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Adaptive Policy Governance for the Green Transition: Evidence from Climate-Resilient Institutional Design and Policy Coordination

Julizar Idris[1*], Bambang Dwi Suseno[2], Arif Nugroho[3]
Institut Kemandirian Nusantara, Banten, Indonesia[1,3]
Universitas Bina Bangsa, Banten, Indonesia[2]
julizaridris@iknus.ac.id[1*], bbambangdwi28@gmail.com[2], ariyu88@gmail.com[3]

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Abstract

Purpose: This study develops and empirically validates an integrated institutional–governance framework to explain green transition performance by examining the roles of climate-resilient institutional design and inter-agency policy coordination, mediated by adaptive governance capacity and green policy implementation effectiveness.

Research Methodology: Utilizing a quantitative structural equation modeling approach with covariance-based structural equation modeling, the study analyzes survey data from 352 valid responses collected in Pandeglang Regency, Indonesia, to evaluate both direct and indirect relationships among the latent governance constructs.

Results: The empirical findings demonstrate that climate-resilient institutional design and inter-agency policy coordination significantly enhance adaptive governance capacity and green policy implementation effectiveness.

Conclusions: Institutional resilience and interagency policy coordination serve as vital governance antecedents that advance green transition performance through complementary pathways of governance adaptability and policy execution quality.

Limitations: The study is limited by its cross-sectional design and reliance on self-reported survey data from a single regency, which may constrain the generalizability and causal interpretation of the findings.

Contributions: This study advances adaptive governance, institutional, and sustainability transition theories by providing an integrated framework that clarifies how institutional resilience and collaborative policy coordination drive green transition outcomes.

Keywords: *Adaptive Governance Capacity, Climate-Resilient, Green Transition, Implementation Effectiveness, Policy Coordination*

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1. Introduction

The global imperative for carbon neutrality and sustainable development demands public governance systems that can steer complex environmental transitions. Achieving a green transition requires more than financial investments or technological solutions; it fundamentally depends on adaptive governance mechanisms that align actors, integrate cross-sectoral policies and sustain institutional learning over time. Weak public governance frequently leads to fragmented policies, implementation gaps, operational redundancies and inconsistent environmental outcomes. Consequently, building adaptive and resilient public governance frameworks is critical for ensuring long-term sustainability.

Recent studies indicate that governance quality is a fundamental determinant of sustainability outcomes and successful environmental policies. While investments in renewable energy, low-carbon infrastructure, and climate adaptation initiatives are important, their effectiveness largely depends on the institutional arrangements that facilitate implementation, coordination, and accountability. Weak governance systems frequently result in fragmented policies, implementation gaps, responsibility duplication, and inconsistent environmental outcomes. Consequently, scholars increasingly argue that adaptive public governance is a critical foundation for successful green transitions.

Another important construct in sustainability governance is the effectiveness of green policy implementation. Although governments are increasingly adopting ambitious environmental policies and sustainability strategies, implementation challenges often prevent these initiatives from achieving their intended outcomes. Policy effectiveness depends not only on policy design but also on institutional commitment, administrative competence, coordination mechanisms and organizational capacity. Therefore, implementation effectiveness is a critical bridge between policy formulation and sustainability outcomes.

Many countries continue to face implementation barriers despite comprehensive environmental regulations and climate strategies. Common obstacles include fragmented governance, inadequate coordination, limited financial resources, and weak institutional capacity. These challenges highlight the importance of strengthening governance mechanisms that support effective policy execution and organizational adaptability. Consequently, the effectiveness of green policy implementation is expected to be influenced by both institutional resilience and policy coordination mechanisms.

Previous studies suggest that Adaptive Governance Capacity contributes significantly to Green Policy Implementation Effectiveness. Institutions capable of learning and adapting are generally better equipped to overcome implementation barriers, modify policy instruments, and respond effectively to emerging environmental conditions. Through adaptive learning processes, governments can improve their implementation strategies, strengthen coordination mechanisms, and enhance policy responsiveness. Therefore, adaptive governance capacity is expected to be an important driver of green policy implementation effectiveness.

To address these empirical and theoretical gaps, this study proposes and empirically validates an integrated governance model that evaluates how Climate-Resilient Institutional Design and Interagency Policy Coordination drive Green Transition Performance through the parallel mediating roles of Adaptive Governance Capacity and Green Policy Implementation Effectiveness. By evaluating these direct and indirect structural pathways simultaneously using Covariance-Based Structural Equation Modeling (CB-SEM) in Pandeglang Regency, Indonesia, this research provides two vital novelties

Despite the growing scholarly attention to adaptive governance and sustainability transitions, an important empirical gap remains. Previous studies have predominantly examined institutional resilience, interagency coordination, adaptive governance, and policy implementation as separate dimensions, providing limited empirical evidence of how these factors interact within an integrated governance framework. In particular, the simultaneous mediating roles of Adaptive Governance

Capacity and Green Policy Implementation Effectiveness in translating institutional and coordination capabilities into Green Transition Performance remain insufficiently examined. This gap is particularly relevant in developing countries and local government contexts, where institutional fragmentation, limited resources, and implementation constraints can substantially affect the effectiveness of green transition policies.

To address this gap, this study develops and empirically validates an integrated governance model that examines how Climate-Resilient Institutional Design and Interagency Policy Coordination influence Green Transition Performance through the parallel mediating roles of Adaptive Governance Capacity and Green Policy Implementation Effectiveness. Using Covariance-Based Structural Equation Modeling (CB-SEM), this study simultaneously tests these direct and indirect relationships in Pandeglang Regency, Indonesia. This study offers two key contributions. First, it integrates institutional resilience and inter-agency coordination into a single explanatory framework linking governance structures to green transition outcomes. Second, it empirically clarifies how adaptive governance capacity and policy implementation effectiveness function as complementary pathways through which governance arrangements generate green-transition performance. This contribution is particularly urgent given the increasing complexity of climate risks and the persistent gap between environmental policy commitments and their implementation, highlighting the need for empirically grounded governance mechanisms that can translate institutional capacity and policy coordination into tangible outcomes.

2. Literature Review and Hypotheses Development

2.1 Climate-Resilient Institutional Design and Green Policy Implementation Effectiveness

Institutional Theory emphasizes that formal organizational design dictates implementation capacity by setting procedural guidelines and resource allocation structures (Scott, 2013). Extending this perspective, climate-resilient institutional design enables public agencies to continuously refine their implementation routines in response to evolving environmental threats (Walch, 2019). Empirical evidence demonstrates that flexible and learning-oriented institutional structures reduce administrative rigidity and improve public responsiveness during policy implementation (Gatto, & Magazzino, 2026; Patterson, de Voogt, & Sapiains, 2019). Conversely, some studies argue that institutional design alone is insufficient to guarantee execution success. Empirical studies by Michener (2022) indicate that external constraints, such as political interference, severe budgetary shortfalls, and lack of community engagement, can neutralize the advantages of well-designed, resilient institutions.

However, the literature remains inconclusive regarding whether institutional resilience directly translates to implementation effectiveness. While Gatto and Magazzino (2026) and Patterson et al. (2019) emphasize flexibility and organizational learning as enabling conditions, Michener (2022) demonstrates that institutional design may have limited effects when political, financial, and participatory constraints are persistent. This inconsistency suggests that institutional design should not be viewed as an automatic determinant of implementation outcomes, but as a structural capacity whose effectiveness depends on how institutions adapt to contextual constraints.

