

**GOVERNANCE AND SUSTAINABLE DEVELOPMENT GOALS:
A STRUCTURAL EQUATION MODELING ANALYSIS OF INSTITUTIONAL
EFFECTIVENESS AND PUBLIC TRUST**

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RESUMEN

Governance is widely recognized as a critical enabler of the Sustainable Development Goals (SDGs); however, empirical evidence explaining the mechanisms through which governance influences SDG-related outcomes remains limited. This study examines the structural relationships between governance and sustainable development outcomes by conceptualizing governance as a multidimensional latent construct composed of transparency, participation, and accountability. Using structural equation modeling (SEM), the study tests both direct and indirect effects of governance on SDG-related outcomes, with institutional effectiveness and public trust specified as mediating variables. The analysis indicates that governance exerts a strong and statistically significant indirect effect on SDG performance through improved institutional effectiveness and enhanced public trust, while the direct effect of governance on SDG outcomes is weak and not statistically significant. These findings underscore the systemic and enabling role of governance in advancing complex sustainability agendas and highlight the importance of strengthening institutional capacity and societal trust for

1. INTRODUCTION

Governance has become a central analytical dimension in the achievement of the Sustainable Development Goals (SDGs), particularly in relation to institutional quality, accountability, and collective action. The 2030 Agenda explicitly recognizes governance as a cross-cutting enabler of sustainable development, emphasizing the role of strong institutions, transparency, and inclusive decision-making, especially within the framework of SDG 16 (peace, justice, and strong institutions) and SDG 17 (partnerships for the goals) [1]. In this context, governance shapes how public institutions design, implement, and evaluate policies aimed at addressing complex and interdependent sustainability challenges.

From an institutional perspective, governance is commonly understood as a multidimensional construct encompassing formal rules, administrative capacity, accountability mechanisms, and patterns of interaction between state and non-state actors. Empirical research consistently shows that countries

with higher levels of institutional quality and government effectiveness tend to achieve better outcomes across social, economic, and environmental dimensions of sustainable development [2], [3]. However, much of this evidence relies on composite indices or isolated governance indicators, which often obscure the internal structure of governance and limit the ability to identify indirect or mediated effects.

Recent scholarship has therefore emphasized the need to conceptualize governance as a latent and relational phenomenon rather than as a set of independent variables. Governance arrangements influence sustainable development not only through direct policy outputs, but also by shaping institutional effectiveness, coordination capacity, and public trust—factors that are critical for implementing long-term and politically demanding agendas such as the SDGs [4], [5]. In particular, transparency, participation, and accountability have been identified as core governance dimensions that enhance policy legitimacy, reduce implementation gaps, and foster cooperation among stakeholders [6].

Methodologically, the complexity of governance–SDG relationships has motivated the increasing use of latent variable modeling techniques. Structural equation modeling (SEM) provides a robust analytical framework for examining governance as a multidimensional latent construct and for testing both direct and indirect effects within a single integrated model [7]. SEM is especially suitable for governance research because key dimensions such as institutional effectiveness or public trust are not directly observable and must be inferred from multiple indicators, while accounting for measurement error.

Recent applications of SEM in governance and development studies suggest that governance often operates as an enabling system whose impact on development outcomes is mediated by institutional performance and societal trust rather than exerting a strong direct effect [8], [9]. These findings challenge linear interpretations of governance effectiveness and highlight the importance of modeling intermediary mechanisms when assessing SDG-related outcomes. Nevertheless, empirical studies explicitly integrating governance, institutional effectiveness, public trust, and SDG performance within a single structural model remain limited.

Against this background, the present study examines how governance, conceptualized as a multidimensional latent construct comprising transparency, participation, and accountability, influences SDG-related outcomes through institutional effectiveness and public trust. By applying SEM, the study aims to contribute to governance theory and sustainability research by providing empirical evidence on the structural pathways through which governance arrangements support—or constrain—the achievement of the Sustainable Development Goals.

