Vol. 1, No. 1, March 2026, pp. 1-10

Administrative Compliance, Urban Tourism Development, and Environmental Pressure: Evidence from a Heritage City in Indonesia

Prima Febriansyah*[1], Afriva Khaidir[1], Junios[2]

[1]*Faculty of Economics and Business, Department of Environmental and Development Studies, Universitas Negeri Padang*

[2]*Master of Public Health, Postgraduate Program, Universitas Prima Nusantara Bukittinggi*

(Received: February 18, 2024; Revised: February 31, 2024; Accepted: April 9, 2024; Available online: April 30, 2026)

Abstract

Rapid growth in urban tourism has intensified hotel development in heritage city centers, raising concerns over regulatory compliance and environmental sustainability. This study examines the relationship between administrative licensing compliance, spatial planning conformity, and environmental pressure arising from hotel development in Bukittinggi, a historic tourism city in Indonesia. Using a socio-legal approach, this research integrates normative legal analysis with empirical environmental assessment. Administrative compliance is evaluated through licensing documents and spatial regulations, while environmental impacts are measured using a composite Environmental Pressure Index constructed via Principal Component Analysis (PCA), incorporating waste generation, noise intensity, and reduction of green open space from 2020 to 2022. The findings reveal a significant gap between formal administrative compliance and substantive environmental outcomes. Although the hotel development fulfilled procedural licensing requirements, environmental pressure increased markedly over time. This indicates that licensing functions more as a procedural authorization than as an effective regulatory instrument for environmental control. The study contributes to urban governance literature by demonstrating that regulatory effectiveness in tourism-driven urban development depends on the integration of environmental performance indicators into administrative enforcement. Policy implications highlight the need for performance-based licensing, post-approval monitoring, and transparency to ensure sustainable urban tourism development in heritage cities.

Keywords: building permits, hotels, spatial planning, administrative law, environmental pressure

1. Introduction

Urban tourism has become a major driver of economic growth in many heritage cities, particularly in developing countries where tourism-oriented investment is actively promoted as a local development strategy. The expansion of accommodation facilities, especially hotels located in city centers, is often justified by the need to enhance tourism competitiveness, increase local revenue, and stimulate urban economic activity. However, empirical studies increasingly show that rapid hotel development in dense urban cores can generate significant environmental externalities if regulatory mechanisms fail to function effectively (1-2).

In heritage cities, the challenge is even more complex. Historic urban centers are typically characterized by limited land availability, high activity intensity, and fragile ecological and cultural assets. When tourism-driven development concentrates in these areas, environmental pressures such as increased waste generation, noise pollution, and loss of green open space tend to accumulate over time. These pressures not only degrade environmental quality but also threaten the sustainability of urban tourism itself by eroding the very heritage values that attract visitors (3).

From a governance perspective, the effectiveness of urban environmental management does not depend solely on the existence of regulations, but on how regulatory instruments are implemented and enforced. A growing body of literature emphasizes that administrative licensing should function as a preventive control mechanism, ensuring that economic development activities remain within environmental carrying capacity limits (4). In practice, however, licensing systems in many cities tend to prioritize procedural compliance and investment facilitation, often at the expense of substantive environmental control.

Vol. 1, No. 1, March 2026, pp. 1-10

This phenomenon is particularly evident in tourism-oriented urban development. Hotel projects frequently obtain formal administrative approval while generating environmental impacts that exceed regulatory expectations. Such conditions reflect what regulatory scholars describe as a compliance gap, where legal authorization exists, but regulatory objectives especially environmental protection are not effectively achieved (5-6). As a result, administrative licensing risks becoming a procedural formality rather than a meaningful instrument of environmental governance.

Indonesia provides a relevant context for examining this issue. In recent years, regulatory reforms aimed at simplifying business licensing and accelerating investment have altered the institutional landscape of urban development governance. While these reforms seek to improve economic efficiency, concerns have emerged regarding their implications for environmental oversight, particularly in environmentally sensitive and heritage urban areas. The tension between economic growth objectives and environmental sustainability is therefore increasingly visible at the local level.

