GREEN BUILDING PRACTICES, GREEN FINANCING, AI AND THE PRESERVATION OF INTANGIBLE CULTURAL HERITAGES (ICH)

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ABSTRACT

*The aim of this paper is to explore the linkage among Sustainable Development Goal (**SDG**) and Environmental, Social & Governance (**ESG**) with Intangible Cultural Heritage (**ICH**) of UNESCO for quality project design elements of "Human and Environment" for **SDG #4.7**: Knowledge Transfer. In order to define the possible variables that were connected to impacts with solutions, research was carried out. In the study, seven ESG reports and articles were examined. Various related factors were discovered, including social well-being, risk reduction programs, gap closing for a better life, **financial inclusion, compliance culture**, talent engagement, values of the ESG report, inclusive leadership, accountability, and servant leadership. This paper also explores the relationship between green building practices and the preservation of **ICH**. It highlights how sustainable design approaches can integrate cultural heritage, traditional ecological knowledge, and community engagement to create spaces that honor both environmental sustainability and cultural identity. The findings underscore the importance of aligning modern building practices with traditional values to foster resilient communities. Last but not the least, AI can support resource optimization, predicting maintenance needs, and enhancing customer engagement. Such applications are exemplified in the Case Study in this paper.*

Keywords: Green Building; Preservation; Intangible Cultural Assets (ICH); ESG; SDG; BEAM, UNISCO, AI

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1. INTRODUCTION

Based on UN Sustainable Development Goals **SDG #11** & **Target #11.3** "By 2030, enhance inclusive and sustainable urbanization and capacity for participatory, integrated and sustainable human settlement planning and management in all countries"; **Target #11.4** "Strengthen efforts to protect and safeguard the world's cultural and natural heritage"; and **Target #11.7** "By 2030, provide universal access to safe, inclusive and accessible, green and public spaces, in particular for women and children, older persons and persons with disabilities" with the rapid urbanization and environmental challenges faced by cities today, innovative approaches to building design and construction is needed to be considered. Green building practices, which emphasize sustainability, resource efficiency, and environmental stewardship, have gained traction as a response to these challenges. This paper examines how these practices intersect with **ICH** — elements of culture that are not tangible but are vital to community identity and heritage.

As we know, there are factors that influence the Creation of Culture of a community and the infrastructure of a green city design. They can be classified into 3 main categories as below:

- Ecologies – climate, population density, arable land
- Resources - food, water and money
- People – community living, basic human needs and motives with fundamental psychological needs fulfillment, like relationship building"

2. LITERATURE REVIEW

Paliwoda-Matiolanska et al. (2020) mentioned that "understanding psychology from a cultural perspective starts with a better appreciation of what is culture." In order to make the cities are sustainable with green elements", we may need to explore the integration of culture, race, nationality, and ethnicity from cultural perspective. Paliwoda-Matiolanska et al. highlighted that "culture can be used to describe activities or behaviours, refer to the hertiage or tradition of a group, describe rules and norms, describe learning or problem solving, define the organization of a group, or refer to the origins of a group. Culture can refer to general characteristics; food and clothing; housing and technology; economy and trasportation; individual and family activities; community and government; welfare, religion, and science; and sex and the life cycle. "(p. 7) Therefore, the next section is going to explore the key elements of **ICH** with green building for achieving **SDG #11** targets of United Nations.

"Green Building Practices, Green Financing, and the Preservation of Intangible Cultural Heritages" encompasses a range of interdisciplinary approaches that integrate sustainability in architecture and urban planning while respecting cultural heritage. The literature review can be broken down into three major headings as follow:

2.1. Green Building Practices

Green building practices focus on creating structures that are environmentally responsible and resource-efficient throughout their life cycle. This includes:

- Sustainable Materials: The use of eco-friendly materials that minimize environmental impact.
- Energy Efficiency: Implementing technologies and designs that reduce energy consumption, such as better insulation and energy-efficient windows (Samuelson, 2023).