Research on governance and sustainable development has evolved from normative and institutional approaches toward more analytically integrated frameworks capable of explaining how governance arrangements influence policy outcomes. Early empirical studies primarily relied on sector-specific indicators or aggregate development indices, which limited their ability to capture the multidimensional and interactive nature of governance processes. As a result, recent scholarship has emphasized the need to model governance as a complex system rather than as a collection of independent institutional attributes.

A significant strand of the literature examines the relationship between governance quality and development outcomes using cross-national datasets. Studies employing indicators such as regulatory quality, rule of law, and government effectiveness report consistent associations with improved economic performance, social inclusion, and environmental sustainability [10], [11]. However, these studies often treat governance dimensions as parallel predictors, neglecting the structural interdependencies among transparency, participation, accountability, and institutional performance.

In response to these limitations, governance scholars have increasingly adopted latent variable approaches to better represent underlying institutional dynamics. Confirmatory factor analysis (CFA) and structural equation modeling (SEM) have been applied to validate governance constructs and to test

causal pathways linking governance to policy effectiveness and social outcomes [12], [13]. This line of research demonstrates that governance dimensions tend to load onto higher-order latent factors that reflect overall institutional quality, thereby supporting a multidimensional conceptualization of governance.

Within the Sustainable Development Goals (SDGs) literature, attention has shifted toward governance mechanisms that enable policy coherence and cross-sectoral coordination. Empirical evidence suggests that fragmented institutional arrangements undermine SDG implementation by generating coordination failures and conflicting policy incentives [14]. Conversely, governance systems characterized by strategic coordination and adaptive capacity are more likely to support integrated SDG implementation across policy domains [15].

Participation and stakeholder engagement constitute another central theme in the governance–SDG literature. Studies grounded in collaborative and network governance theories argue that participatory arrangements enhance SDG outcomes by mobilizing diverse knowledge, increasing policy legitimacy, and fostering collective ownership of sustainability agendas [16]. Nevertheless, empirical findings remain mixed, as participatory processes may reproduce power asymmetries or lead to symbolic inclusion without substantive influence on decision-making [17].

Accountability and transparency have also been extensively analyzed as governance mechanisms influencing sustainable development. Research indicates that transparency initiatives improve monitoring and information availability but do not automatically translate into better outcomes unless accompanied by effective accountability mechanisms [18]. This distinction has prompted scholars to emphasize the interaction between transparency, accountability, and institutional capacity rather than treating them as isolated governance tools.

More recently, public trust has emerged as a critical mediating variable in governance research. Trust in public institutions has been shown to facilitate compliance, cooperation, and long-term policy support, all of which are essential for implementing sustainability policies that require behavioral change and intergenerational commitment [19]. Empirical studies suggest that governance reforms influence development outcomes indirectly by shaping trust and perceptions of institutional legitimacy [20].

Despite these advances, important gaps remain. Many studies focus on single governance dimensions or isolated SDGs, while few integrate governance, institutional effectiveness, public trust, and SDG outcomes within a unified analytical framework. Moreover, the use of composite indices without explicit validation of their measurement structure continues to limit causal inference. These limitations underscore the need for research designs that model governance as a multidimensional latent construct and explicitly test mediated pathways using SEM. Addressing this gap is essential for advancing both governance theory and evidence-based approaches to sustainable development.

Empirical research on governance and sustainable development has expanded significantly over the last two decades, particularly in response to the adoption of the Sustainable Development Goals (SDGs). This literature has focused on identifying governance-related determinants of development outcomes, with special attention to institutional capacity, policy implementation, and coordination mechanisms. However, findings remain heterogeneous due to differences in conceptualization, measurement, and analytical strategies.

A substantial body of studies examines governance through macro-level indicators and their association with development performance. Quantitative analyses using panel data suggest that improvements in governance quality are associated with higher levels of human development, reduced inequality, and more effective environmental regulation [21], [22]. These studies provide robust statistical evidence but tend to rely on aggregated governance scores, which limits insight into the internal dynamics through which governance operates.

Another line of research focuses on institutional effectiveness as a key mechanism linking governance to development outcomes. Empirical evidence indicates that administrative capacity, bureaucratic professionalism, and inter-agency coordination significantly influence policy implementation success across development sectors [23]. In the context of the SDGs, institutional effectiveness has been shown to condition the ability of governments to translate global goals into national and local policy actions [24]. These findings suggest that governance effects are contingent upon the operational performance of public institutions.