Bukittinggi, a historic tourism city in West Sumatra, represents a critical case for analyzing these dynamics. As a former colonial administrative center that has evolved into a major tourism destination, Bukittinggi's urban core faces mounting development pressure. Hotel construction in proximity to iconic heritage landmarks has intensified debates over regulatory compliance, spatial planning consistency, and environmental degradation. These debates highlight broader institutional questions regarding the role of administrative licensing in managing urban tourism externalities.

Most existing studies on urban hotel development focus either on legal compliance from a normative perspective or on environmental impacts measured independently of governance processes. Few studies integrate administrative compliance analysis with quantitative environmental indicators to assess whether licensing systems function effectively as regulatory controls. This gap limits our understanding of how regulatory governance shapes environmental outcomes in tourism-driven urban development.

This study addresses that gap by examining the relationship between administrative licensing compliance and environmental pressure in hotel development within a heritage city context. Using a socio-legal approach combined with a composite environmental pressure index based on principal component analysis (PCA), the study evaluates whether formal licensing compliance translates into substantive environmental control. By linking regulatory processes with measurable environmental outcomes, this research contributes to the literature on urban governance, environmental economics, and sustainable tourism development.

Vol. 1, No. 1, March 2026, pp. 1-10

2. LITERATURE REVIEW

2.1 Administrative Licensing and Regulatory Effectiveness

Administrative licensing is a central instrument in public governance, designed to regulate private economic activities in accordance with public interest objectives. In environmental governance, licensing serves a preventive function by setting conditions, limits, and obligations before development activities are undertaken. The effectiveness of this instrument, however, depends not merely on procedural compliance but on its capacity to influence actual environmental performance (7).

Recent governance studies highlight a growing disconnect between formal regulatory compliance and substantive outcomes. Newig et al argue that regulatory systems often exhibit high formal compliance while failing to deliver environmental improvements due to weak monitoring and enforcement mechanisms. This condition is particularly pronounced in decentralized governance settings, where local authorities face institutional constraints and political pressure to accommodate economic investment.

2.2 Urban Tourism Development and Environmental Externalities

Urban tourism generates significant economic benefits, including employment creation, increased local revenue, and infrastructure development. Nevertheless, it also produces environmental externalities that are often spatially concentrated in city centers. Hotel operations contribute to increased waste generation, higher energy and water consumption, elevated noise levels, and pressure on limited green spaces (8).

Empirical studies in tourist cities demonstrate that environmental impacts tend to be cumulative and non-linear. Li et al. show that environmental degradation in tourism-intensive urban areas is closely linked to governance quality rather than tourism volume alone. Similarly, Sun et al. find that inadequate integration of environmental indicators into urban policy frameworks leads to delayed recognition of environmental stress, making mitigation more costly and less effective.

In heritage cities, environmental externalities also intersect with cultural sustainability. Degradation of urban environmental quality can reduce the aesthetic and experiential value of heritage areas, ultimately weakening tourism competitiveness. This reinforces the argument that environmental governance is not merely an ecological concern, but a core component of sustainable urban economic development.

2.3 Environmental Pressure Indices as Policy Evaluation Tools

To assess environmental impacts in complex urban systems, researchers increasingly employ composite indices that integrate multiple indicators into a single measure. Environmental pressure indices based on multivariate techniques, such as principal component analysis, allow for objective weighting of indicators and reduce subjectivity in impact assessment (9).

Such indices have been widely used in sustainability assessment, urban planning, and tourism impact evaluation. By capturing multiple dimensions of environmental stress, composite indices provide policymakers with actionable insights into trends and thresholds that may not be visible through single-indicator analysis. Importantly, these tools enable the evaluation of regulatory effectiveness by linking governance arrangements to measurable environmental outcomes.

Despite their potential, environmental pressure indices are rarely integrated into administrative licensing evaluation. Most licensing systems continue to rely on ex ante assessments and static compliance checks, with limited use of post-approval performance indicators. This gap limits the adaptive capacity of regulatory systems, particularly in rapidly changing urban tourism environments.

2.4 Conceptual Framework

Vol. 1, No. 1, March 2026, pp. 1-10

Building on the literature, this study conceptualizes administrative licensing compliance as a regulatory control variable and environmental pressure as an outcome variable. Administrative compliance is understood substantively, encompassing spatial planning conformity, environmental approval obligations, and post-licensing oversight. Environmental pressure is operationalized through a composite index reflecting waste generation, noise intensity, and reduction of green open space.