- Water Conservation: Systems designed to reduce water usage and manage stormwater effectively.

2.2. Green Financing

Green financing refers to funding mechanisms that support sustainable development projects. This includes:

- Incentives for Sustainable Practices: Financial incentives for developers who incorporate green technologies and practices into their projects.
- Investment in Renewable Energy: Funding for projects that utilize renewable energy sources, which is becoming increasingly important as regulations tighten around carbon emissions.
- Lifecycle Cost Analysis: Evaluating the long-term savings associated with green buildings, which can offset initial higher costs (Samuelson, 2023).

2.3. Preservation of Intangible Cultural Heritage

The preservation of intangible cultural heritage involves safeguarding traditions, practices, and expressions that are vital to cultural identity. This can intersect with green building practices in several ways:

- Community Engagement: Involving local communities in the planning and design processes to ensure that cultural values are respected and integrated into new developments.
- Adaptive Reuse: Transforming existing structures in a way that honors their historical significance while upgrading them to meet modern sustainability standards.
- Cultural Sensitivity in Design: Ensuring that new buildings reflect local architectural styles and cultural practices, which can enhance community acceptance and pride (Ong, 2017).

The integration of these elements presents both challenges and opportunities:

- Regulatory Landscape: As cities implement stricter environmental regulations, developers must adapt quickly to remain compliant while also considering cultural heritage.
- Technological Advancements: Innovations in building materials and energy systems can facilitate the creation of sustainable buildings that also respect cultural contexts.
- Funding and Resources: Access to green financing can help bridge the gap between traditional building practices and modern sustainable approaches, fostering a more holistic view of development that includes cultural preservation (Samuelson 2023).

In summary, the intersection of green building practices, green financing, and the preservation of intangible cultural heritages is a complex but essential area of study that requires collaboration among architects, urban planners, cultural historians, and financial experts.

The focus on sustainability within the data centre industry is not merely a trend but a necessary evolution in the face of global environmental challenges. By integrating these innovations aligned with BEAM Plus New Data Centres criteria, Hong Kong entrepreneurs can not only enhance their operational efficiency but also establish themselves as leaders in sustainability. The benefits extend beyond mere compliance; they encompass long-term savings, customer loyalty, and a positive impact on the broader community.

3. GREEN BUILDINGS AND ICH

3.1. Cultural Practices and Sustainability

Many cultures possess traditional practices that emphasize sustainability and harmony with nature. For example, the practices of geen building techniques, such as the use of local materials and passive design strategies are found in some of the environmental sites in Hong Kong, enhancing environmental performance but also preserve cultural significance.

3.2. Community Identity

Green buildings that reflect local architectural styles and utilize local resources help maintain a community's identity, foe example the Chinese traditional temple styles reflecting the cultures of harmony and calmness of Buddhasim and Taosim. This relationship between architecture and cultural heritage is crucial for preserving **ICH**, as it fosters a sense of belonging and pride among community members.

3.3. Traditional Knowledge

ICH often encompass traditional ecological knowledge (TEK), which includes local wisdom about resource management and sustainability. Incorporating TEK into green building practices enhances environmental performance while ensuring cultural relevance. For example, Hosen et al. (2020) mentioned that "*The communities managed their subsistence activities such as agriculture, hunting and fishing by observing and predicting the variability of their climate and local surroundings." Hence, TEK with observation of the changes of sky colour, temperature, moon phases, fruiting of fruit trees and the migration of animals in the nature is a kind of ecological community design.*

3.4. Community Engagement

Green building projects frequently involve community input and participation, fostering a sense of ownership and pride. This engagement strengthens cultural ties and promotes the preservation of **ICH**, as communities work together to create spaces that reflect their values and heritage.

3.5. Education and Awareness

Green building initiatives, for example, the zero carbon park in Hong Kong serves as platforms for educating communities about their cultural heritage and sustainable practices. By reinforcing the value of both, these projects enhance awareness and appreciation for **ICH**.

