



Green Transformation Coupled with Digitalization in the Tourism and Hospitality Sector: Lessons Learned for Vietnam

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Abstract

In the context of accelerating climate change and the growing imperative for sustainable development, green transformation integrated with digitalization has emerged as an inevitable trend in the tourism and hospitality sector. This transformation not only contributes to mitigating environmental impacts but also facilitates the modernization of management practices, enhances operational efficiency, and improves the quality of tourist experiences. However, in Vietnam, the implementation of green transformation and digitalization in the tourism and hospitality sector continues to face numerous challenges, including limited financial and human resources, inadequate technological capabilities, and a lack of comprehensive studies that synthesize international experiences to derive practical lessons for sustainable sectoral development.

The study employs a literature review and document analysis approach to examine the concept of green transformation integrated with digitalization in the tourism and hospitality sector. It further synthesizes representative international experiences concerning policy frameworks, governance practices, technological applications, human resource development, and the enhancement of tourist experiences. Based on these findings, the study derives several lessons that are relevant to the Vietnamese context, highlighting the pivotal role of government, the central role of enterprises, the importance of human capital, and the need to align transformation strategies with local conditions and characteristics.

The findings contribute to the existing literature by providing a comprehensive perspective on green transformation integrated with digitalization in the tourism and hospitality sector. Furthermore, they offer a scientific basis for policy formulation and strategic decision-making to promote sustainable tourism development in Vietnam amid emerging global challenges.

Keywords:

Green transformation; digitalization; tourism and hospitality; sustainable development; lessons learned.

1. Introduction

In the context of increasingly severe global challenges posed by climate change, resource depletion, and the growing imperative for sustainable development (UNWTO, 2018),

green transformation and digital transformation have emerged as indispensable trends across a wide range of economic sectors. In the tourism and hospitality industry, these two transformative processes not only aim to mitigate adverse environmental impacts but also play a pivotal role in modernizing management practices, enhancing service quality, and strengthening competitiveness in an increasingly integrated global market.

Evidence from tourism development demonstrates that green transformation is unlikely to achieve its full potential without the support of digital technologies. The adoption of innovations such as artificial intelligence (AI), big data analytics, and smart management platforms has significantly improved resource efficiency, reduced carbon emissions, optimized operational processes, and enabled more personalized tourist experiences. The integration of green transformation with digitalization has therefore been widely recognized as a key driver of the long-term sustainable development of the tourism and hospitality sector (UNWTO, 2021; OECD, 2020).

In Vietnam, green transformation and digitalization in the tourism and hospitality sector have been identified as strategic priorities for shaping and advancing tourism development policies (Government of Vietnam, 2021; Government of Vietnam, 2022). In recent years, the country has established an increasingly favorable foundation for accelerating both green and digital transformation. Nevertheless, the implementation process continues to face substantial internal challenges that have not kept pace with these developments. Key constraints include limited technological capabilities, inadequate financial and human resources, insufficient digital infrastructure, and a lack of institutional coordination and integrated implementation mechanisms.

Moreover, the existing body of literature has primarily focused on assessing the current state of green or digital transformation or proposing isolated solutions. Comparatively few studies have adopted a comprehensive perspective that examines the integration of green transformation and digitalization while drawing practical lessons from international experiences.

Against this backdrop, this study aims to examine selected experiences of integrating green transformation with digitalization in the tourism and hospitality sector through a comprehensive literature review and document analysis. Based on these findings, the study identifies a number of lessons that are relevant to the Vietnamese context, providing valuable insights for promoting the green and digital transformation of the tourism and hospitality industry and supporting the country's transition toward sustainable tourism development in the evolving global landscape.

2. Theoretical Background and Research Methodology

2.1. Key Concepts and Conceptual Approaches

In contemporary tourism and hospitality research, green transformation and digitalization are widely recognized as two closely interconnected and mutually reinforcing processes that contribute to the achievement of sustainable development goals (Brundtland Commission, 1987). Green transformation in the tourism and hospitality sector refers to the process of restructuring development and management practices to minimize environmental

impacts, improve resource efficiency, reduce greenhouse gas emissions, and strengthen corporate social responsibility. This transformation extends beyond the adoption of environmentally friendly technologies and practices; it also encompasses fundamental changes in managerial thinking, organizational behavior, and service delivery models.