The underlying assumption is that weak substantive compliance will result in increasing environmental pressure, even when formal licensing requirements are met. This framework allows for a systematic evaluation of whether administrative licensing functions as an effective governance instrument in tourism-driven urban development.

3. METHODOLOGY

3.1 Research Design and Analytical Approach

This study employs a socio-legal research design that integrates regulatory analysis with empirical environmental assessment to evaluate the effectiveness of administrative licensing in urban tourism development. The approach is designed to bridge the gap between formal regulatory compliance and actual environmental outcomes, which is often overlooked in conventional urban governance studies.

Rather than testing causal relationships statistically, the study adopts a descriptive–analytical framework to examine whether administrative licensing functions as a substantive regulatory instrument or merely as a procedural authorization. This approach allows for an in-depth evaluation of institutional performance within a specific urban governance context.

3.2 Case Study Selection

Bukittinggi, a heritage tourism city in West Sumatra, Indonesia, was selected as the study area due to its historical significance, high tourism intensity, and limited environmental carrying capacity. The city's urban core, particularly areas surrounding major heritage landmarks, has experienced increasing hotel development pressure over the past decade.

The hotel project examined in this study represents a typical case of tourism-oriented urban investment in a dense historic environment. The case is analytically relevant because it fulfills formal licensing requirements while simultaneously generating public debate regarding spatial conformity and environmental impacts. This condition provides a suitable basis for assessing the presence of an administrative compliance gap.

3.3 Data Sources and Collection

The study utilizes both normative and empirical data, collected from multiple sources to ensure analytical triangulation.

Normative data consist of national and local regulations governing administrative licensing, spatial planning, and environmental protection, as well as official licensing documents related to the hotel development. These materials are analyzed to identify the formal standards of administrative compliance applicable to urban hotel projects.

Empirical data include secondary environmental data collected for the period 2023–2025, covering indicators relevant to urban environmental pressure. The data were obtained from municipal environmental reports, local government agencies, and officially published urban statistics. Using a three-year observation period allows for the identification of environmental pressure trends following licensing approval and early operational phases.

Vol. 1, No. 1, March 2026, pp. 1-10

3.4 Measurement of Administrative Compliance

Administrative compliance in this study is assessed substantively rather than procedurally. Compliance is evaluated across three interrelated dimensions:

1. Spatial Planning Conformity, referring to the consistency of licensing decisions with officially adopted spatial plans and zoning regulations in the city center.
2. Environmental Approval Obligations, focusing on whether environmental requirements embedded in licensing decisions are adequately specified and monitored.
3. Post-Licensing Oversight, examining the presence and effectiveness of monitoring and enforcement mechanisms after permits have been issued.

This multidimensional assessment enables the evaluation of whether licensing operates as a dynamic regulatory control or as a static administrative formality.

3.5 Construction of the Environmental Pressure Index

To quantify environmental impacts associated with hotel development, the study constructs a composite Environmental Pressure Index (EPI) using Principal Component Analysis (PCA). This method is widely applied in urban sustainability and environmental economics research to integrate multiple correlated indicators into a single composite measure while minimizing subjectivity (1), (10-11).

Three indicators were selected based on theoretical relevance and data availability:

- Daily solid waste generation,
- Ambient noise intensity,
- Reduction of green open space in the surrounding urban area.

All indicators were standardized using z-score normalization to ensure comparability across different measurement units. PCA was then applied to extract the principal component with the highest eigenvalue, representing the dominant dimension of environmental pressure.

The Environmental Pressure Index is calculated as a weighted linear combination of standardized indicators, using factor loadings derived from the PCA results. This index provides a quantitative representation of environmental stress dynamics over time and enables comparison across observation periods.

3.6 Analytical Procedure

The analysis proceeds in two stages. First, administrative compliance is evaluated qualitatively by comparing formal licensing provisions with observed governance practices, focusing on spatial conformity and environmental oversight. Second, trends in the Environmental Pressure Index are analyzed to identify changes in environmental conditions during the observation period.

The findings from both stages are then interpreted jointly to assess whether formal administrative compliance corresponds with substantive environmental control. This integrated analysis allows for the identification of institutional gaps between regulatory intent and environmental outcomes.