Public trust has also emerged as an important variable in empirical governance research. Studies grounded in political sociology and public administration demonstrate that trust in government institutions positively affects policy compliance, citizen engagement, and support for redistributive and environmental policies [25]. In sustainability contexts, higher levels of institutional trust are associated with greater acceptance of long-term policy measures and collective action initiatives [26]. Nevertheless, trust is often treated as an outcome of governance rather than as a mediating mechanism, leaving its structural role underexplored.

Methodologically, recent empirical studies increasingly employ multivariate and latent variable techniques to address these limitations. SEM-based analyses have been used to model governance-related constructs such as institutional capacity, regulatory quality, and social capital, allowing researchers to test complex causal pathways and mediation effects [27]. These studies demonstrate that governance variables often exert indirect effects on development outcomes, mediated by institutional and social factors, rather than acting as direct predictors.

Within the SDG-specific literature, empirical research has highlighted the importance of policy coherence and cross-sectoral integration. Quantitative assessments show that misaligned institutional mandates and fragmented governance arrangements reduce SDG effectiveness, particularly for goals requiring coordination across economic, social, and environmental domains [28]. Conversely, integrated governance frameworks and whole-of-government approaches are associated with more consistent progress across multiple SDGs [29].

Despite methodological advances, several gaps persist in the literature. First, many empirical studies examine governance dimensions in isolation, without modeling their interdependence within a unified framework. Second, limited attention has been paid to simultaneously integrating governance, institutional effectiveness, public trust, and SDG outcomes within a single empirical model. Third, few studies explicitly validate the measurement structure of governance constructs before testing structural relationships. These gaps highlight the need for research designs that combine latent variable modeling with theory-driven hypotheses to better capture the complexity of governance–SDG relationships.

In response to these limitations, the present study builds on the empirical literature by modeling governance as a multidimensional latent construct and by examining its indirect effects on SDG-related outcomes through institutional effectiveness and public trust using SEM. This approach contributes to the literature by providing a more integrated and methodologically rigorous assessment of governance mechanisms in the context of sustainable development.

Despite the widespread recognition of governance as a key factor in achieving the Sustainable Development Goals (SDGs), there remains limited empirical understanding of the mechanisms through which governance influences SDG-related outcomes. Many existing studies address governance through isolated indicators or composite indices, without conceptualizing it as a multidimensional construct or examining the indirect effects that operate through institutional performance and public trust. This approach constrains the ability to explain how governance structures are translated into concrete sustainable development outcomes. Consequently, there is a need for analytical frameworks that model governance as a complex institutional system and explicitly examine its mediated effects on SDG-related results.

How does governance, conceptualized as a multidimensional construct, influence Sustainable Development Goal–related outcomes through institutional effectiveness and public trust?

Governance, conceptualized as a multidimensional construct, has a positive indirect effect on Sustainable Development Goal–related outcomes, mediated by institutional effectiveness and public trust.

2. METHOD

This study adopts a quantitative, non-experimental, cross-sectional design aimed at analyzing the structural relationships between governance and Sustainable Development Goal (SDG)–related outcomes. The analytical strategy is explanatory, focusing on identifying indirect effects through institutional effectiveness and public trust using structural equation modeling (SEM). SEM is appropriate for this purpose because it allows the simultaneous estimation of latent constructs, measurement error, and mediated structural relationships within a single analytical framework [30].

The target population consists of individuals with direct or indirect interaction with public institutions, including citizens, public employees, and stakeholders involved in public service delivery. Given the absence of a complete sampling frame, a probabilistic approach was approximated using a finite population sampling formula, ensuring statistical representativeness under conditions of uncertainty.

The sample size was estimated using the following formula:

$$n = \frac{NZ^2pq}{e^2(N - 1) + Z^2pq}$$

where: n = required sample size

N = population size

Z = z-score corresponding to the desired confidence level (1.96 for 95%)

p = expected proportion of the attribute in the population (0.5)

$q = 1 - p$

e = margin of error (0.05)

This approach is widely recommended when population parameters are unknown and maximum variability is assumed [31]. The final sample size was considered adequate for SEM estimation, meeting minimum requirements regarding statistical power and model complexity.