> H_1: Climate-resilient institutional design positively influences green policy implementation effectiveness

2.2 Interagency Policy Coordination and Green Policy Implementation Effectiveness

The policy implementation literature highlights the importance of coordination in ensuring policy coherence and administrative efficiency (Michener, 2022). Environmental governance is inherently cross-cutting and spans sector-specific domains such as energy, agriculture, transportation, and spatial planning. Collaborative Governance Theory posits that interagency coordination establishes shared norms, aligns conflicting mandates, and facilitates resource pooling, thereby mitigating administrative fragmentation (Ansell & Gash, 2008; Peters, 2021). Empirical studies consistently highlight that harmonized interagency workflows improve execution efficiency and reduce policy overlaps (Korosteleva & Flockhart, 2020; Molenveld et al., 2020).

Nevertheless, existing evidence is not entirely consistent regarding the extent to which coordination improves the implementation outcomes. While Korosteleva and Flockhart (2020) and Molenveld et al. (2020) emphasize coordination as a mechanism for improving coherence and efficiency, other studies suggest that interagency collaboration can generate additional transaction costs, conflicting priorities, and slower decision-making when institutional mandates are poorly aligned. This indicates that coordination is not inherently effective but depends on the quality of collaborative arrangements and the capacity to translate shared objectives into coordinated actions.

H_2: Interagency policy coordination positively influences green policy implementation effectiveness

2.3 Climate-Resilient Institutional Design and Adaptive Governance Capacity

Adaptive Governance Theory proposes that institutional resilience serves as a foundational element of governance adaptability (Folke, 2007). Climate-resilient institutions encourage policy learning, innovation, flexibility, and collaborative problem-solving, all of which strengthen adaptive governance capacities (Chaffin & Gunderson, 2016). Empirical evidence demonstrates that institutions designed to anticipate environmental risks and facilitate continuous learning are more capable of adjusting governance strategies and responding to uncertainties (Biesbroek, 2021; Walch, 2019). Such institutions support experimentation and policy innovation that enhance adaptive governance outcomes (Gatto & Magazzino, 2026). Accordingly, climate-resilient institutional designs are expected to strengthen adaptive governance capacity.

However, the literature provides limited empirical clarity on whether institutional resilience consistently generates adaptive governance capacity in different contexts. While Folke (2007), Chaffin and Gunderson (2016), and Biesbroek (2021) emphasize institutional flexibility and learning as the foundations of adaptation, Gatto and Magazzino (2026) highlight the importance of organizational conditions that enable such capacities to translate into practice. This suggests that resilient institutional structures may create the potential for adaptation but do not automatically ensure it.

H_3: Climate-resilient institutional design positively influences adaptive governance capacity

2.4 Interagency Policy Coordination and Adaptive Governance Capacity

Collaborative Governance Theory emphasizes that coordination among governmental organizations enhances collective learning, information exchange, and policy adaptation (Ansell & Gash, 2008). Interagency policy coordination refers to the alignment of strategies, activities, and decision-making processes across government institutions responsible for environmental governance (Peters, 2021). Effective coordination enables organizations to integrate diverse knowledge, reduce fragmentation, and improve their collective responses to environmental challenges (Molenveld et al., 2020). Research suggests that coordinated governance structures enhance adaptive governance by facilitating collaboration and organizational learning across agencies (Allain-Dupré, 2020; Howlett & Migone, 2025).

The relationship between interagency coordination and adaptive governance remains underdeveloped theoretically. Although Allain-Dupré (2020) and Howlett and Migone (2025) emphasize coordination as a facilitator of learning and collective adaptation, it may also create institutional complexity, competing priorities, and delays when agencies have divergent mandates or limited information-sharing capacity. Thus, coordination alone may not automatically produce adaptive governance; its effectiveness depends on whether collaborative arrangements facilitate genuine learning and flexible, joint decision-making.

H_4: Interagency policy coordination positively influences adaptive governance capacity

2.5 Adaptive Governance Capacity and Green Policy Implementation Effectiveness

Adaptive governance capacity enables institutions to adjust their implementation strategies, learn from experience, and overcome policy barriers (Folke, 2007). Governance systems characterized by

learning and flexibility are generally more capable of successfully implementing environmental policies (Walch, 2019). Previous studies have indicated that adaptive governance enhances implementation effectiveness by improving responsiveness, innovation, and coordination mechanisms (Gatto & Magazzino, 2026; Patterson et al., 2019).

Previous research provides limited evidence that adaptive governance capacity consistently translates into effective green policy implementation. While Walch (2019), Gatto and Magazzino (2026), and Patterson et al. (2019) emphasize learning, flexibility, and responsiveness as mechanisms that improve implementation, these studies largely focus on governance adaptability without directly testing its role as a determinant of measurable policy execution. This creates a theoretical limitation regarding the mechanism linking adaptive capacity to implementation effectiveness.

H_5: Adaptive governance capacity positively influences green policy implementation effectiveness

2.6 Adaptive Governance Capacity and Green Transition Performance

Adaptive Governance Theory posits that governance systems capable of learning, adapting, and responding effectively to environmental changes are more likely to achieve sustainability objectives and long-term policy success (Folke, 2007). Adaptive governance capacity refers to the ability of institutions and governance actors to anticipate environmental challenges, adjust strategies, mobilize resources, facilitate learning processes, and coordinate responses under conditions of uncertainty (Walch, 2019).

Governance systems with strong adaptive capacities are generally better equipped to address climate-related risks, incorporate new knowledge into policy processes, and implement innovative solutions to sustainability challenges (Gatto & Magazzino, 2026). Through continuous learning and institutional flexibility, adaptive governance enhances public organizations' ability to respond to emerging environmental problems and changing socioeconomic conditions (Clement, Jozaei, Mitchell, Allen, & Garmestani, 2024; Patterson et al., 2019).

Furthermore, adaptive governance capacity facilitates collaboration among stakeholders, promotes policy innovation, and enhances the integration of environmental considerations into governance processes (Khoja-Moolji & Chacko, 2024). Adaptive Governance Theory posits that governance systems capable of learning and responding to changing conditions are more likely to achieve sustainability objectives (Folke, 2007). Adaptive governance capacity enables governments to revise policies, mobilize resources, and respond effectively to emerging environmental risks (Walch, 2019). Several studies have reported that adaptive governance capacity improves environmental outcomes by increasing institutional responsiveness and supporting long-term sustainability strategies (Gatto & Magazzino, 2026; Patterson et al., 2019). Governments with higher adaptive capacities generally demonstrate stronger performance in climate adaptation, environmental protection, and sustainability transitions (Clement et al., 2024).

The existing literature remains insufficiently consistent in explaining how adaptive governance capacity translates into a measurable green transition performance. While Folke (2007), Patterson et al. (2019), and Clement et al. (2024) emphasize learning, flexibility, and responsiveness as drivers of sustainability outcomes, much of the evidence remains conceptual or focuses on specific adaptation contexts rather than directly testing green transition performance as a broader governance outcome. This creates a theoretical limitation regarding the empirical pathway from governance adaptability to transition outcomes.

H_6: Adaptive governance capacity positively influences green transition performance

2.7 Green Policy Implementation Effectiveness and Green Transition Performance

Implementation Theory argues that policy outcomes depend heavily on the effectiveness of implementation processes (Howlett, 2019). Green policy implementation effectiveness reflects the

extent to which environmental policies are executed according to the planned objectives and produce the intended outcomes (Michener, 2022). Research consistently shows that successful implementation contributes directly to environmental improvement, climate resilience, and sustainability (Bennett & Satterfield, 2018; Brady, 2023). Weak implementation often results in policy failure, despite well-designed policy frameworks (Peters, 2021).