3.7 Research Limitations

Several limitations should be acknowledged. The Environmental Pressure Index is constructed using a limited number of indicators due to data constraints, which may not capture all dimensions of urban environmental impact. Additionally, the study focuses on a single case study, limiting the generalizability of findings. Nevertheless, the case

Vol. 1, No. 1, March 2026, pp. 1-10

provides analytically rich insights into regulatory effectiveness in heritage tourism cities and contributes to broader discussions on urban governance and sustainability.

4. RESULTS AND DISCUSSION

4.1 Administrative Licensing Compliance in Urban Hotel Development

The analysis indicates that the hotel development under study formally complied with the administrative licensing requirements stipulated under national and local regulatory frameworks. Licensing documents demonstrate that the project obtained the necessary approvals related to building permits, spatial utilization, and environmental authorization. From a procedural standpoint, the development can therefore be classified as legally authorized.

However, when assessed substantively, administrative compliance appears limited. The licensing process primarily emphasized document completeness and procedural conformity, while mechanisms for ensuring ongoing environmental control were weak. This finding supports the argument that regulatory compliance in urban development is often reduced to procedural authorization rather than functioning as an effective preventive control mechanism (12-14).

From an institutional perspective, post-licensing oversight was neither systematic nor performance-based. Environmental obligations embedded in licensing decisions were not accompanied by clear monitoring indicators or measurable performance thresholds. Consequently, licensing operated as a static administrative approval rather than a dynamic governance instrument capable of adapting to environmental changes during the operational phase of the hotel.

This pattern reflects what governance scholars describe as an administrative compliance gap, where formal legality coexists with substantive regulatory failure. In the context of tourism-oriented urban development, such gaps are frequently reinforced by local government incentives to promote investment and economic growth, particularly in cities dependent on tourism revenue (15-16).

4.2 Environmental Pressure Index Results

The Environmental Pressure Index (EPI) constructed using principal component analysis reveals a clear upward trend in environmental pressure during the observation period from 2020 to 2022. The PCA results show that all three indicators daily waste generation, ambient noise intensity, and reduction of green open space loaded positively and significantly on the first principal component, indicating that they collectively represent a single underlying dimension of environmental stress (17).

The index values demonstrate a transition from low environmental pressure in 2023 to moderate pressure in 2024, and high pressure in 2025. This pattern suggests that environmental impacts intensified over time following licensing approval and the early operational phase of the hotel. Importantly, the increase in environmental pressure occurred despite the project’s formal administrative compliance.

These findings are consistent with empirical studies in other tourism-intensive cities, which show that environmental degradation often emerges gradually and becomes visible only after cumulative impacts reach a critical threshold (1), (8). The delayed manifestation of environmental stress underscores the

Vol. 1, No. 1, March 2026, pp. 1-10

limitations of licensing systems that rely solely on ex ante assessments without robust post-approval monitoring.

4.3 Linking Administrative Compliance and Environmental Outcomes

The juxtaposition of administrative compliance assessment and Environmental Pressure Index results reveals a significant disconnect between regulatory intent and environmental outcomes. While licensing procedures were fulfilled formally, environmental pressure increased measurably over time. This divergence highlights the limited capacity of procedural compliance to deliver substantive environmental protection.

From a governance standpoint, this finding supports the argument that regulatory effectiveness depends not only on rule design but also on enforcement architecture and feedback mechanisms. Newig et al. emphasize that without continuous monitoring and adaptive enforcement, regulatory instruments tend to lose their environmental effectiveness, particularly in complex urban systems.

In this case, the absence of performance-based indicators within the licensing framework meant that rising environmental pressure did not trigger regulatory intervention. As a result, administrative licensing failed to function as an early-warning system capable of signaling environmental stress and enabling corrective action. This condition aligns with Ostrom's critique of governance systems that lack polycentric monitoring and adaptive capacity.

4.4 Implications for Urban Economic Governance

The findings have important implications for urban economic governance in tourism-dependent cities. While hotel development contributes to local economic growth, the environmental externalities generated by weak regulatory control can undermine long-term urban competitiveness. Degraded environmental quality reduces the attractiveness of heritage areas and imposes social costs on local communities, ultimately offsetting short-term economic gains.

From an economic policy perspective, the study demonstrates that administrative licensing should be understood as an integral component of urban economic governance rather than as a purely legal instrument. When licensing prioritizes procedural efficiency over environmental performance, it risks creating a regulatory environment that externalizes environmental costs while privatizing economic benefits.