4. GREEN BUILDING PRACTICES AND POLICIES ON PRESERVATION

4.1. Cultural Relevance in Design

Green building encourages designs that reflect local culture and heritage, helping maintain community identity. Incorporating traditional construction methods and materials enhances the cultural significance of buildings, linking modern practices with historical context.

4.2. Community Engagement

Participatory approaches in green building projects involve community input, ensuring that local cultural values are respected and integrated. This engagement promotes awareness and appreciation of **ICH**.

4.3. Sustainable Practices

Sustainable resource management can reflect traditional ecological practices, reinforcing the importance of these **ICH**. By valuing and implementing traditional knowledge, communities can preserve their cultural heritage while addressing modern environmental challenges.

4.4. Adaptive Reuse of Historic Sites

Green building policies often promote the adaptive reuse of historic structures, allowing communities to maintain cultural landmarks while upgrading their environmental performance. Preserving and repurposing such sites can keep cultural narratives alive.

4.5. Economic Benefits

Green building can stimulate local economies through the use of local materials and labor, supporting traditional crafts and practices integral to cultural identity. Sustainable practices can enhance cultural tourism, attracting visitors interested in authentic cultural experiences.

4.6. Policy Frameworks

Policies that recognize and integrate TEK into green building standards can help ensure **ICH** are preserved. Government support for green building often includes funding and incentives for projects that incorporate cultural heritage.

Integrating Traditional Ecological Knowledge into Green Building Practices

Integrating TEK into modern green building practices can enhance sustainability and strengthen cultural connections. Key strategies include:

- Site Selection and Orientation: Using local knowledge about climate and ecosystems to optimize building sites.
- Material Use: Incorporating locally sourced and natural materials that reflect traditional practices.
- Design Principles: Implementing passive design techniques and cultural aesthetics that promote community pride.
- Water Management: Applying indigenous water management techniques to promote conservation.
- Landscaping and Biodiversity: Using native plants to support local ecosystems and integrate traditional agricultural practices.
- Community Involvement: Engaging local communities in the design process to ensure TEK is respected and integrated.

5. GREEN FINANCING IN PRESERVATION ICH

Green financing is increasingly recognized as a pivotal mechanism for promoting sustainability and preserving cultural heritage. This paper explores how current and future green financing initiatives impact the preservation of ICH and the advancement of green building projects, with a specific focus on the context of Hong Kong. The current impact of green financing can be summarised in the following points:-

5.1. Access to Capital

- Dedicated Green Funds: Financial institutions and governments have established numerous funds specifically aimed at supporting green projects. These funds provide crucial capital for initiatives that foster sustainability and cultural preservation.
- Lower Interest Rates: Green projects often benefit from reduced interest rates, making it more feasible for developers and organizations to pursue projects that integrate cultural heritage with sustainability.

5.2. Incentives for Sustainable Practices

- Tax Breaks and Grants: Many governments offer tax incentives and grants for projects that adhere to green criteria. This encourages developers to incorporate elements of cultural heritage into their designs.

- Certification Programs: Financial benefits linked to certifications such as LEED (Leadership in Energy and Environmental Design) motivate builders to adopt sustainable practices that respect and preserve **ICH**.

5.3. Investment in Community Projects

- Socially Responsible Investing: Investors are increasingly interested in projects that yield both social and environmental benefits. This trend has led to funding for community-based projects that focus on preserving cultural heritage while promoting green building practices.

5.4. Public-Private Partnerships (PPPs)

- Collaborative Financing Models: Green financing often facilitates partnerships between public entities and private investors, allowing for shared resources in projects that emphasize both sustainability and cultural preservation.