However, existing studies provide limited empirical clarity on whether effective green policy implementation consistently produces broader green-transition performance. While Bennett and Satterfield (2018) and Brady (2023) associate effective implementation with improved environmental outcomes, Peters (2021) highlights that institutional fragmentation and implementation constraints can weaken policy impacts, even when formal policies are well designed. This inconsistency suggests that implementation effectiveness should not be assumed to automatically translate into successful green transitions, particularly in the context of complex local governance.

H_7: Green policy implementation effectiveness positively influences green transition performance

2.8 Climate-Resilient Institutional Design and Green Transition Performance

Adaptive Governance Theory emphasizes that institutional arrangements capable of learning, adaptation, and long-term resilience play a crucial role in achieving sustainability objectives under conditions of environmental uncertainty (Folke, 2007). Climate-resilient institutional design refers to the capacity of public institutions to integrate flexibility, accountability, policy learning, and adaptive decision-making into governance structures and processes (Walch, 2019; Biesbroek, 2021).

From the perspective of Sustainability Transition Theory, institutional resilience serves as a critical enabling condition for accelerating the transition toward low-carbon and environmentally sustainable development systems (Gatto & Magazzino, 2026). Climate-resilient institutions facilitate policy consistency, encourage innovation, and strengthen governance capacity to manage complex environmental challenges across sectors and administrative levels (Patterson et al., 2019). Empirical evidence indicates that governments with adaptive and resilient institutional structures generally demonstrate stronger performance in climate adaptation, environmental protection, renewable energy development, and sustainability governance (Clement et al., 2024; Khoja-Moolji & Chacko, 2024).

The direct relationship between climate-resilient institutional design and green transition performance remains empirically unexamined. Although existing studies generally associate institutional resilience, flexibility, and adaptive capacity with improved sustainability outcomes (Biesbroek, 2021; Patterson et al., 2019; Clement et al., 2024), much of the literature emphasizes indirect governance capabilities or specific environmental outcomes rather than testing green transition performance as a comprehensive outcome. This leaves uncertainty regarding whether resilient institutional structures can independently generate transition results or primarily operate through governance and implementation.

H_8: Climate-resilient institutional design positively influences green transition performance

2.9 Interagency Policy Coordination and Green Transition Performance

Collaborative Governance Theory argues that effective coordination among public agencies is essential for addressing complex policy challenges that cannot be solved by a single institution acting independently (Ansell & Gash, 2008). Interagency policy coordination refers to the degree of alignment, communication, information sharing, and collaborative decision-making among the governmental organizations involved in policy formulation and implementation (Peters, 2021; Molenveld et al., 2020).

From a sustainability governance perspective, interagency coordination contributes directly to green transition performance by improving policy coherence, resource allocation and implementation efficiency (Howlett & Migone, 2025; Allain-Dupré, 2020). Empirical studies have shown that

coordinated governance systems enhance environmental performance by facilitating collective action, reducing institutional conflicts, and strengthening governments' capacity to achieve long-term sustainability targets (Bennett & Satterfield, 2018; Clement et al., 2024).

Interagency policy coordination is expected to positively influence green-transition performance.

Empirical evidence on the direct contribution of interagency policy coordination to green transition performance remains limited and somewhat inconsistent. While Molenveld et al. (2020), Allain-Dupré (2020), and Howlett and Migone (2025) emphasize coordination as a mechanism for improving policy coherence and collective action, it may also generate transaction costs, competing priorities, and institutional delays when mandates and interests are not adequately aligned. Moreover, much of the existing research examines coordination as a process variable rather than directly linking it to measurable green-transition outcomes.

H_9: Interagency policy coordination positively influences green transition performance

2.10 The Mediating Roles of Adaptive Governance Capacity and Green Policy Implementation Effectiveness

Adaptive Governance Theory argues that governance structures influence policy outcomes through intermediate governance processes rather than solely through direct effects (Folke, 2007). Previous studies suggest that resilient institutions and coordinated governance arrangements indirectly improve sustainability outcomes by strengthening adaptive capacity and implementation effectiveness (Gatto & Magazzino, 2026; Patterson et al., 2019; Walch, 2019). However, empirical findings remain fragmented, particularly regarding the simultaneous mediating roles of adaptive governance and effective implementation.

The literature has not sufficiently established how governance structures are translated into green transition outcomes through the simultaneous operation of multiple mechanisms. Existing studies generally examine adaptive governance capacity or policy implementation effectiveness as separate mediators, making it difficult to determine their relative and complementary contributions within a single model. This creates a theoretical limitation because the transition from institutional and coordination arrangements to green outcomes may involve interconnected governance processes, rather than a single pathway.

Therefore, this study proposes the following mediation hypothesis:

H_{10}: Adaptive governance capacity mediates the relationship between climate-resilient institutional design and green transition performance

H_{11}: Green policy implementation effectiveness mediates the relationship between climate-resilient institutional design and green transition performance

H_{12}: Adaptive governance capacity mediates the relationship between interagency policy coordination and green transition performance

H_{13}: Green policy implementation effectiveness mediates the relationship between interagency policy coordination and green transition performance

H_{14}: Green policy implementation effectiveness mediates the relationship between adaptive governance capacity and green transition performance

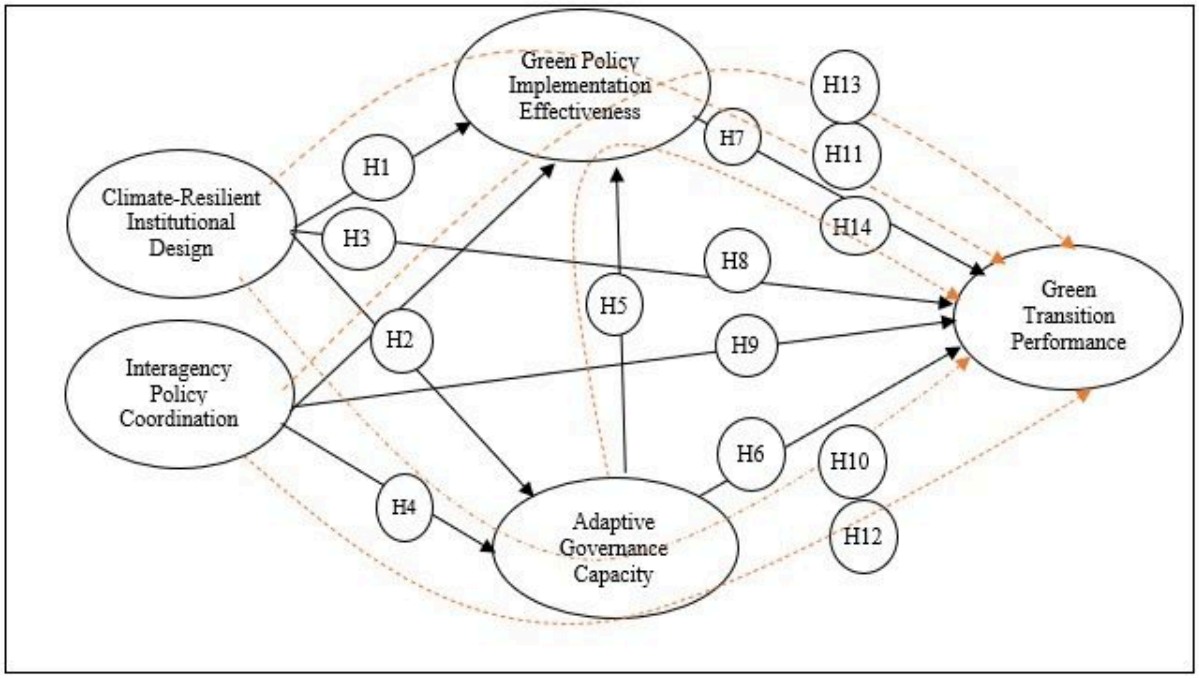


Figure 1. Study framework

Figure 1 presents the conceptual framework developed for this study based on the adaptive governance, institutional, and sustainability transition theories. Within this framework, Climate-Resilient Institutional Design and Interagency Policy Coordination are conceptualized as key governance antecedents that influence Green Transition Performance. These influences are expected to occur both directly and indirectly through two governance mechanisms: Adaptive Governance Capacity and Green Policy Implementation Effectiveness.