Digital transformation in the tourism and hospitality industry refers to the process of adopting digital technologies to innovate management practices, operational processes, and customer interactions, thereby enhancing organizational efficiency and service quality. In the contemporary context, digital transformation extends beyond the mere digitization of processes and data; rather, it represents a comprehensive transformation in the way organizations create value through the effective utilization of data, digital platforms, and intelligent technologies (OECD, 2020; UNWTO, 2021).

The integration of green and digital transformation is increasingly conceptualized as a unified process of *green digital transformation*, in which digital technologies serve as key enablers for achieving environmental sustainability objectives, while green development principles provide the strategic direction and overarching goals for digitalization. This integrated approach enables tourism and hospitality enterprises as well as destinations to enhance economic performance while simultaneously fulfilling environmental protection requirements and advancing sustainable development. This study adopts a holistic perspective on green digital transformation in the tourism and hospitality sector, conceptualizing it as a systemic process that simultaneously encompasses governance, technological innovation, human resource development, and tourist experience management. This perspective provides a robust analytical foundation for examining representative international practices and deriving generalized lessons and policy implications applicable to the Vietnamese context.

2.2. Research Methodology

This study employs a literature review and document analysis approach to achieve the proposed research objectives. Specifically, the authors systematically collected, analyzed, and synthesized scientific publications, thematic reports, policy documents, and other relevant literature on green transformation, digital transformation, and sustainable development in the tourism and hospitality sector from both domestic and international sources.

Drawing on the collected literature, this study employs comparative analysis to examine the similarities and differences in approaches to green digital transformation, thereby identifying representative international practices and generating generalizable insights. Furthermore, a synthesis approach is adopted to systematically integrate the analytical findings and derive lessons that offer practical and policy relevance for Vietnam in advancing green and digital transformation within the tourism and hospitality sector. This methodological approach is consistent with review-based studies in the tourism and hospitality literature (UNWTO, 2018; World Bank, 2020).

The selection of a literature review and document analysis methodology is well aligned with the objectives of this study, as it enables a comprehensive and systematic examination of the research topic without relying on primary survey data. At the same time, this approach

ensures methodological rigor and logical consistency in deriving evidence-based lessons that can inform both future research and policy formulation.

2.3. Overview of Green Digital Transformation Implementation in Vietnam's Tourism Industry

Green digital transformation in Vietnam's tourism and hospitality sector has gradually gained momentum in recent years, with encouraging initial progress. These developments reflect the government's well-prepared strategies and sustained commitment to promoting the dual transition, thereby creating a solid foundation for domestic tourism and hospitality enterprises to strengthen their international competitiveness and integration. National strategies and development programs have increasingly incorporated green growth, sustainable tourism, and digital technologies as core priorities, providing an enabling policy framework for industry stakeholders to progressively adopt green digital transformation in line with the country's long-term development agenda.

Despite these encouraging developments, the implementation of green digital transformation remains uneven across localities and tourism enterprises, reflecting differences in regional characteristics, levels of economic development, and organizational readiness to adopt digital technologies in business operations. In many cases, digital transformation initiatives remain fragmented, limited in scope, and largely confined to pilot or isolated applications, with insufficient integration of digital solutions to effectively support environmental sustainability and green development objectives. Furthermore, constraints related to financial resources, managerial capabilities, and human capital continue to represent significant barriers to scaling up and enhancing the effectiveness of green digital transformation in Vietnam's tourism and hospitality sector.

3. International experiences in green digital transformation in the tourism and hospitality sector

3.1. Policy Orientation and Governance

Experiences from the tourism and hospitality sectors across various countries indicate that green digital transformation can only be effectively achieved when supported by clear government direction and implemented within a coherent governance framework. Governments play a pivotal enabling role by formulating strategic visions, establishing supportive policy frameworks, and fostering an enabling institutional environment. These measures guide the behavior of tourism enterprises and other stakeholders toward the shared objective of sustainable development (UNWTO, 2018; World Bank, 2020).