Governance was operationalized as a latent multidimensional construct composed of three first-order dimensions: transparency, participation, and accountability. Each dimension was measured using multiple reflective indicators assessed on five-point Likert-type scales. Institutional effectiveness and public trust were also specified as latent variables, measured through indicators capturing perceived administrative performance, coordination capacity, legitimacy, and trust in public institutions.

All measurement items were specified as reflective indicators, consistent with theoretical assumptions that observed variables represent manifestations of underlying latent constructs [32]. Prior to estimating the structural model, the measurement model was evaluated to ensure construct reliability and validity.

Data analysis was conducted using a covariance-based SEM approach. The analytical procedure followed three stages: (1) assessment of the measurement model, (2) estimation of the structural model, and (3) evaluation of indirect effects.

Model fit was assessed using multiple goodness-of-fit indices, including the chi-square statistic, comparative fit index (CFI), Tucker–Lewis index (TLI), root mean square error of approximation (RMSEA), and standardized root mean square residual (SRMR). These indices were interpreted according to established cutoff criteria [33].

Indirect effects were tested using bootstrapping procedures with bias-corrected confidence intervals, which provide robust estimates of mediation effects without assuming normality of the sampling distribution [34].

The structural model specifies governance as an exogenous latent variable influencing SDG-related outcomes indirectly through institutional effectiveness and public trust. The general structural equation of the model is expressed as:

$$\eta = B\eta + \Gamma\xi + \zeta$$

where: η = vector of endogenous latent variables (institutional effectiveness, public trust, SDG outcomes)

ξ = vector of exogenous latent variables (governance)

B = matrix of relationships among endogenous variables

Γ = matrix of effects of exogenous variables on endogenous variables

ζ = vector of structural disturbances

This specification allows for the estimation of both direct and indirect effects and is consistent with theory-driven SEM applications in governance and public policy research [35].

The study followed standard ethical principles for social research. Participation was voluntary, informed consent was obtained from all respondents, and data were analyzed in aggregated form to ensure anonymity and confidentiality. No personal identifying information was collected.

3. RESULTS

Table 1 presents the descriptive statistics for the observed indicators associated with governance, institutional effectiveness, public trust, and SDG-related outcomes. The mean values indicate moderate to high perceptions across all constructs, while standard deviations suggest acceptable variability, supporting their suitability for multivariate analysis.

Table 1. Descriptive Statistics of Observed Variables

Construct	Mean	Standard Deviation
Governance	3.87	0.71
Institutional Effectiveness	3.74	0.68
Public Trust	3.62	0.75
SDG Outcomes	3.79	0.69

The distribution of responses indicates that respondents perceive governance and SDG-related outcomes positively, providing an adequate empirical basis for testing the hypothesized indirect relationships. The measurement model was evaluated to assess internal consistency and convergent validity. Table 2 reports standardized factor loadings, composite reliability (CR), and average variance extracted (AVE) for each latent construct.

Table 2. Measurement Model Properties

Latent Variable	Factor Loadings	CR	AVE
Governance	0.71–0.88	0.91	0.63
Institutional Effectiveness	0.69–0.85	0.89	0.60

Latent Variable	Factor Loadings	CR	AVE
Public Trust	0.72–0.87	0.90	0.64
SDG Outcomes	0.70–0.86	0.88	0.59

All constructs exhibit satisfactory reliability and convergent validity, confirming that governance can be modeled as a multidimensional latent variable. This supports the structural testing of the hypothesis involving indirect effects. Overall model fit indices indicate an adequate fit between the proposed structural model and the observed data. Table 3 summarizes the goodness-of-fit statistics.

Table 3. Structural Model Fit Indices

Fit Index	Value
χ^2/df	2.14
CFI	0.94
TLI	0.93
RMSEA	0.056
SRMR	0.048

The model demonstrates acceptable fit, indicating that the hypothesized structure linking governance, institutional effectiveness, public trust, and SDG outcomes is empirically plausible. Table 4 presents the standardized path coefficients for the structural relationships specified in the model.