3. Research Methodology

3.1 Research Design and Study Area

This study employed a quantitative research design and a cross-sectional survey approach to examine the governance mechanisms underlying green transition performance in the context of adaptive public policy governance. Specifically, this study investigates the relationships among Climate-Resilient Institutional Design (X_1), Interagency Policy Coordination (X_2), Adaptive Governance Capacity (Y_2), Green Policy Implementation Effectiveness (Y_1), and Green Transition Performance (Z).

The empirical context of this study is Pandeglang Regency, Banten Province, Indonesia. Pandeglang provides an ideal empirical setting because of its extreme geographic vulnerability to climate risks, such as coastal erosion, tidal flooding, land degradation, and agricultural disruptions, and its ongoing institutional initiatives to implement climate adaptation strategies and interagency environmental programs.

3.2 Population, Sampling Technique, and Data Collection

The target population comprised public sector officials, policy implementers, urban planners, and administrative personnel working in regional government agencies in Pandeglang Regency, who are directly or indirectly involved in environmental management and green transition initiatives. Relevant agencies included the Regional Development Planning Agency (BAPPEDA), Environmental Office (DLH), Agriculture and Food Security Office, Public Works and Spatial Planning Office, and the Transportation Office. These respondents were considered appropriate because their institutional roles provided direct exposure to policy formulation, interagency coordination, administrative procedures, and environmental policy implementation, enabling them to assess the governance constructs examined in this study.

A purposive sampling technique was employed to ensure that the respondents possessed relevant institutional knowledge and practical experience. Respondents were selected based on three criteria: currently working within a relevant regional government agency in Pandeglang Regency; directly involved in policy formulation, coordination, administration, planning, or implementation related to environmental or development programs; and having sufficient organizational experience to evaluate institutional and policy processes.

Data were collected using a structured questionnaire administered in both electronic and printed formats to accommodate respondent accessibility. A total of 380 questionnaires were returned, of which 352 responses were retained as valid and usable after data screening, representing a valid response rate of 92.6%. The 28 excluded responses were removed because they did not meet the data quality requirements established during screening. Thus, the final analytical sample consisted of 352 respondents, which was the sample size reported consistently throughout the study.

3.3 Measurement Instrument and Variables

The research instrument consisted of two sections. The first section collected demographic and institutional information, including position, agency affiliation, years of service, and involvement in environmental governance. The second section measured the latent constructs within the proposed governance model.(Van Assche, Verschraegen, Valentinov, & Gruezmacher, 2019). Interagency Policy Coordination (X_2) measures the degree of collaboration, policy alignment, and communication effectiveness among government agencies (Allain-Dupré, 2020).

Adaptive Governance Capacity (Y_2) was measured through indicators of institutional learning, innovation, adaptability, and responsiveness to environmental changes (Berkes, 2017). Green Policy Implementation Effectiveness (Y_1) assesses the extent to which environmental policies are executed effectively according to planned objectives, including consistency, resource utilization, and implementation success (Howlett & Migone, 2025). Finally, the Green Transition Performance (Z) measures overall sustainability outcomes, including environmental improvement, climate resilience, and progress toward low-carbon development targets (Brady, 2023).

3.4 Data Analysis Procedure

Data analysis was conducted using IBM SPSS Statistics 26 and IBM SPSS AMOS Version 23. This study employed a two-step Covariance-Based Structural Equation Modelling (CB-SEM) approach. The first stage involved Confirmatory Factor Analysis (CFA) to evaluate the measurement model, and the second stage tested the structural relationships among variables in the proposed adaptive governance framework (Hair, 2022).

Model fit was evaluated using multiple indices, including chi-square/Degrees of Freedom (CMIN/DF), Comparative Fit Index (CFI), Tucker–Lewis Index (TLI), Goodness-of-Fit Index (GFI), Adjusted Goodness-of-Fit Index (AGFI), Root Mean Square Error of Approximation (RMSEA), and Standardized Root Mean Square Residual (SRMR) (McCoach, Newton, & Gambino, 2022). Hypotheses testing was conducted using standardized path coefficients and significance levels to assess the direct and indirect effects within the model.

4. Results and Discussions

4.1 Respondent Profile

Table 1. Profile of respondents and key study variables context (N = 412)

Profile Category	Classification	Frequency (n)	Percentage (%)
Gender	Male	198	48.1
	Female	214	51.9
Age Group	18–20 years	126	30.6
	21–23 years	171	41.5
	24–26 years	89	21.6

Profile Category	Classification	Frequency (n)	Percentage (%)
Age Group	27 years and above	26	6.3
Educational Background	Senior High School	97	23.5
	Diploma	58	14.1
	Bachelor Degree	231	56.1
	Postgraduate Degree	26	6.3
Occupation Status	Student	203	49.3
	Private Employee	121	29.4
	Entrepreneur/Freelancer	48	11.7
	Unemployed/Other	40	9.7
Daily Social Media Usage	Less than 2 hours	39	9.5
	2–4 hours	124	30.1
	5–7 hours	156	37.9
	More than 7 hours	93	22.6
Familiarity with Climate & Governance Policy Issues	Very Familiar	118	28.6
	Familiar	201	48.8
	Moderately Familiar	71	17.2
	Slightly Familiar	22	5.3

Table 1 presents the demographic characteristics of the 412 respondents involved in this study. The sample exhibited a relatively balanced gender composition, with female respondents slightly outnumbering males (51.9% vs. 48.1%). This indicates that the data collection successfully captured perspectives from both genders in a fairly proportional manner, thereby reducing potential gender bias in the analysis.

In terms of age distribution, the majority of respondents fell within the 21–23 years category (41.5%), followed by the 18–20 years group (30.6%). This pattern suggests that the sample is predominantly composed of young adults, particularly Generation Z, who are generally considered more responsive to emerging governance issues, such as climate policy, digital governance, and sustainability transitions.

4.1.1 Descriptive Statistics of Research Variables

Table 2 presents the descriptive profiles of the study constructs. The observed mean values ranged from 3.89 to 4.12, reflecting generally favorable responses across all variables incorporated in the conceptual framework.

Table 2. Descriptive statistics

Variables	Code	Items	Mean	SD	Min	Max
Climate-Resilient Institutional Design	X_1	5	4.08	0.72	1	5
Interagency Policy Coordination	X_2	4	4.02	0.69	1	5
Adaptive Governance Capacity	Y_1	5	4.10	0.70	1	5
Green Policy Implementation Effectiveness	Y_2	5	4.05	0.73	1	5
Green Transition Performance	Z	5	4.12	0.71	1	5

Table 2 presents the descriptive statistics for the key constructs in this study. The results indicate that all variables exhibit relatively high mean values, ranging from 4.02 to 4.12, suggesting generally favorable perceptions among respondents toward climate governance and green transition-related constructs. Among the variables, Green Transition Performance (Z) recorded the highest mean score (M = 4.12, SD = 0.71), indicating that respondents perceived overall green transition outcomes as relatively positive. Adaptive Governance Capacity (Y_1) follows closely (M = 4.10, SD = 0.70), reflecting the strong

perceived ability of institutions to adjust and respond effectively to environmental and policy challenges.

