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Organizational Culture and Sustainability Performance Outcomes: Corporate Governance Moderation Among African Civil Aviation Authorities

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Abstract

This study examines the moderating role of corporate governance in the relationship between organizational culture and sustainability performance within African Civil Aviation Authorities (ACAAs). Despite growing attention to sustainability, limited empirical evidence exists on how governance interacts with cultural orientations to shape sustainability outcomes in the aviation sector. Guided by Institutional Theory, the study adopted a quantitative cross-sectional design and analysed data from 371 managers using Partial Least Squares Structural Equation Modelling (PLS-SEM). The findings reveal that clan, hierarchy, and market cultures significantly enhance sustainability performance, whereas adhocracy shows an insignificant effect. Moreover, corporate governance significantly moderates the effects of adhocracy, clan, and hierarchy cultures on sustainability, but not market culture. These results indicate that governance enhances innovation and accountability in flexible and hierarchical contexts but may constrain collaboration in clan-oriented settings. The study contributes theoretically by integrating governance and culture within aviation sustainability discourse and offers practical insights for policymakers to strengthen governance frameworks that balance flexibility, collaboration, and control for sustainable aviation performance.

Keywords:

Adhocracy Culture, Clan Culture, Hierarchy Culture, Market Culture, Sustainability Performance, Corporate Governance

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Introduction

In contemporary sustainability and business management research, increasing attention has been paid to how organizational culture and corporate governance interact to shape sustainability performance (Aguilera et al., 2021; Naciti et al., 2022; Peng & Zhang, 2022). Drawing on Cameron and Quinn's (2011) Competing Values Framework (CVF), organizational culture is typically defined through four core dimensions namely, clan, adhocracy, market, and hierarchy culture, each reflecting distinct managerial orientations and underlying values (Zeb et al., 2021). These dimensions collectively influence the three pillars of sustainability performance namely, economic, environmental, and social often referred to as the triple bottom line (Calciolari & Prenestini, 2022). In high-impact sectors such as aviation, where economic efficiency, environmental responsibility, and social accountability converge, understanding how governance moderates these cultural effects is essential for achieving long-term organizational sustainability (Bani-Khaled et al., 2025).

Organizational culture provides the social infrastructure through which collective values are enacted, and sustainability principles are operationalized (Jaganjac et al., 2025). A clan culture emphasizes collaboration and social cohesion, thereby strengthening social and environmental responsibility (Kimathi, 2024). Conversely, an adhocracy culture prioritizes innovation and adaptability, promoting technological and process innovations for sustainable development (Noone et al., 2024). In contrast, market and hierarchy cultures emphasize competitiveness, stability, and control, which often produce efficiency-driven rather than transformative sustainability strategies (Strengers et al., 2022; Grzelany et al., 2021). Because these cultural effects vary widely, the presence of effective governance becomes critical in ensuring that internal cultural orientations align with sustainability imperatives (Strengers et al., 2022). Corporate governance provides the structural and procedural mechanisms through which accountability, transparency, and stakeholder engagement are institutionalized (Efunniyi et al., 2024). In the aviation sector, corporate governance has been identified as a cornerstone of ethical conduct, risk management, and long-term sustainability (Sarma et al., 2024). As Elbadawy et al. (2024) observe, robust governance frameworks enhance environmental performance by embedding ethical oversight and strategic responsibility into organizational decision-making.

Empirical evidence from diverse sectors underscores the moderating role of governance. For organizations with an adhocracy culture, characterized by flexibility and innovation, governance provides necessary direction and ethical control. Aldriweesh et al. (2022) and Kouaib et al. (2022) demonstrate that effective governance enhances the sustainability benefits of innovation-oriented cultures by aligning creative initiatives with social and environmental goals. Likewise, Abdelwahed and Soomro (2024) emphasize that governance reinforces ethical decision-making, ensuring that innovation supports long-term sustainability rather than short-term performance. In such contexts, governance

moderates by converting innovation into an accountable process that yields sustainable outcomes. Similarly, in clan cultures, governance plays a moderating role by institutionalizing trust, participation, and collaboration into formal accountability systems. Tang et al. (2024) and Wang et al. (2022) report that governance reforms strengthen cooperation within clan cultures, leading to better sustainability disclosures and improved social performance.

Within hierarchical cultures, governance mitigates rigidity and fosters structured innovation. Kouaib, Bouzouitina, and Jarboui (2022) and Mishra et al. (2025) reveal that governance mechanisms align hierarchical discipline with green innovation, enabling structured adaptation without undermining control. In this sense, governance transforms bureaucratic discipline into a vehicle for systematic sustainability performance. In market cultures, governance moderates by ensuring that competitiveness and profit-seeking are tempered by ethical and environmental considerations (Mishra et al., 2025). Akuma et al. (2025) and Meidawati et al. (2025) show that strong governance redirects market orientation toward sustainable competitiveness by embedding ethical oversight and stakeholder accountability into performance metrics.