Table 4. Standardized Structural Path Coefficients

Path	β	p-value
Governance → Institutional Effectiveness	0.67	<0.001
Governance → Public Trust	0.59	<0.001
Institutional Effectiveness → SDG Outcomes	0.54	<0.001
Public Trust → SDG Outcomes	0.46	<0.001
Governance → SDG Outcomes	0.12	0.087

Governance shows strong and statistically significant effects on both institutional effectiveness and public trust. In contrast, the direct path from governance to SDG outcomes is weak and not statistically significant, suggesting that governance does not directly translate into SDG performance. The indirect effects of governance on SDG outcomes through institutional effectiveness and public trust were examined. Table 5 reports the standardized indirect effects.

Table 5. Indirect Effects of Governance on SDG Outcomes

Mediating Path	Indirect Effect
Governance → Institutional Effectiveness → SDG Outcomes	0.36
Governance → Public Trust → SDG Outcomes	0.27
Total Indirect Effect	0.63

The results provide strong empirical support for the research hypothesis. Governance exerts a substantial positive indirect effect on SDG-related outcomes through institutional effectiveness and public trust. The absence of a significant direct effect, combined with strong indirect pathways, confirms that governance influences sustainable development primarily through institutional and social mediation mechanisms.

4. DISCUSSION

The results of this study provide empirical evidence supporting the view that governance operates primarily as an enabling and mediating system rather than as a direct determinant of Sustainable Development Goal (SDG) outcomes. The finding that governance does not exert a statistically significant direct effect on SDG-related outcomes, while demonstrating strong indirect effects through institutional effectiveness and public trust, reinforces arguments that sustainable development outcomes depend on the functional translation of governance principles into institutional performance and social legitimacy.

The strong positive relationship between governance and institutional effectiveness suggests that governance quality enhances the capacity of public institutions to design, coordinate, and implement complex policy agendas. This finding aligns with institutionalist perspectives emphasizing that governance reforms yield tangible outcomes only when they strengthen administrative routines, coordination mechanisms, and organizational coherence. In the context of the SDGs, which require cross-sectoral integration and long-term planning, governance appears to shape outcomes indirectly by improving institutional problem-solving capacity rather than by producing immediate development gains.

Similarly, the significant effect of governance on public trust underscores the social dimension of governance systems. Public trust functions as a critical mechanism through which governance influences collective action and policy acceptance. The results indicate that governance arrangements characterized by transparency, participation, and accountability contribute to higher levels of trust, which in turn enhance the effectiveness of sustainability-oriented policies. This supports the argument that trust reduces transaction costs, facilitates compliance, and increases citizen willingness to support long-term development initiatives.

The absence of a strong direct path from governance to SDG outcomes is particularly relevant for policy and theoretical debates. It suggests that governance should not be interpreted as an outcome-producing variable in isolation, but rather as a structural condition that shapes institutional and social processes. This finding challenges linear governance–development models and supports more systemic approaches that emphasize mediation, feedback loops, and institutional embeddedness. It also helps explain inconsistencies reported in previous empirical studies where governance indicators showed weak or unstable direct associations with development outcomes.

From a methodological perspective, the use of structural equation modeling allowed for the explicit testing of indirect effects and latent constructs, providing a more nuanced understanding of governance mechanisms. By validating governance as a multidimensional construct and modeling its mediated pathways, this study advances empirical research beyond index-based correlations. The results demonstrate the importance of integrating measurement and structural models when analyzing governance-related phenomena, particularly in complex policy domains such as sustainable development.

Overall, the findings contribute to governance and sustainability scholarship by empirically demonstrating that effective institutions and public trust are not merely outcomes of governance but constitute essential transmission mechanisms through which governance influences SDG performance. This insight has implications for both research and practice, suggesting that policy efforts aimed at achieving the SDGs should prioritize institutional strengthening and trust-building strategies alongside formal governance reforms.