6. FUTURE IMPACT OF GREEN FINANCING

6.1. Growth of Green Bonds

Increased Issuance: The issuance of green bonds is expected to grow, providing dedicated funding sources for projects that focus on sustainability and cultural preservation. Future green bonds may explicitly include provisions for supporting cultural heritage projects alongside environmental sustainability.

6.2. Technological Innovations

- Fintech Solutions: Advances in financial technology may lead to more efficient funding methods for green projects, including crowd-funding platforms specifically aimed at cultural and sustainable initiatives.
- Blockchain for Transparency: Utilizing block-chain technology can enhance transparency in funding allocations for cultural preservation and green building projects, potentially attracting more investors.

6.3. Integrated Sustainability Metrics

Holistic Evaluation: Future financing models may incorporate comprehensive metrics that assess both environmental and cultural impacts, encouraging projects that preserve **ICH** while achieving sustainability goals.

6.4. Regulatory Changes

- Stricter Environmental Standards: As global regulations tighten, green financing will likely become essential for building projects, pushing developers to integrate cultural heritage considerations into their sustainability strategies.
- Cultural Heritage Policies: Increased emphasis on cultural preservation in regulatory frameworks may lead to greater availability of green financing for projects that honor local traditions.

6.5. Global Collaboration

- International Funding Initiatives: Global partnerships and funding initiatives focused on sustainability may increasingly prioritize projects that integrate cultural heritage, enhancing preservation efforts worldwide.
- Cross-Border Investments: As green financing becomes standardized, cross-border investments may facilitate the sharing of best practices in cultural preservation and sustainable building.

7. SUCCESSFUL EXAMPLE IN HONG KONG – CASE STUDY

Converted from a historic police station, this boutique hotel preserves local architecture and promotes sustainable tourism, enhancing community engagement.

A recent report from the HK Census and Statistics Department (C&SD) states that: *"the provisional estimate of the value of total retail sales decreased by 7.0% in the three months ending July 2023 compared with the preceding three-month period, while the provisional estimate of the volume of total retail sales decreased by 6.8%."* Cushman & Wakefield (2023) mentioned that there is a trend of "Reactivate Underused Spaces with Sports Concepts and Cultural Activities Leveraging ESG and Corporate Branding". Hence, this section is going to explore the linkage of applying UN **SDG** and **ESG** into the heritage building for preservation and transformations. Also we shall explore how are we can use AI in the ways of seeking solutions for preserving cultures and transforming with new elements for a better world?

Sala et.al (2021) mentioned that "Circular Economy (CE) describes a sustainable alternative approach to the current linear economy system.". They also highlighted that "innovation is a crucial aspect for implementing CE business. During the 9th Entrepreneurial Education Meeting of UNESCO Bangkok in October, 2023, the key takeaways of the meeting by Hangzhou (China) are innovations in entrepreneurial education system with disruptions in pedagogies. These include partnership and financing entrepreneurial activities of students, and curriculum design with attention to policy-makers and educators to narrow down the global unemployment of young people. Hence, it is time to explore integrate **SDG**, **ESG**, and entrepreneurial spirit in the rising industries in **ICH** AI for transformations.

The aim of this section is to align with the previous findings of Yeung (2022) and the goals of UNESCO on resilience art and the 2021 policy address (please refer to the Para-158 below) of the Hong Kong government in talent development, nurturing educators, entrepreneurs, policy-makers and management in NGOs. More emphasis is in the use of design thinking and **SDG**s with technology for new business co-creation and business sustainability. Ultimately, the gap between academic and vocational skill developments will be narrowed down with a greater level of solution-seeking skills.

"Para 158 - Talents are the key to arts and cultural excellence. We will put more emphasis on nurturing talents in different artistic and creative fields such as arts administration, arts technology and script writing."

Incorporating AI with understanding of biological and technological thinking brings humanity in life. After COVID-19, the rising industries with AI applications are more focused on health and wellness, entertainment and education, supply chain management with automation in manufacturing and service industries for improving productivity, becoming smarter and making the workflow change. Hanson (2022) pointed out that we need to understand the ecosystem of AI, jobs market co-creation with AI and humans, and the regulatory focus bringing positive impacts to the society, ways to grow and opportunities of economic development.