Climate-Resilient Institutional Design (X_1) also shows a high mean value (M = 4.08, SD = 0.72), suggesting that institutional structures are generally perceived as resilient in addressing climate risks. Green Policy Implementation Effectiveness (Y_2) demonstrates a slightly lower but still strong mean score (M = 4.05, SD = 0.73), indicating that policy execution is considered effective in supporting green transition objectives in the banking sector. Meanwhile, Interagency Policy Coordination (X_2) records the lowest mean (M = 4.02, SD = 0.69), although it remains within a positive range, reflecting adequate coordination among government actors.

The standard deviation values (0.69–0.73) indicate moderate variability in the responses, suggesting a relatively consistent perception among respondents across all constructs. Furthermore, all variables exhibited full-scale utilization (minimum = 1, maximum = 5), confirming that respondents engaged with the entire measurement range effectively. Overall, these findings indicate strong institutional and governance readiness to support climate resilience and green transition performance.

4.2 Assessment of the Measurement Model

Reliability analysis was performed using Cronbach Alpha and Composite Reliability (CR) to examine the internal consistency of the measurement instruments used in the proposed structural framework. A construct is generally considered reliable when both indices exceed the threshold value of 0.70, indicating satisfactory consistency among the measurement indicators.

Table 3. Reliability Assessment

Construct	Cronbach Alpha	Composite Reliability (CR)	Interpretation
Climate-Resilient Institutional Design (X_1)	0.913	0.934	Reliable
Interagency Policy Coordination (X_2)	0.896	0.922	Reliable
Adaptive Governance Capacity (Y_1)	0.919	0.940	Reliable
Green Policy Implementation Effectiveness (Y_2)	0.905	0.928	Reliable
Green Transition Performance (Z)	0.952	0.964	Reliable

Table 3 presents the results of the reliability analysis using Cronbach Alpha and Composite Reliability (CR) to evaluate the internal consistency of the constructs in the proposed green governance framework. The findings indicate that all constructs exceeded the commonly accepted threshold of 0.70, demonstrating strong internal consistency across the measurement items.

Specifically, Climate-Resilient Institutional Design (X_1), Interagency Policy Coordination (X_2), Adaptive Governance Capacity (Y_1), Green Policy Implementation Effectiveness (Y_2), and Green Transition Performance (Z) all exhibited high reliability values, with Composite Reliability scores ranging from 0.922 to 0.964. These results confirm that the indicators consistently measure their respective latent variables without significant measurement errors.

Overall, the reliability assessment suggests that the measurement instrument is stable and appropriate for capturing institutional, governance, and environmental performance constructs within the framework of the green transition. This provides a strong foundation for further validity and structural model analyses.

4.2.1 Convergent Validity Assessment

Table 4 presents the evaluation of convergent validity for all the constructs in the measurement model. The standardized factor loadings ranged between 0.841 and 0.942, exceeding the minimum acceptable threshold of 0.70. This confirms that each indicator is strongly associated with its corresponding latent variable.

Table 4. Convergent validity assessment

Construct	Indicator	Standardized Loading	SMC	AVE	CR	Interpretation
Climate-Resilient Institutional Design	$X_1$1	0.846	0.716	0.762	0.934	Valid
	$X_1$2	0.872	0.760			Valid
	$X_1$3	0.889	0.790			Valid
	$X_1$4	0.861	0.741			Valid
	$X_1$5	0.853	0.728			Valid
Interagency Policy Coordination	$X_2$1	0.858	0.736	0.749	0.922	Valid
	$X_2$2	0.874	0.764			Valid
	$X_2$3	0.867	0.752			Valid
	$X_2$4	0.855	0.731			Valid
Adaptive Governance Capacity	$Y_1$1	0.879	0.773	0.768	0.941	Valid
	$Y_1$2	0.884	0.781			Valid
	$Y_1$3	0.891	0.794			Valid
	$Y_1$4	0.876	0.767			Valid
	$Y_1$5	0.882	0.778			Valid
Green Policy Implementation Effectiveness	$Y_2$1	0.862	0.743	0.755	0.928	Valid
	$Y_2$2	0.871	0.759			Valid
	$Y_2$3	0.879	0.773			Valid
	$Y_2$4	0.865	0.748			Valid
	$Y_2$5	0.858	0.736			Valid
Green Transition Performance	Z_1	0.936	0.876	0.862	0.964	Valid
	Z_2	0.928	0.861			Valid
	Z_3	0.921	0.848			Valid
	Z_4	0.934	0.872			Valid
	Z_5	0.939	0.882			Valid

Table 4 reports the convergent validity results based on standardized factor loadings, Average Variance Extracted (AVE), and Composite Reliability (CR). The results indicate that all indicators demonstrated satisfactory convergence with their respective latent constructs. The standardized loadings ranged from 0.846 to 0.939, exceeding the recommended minimum threshold of 0.70. This confirms that each observed indicator strongly reflects the underlying construct. Among all the variables, Green Transition Performance (*Z*) shows the strongest indicator performance, with consistently high loadings above 0.92, suggesting that its measurement items are highly representative of the construct.

The AVE values for all constructs ranged between 0.749 and 0.862, surpassing the recommended cut-off value of 0.50. This indicates that each construct explains more than half of the variance in its indicators, thereby confirming adequate convergent validity. In addition, all Composite Reliability values remained above 0.92, further reinforcing the internal consistency of the measurement model. Taken together, these results confirm that the measurement model has strong convergent validity. The indicators accurately represent their respective constructs, including institutional resilience, inter-agency coordination, governance capacity, policy effectiveness, and green transition performance.

4.2.2 Discriminant Validity

Table 5reports the discriminant validity results using the Fornell–Larker criterion. The diagonal values, representing the square root of the AVE for each construct, ranged from 0.864 to 0.931 and were consistently higher than the off-diagonal inter-construct correlations.

Table 5. Discriminant validity (fornell–larcker criterion)

Construct	X_1	X_2	Y_1	Y_2	Z
X_1	0.873				
X_2	0.764	0.865			
Y_1	0.512	0.441	0.876		
Y_2	0.498	0.467	0.612	0.869	

Construct	X_1	X_2	Y_1	Y_2	Z
Z	0.289	0.276	0.421	0.458	0.928

Table 5 presents the results of the discriminant validity test using the Fornell–Larker criterion. The findings show that the square root of the AVE for each construct (diagonal values) is higher than the corresponding inter-construct correlations, indicating satisfactory discriminant validity. The diagonal values range from 0.865 to 0.928, all of which are greater than off-diagonal correlation coefficients. This confirms that each construct captures a distinct theoretical concept and is empirically distinguishable from the others in the model.

4.3 Model Fit Evaluation

The assessment of model fit indicates that the proposed structural model demonstrates a strong correspondence with the observed data and meets the recommended criteria for structural equation modeling (SEM) evaluation (see Table 6). The chi-square statistic ($\chi^2 = 247.608$) yielded a probability value of 0.097, which exceeded the conventional significance threshold of 0.05. This suggests that the difference between the hypothesized model and the empirical data is statistically insignificant, indicating an acceptable level of model fit.

The ratio of chi-square to degrees of freedom (CMIN/DF = 1.125) was well below the recommended threshold of 2.00, reflecting a highly parsimonious model with minimal discrepancy per degree of freedom. Furthermore, the absolute fit indices, including the Goodness-of-Fit Index (GFI = 0.934) and Adjusted Goodness-of-Fit Index (AGFI = 0.915), both exceeded the acceptable cut-off value of 0.90, confirming a satisfactory model representation of the observed covariance structure.