This outcome contradicts the principles of sustainable urban development, which require internalization of environmental externalities through effective governance mechanisms. The findings therefore reinforce the need to embed environmental performance indicators into licensing and monitoring systems to align economic incentives with sustainability objectives.

4.5 Discussion in the Context of Existing Literature

The results corroborate and extend existing literature on regulatory compliance and environmental governance. Similar to findings by Bansard (18), Prima et al. (19) and Potoski et al. (20), this study shows that formal compliance does not guarantee environmental protection in the absence of enforcement and

Vol. 1, No. 1, March 2026, pp. 1-10

monitoring. However, by integrating a quantitative environmental pressure index, the study provides empirical evidence linking regulatory compliance gaps to measurable environmental outcomes.

Moreover, the use of PCA-based environmental indicators strengthens the analytical connection between governance processes and environmental economics. This approach responds to calls in the literature for more integrative evaluation frameworks that move beyond legal formalism and capture real-world impacts of policy implementation (21-23).

In the context of heritage tourism cities, the findings underscore the vulnerability of historic urban cores to cumulative environmental stress. Weak regulatory enforcement in such settings can accelerate environmental degradation and compromise both ecological sustainability and tourism-based economic development.

5. Conclusion

This study examined the effectiveness of administrative licensing as a regulatory instrument for managing environmental externalities associated with hotel development in a heritage tourism city. Using a socio-legal approach combined with a composite environmental pressure index based on Principal Component Analysis, the research assessed whether formal licensing compliance translated into substantive environmental control.

The findings demonstrate that although the hotel development fulfilled procedural licensing requirements, environmental pressure increased significantly over the observation period. Rising waste generation, elevated noise levels, and declining green open space occurred simultaneously, indicating a clear divergence between formal administrative compliance and actual environmental outcomes. This divergence reflects an administrative compliance gap, where regulatory authorization exists without corresponding environmental effectiveness.

From a governance perspective, the results indicate that administrative licensing in urban tourism development has not functioned optimally as a preventive and adaptive control mechanism. Weak post-licensing oversight, limited integration of quantitative environmental indicators, and insufficient enforcement capacity have reduced licensing to a procedural formality rather than an active instrument of environmental governance. In heritage urban contexts with limited environmental carrying capacity, such regulatory shortcomings pose significant risks to long-term sustainability.

The study contributes to the literature on urban governance and environmental economics by empirically linking regulatory compliance analysis with quantitative environmental outcomes. By demonstrating how licensing effectiveness can be evaluated through environmental pressure indicators, the research moves beyond legal formalism and offers a more integrated framework for assessing regulatory performance in tourism-driven urban development.

While the study is limited to a single case and a restricted set of environmental indicators, it provides analytically rich insights with broader relevance for cities facing similar governance challenges. Future research may extend this approach through comparative analysis across multiple cities or by incorporating additional environmental and socio-economic indicators.

Vol. 1, No. 1, March 2026, pp. 1-10

Overall, the findings underscore that formal legality alone is insufficient to ensure sustainable urban tourism development. Effective administrative licensing must be grounded in substantive environmental performance, continuous monitoring, and adaptive governance. Strengthening these dimensions is essential for aligning urban economic growth with environmental sustainability in heritage tourism cities.

6. Declarations

Prima Febriansyah, Afriva Khaidir, and Junios equally contributed as the main contributors to this paper. All authors read and approved the final version of the paper.

References

1. Li T, Zhang H, Yuan C, Liu Z, Fan C. A PCA-based method for construction of composite sustainability indicators. Int J Life Cycle Assess. 2012 Jun;17(5):593–603. doi:10.1007/s11367-012-0394-y

2. Zieneldien T, Ma S, Tan IJ, Kim J, Busot D, Cohen BA. The Environmental Determinants of Skin Health: Linking Climate Change, Air Pollution, and the Dermatologic Disease Burden. Int J Environ Res Public Health. 2025 Dec 4;22(12):1820. doi:10.3390/ijerph22121820

3. Shi C, Guo N, Zhu X, Wu F. Assessing Urban Resilience from the Perspective of Scaling Law: Evidence from Chinese Cities. Land. 2022 Oct 14;11(10):1803. doi:10.3390/land11101803