An important lesson from international practice is the establishment of institutional frameworks and standards to support the implementation of green digital transformation. Standards related to green tourism, sustainable accommodation, energy and emissions management, as well as digital data standards and platform interoperability, provide a foundation for ensuring transparency, consistency, and comparability throughout the transformation process. Rather than relying solely on rigid administrative regulations, many countries have adopted a more flexible governance approach that combines mandatory

standards with incentive-based mechanisms, thereby encouraging tourism enterprises to proactively engage in green digital transformation.

In addition, multi-stakeholder collaboration among governments, tourism enterprises, and local communities is widely recognized as a critical factor in the governance of green digital transformation. Governments assume a coordinating and regulatory role by overseeing the implementation of relevant policies and ensuring an enabling institutional environment. Tourism enterprises serve as the primary actors responsible for adopting digital technologies and green management practices in accordance with established regulations and sustainability standards. Meanwhile, local communities contribute by preserving natural and cultural resources while monitoring the social and environmental impacts of tourism and hospitality activities. Such collaborative governance facilitates a coordinated and coherent transformation process, strengthens institutional cooperation among stakeholders, mitigates potential conflicts of interest, and enhances the long-term sustainability and resilience of the tourism and hospitality ecosystem.

3.2. Digital Technology Applications for Green Transformation

In the tourism and hospitality sector, digital technologies are increasingly recognized as essential enablers of green transformation. One of the most notable international practices is the application of digital technologies to enhance resource efficiency throughout operational processes. Smart management systems enable the real-time monitoring, analysis, and optimization of electricity, water, and other resource consumption, thereby reducing operational waste, improving resource efficiency, and lowering operating costs.

Energy and waste management represent two areas in which the enabling role of digital technologies is particularly evident. The adoption of energy monitoring systems, smart sensors, and data-driven platforms enables tourism and hospitality enterprises to monitor resource consumption, detect operational anomalies at an early stage, and make timely, evidence-based management decisions. In waste management, digital technologies facilitate waste classification, tracking, and life-cycle assessment, thereby supporting the implementation of circular economy practices and improving resource efficiency within the tourism and hospitality sector.

Furthermore, digital technologies are increasingly employed to support emissions reduction across tourism and hospitality operations. The digitalization of business processes, the reduction of paper-based procedures, and the optimization of logistics and supply chain management contribute to lowering indirect greenhouse gas emissions. Moreover, integrating environmental data into digital management systems enables tourism enterprises and public authorities to comprehensively assess environmental performance and impacts, thereby facilitating evidence-based decision-making and the development of more sustainable management strategies.

3.3. Human Resource Development and Management Mindset Transformation

Another important lesson from international experience in green digital transformation is the strategic emphasis placed on human resource development. The transformation process requires not only investment in digital technologies but also a workforce and managerial team

equipped with the competencies necessary to adopt, operate, and effectively leverage innovative digital and green solutions. Consequently, developing digital and green skills has become a fundamental prerequisite for ensuring the long-term sustainability of green digital transformation (UNWTO, 2021). Evidence from international practice indicates that enhancing the awareness of managers and employees regarding the importance of green digital transformation is a critical determinant of successful implementation. When the transition is perceived not merely as a compliance requirement or an additional cost, but as a strategic opportunity to create value and strengthen organizational competitiveness, tourism and hospitality enterprises are more likely to adopt proactive and innovative approaches to implementation. Consequently, education, professional training, and lifelong learning have become integral components of human resource development strategies in the tourism and hospitality sector.

In addition, fostering an organizational culture oriented toward sustainable development represents another important lesson from international practice. Such a culture is reflected in the promotion of innovation, the responsible use of digital technologies, and a strong commitment to environmental and social values in business operations. When green digital transformation is embedded within an organization's core values and corporate culture, its implementation becomes more sustainable, resilient, and less dependent on short-term initiatives or external pressures.

3.4. Enhancing Tourist Experiences Through Social Responsibility

A prominent trend in green digital transformation is the adoption of a tourist-centered approach that integrates visitor experiences with environmental and social responsibility. Digital technologies enable the personalization of tourism services, the provision of transparent and accessible information, and more interactive engagement with visitors, thereby enhancing customer satisfaction while fostering greater awareness of sustainable tourism principles and responsible travel behaviors.