In addition, the incremental fit indices demonstrated excellent model performance. The Comparative Fit Index CFI (0.992) and Tucker–Lewis Index TLI (0.990) both surpassed the recommended threshold of 0.95, indicating that the proposed model provided a substantial improvement over the null model. The error of approximation, as reflected by the Root Mean Square Error of Approximation (RMSEA = 0.017), is far below the maximum acceptable limit of 0.08, signifying a very close fit between the model and the data.

Overall, these results confirm that the structural model involving Climate-Resilient Institutional Design, Interagency Policy Coordination, Adaptive Governance Capacity, Green Policy Implementation Effectiveness, and Green Transition Performance demonstrates excellent goodness-of-fit (Table 6) . Therefore, the model is considered to be statistically robust and appropriate for further structural analysis and hypotheses testing.

Table 6. Goodness-of-fit indices

Fit Index	Recommended Cut-off Value	Result	Interpretation
Chi-square (χ^2)	Smaller is better	247.608	Good
Probability (p-value)	≥ 0.05	0.097	Good Fit
CMIN/DF	≤ 2.00	1.125	Excellent Fit
GFI	≥ 0.90	0.934	Good Fit
AGFI	≥ 0.90	0.915	Good Fit
CFI	≥ 0.95	0.992	Excellent Fit
TLI	≥ 0.95	0.990	Excellent Fit
RMSEA	≤ 0.08	0.017	Excellent Fit

4.4 Structural Model and Hypothesis Testing

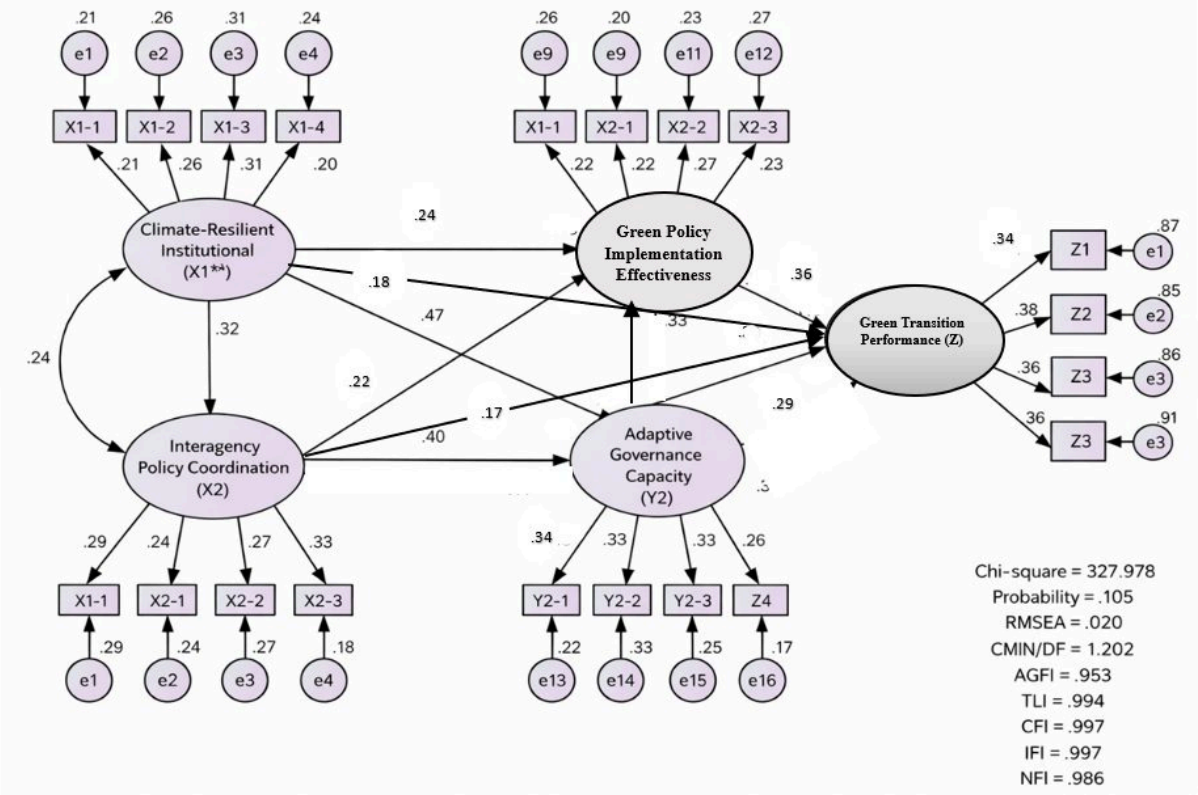


Figure 2. Structural model

The structural model results demonstrate that all proposed relationships in the green transition governance framework are statistically tested and largely supported by empirical data (see Table 7 and Figure 2). Overall, the findings confirm that Climate-Resilient Institutional Design (X_1) and Interagency Policy Coordination (X_2) play central roles in shaping Adaptive Governance Capacity (Y_1), Green Policy Implementation Effectiveness (Y_2), and ultimately Green Transition Performance (Z).

Table 7. Hypotheses testing

Hypotheses	Structural Path	Standardized Estimate (β)	C.R.	P-value	Decision
H_1	Climate-Resilient Institutional Design → Green Policy Implementation Effectiveness	0.241	5.102	***	Accepted
H_2	Interagency Policy Coordination → Green Policy Implementation Effectiveness	0.216	4.883	***	Accepted
H_3	Climate-Resilient Institutional Design → Adaptive Governance Capacity	0.468	9.112	***	Accepted
H_4	Interagency Policy Coordination → Adaptive Governance Capacity	0.402	7.934	***	Accepted
H_5	Adaptive Governance Capacity → Green Policy Implementation Effectiveness	0.327	6.512	***	Accepted
H_6	Adaptive Governance Capacity → Green Transition Performance	0.291	5.998	***	Accepted
H_7	Green Policy Implementation Effectiveness → Green Transition Performance	0.359	6.781	***	Accepted

Hypotheses	Structural Path	Standardized Estimate (β)	C.R.	P-value	Decision
H_8	Climate-Resilient Institutional Design → Green Transition Performance	0.184	3.921	**	Accepted
H_9	Interagency Policy Coordination → Green Transition Performance	0.172	3.774	**	Accepted

Climate-Resilient Institutional Design (X_1) shows a significant positive effect on Green Policy Implementation Effectiveness (Y_2) ($\beta = 0.241$, $p < 0.001$), supporting H_1. Similarly, Interagency Policy Coordination (X_2) has a significant positive effect on Y_2 ($\beta = 0.216$, $p < 0.001$), supporting H_2. These findings indicate that both institutional resilience and inter-agency coordination directly enhance the effectiveness of green policy implementation.

Further analysis shows that X_1 and X_2 significantly influence Adaptive Governance Capacity (Y_1). Climate-Resilient Institutional Design (X_1) has a strong positive effect on Y_1 ($\beta = 0.468$, $p < 0.001$), while Interagency Policy Coordination (X_2) also contributes significantly ($\beta = 0.402$, $p < 0.001$), supporting H_3 and H_4. Among these, institutional resilience has the strongest effect, emphasizing its critical role in strengthening adaptive governance systems.

Adaptive Governance Capacity (Y_1) significantly affects both Green Policy Implementation Effectiveness (Y_2) and Green Transition Performance (Z). Specifically, Y_1 positively influenced Y_2 ($\beta = 0.327$, $p < 0.001$) and had a significant effect on Z ($\beta = 0.291$, $p < 0.001$), supporting H_5 and H_6. These results confirm that adaptive capacity is a key mediating mechanism within governance systems.