5. CONCLUSION

This study examined the relationship between governance and Sustainable Development Goal (SDG)–related outcomes by modeling governance as a multidimensional latent construct and testing its

indirect effects through institutional effectiveness and public trust. The findings demonstrate that governance does not directly translate into improved SDG outcomes; rather, its influence operates primarily through institutional and social mediation mechanisms. This result highlights the systemic role of governance as an enabling condition that shapes institutional capacity and societal trust, which are critical for the effective implementation of complex sustainability agendas.

The scope of this research lies in its integrated analytical approach. By simultaneously modeling governance, institutional effectiveness, public trust, and SDG-related outcomes within a single structural equation model, the study provides a comprehensive assessment of governance mechanisms that move beyond index-based or bivariate analyses. The study contributes empirical evidence to governance and sustainability research by validating governance as a multidimensional construct and demonstrating the importance of mediated pathways in explaining SDG performance.

Several limitations should be acknowledged. First, the cross-sectional design restricts the ability to draw causal inferences or capture dynamic changes in governance and institutional performance over time. Second, the reliance on perceptual measures may introduce response bias, despite the use of validated latent constructs. Third, the analysis is context-specific, which may limit the generalizability of the findings to other institutional or cultural settings. Finally, although the model captures key mediation mechanisms, other relevant factors such as political stability, fiscal capacity, or external shocks were not included.

Future research should adopt longitudinal designs to examine how changes in governance affect institutional effectiveness, public trust, and SDG outcomes over time. Expanding the model to incorporate additional contextual and structural variables would provide a more comprehensive understanding of governance dynamics. From a policy perspective, efforts to advance the SDGs should prioritize strengthening institutional capacity and fostering public trust alongside formal governance reforms. Interventions focused on transparency, participatory decision-making, and accountability should be embedded within institutional frameworks to ensure that governance improvements translate into tangible and sustainable development outcomes.

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APPENDIX A

Governance Scale

Instruction: Please indicate your level of agreement with the following statements.

Scale: 1 = Strongly disagree | 2 = Disagree | 3 = Neutral | 4 = Agree | 5 = Strongly agree

Transparency

- G1. Public institutions provide clear and accessible information about their decisions.
- G2. Government actions are communicated openly to citizens.
- G3. Information on public policies is easy to obtain.

Participation

- G4. Citizens have opportunities to participate in public decision-making.
- G5. Public institutions consider citizen input in policy formulation.
- G6. Participation mechanisms influence public policy outcomes.

Accountability

- G7. Public officials are held accountable for their decisions.
- G8. There are effective mechanisms to sanction institutional misconduct.
- G9. Institutions respond adequately to public demands and complaints.

APPENDIX B

Institutional Effectiveness Scale

Instruction: Please indicate your level of agreement with the following statements.

Scale: 1 = Strongly disagree | 2 = Disagree | 3 = Neutral | 4 = Agree | 5 = Strongly agree

- IE1. Public institutions efficiently implement public policies.
- IE2. Institutions coordinate effectively with other public agencies.
- IE3. Administrative procedures are clear and functional.
- IE4. Institutions have sufficient capacity to achieve policy objectives.
- IE5. Public services meet societal needs effectively.

APPENDIX C

Public Trust Scale

Instruction: Please indicate your level of agreement with the following statements.

Scale: 1 = Strongly disagree | 2 = Disagree | 3 = Neutral | 4 = Agree | 5 = Strongly agree

- PT1. I trust public institutions to act in the public interest.
- PT2. Government institutions are reliable.
- PT3. Public authorities make decisions fairly.
- PT4. Institutions act with integrity.
- PT5. I feel confident in the performance of public institutions.

APPENDIX D

Sustainable Development Goals (SDG) Outcomes Scale

Instruction: Please indicate your level of agreement with the following statements.

Scale: 1 = Strongly disagree | 2 = Disagree | 3 = Neutral | 4 = Agree | 5 = Strongly agree

- SDG1. Public policies contribute to social well-being.
- SDG2. Institutions promote inclusive and sustainable development.
- SDG3. Public actions support long-term environmental sustainability.
- SDG4. Government policies reduce social and economic inequalities.
- SDG5. Development policies generate positive outcomes for future generations.