The key takeaways of the sharing are AI and humans co-existed with cultural thinking and conversion mindset for solutions with love, caring, respect and survial. Based on the sharing from Dr. David Hanson on 30th Nov., 2023, Ai is a tool to help us to have conversion mindset for inventing creative solutions with consideration of social inclusion and compassion, Human values.

"The direction of research on AI and capability of machines is learning journey which is to link up cross disciplinary knowledgeable manageable people together with open hearts and organised mind to explore how to perceive problems and how to acquire knowledge for innovative solutions," said Dr. David Hanson.

AI, data analysis for decision-making and transformations for productivity with humanistic caring are considered to be the trend in co-creating and/ or tri-inventing new services/ products/ processes/ talents under circular and green economy. The true potential lies in combining AI's computational efficiency with the cognitive and emotional intelligence of humans. AI can process and analyze large volumes of data with predictive analysis for human to make humanistic, social inclusion, compassionate and valuable decisions for the society. Through building a collaborative environment where AI and humans work together as a team, innovative solutions may appear to drive us go further in a smarter, socially responsible, and productive way.

CASE STUDY: The Tai O Heritage Hotel

The Tai O Heritage Hotel, converted from a historic police station, exemplifies principles from both the concepts of Green Leaf's Servant Leadership and Total Quality Management (TQM). Below is a structured rationale and impacts aligned with these concepts with selected Deming's 14-point to illustrate TQM concepts to serve the community.

7.1.   Preservation of Local Architecture
- **Impact**: The hotel preserves the unique architectural features of the heritage site, strengthening a sense of identity of Hong Kong from a cultural perspective.

  (SDG #8 economic impacts).
- **TQM Relevance**: Emphasizes on maintaining a high standard in preserving cultures with quality guest experience

7.2.   Promotion of Sustainable Tourism
- **Impact**: The hotel encourages environmental sustainability, attracting local guests and overseas tourists who are eco-conscious and culture-oriented to appreciate responsible tourism practices *(SDG #12 – responsible production and consumption).*
- **Servant Leadership**: Leaders prioritize community welfare and the environment, embodying a commitment to stewardship.

7.3.   Community Engagement
- **Impact**: The hotel involves the local community in its operations, providing decent jobs via engagement with local artists to explore socioeconomic development opportunities (**SDG #3** wellness and #8 economic impacts).
- **Servant Leadership**: Focuses on serving the community with community recognition.

7.4.   Educational Initiatives
- **Impact**: The hotel educates guests and travellers on local culture with multi-disciplinary knowledge of history, ecology, and tourism. (**SDG #4.7** Knowledge Transfer)
- **TQM Relevance**: Continuous improvement through knowledge sharing and staff training remains a foundational principle of Deming's 14 points.

7.5.   Local Sourcing of Products
- **Impact**: Prioritizing local green and responsible suppliers reduce the carbon footprint and supports the local economy. (**SDG #13** Climate Action)
- **Total Quality Management**: A focus on creating values from a diverse perspective through quality inputs/ processes/ outputs to ensure a holistic guest and traveller experience.

7.6.   Cultural Immersion Experiences
- **Impact**: Offering authentic local experiences strengthens cultural ties and enriches visitor experiences. (**SDG #3** wellness and #16 peace)
- **Servant Leadership**: Leaders serve the community by allowing cultural traditions to flourish and be appreciated by visitors.

7.7.   Customer-Centric Approach
- **Impact**: Listening to guest feedback fosters an adaptive environment that caters to diverse needs, enhancing satisfaction. (**SDG #12** Responsible Production and Consumption)

- **TQM Relevance**: Continuous quality improvement based on customer feedback assures high service standards.