International experience indicates that responsible tourism has become an increasingly important determinant of tourists' travel choices. Providing transparent information on environmental impacts, encouraging environmentally responsible consumption, and creating opportunities for tourists to participate in conservation activities contribute to enhancing the overall visitor experience. Digital technologies play a vital supporting role by facilitating communication, strengthening stakeholder engagement, and monitoring tourists' participation in these sustainability-oriented activities, thereby reinforcing both visitor satisfaction and the social and environmental value of tourism (UNWTO, 2018).

Furthermore, integrating conservation with business development represents another noteworthy lesson in advancing sustainable tourism and hospitality. Through digital platforms, tourism enterprises can strengthen collaboration with local communities, support the conservation of natural resources and cultural heritage, and develop higher value-added tourism products and services. This integrated approach helps balance economic objectives with social and environmental responsibilities, thereby contributing to the establishment of a more sustainable tourism and hospitality development model in the long term. A clear manifestation of this trend is the growing adoption of experiential tourism models that combine visitor

experiences with resource conservation, cultural heritage preservation, and social responsibility at tourism destinations.

Tourism enterprises have increasingly leveraged digital communication to promote conservation initiatives, such as sea turtle protection projects, by transforming them into meaningful visitor experiences. These initiatives have enabled enterprises to attract high-value market segments that are willing to pay a premium for socially and environmentally responsible tourism experiences, while simultaneously generating financial resources that can be reinvested in local ecosystems and conservation efforts. Similarly, in heritage destinations, tourism enterprises and local authorities have prioritized the preservation of cultural heritage by capitalizing on distinctive local assets. The adoption of digital maps and online booking platforms has facilitated a more balanced distribution of visitor flows from core heritage sites to surrounding areas, thereby alleviating tourism pressure on sensitive heritage zones while creating broader economic benefits for local communities.

Such an approach not only alleviates pressure on existing tourism infrastructure but also transforms living heritage assets, including traditional pottery making and vegetable farming, into distinctive tourism products with strong competitive advantages that are difficult to replicate elsewhere. These examples demonstrate how the integration of digital technologies, heritage conservation, and community participation can effectively balance economic benefits with social responsibility. As a result, this approach supports the development of a more sustainable tourism and hospitality sector while generating long-term economic value for local communities and contributing to Vietnam's broader sustainable development objectives.

4. Lessons Learned and Policy Implications for Vietnam

4.1. Key Lessons

International experience demonstrates that green transformation in the tourism and hospitality sector can achieve meaningful and lasting outcomes only when it is implemented in conjunction with a comprehensive digital transformation process encompassing both public governance and enterprise operations. The adoption of digital technologies not only enhances resource efficiency and reduces greenhouse gas emissions but also improves service quality, strengthens stakeholder connectivity across the tourism value chain, and reinforces the long-term competitiveness of the tourism industry.

Drawing upon the synthesis and analysis of international experiences in green digital transformation within the tourism and hospitality sector, several key lessons can be identified for Vietnam in advancing sustainable tourism development. These lessons underscore the importance of integrating environmental sustainability with digital innovation and are broadly consistent with the policy recommendations proposed by international organizations for promoting sustainable tourism development (UNWTO, 2018; World Bank, 2020).

First, international experience suggests that although the Vietnamese Government has established an initial policy framework and introduced several dedicated financial support mechanisms, including Decision No. 147/QĐ-TTg and Decision No. 1658/QĐ-TTg, detailed implementation guidelines for tourism enterprises remain insufficient, particularly with respect to operational implementation.

An important lesson is the need to develop a comprehensive set of quantitative criteria for assessing “Digital Green Hotels.” At present, the Green Lotus ecolabel could be further

strengthened by incorporating indicators that measure digital transformation capabilities, such as the proportion of electronic documentation and the level of automation in energy management systems.

From the perspective of international experience, the establishment of preferential green financing mechanisms represents an effective approach to supporting tourism enterprises in investing in green transformation. When appropriately designed and implemented, such policies can encourage financial institutions to expand green financing schemes for investments in clean energy solutions, environmentally sustainable technologies, and digital management systems that enhance operational efficiency and environmental performance.

