

MULTIDISCIPLINARY SYNERGY IN DRIVING SUSTAINABLE INNOVATION: TRANSFORMING THE MANAGEMENT ECOSYSTEM TOWARD ACHIEVING THE SDGs

Gusti Ayu Mahanavami¹⁾, Ni Nyoman Menuh²⁾, Wiryawan Suputra Gumi³⁾ and Ida Bagus Ngurah Wimpascima⁴⁾

¹⁾ STIMI Handayani, Denpasar

Email: gustiayumahanavami@gmail.com

²⁾ STIMI Handayani, Denpasar

³⁾ STIMI Handayani, Denpasar

⁴⁾ STIMI Handayani, Denpasar

ABSTRACT

The transformation towards sustainable development demands a collaborative and interdisciplinary management ecosystem. This study aims to analyze the dynamics of multidisciplinary synergy in driving sustainable innovation in Bali, a region with a unique socio-cultural structure. The research approach uses exploratory qualitative methods with in-depth analysis. The results show that multidisciplinary synergy is formed through the interaction of technical, social, and managerial knowledge integrated in the practice of innovation based on the local culture of Tri Hita Karana. Collaborative leadership and adaptive governance are the main catalysts for the successful integration of economic, social, and environmental dimensions. This study contributes theoretically by offering a conceptual model of the Local-Based Multidisciplinary Synergy Framework, which integrates the Quadruple Helix with Balinese local wisdom values. Practically, the research results provide direction for local governments and educational institutions to strengthen the collaborative ecosystem in realizing the SDGs at the local level.

Keywords: *Multidisciplinary Synergy, Sustainable Innovation, Management Ecosystem, Tri Hita Karana, SDGs.*

1. INTRODUCTION

In an era of globalization and economic uncertainty, achieving the Sustainable Development Goals (SDGs) is a complex challenge that demands synergy across disciplines and sectors. Sustainable development cannot be achieved through a purely technocratic approach but requires the integration of management, social sciences, technology, and culture to create inclusive and competitive innovation (Carayannis & Campbell, 2021). Multidisciplinary synergy is a strategic approach to addressing social, economic, and environmental complexities through collaboration between government, academics, business actors, and the community. Bali is a relevant context for research due to its success in combining tourism-based economic growth with the preservation of socio-cultural and environmental values. Sustainable development in Bali not only demands economic efficiency but also emphasizes harmony between social, environmental, and cultural dimensions. In this context, sustainable innovation is at the heart of efforts to address the global challenges of the SDGs. Multidisciplinary synergy serves as a bridge to integrate diverse knowledge, technologies, and local values to produce contextually relevant, innovative solutions. The Tri Hita Karana values, as a Balinese

philosophy of life, provide a moral and cultural framework to support innovation rooted in local wisdom while remaining open to global change. However, the pressures of globalization, climate change, and dependence on the tourism sector present new challenges that demand cross-disciplinary innovation and adaptation in resource management. This research aims to analyze the dynamics of multidisciplinary synergy in fostering sustainable innovation in Bali, a region with a unique socio-cultural structure.

2. RESEARCH METODOLOGY

This study uses a qualitative approach with an exploratory type. This approach was chosen because the aim of the study is to deeply understand the phenomenon of multidisciplinary synergy in driving sustainable innovation, which is still relatively new and complex, especially in the context of transforming the management ecosystem towards achieving the Sustainable Development Goals (SDGs). The data collection technique is a documentation study to obtain comprehensive and in-depth data. Data analysis is carried out by the steps of compiling themes, reviewing themes, and interpreting results to build a conceptual model of the Multidisciplinary Synergy Framework for Sustainable Innovation.

3. RELATED RESEARCH/LITERATUR REVIEW

A Sustainable Business Model (SBM) is a strategic framework that combines economic value creation with social responsibility and environmental preservation (Bocken, 2020). This approach emphasizes the integration of the people, profit, and planet dimensions into organizational strategy and performance, so that businesses are oriented not only toward financial gain but also toward social welfare and ecological sustainability. In the Balinese context, the application of SBM principles is relevant because it is supported by the values of Tri Hita Karana—the concept of harmony between humans, nature, and spirituality—which serves as an ethical and philosophical foundation for sustainable business practices. Cross-sector collaboration between government, academics, business actors, and the community is key to creating business models that are not only economically profitable but also strengthen social and ecological balance. The integration of Tri Hita Karana into the local innovation ecosystem can strengthen management transformation towards achieving the SDGs, while maintaining social and environmental sustainability (Kristinayanti et al., 2025; Negara et al., 2025). In line with this, Baldassarre et al. (2020) developed a sustainable design framework that combines ecodesign, product-service systems, sustainable business models, and collaborative ecosystem design. Meanwhile, the Quadruple Helix model proposed by Carayannis and Campbell (2009) emphasizes the importance of integrating cultural and media-based public perspectives within the innovation ecosystem, thereby creating a dynamic, adaptive, and layered knowledge system to support a knowledge-based economy.

