of reusing towels and linens</p> <p>ENV 15 Have waste management strategies to reduce waste</p> <p>ENV 16 Establish 3Rs program</p> <p>ENV 17 Disclose measurements in reports for energy, water, waste and emissions accumulated and discarded</p>	2, 3, 6, 7, 11, 12, 13, 13 & 15	
			<p>ENV 18 Have sustainable transportation to reduce carbon footprint and greenhouse gas emissions</p> <p>ENV 19 Reduce energy and water consumption</p> <p>ENV 20 Install greenhouse gas monitoring systems</p> <p>ENV 21 Utilize environmentally friendly refrigerants</p> <p>ENV 22 Plant trees</p> <p>ENV 23 Provide sustainable transportation</p> <p>ENV 24 Install energy and water-saving technologies (solar panels, motion sensor, low-flush toilets, low pressure showers)</p> <p>ENV 25 Install air filters/ air detectors/ controllers</p> <p>ENV 26 Designated smoking area</p> <p>ENV 27 Low usage of VOC products</p> <p>ENV 28 Install energy, water, waste and emissions monitoring systems</p>		

Appendix A. (con't)

Dimensions	Categories	Sub-Dimensions	Potential Indicators	SDGs	Sources
			ENV 29 Protect natural habitats, flora and fauna ENV 30 Harvest, treat and reuse rainwater/ wastewater ENV 31 Avoid releasing any odours or gases that may be harmful to health ENV 32 Develop air quality management systems ENV 33 Use eco-friendly/ sustainable products wherever possible ENV 34 Use biodegradable products wherever possible ENV 35 Hotel's sustainability committee to assess and evaluate the impact of tourists to local biodiversity		
			ENV 36 Comply with all requirements established by local environmental policies ENV 37 Obtain/achieve environmental awards and certifications for better sustainability ENV 38 Sustainable building and infrastructure design ENV 39 Use local materials wherever possible to reduce carbon footprints	11 & 15	
Resilience	Resource Management	Employees	RES 1 Rearrange manpower to reduce costs RES 2 Retain minimal employees to save costs	11	Ivkov et al., 2019; Kumar, 2021
		Financial capability, reserves and liquidity	RES 3 Prepare financial reserves to sustain the business during unprecedeted times RES 4 Prepare sufficient liquidity to sustain the business RES 5 Insurance coverage against natural disasters	11	

Appendix A. (con't)

Dimensions	Categories	Sub-Dimensions	Potential Indicators	SDGs	Sources
	Government Support	Communication and Government Plans	RES 6 Keep updated with latest policies released by the ministries, government, local bodies, authorities and associations to promote and coordinate recovery programs RES 7 Keep updated with latest local tourism plans revealed by the ministries, government, local bodies, authorities and associations RES 8 Actively cooperate with the government RES 9 Communicate and cooperate with the government organizations to promote and coordinate recovery programs	11 & 17	
	Institutional/ Management	Leadership & Organizational Support	RES 10 Clear vision is communicated to employees RES 11 Encourage open mindset in accepting and adapting to changes RES 12 Managers' prior experience in handling crisis RES 13 Managers with longer working experience RES 14 Manager's skills and capability in handling crisis RES 15 Establish risk management/ contingency plans post-crisis	4 & 11	
		Management & Staff Training	RES 16 Strengthen bonds via networking sessions and collaboration with stakeholders to make changes and improvements RES 17 Exchange knowledge with other experts through forums RES 18 Provide refresher training courses post-crisis to prepare staff for when business resumes	4, 9 & 17	

Appendix A. (con't)

Dimensions	Categories	Sub-Dimensions	Potential Indicators	SDGs	Sources
			RES 19 Provide crisis management training to better handle future crisis RES 20 Provide leadership training to enhance employees' leadership skills RES 21 Provide digitalization training to keep up with market demands and trends		
Governance		Corporate Social Responsibility (CSR)	GOV 1 Promote social welfare activities GOV 2 Participate in volunteering programs aimed at local and global needs GOV 3 Participate in charity events GOV 4 Educate the benefits and importance of CSR initiatives to raise awareness and understanding GOV 5 Encourage stakeholders' commitments and enhance their interests in CSR initiatives GOV 6 Have sufficient funds for CSR initiatives GOV 7 Develop and set up CSR measurement systems GOV 8 Incorporate company's objectives and values relating to sustainability into company's vision and mission		
		Transparency/ Sustainability Reporting/ Information Disclosure	GOV 9 Disclose detailed annual reports containing details of sustainability implementations and accomplishments achieved GOV 10 Public sustainability reporting		
		Accountability	GOV 11 Dedicated committee in handling sustainability-related issues and initiatives		

Appendix A. (con't)

Dimensions	Categories	Sub-Dimensions	Potential Indicators	SDGs	Sources
			GOV 12 Having an internal audit to assess, evaluate and improve the sustainability efficiency and governance processes GOV 13 Having a risk management team		
			Fairness GOV 14 Compliance and regulation to local labour laws to protect employee rights (Employment Act 1955) GOV 15 Comply with food safety acts and regulations to protect consumer rights [Food Regulations 1985, Food Act 1983, Hazard Analysis Critical Control Point (HACCP)]	12 & 16	

Appendix B: List of indicators removed

R1: 10 indicators removed		Code
Social		SOC 5
– Tactical paving		SOC 11
– Special assistance (Eg: bulter service and etc)		
– Researchers and universities involvement in R&D innovation		SOC 18
– Consult with the local community before launching new goods or services that are based on their identities or traditions to ensure authenticity of tourists' experience		SOC 22
Environmental		
• Recycle guests' leftover soap to utilize as laundry detergent		ENV 11
• Establish a donation programme such as food leftovers and linen donations to charities		ENV 12
• Install greenhouse gas monitoring systems		ENV 20
Resilience		
• Retain minimal employees to save costs		RES 2
Governance		
• Disclose detailed annual reports containing details of sustainability implementations and accomplishments achieved		GOV 9
• Public sustainability reporting		GOV 10
R2: 8 indicators removed		
Social		
– Designated parking spaces		SOC 1
– Ramps		SOC 2
– Visual and audible indication of floors		SOC 6
– Wide doors, corridors, turning spaces		SOC 7
– Easy to reach wardrobes with pull-down coat hangers		SOC 9
– Employees trained in disability awareness		SOC 10
– Participation in volunteering work or fundraising with hotels		SOC 16
– Hotel's sustainability committee to assess and evaluate the impact of tourists on local social issues		SOC 39
R3: 2 indicators removed		
Social		
Provides equal opportunity to the minority (employees with disabilities/special needs)		SOC 26