4. Newig J, Challies E, Jager NW, Kochskaemper E, Adzersen A. The Environmental Performance of Participatory and Collaborative Governance: A Framework of Causal Mechanisms. Policy Stud J. 2018 May;46(2):269–97. doi:10.1111/psj.12209

5. Bodin Ö, Tengö M. Disentangling intangible social–ecological systems. Glob Environ Change. 2012 May;22(2):430–9. doi:10.1016/j.gloenvcha.2012.01.005

6. Mihalic T. Conceptualising overtourism: A sustainability approach. Ann Tour Res. 2020 Sep;84:103025. doi:10.1016/j.annals.2020.103025

7. Gössling S, Scott D, Hall CM. Pandemics, tourism and global change: a rapid assessment of COVID-19. J Sustain Tour. 2021 Jan 2;29(1):1–20. doi:10.1080/09669582.2020.1758708

8. Omrany H, Mehdipour A, Oteng D, Al-Obaidi KM. The uptake of urban digital twins in the built environment: a pathway to resilient and sustainable cities. Comput Urban Sci. 2025 Apr 16;5(1):20. doi:10.1007/s43762-025-00177-x

9. Yang L, Li Y, Jia L, Ji Y, Hu G. Ecological risk assessment and ecological security pattern optimization in the middle reaches of the Yellow River based on ERI+MCR model. J Geogr Sci. 2023 Apr;33(4):823–44. doi:10.1007/s11442-023-2108-8

10. United Nations Environment Programme. Keeping the Promise - Annual Report 2023 [Internet]. United Nations Environment Programme; 2024 [cited 2026 Apr 7]. Available from: https://wedocs.unep.org/20.500.11822/44777 doi:10.59117/20.500.11822/44777

11. Gupta J, Lebel L. Access and allocation in earth system governance: lessons learnt in the context of the Sustainable Development Goals. Int Environ Agreem Polit Law Econ. 2020 Jun;20(2):393–410. doi:10.1007/s10784-020-09486-4

Vol. 1, No. 1, March 2026, pp. 1-10

12. Healey P. Creativity and urban governance. Policy Stud. 2004 Jun;25(2):87–102. doi:10.1080/0144287042000262189

13. BR toolbox - December 2025.

14. Junios Ju, Gusri Yanti, Haezah Fatdillah, Kharisma Putri Salsabila, Habibillah M. Peningkatan Ketahanan Pangan dan Pencegahan Stunting Melalui Pemberdayaan Masyarakat dalam Pengembangan [Internet]. 2024. doi:10.13140/RG.2.2.18909.83684

15. Hair JF, Black WC, Babin BJ, Anderson RE. Multivariate data analysis. Eighth edition. Australia Brazil Mexico South Africa Singapore United Kingdom United States: Cengage; 2019. 813 p.

16. World Tourism Organization (UNWTO), editor. Outcomes from the UNWTO Affiliate Members World Expert Meeting on Cultural Tourism, Madrid, Spain, 1–2 December 2022 [Internet]. World Tourism Organization (UNWTO); 2023 [cited 2026 Apr 7]. Available from: https://www.e-unwto.org/doi/10.18111/9789284424740 doi:10.18111/9789284424740

17. Jordan A, Lenschow A. Environmental policy integration: a state of the art review. Environ Policy Gov. 2010 May;20(3):147–58. doi:10.1002/eet.539

18. Bansard J. Pathways to Sustainable Cities.

19. Juridical Analysis of Hotel Building Permits In The City Center: Administrative Compliance and Environmental Impact Study of Velmont Hotel Construction In Bukittinggi City.

20. Potoski M. PROTECTING THE ENVIRONMENT: VOLUNTARY REGULATIONS IN ENVIRONMENTAL GOVERNANCE.

21. Lawn PA, editor. Sustainable development indicators in ecological economics. Cheltenham: Elgar; 2006. 467 p. (Current issues in ecological economics).

22. Staroňová K, Gajduschek G. Guy Peters – Institutional Theory in Political Science: The New Institutionalism. Perspectives from Central and Eastern Europe. NISPAcee J Public Adm Policy. 2019 Dec 1;12(2):281–5. doi:10.2478/nispa-2019-0024

23. ADB, Technical Assistance Report.