4. RESULTS AND DISCUSSION

Cross-disciplinary Knowledge Integration is the process of combining perspectives, methods, and knowledge from diverse scientific fields to produce more comprehensive solutions to complex problems, such as sustainable innovation. In this context, collaboration between academics, business actors, and local communities is key. Academics contribute through research and the development of scientific concepts, business actors provide resources and implementation strategies, and local communities bring cultural wisdom and contextual social practices. This cross-disciplinary collaboration can foster social innovations, such

as the development of environmentally friendly products, organic farming systems, and culture-based tourism that empowers local communities. Such integration not only generates economic value but also strengthens the social and environmental dimensions as part of sustainable development. However, in practice, the knowledge integration process often faces various structural and cultural barriers. One of these is the lack of effective communication platforms, which limits the exchange of information and knowledge between actors. Furthermore, there are capacity gaps between the parties involved—for example, differences in research capabilities, access to technology, and understanding of sustainability principles. As a result, the collaborative potential that should be synergistic is often not optimally maximized. Overall, the success of cross-disciplinary knowledge integration depends on the creation of open communication mechanisms, strengthening the capacity of each actor, and the existence of collaborative governance that can bridge differences in perspectives and interests.

The research results show that multidisciplinary synergy is formed through the integration of cross-disciplinary knowledge and collaboration between various actors within the innovation ecosystem. This collaboration not only connects the fields of management, economics, technology, and social sciences, but also involves stakeholders from the public sector, academia, business actors, and the community. Cross-disciplinary integration enables a mutually enriching exchange of knowledge, creating more contextual and sustainable innovative solutions. Thus, multidisciplinary synergy serves as a mechanism that brings together diverse perspectives to address the complex challenges of sustainable development.

Furthermore, Collaborative Leadership and Adaptive Governance play a crucial role in maintaining a balance between economic, social, and environmental interests. In Bali, local figures serve as collaborative leaders, bringing together various actors—government, business, academics, and the community—to realize sustainability initiatives. Adaptive governance approaches are reflected in communities' ability to adjust strategies and policies based on changing social and environmental conditions. Examples include eco-village projects that integrate environmentally friendly practices with local culture, and waste-to-value programs that transform waste into new economic resources. Through inclusive leadership and flexible governance, cross-sector collaboration in Bali is enabling sustainable innovations rooted in local values and community needs. Collaborative leadership and adaptive governance emerge as key elements in maintaining the sustainability of this synergy. Collaborative leadership emphasizes a facilitative role, open communication, and equality among actors in the decision-making process. Meanwhile, adaptive governance plays a role in ensuring that the system can flexibly respond to change without losing its strategic direction toward sustainability goals. The combination of the two creates a structure that enables the harmonious integration of economic, social, and environmental dimensions in organizational practices and public policies.

The role of local cultural values (Tri Hita Karana) serves as an ethical and moral foundation for driving sustainable innovation in Bali. The principle of harmony between humans, nature, and God creates a balance that guides every development initiative to align with humanitarian values and environmental sustainability. The integration of Tri Hita Karana values into sustainability programs not only strengthens social legitimacy but also increases community participation. When innovations are based on mutually understood and respected cultural values, communities are more receptive and committed to their implementation.

Thus, these local values serve as a bridge between the spiritual, social, and ecological aspects of sustainable development. In the Balinese context, the values of Tri Hita Karana serve as an ethical and cultural foundation that strengthens the social legitimacy of sustainable innovation. The principle of harmony between humans, nature, and God serves as a moral guideline in all forms of collaboration and decision-making. Rooted in these local cultural values, sustainable innovation practices are not only socially accepted but also possess profound spiritual and moral significance for the Balinese people. This makes Tri Hita Karana not merely a cultural value but also a transformational instrument in strengthening a sustainable innovation ecosystem.

Theoretically, this research expands the Quadruple Helix model into the Quintuple Helix by adding the local cultural dimension as a key factor in the innovation process. While the Quadruple Helix model encompasses the roles of government, academia, business, and society, the fifth dimension of the Quintuple Helix model—culture and environment—emphasizes the importance of local context in creating relevant and sustainable innovation. Thus, incorporating local cultural values such as Tri Hita Karana into innovation models not only enriches theory but also provides a practical contribution to building a more inclusive, adaptive management paradigm rooted in local wisdom.

These findings suggest that the Quadruple Helix model, which originally emphasized collaboration between government, academics, business actors, and the community, can be expanded into a Quintuple Helix by adding a local cultural dimension as a fifth pillar. In the Balinese context, cultural values such as Tri Hita Karana play a crucial role in shaping the orientation and practice of sustainable innovation. The addition of this cultural dimension explains why sustainable innovation in Bali tends to be communitarian and participatory, as each initiative focuses not only on economic outcomes but also considers social harmony and environmental sustainability. Local culture serves as a binding force that fosters a sense of collective responsibility and strengthens collaboration between actors in the innovation system. Thus, the Quintuple Helix in Bali represents an innovation ecosystem rooted in local wisdom while supporting the achievement of the sustainable development goals (SDGs).

5. CONCLUSION

This research confirms that multidisciplinary synergy is a prerequisite for sustainable innovation rooted in local values. Collaboration among actors in the Balinese management ecosystem demonstrates that the integration of cross-disciplinary knowledge, collaborative leadership, and adaptive governance are essential foundations for realizing the SDGs at the local level. The theoretical implication of this research is the strengthening of the Local-Based Multidisciplinary Synergy framework, which extends the Quadruple Helix model with a cultural dimension. Practically, the findings of this research encourage local governments and universities to develop collaborative innovation platforms based on local culture and socio-environmental sustainability.

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