For small and medium-sized enterprises (SMEs), which represent a significant proportion of tourism businesses but often face considerable resource constraints, access to preferential credit mechanisms and financial support is particularly important. Such mechanisms can enhance the capacity of SMEs to undertake green transformation initiatives, thereby highlighting the critical role of green finance in accelerating sustainable transformation within the tourism and hospitality sector.

Second, in the context of ongoing digital transformation, the development of open data infrastructure and shared digital ecosystems should be considered as a strategic priority. One of the major barriers currently hindering effective digital transformation is data fragmentation and the lack of interoperability among stakeholders. Green transformation requires transparent and reliable data systems to accurately measure environmental impacts, monitor sustainability performance, and support evidence-based decision-making.

National tourism authorities should take a leading role in developing a national digital platform for tourism environmental management. Such a platform would enable local authorities and tourism enterprises to update real-time sustainability indicators, including electricity consumption per room night and the amount of plastic waste reduced, thereby supporting more effective monitoring, evaluation, and decision-making in the pursuit of green transformation.

Such data transparency would not only enhance the capacity of regulatory authorities to monitor and evaluate sustainability performance but also create the foundation for a sector-specific “carbon credit trading platform” within the tourism industry. Through such a mechanism, tourism enterprises that achieve superior environmental performance could potentially trade emission allowances, receive recognition, or gain reputational advantages, thereby fostering healthy competition and encouraging broader participation in green transformation initiatives.

Third, research evidence and practical experience indicate that developing a “dual-skills” workforce combining digital and green competencies is essential for successful green digital transformation. This transition requires employees to adopt new mindsets and acquire a broader range of capabilities. For example, housekeeping staff should not only perform routine cleaning tasks but also be able to operate indoor air quality monitoring devices; similarly, front-desk employees should not only manage check-in procedures but also assist guests in using smart tourism applications to reduce reliance on printed materials such as paper maps.

For educational institutions: Training programs should be reviewed and updated toward integrating modules on “Smart and Sustainable Tourism” into professional tourism and hospitality curricula. Such integration would help equip future tourism professionals with the interdisciplinary knowledge and competencies required for managing digital transformation and sustainability-oriented operations.

For tourism enterprises: Enterprises should strengthen workplace-based training (*on-the-job training*) to enhance employees’ digital competencies. In particular, greater emphasis should be placed on transforming managerial mindsets, as green transformation should not be perceived merely as an operational cost but rather as a strategic investment in brand value creation, competitiveness, and long-term sustainable development.

Fourth, international experience highlights the importance of leveraging digital technologies to promote sustainability communication and influence tourist behavior. Ultimately, tourists are key stakeholders who determine the success of green transformation initiatives. Tourism enterprises should be encouraged to integrate gamification mechanisms into digital tourism applications to motivate more sustainable visitor behaviors. For example, tourists who check in at green destinations or reduce the use of single-use plastics could accumulate reward points (“Green Points”) through mobile applications and exchange them for service vouchers.

This approach makes environmental protection more accessible, engaging, and enjoyable, encouraging tourists to participate voluntarily rather than relying on rigid regulatory restrictions or mandatory measures.

4.2. Policy Implications Derived from Lessons Learned

Based on the lessons discussed in Section 4.1, the following proposals are presented as exploratory policy implications rather than as substitutes for existing strategies.

First, strengthening the policy and institutional framework to support green digital transformation. The government should continue reviewing and improving policies related to sustainable tourism development by integrating green objectives and digital transformation goals in a more coherent manner. The development of standards, implementation guidelines, and assessment frameworks for green tourism, sustainable accommodation facilities, and digital technology adoption should be undertaken systematically to ensure consistency and practical applicability. Furthermore, policy frameworks should provide sufficient flexibility for enterprises to determine appropriate transformation pathways based on their scale, resources, and specific operating conditions, thereby avoiding overly rigid requirements that may create unnecessary burdens (Government of Vietnam, 2021; Government of Vietnam, 2022).

Second, strengthening incentive mechanisms and support measures for tourism and hospitality enterprises. Green digital transformation requires substantial investment resources, particularly for small and medium-sized enterprises (SMEs). Therefore, appropriate support mechanisms should be developed, including preferential financing, technical assistance, transformation consulting, and incentives for innovation in the tourism and hospitality sector. Encouraging enterprises to adopt digital technologies to improve resource efficiency, reduce emissions, and enhance operational performance will contribute to ensuring that the transformation process is implemented in a substantive and sustainable manner.