7.8.   Long-term Community Development Focus
- **Impact**: A commitment to sustainable practices ensures that tourism benefits will continue for generations to come. (**SDG #4** Quality Education)
- **TQM Relevance**: Total Quality Management supports long-term planning that integrates community and business strategies.

The Tai O Heritage Hotel stands as a model of how the principles of Green Leaf's Servant Leadership and Total Quality Management can be effectively applied in the real practices for impacts. By prioritizing local heritage, sustainability, and community engagement, the hotel not only enhances the quality of the experience of local guests and travellers but also contributes positively to the local community and artist engagement on understanding nature, people and culture. This comprehensive approach ensures that both visitors and residents benefit from the hotel's operations, leading to a win-win scenario that aligns with circular economy for sustainable tourism goals.

8. THE ROLE OF "AI" IN IMPLEMENTING CIRCULAR AND GREEN ECONOMIES

AI stands as a transformative tool in leveraging Circular and Green Economy principles. By analyzing data and learning from patterns, AI can support resource optimization, predicting maintenance needs, and enhancing customer engagement. The following applications of AI in the context of the Tai O Heritage Hotel have been illustrated:

8.1   Resource Management: AI can be utilized to monitor energy consumption in real-time, implementing smart energy management systems that adjust usage based on occupancy levels. This leads to significant reductions in the wastage of unnecessary energy and saving cost.

8.2   Sustainable Supply Chain Management: AI can facilitate a circular supply chain by helping the hotel to source green and upcycled materials from local suppliers who practice sustainable methods and help the site to become a learning site of environment with culture. This enhances community engagement and supports the local economy while reducing the carbon footprint associated with transportation.

8.3   Predictive Maintenance: AI systems can predict when repairs or maintenance are necessary for hotel facilities, ensuring the sustainability and longevity of the hotel from a prevention perspective of TQM.

8.4   Training and Engagement: AI-powered platforms can educate staff about sustainability practices, ensuring that all employees are engaged in the hotel's green initiatives. This fosters a culture of sustainability, TQM and **ICH** throughout the organization.

The Tai O Heritage Hotel exemplifies a forward-thinking model where Circular Economy and Green Economy principles applied with AI technology for innovations and culture preservation. By embracing these concepts, the hotel not only contributes to the Sustainable Development Goals, particularly **SDG #9** innovations, but also creates tangible economic benefits SDG#8 economic impacts, ensuring a vibrant, sustainable future for the local community. This integrated approach fosters innovation, creating a blueprint for other enterprises looking to balance profitability with environmental stewardship.

Basing on the experience of the above case study, the following sites can also be recommended to apply circular and green economy concepts with AI, TQM and **ICH** elements for sustainable development:

-- **The Zero Carbon Building, Kowloon,**

-- **Hong Kong International Airport -- SkyCity,** and

-- **The Hong Kong Museum of History.**

9. CONCLUSIOIN

The relationship between green building practices and the preservation of **ICH** highlights the importance of integrating sustainability with cultural heritage. Projects that incorporate local traditions, community engagement, and sustainable practices can create spaces that honor both the environment and the community's identity. By fostering a holistic approach to development, we can ensure that both cultural and environmental assets are preserved for future generations.

Green financing is making significant strides in supporting the preservation of **ICH** and advancing green building projects. As this field evolves, it promises to provide robust mechanisms for integrating cultural heritage into sustainability efforts. By leveraging innovative financing solutions and regulatory frameworks, the future holds great potential for enhancing the preservation of **ICH** alongside sustainable development in urban environments like Hong Kong. Last but not the least, AI can support resource optimization, predicting maintenance needs, and enhancing customer engagement. Such applications are exemplified in the Case Study in this paper.

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DECLARATION OF CONFLICTING INTEREST

The author declares NO conflict of interest. There are no other third parties in the design of the study, in the collection, analyses, or interpretation of data, in the writing of the manuscript, or in the decision to publish the results.

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