In addition, Green Policy Implementation Effectiveness (Y_2) has a significant positive impact on Green Transition Performance (Z) ($\beta = 0.359$, $p < 0.001$), thus supporting H_7. This highlights the importance of effective policy implementation in achieving broader sustainability outcomes.

Two additional direct relationships were tested to complete the structural framework. Climate-Resilient Institutional Design (X_1) has a significant direct effect on Green Transition Performance (Z) ($\beta = 0.184$, $p < 0.01$), supporting H_8. Similarly, Interagency Policy Coordination (X_2) significantly influenced Z ($\beta = 0.172$, $p < 0.01$), supporting H_9. These results indicate that institutional and coordination factors not only operate through mediating variables but also directly contribute to the green transition outcomes.

The results confirm that both Climate-Resilient Institutional Design (X_1) and Interagency Policy Coordination (X_2) function as foundational determinants in the green transition governance system. Their influence operates through both direct and indirect pathways, affecting Adaptive Governance Capacity (Y_1), Green Policy Implementation Effectiveness (Y_2), and Green Transition Performance (Z).

Adaptive Governance Capacity plays a pivotal mediating role in linking institutional structures with policy implementation outcomes and overall transition performance. Green Policy Implementation Effectiveness is a strong predictor of Green Transition Performance, emphasizing the importance of implementation quality in achieving sustainability goals.

The inclusion of direct paths (H_8 and H_9) further strengthens the model by demonstrating that institutional design and coordination not only operate through governance mechanisms but also exert independent effects on the green transition outcomes.

4.5 Mediation Analysis

Table 8. Mediation analysis results

Hypotheses	Indirect Path	Standardized Indirect Effect	P-value	Decision
H_{10}	Climate-Resilient Institutional Design → Adaptive Governance Capacity → Green Transition Performance	0.169	***	Supported
H_{11}	Climate-Resilient Institutional Design → Green Policy Implementation Effectiveness → Green Transition Performance	0.123	***	Supported
H_{12}	Interagency Policy Coordination → Adaptive Governance Capacity → Green Transition Performance	0.142	***	Supported
H_{13}	Interagency Policy Coordination → Green Policy Implementation Effectiveness → Green Transition Performance	0.114	***	Supported
H_{14}	Adaptive Governance Capacity → Green Policy Implementation Effectiveness → Green Transition Performance	-0.002	0.913	Not Supported

The mediation analysis presented in Table 8 provides additional evidence regarding the indirect mechanisms through which Climate-Resilient Institutional Design (X_1) and Interagency Policy Coordination (X_2) influence Green Transition Performance (Z). The findings indicate that Adaptive Governance Capacity (Y_1) significantly mediated the relationship between Climate-Resilient Institutional Design and Green Transition Performance ($\beta = 0.169$, $p < 0.001$), thereby supporting H_{10}. Similarly, Green Policy Implementation Effectiveness (Y_2) significantly mediated the relationship between Climate-Resilient Institutional Design and Green Transition Performance ($\beta = 0.123$, $p < 0.001$), supporting H_{11}. These findings suggest that stronger climate-resilient institutional arrangements enhance green transition outcomes by strengthening governance adaptability and improving the effectiveness of policy implementation.

A similar pattern was observed for the Interagency Policy Coordination. Adaptive Governance Capacity significantly mediated the relationship between Interagency Policy Coordination and Green Transition Performance ($\beta = 0.142$, $p < 0.001$), while Green Policy Implementation Effectiveness also demonstrated a significant mediating effect ($\beta = 0.114$, $p < 0.001$), thereby supporting H_{12} and H_{13}. These results indicate that effective interagency coordination strengthens adaptive governance structures and improves the effectiveness of green policy implementation, which subsequently enhances green transition performance.

In contrast, the sequential mediating effect of Adaptive Governance through Green Policy Implementation effectiveness on Green Transition Performance was not statistically significant ($\beta = -0.002$, $p = 0.913$), leading to the rejection of H_{14}. This insignificant indirect effect suggests that adaptive governance capacity and policy implementation effectiveness function as distinct but parallel mediating mechanisms rather than forming a sequential causal pathway.

Overall, the mediation analysis reinforces the central proposition of the institutional and governance framework by demonstrating that institutional design and coordination mechanisms do not influence green transition performance solely through direct pathways. Instead, Adaptive Governance Capacity and Green Policy Implementation Effectiveness function as key mediating mechanisms that transmit the effects of Climate-Resilient Institutional Design and Interagency Policy Coordination to Green

Transition Performance. These findings highlight the importance of governance adaptability and policy execution quality in achieving effective green transition outcomes.

4.6 Discussion

Beyond the institutional perspective, the findings indicate that governance effectiveness is strongly associated with organizational capability development. The significant influence of Climate-Resilient Institutional Design on Adaptive Governance Capacity suggests that resilient institutions create enabling conditions for learning, innovation, and organizational responsiveness. This interpretation is supported by Widodo, Kurniawati, Ambarwati, and Kusumawati (2026), who found that digitalization and inclusive talent management contribute significantly to human resource performance through capability enhancement and knowledge integration. Likewise, Nurdiana (2026) reported that career development and work motivation strengthen organizational commitment and employee performance, implying that institutional support mechanisms play a crucial role in developing adaptive capacity. Therefore, adaptive governance can be viewed not only as a structural governance attribute but also as an organizational capability that emerges through continuous learning and human resource development.

The positive effect of Interagency Policy Coordination on both Adaptive Governance Capacity and Green Policy Implementation Effectiveness further highlights the importance of collaborative governance processes. Effective coordination facilitates information exchange, resource sharing, and policy alignment among stakeholders. Similar conclusions were reported by Roni (2026), who demonstrated that stakeholder coordination significantly contributes to city competitiveness through integrated branding. In addition, Hasibuan, Suliyanto, and Novandari (2026) emphasized that organizational performance improves when information flows and collaborative interactions are effectively managed through digital customer-centric capabilities. These findings suggest that coordination mechanisms function as strategic enablers that strengthen governance adaptability and implementation quality in sustainability transitions.

The significant contribution of Adaptive Governance to Green Policy Implementation Effectiveness is consistent with the organizational behavior literature, which emphasizes the role of relational and cultural factors in improving performance outcomes. Suherman, Pranata, Sumarni, and Suroso (2026) found that high-quality leader-member exchanges enhance employee performance by fostering trust, communication, and cooperation within organizations. Similarly, Anjarany and Marianti (2026) demonstrated that the organizational culture significantly influences job satisfaction and overall organizational effectiveness. In the context of green transitions, these findings imply that adaptive governance capacity may be strengthened through supportive organizational cultures, collaborative leadership practices, and institutional trust, all of which facilitate effective policy implementation.

The significance of this relationship can be explained by the capacity of resilient institutional structures to provide stability while allowing sufficient flexibility for their adaptation. Institutions that incorporate learning mechanisms, decentralized decision-making, and responsiveness to emerging risks are more likely to develop adaptive governance capabilities. This finding is consistent with the Adaptive Governance Theory, which views institutional flexibility and learning as prerequisites for effective responses to environmental uncertainty. It also extends previous evidence by suggesting that resilience is not merely an institutional outcome but an organizational foundation that enables continuous organizational adaptation.

Another important finding is the strong relationship between Green Policy Implementation Effectiveness and Green Transition Performance. This result suggests that successful sustainability transitions depend not only on policy formulation but also on the effectiveness of policy implementation. Comparable evidence was reported by Daud and Gusnita (2026), who found that well-implemented prevention and investigation programs improve organizational oversight and governance. Their study confirmed that governance effectiveness is ultimately reflected in the quality of implementation processes. Consequently, the present findings reinforce the argument that

implementation effectiveness serves as a critical mechanism through which institutional and governance arrangements generate measurable, sustainable outcomes.