Third, prioritizing human resource development to meet the requirements of green digital transformation. Human capital development plays a critical role and is considered a key pillar in the transformation strategy of the tourism and hospitality sector. Training and professional development programs should incorporate digital skills, green management, and sustainable development knowledge to align with the evolving demands of the labor market in the new context. At the same time, strengthening collaboration between educational institutions and tourism enterprises would help bridge the gap between training and industry practice, thereby enhancing employees' adaptive capacity in response to rapid technological advancements and changing management models.

Fourth, promoting multi-stakeholder collaboration and strengthening the role of local communities in sustainable tourism development. Green digital transformation is not solely the responsibility of governments and enterprises; rather, it requires the active participation of local communities and other relevant stakeholders. Establishing effective coordination mechanisms among government authorities, tourism enterprises, educational institutions, and local communities can contribute to balancing economic, social, and environmental interests. Digital technologies can serve as enabling tools to facilitate stakeholder connectivity, enhance information transparency, and strengthen community participation in tourism governance and development.

Fifth, aligning policy implications with regional characteristics, local contexts, and the development trajectory of the tourism and hospitality sector. The proposed policy implications require flexible design and implementation approaches that are tailored to the specific conditions of different localities and tourism destinations. Integrating green digital transformation objectives into regional and local tourism development planning would enhance the feasibility and effectiveness of policy implementation. At the same time, appropriate transformation roadmaps should be developed in accordance with each stage of development of Vietnam's tourism and hospitality sector, thereby avoiding superficial adoption of emerging trends or unsustainable transformation practices.

5. Conclusion

Green digital transformation has emerged as a critical pathway for achieving sustainable development in the tourism and hospitality sector amid globalization and the ongoing transformation of growth models. Through the synthesis and analysis of representative international experiences, this study demonstrates that green transformation and digital transformation should not be viewed as separate processes but rather as interconnected and mutually reinforcing components that need to be implemented in a coordinated and strategic manner within tourism and hospitality development strategies.

The findings indicate that the effectiveness of this transformation process largely depends on the enabling and coordinating role of the government, as well as the proactive innovation capacity of enterprises, the quality of human resources, and the level of community engagement. The application of digital technologies not only supports green objectives through resource efficiency, emissions reduction, and operational optimization but also contributes to enhancing visitor experiences and increasing the socio-economic value generated by tourism and hospitality activities.

Building upon the lessons derived from international experiences, this study proposes several policy implications and implementation orientations to support Vietnam in advancing green digital transformation in the tourism and hospitality sector. These implications emphasize the importance of strengthening institutional frameworks, supporting enterprises, developing human capital, and implementing transformation strategies that are aligned with the specific characteristics of different regions and local destinations.

Although this study does not employ primary survey data, it contributes both theoretically and practically by providing a comprehensive and systematic perspective on green digital transformation in the tourism and hospitality sector. The study serves as a valuable reference for policymakers, industry managers, and future researchers, particularly those conducting quantitative studies or case-based research aimed at further evaluating the effectiveness and impacts of transformation processes within the Vietnamese context.

References

- Brundtland Commission. (1987). *Our common future*. Oxford University Press.
- Government of Vietnam. (2021). *Decision No. 1658/QĐ-TTg dated October 1, 2021, approving the National Green Growth Strategy for the 2021–2030 period, with a vision toward 2050*.
- Government of Vietnam. (2022). *Decision No. 147/QĐ-TTg dated January 28, 2022, approving the Vietnam Tourism Development Strategy to 2030*.
- OECD. (2020). *Digital transformation and tourism*. OECD Publishing.
- OECD. (2021). *Towards green recovery: Building back better after COVID-19*. OECD Publishing.
- UNWTO. (2018). *Tourism and the Sustainable Development Goals – Journey to 2030*. World Tourism Organization.
- UNWTO. (2021). *Digital transformation in tourism*. World Tourism Organization.
- UNWTO. (2022). *Tourism and the green transition: Pathways to sustainable development*. World Tourism Organization.
- World Bank Group. (2020). *Tourism and the green recovery*. World Bank Group.