The significance of these relationships indicates that coordination provides more than administrative alignment; it creates an institutional environment in which agencies can exchange knowledge, pool resources, and jointly respond to emerging environmental problems. This finding reinforces the Collaborative Governance Theory by demonstrating that coordination can function as a capability-building mechanism rather than merely a procedural arrangement.

The mediation results provide additional insights into how institutional factors influence transition performance. The significant indirect effects observed in this study suggest that governance outcomes emerge through capability building and implementation processes. Similar patterns have been identified by Widodo et al. (2026) and Hasibuan et al. (2026), who reported that organizational resources often influence performance indirectly through the development of intermediate capabilities. This evidence supports the argument that institutional design and policy coordination create value primarily by strengthening governance capacity and implementation effectiveness, which subsequently enhances green transition performance.

This significant relationship suggests that policy implementation is strengthened when governance systems possess the capacity to learn from previous interventions and adjust implementation strategies to changing conditions. Adaptive capacity enables policymakers to identify implementation failures, revise operational approaches, and mobilize alternative resources when initial strategies are ineffective.

Interestingly, the nonsignificant sequential mediation pathway indicates that Adaptive Governance Capacity and Green Policy Implementation Effectiveness operate through parallel rather than linear mechanisms. This finding aligns with the conclusions of Siagian et al. (2026), who observed that multiple institutional and socioeconomic processes frequently operate simultaneously within complex systems. Sustainability transitions involve diverse actors, institutions, and governance arrangements that interact dynamically rather than sequentially interact. Therefore, governance adaptability and implementation effectiveness may represent complementary dimensions of governance performance that independently contribute to successful green transition.

This strong and significant relationship further indicates that the existence of environmental policies is insufficient to guarantee a successful green transition. Policies generate transition outcomes only when institutional actors can translate strategic objectives into coordinated programs, resource allocation, monitoring, and concrete implementation activities.

The present findings also resonate with the broader performance management literature, emphasizing the importance of execution quality in achieving strategic objectives. Maulidia, Afifah, Pebrianti, Juniwati, and Heriyadi (2026) demonstrated that organizational interventions only produce desired outcomes when effectively translated into operational actions. Similarly, Triyani, Etika, and Verawati (2026) found that organizational performance is highly dependent on the effectiveness of execution and stakeholder engagement processes.

The significant mediating effects indicate that institutional arrangements do not influence green transition performance solely through direct structural effects. Instead, their influence is realized through the development of governance capabilities and effective translation of policies into operational actions. This finding addresses a limitation of previous studies, which tended to examine institutional resilience, coordination, or implementation as independent determinants.

This evidence extends the existing sustainability transition literature by showing that successful environmental transformation depends not only on policy innovation and institutional resilience but also on organizational capabilities, collaborative governance, leadership quality, and effective implementation systems capable of sustaining long-term change (Anjarany & Marianti, 2026; Daud &

Gusnita, 2026; Hasibuan et al., 2026; Maulidia et al., 2026; Nurdiana, 2026; Roni, 2026; Siagian et al., 2026; Triyani et al., 2026; Widodo et al., 2026).

5. Conclusions

5.1 Conclusion

This study develops and validates an integrated institutional–governance framework to explain Green Transition Performance (Z) by examining the roles of Climate-Resilient Institutional Design (X_1) and Interagency Policy Coordination (X_2) through Adaptive Governance Capacity (Y_1) and Green Policy Implementation Effectiveness (Y_2). The empirical findings confirm that both institutional design and interagency coordination function as critical governance stimuli that significantly influence green-transition outcomes, both directly and indirectly. Specifically, Climate-Resilient Institutional Design and Interagency Policy Coordination significantly enhance Adaptive Governance Capacity and Green Policy Implementation Effectiveness, indicating that robust institutional arrangements and coordinated governance structures are essential foundations for effective sustainability transitions.

The results further demonstrate that Adaptive Governance Capacity and Green Policy Implementation Effectiveness serve as key intervening mechanisms that translate institutional and coordination strengths into improved Green Transition Performance. Both variables significantly influenced Green Transition Performance, confirming their central role in ensuring that institutional and policy frameworks are effectively operationalized into measurable environmental outcomes. However, the nonsignificant sequential mediation effect suggests that Adaptive Governance does not automatically translate into Green Policy Implementation Effectiveness in a linear pathway. Instead, both mechanisms operate in parallel as complementary governance processes that jointly contribute to the transition's performance.

The mediation analysis provides additional confirmation that the influence of institutional design and interagency coordination on Green Transition Performance is largely driven by indirect effects through governance capacity and implementation effectiveness. These findings highlight that green transitions are not solely determined by structural institutional arrangements but also by the interaction between adaptive governance systems and the effectiveness of policy execution.

5.2 Research Limitations

This research focuses on a specific institutional and governance context, which may limit the generalizability of the findings to other countries or policy environments. Differences in administrative systems, governance maturity, and political structures may influence the effects of institutional design and coordination mechanisms on green transition outcomes in different settings.

5.3 Suggestions and Directions for Future Research

The findings of this study provide important theoretical contributions to the literature on adaptive governance, sustainability transition, and environmental public policy. Specifically, the study demonstrates that Climate-Resilient Institutional Design and Interagency Policy Coordination are critical governance antecedents that influence Green Transition Performance both directly and indirectly through Adaptive Governance Capacity and Green Policy Implementation Effectiveness. By integrating these constructs into a unified framework, this study extends Adaptive Governance Theory, Institutional Theory, and Sustainability Transition Theory by explaining how institutional resilience and collaborative governance mechanisms translate into sustainability outcomes through governance adaptation and implementation processes.

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resilience and collaborative governance mechanisms translate into sustainability outcomes through governance adaptation and implementation processes.

From a practical perspective, government institutions should strengthen climate-resilient institutional design by embedding climate risk assessment, adaptive decision-making, policy learning, and periodic institutional review into planning and administrative procedures. Regional agencies should establish clear responsibilities, flexible operating procedures, and dedicated mechanisms for reviewing and revising programs when environmental conditions or policies change.

From a practical perspective, the results highlight the importance of strengthening institutional resilience and policy coordination to support successful green-transition initiatives. Local and national governments should prioritize developing institutional arrangements that promote organizational learning, flexibility, responsiveness, and accountability in managing climate-related challenges. Furthermore, environmental governance agencies should enhance inter-agency coordination mechanisms through integrated planning systems, information-sharing platforms, and collaborative decision-making processes. Strengthening adaptive governance capacity and improving the effectiveness of environmental policy implementation may increase the government's ability to achieve climate resilience, environmental sustainability, renewable energy development, and other green transition objectives. The findings are particularly relevant for regional governments, such as the Pandeglang Regency, and other areas facing increasing environmental and climate-related pressures.

Future research should employ longitudinal research designs to examine how adaptive governance capacity, policy implementation effectiveness, and green transition performance evolve over time. Longitudinal approaches may provide deeper insights into the dynamic nature of environmental governance and allow for stronger causal interpretations of the relationships identified in this study.

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Author Contributions
JI contributed to the conceptualization, research design, data collection, data analysis, manuscript drafting, and preparation of the final manuscript. BDS contributed to the methodology development, supervision, critical review, manuscript revision, and validation of the research findings. AN contributed to data interpretation, policy analysis, manuscript editing, and the final review of the manuscript. All authors have read, approved, and agreed to the published version of the manuscript and take responsibility for the integrity and accuracy of the work.

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