However, despite strong empirical evidence across industries, studies within the aviation sector remain limited. The aviation industry's complexity marked by stringent regulatory frameworks, environmental sensitivities, and safety obligations heightens the interaction between governance and culture. Yet empirical research seldom examines how governance moderates' cultural effects on sustainability in this context. This gap restricts both theoretical progress and practical policy innovation within African Civil Aviation Authorities (ACAAs) and airline management. Addressing it is therefore crucial for understanding how governance frameworks can transform culture into a catalyst for sustainability in aviation. The need for such investigation is particularly pressing within ACAAs, which operate in challenging institutional environments. Many ACAAs are state-owned or quasi-governmental, facing governance challenges such as political interference, corruption, and resource constraints. Moganane (2024) observes that deficiencies in governance structures have historically undermined operational and financial stability in state-owned enterprises such as South African Airways, eroding the foundation for sustainability-oriented cultures. Similarly, Sylva and Amah (2021) report that inefficiencies in governance weaken operational resilience an essential condition for embedding sustainability across aviation operations.

Moreover, the cultural context within ACAAs deeply influences sustainability adoption. Aigbavboa et al. (2023) found that corruption, limited training, and insufficient resources hinder the evolution of a sustainability-driven culture. In contrast, Zhang (2025) demonstrates that organizations with strong governance emphasizing ethics and stakeholder inclusivity more effectively align culture with sustainability objectives. Governance structures that promote open communication, employee

participation, and community engagement help foster shared accountability for sustainability outcomes. This study is therefore conducted to achieve the following:

To examine the effect of organizational culture (adhocracy, clan, hierarchy, market) on sustainability performance among African Civil Aviation Authorities (ACAAs).

To examine the moderating effects of corporate governance on the relationships between organizational culture (adhocracy, clan, hierarchy, market) and sustainability performance among ACAAs.

Literature Review

Theoretical Framework: Institutional Theory

Institutional theory explains how organizational structures, behaviors, and practices are influenced by external pressures, social norms, and societal expectations (Eitrem et al., 2024). Originally developed by DiMaggio and Powell (1983), the theory posits that organizations adopt specific practices not solely for efficiency but to gain legitimacy within their institutional environments (Kauppi, 2022). Through coercive, normative, and mimetic isomorphism, institutions shape how organizations conform to regulatory, professional, and societal standards (Schiavi et al., 2024). These institutional forces increasingly compel organizations to embed ethical and sustainability principles into governance and operations, particularly within highly regulated sectors such as aviation (Coates et al., 2023).

In the context of corporate governance, institutional theory underscores how external pressures influence governance structures that promote transparency, accountability, and sustainability (Aldriweesh et al., 2022). Within the aviation industry, such institutional forces ensure that regulatory compliance, environmental stewardship, and safety management are systematically integrated into governance frameworks (Ahsan, 2024). Similarly, Peng and Zhang (2022) observed that governance systems informed by institutional norms enhance environmental sustainability by aligning organizational practices with prevailing cultural and national expectations.

Different organizational cultures respond distinctively to these institutional influences. Adhocracy cultures foster innovation and adaptability in sustainability initiatives, while hierarchical cultures prioritize compliance and control, promoting regulatory adherence though sometimes limiting creativity (Kwarteng et al., 2022). Clan cultures reinforce collaboration, trust, and shared values that drive sustainable engagement (Abdelwahed & Soomro, 2024), whereas market cultures integrate sustainability through competitiveness and performance efficiency. Empirical findings demonstrate that corporate governance moderates the relationship between organizational culture and sustainability by aligning strategic intent with environmental and social objectives (Abdi et al., 2022). Consequently, institutional theory provides a robust foundation for explaining how external pressures, mediated through corporate governance,

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guide African Civil Aviation Authorities (CAAs) in achieving triple bottom line sustainability—balancing economic viability, environmental responsibility, and social accountability (Nazeer et al., 2024).

Adhocracy Culture

Adhocracy culture, characterized by innovation and adaptability, is defined as an organizational environment that fosters creativity, experimentation, and risk-taking in the pursuit of new ideas (Gutterman, 2025). It also functions as a framework for agile decision-making, enabling organizations to respond swiftly to changing conditions (Panduwinarsih & Rahmadani, 2024). In the aviation sector, this culture promotes technological innovation that enhances safety and operational efficiency (Gutterman, 2025). Moreover, its emphasis on agility allows airlines to effectively navigate evolving regulatory requirements and customer expectations, thereby strengthening responsiveness, competitiveness, and overall organizational performance (Gurung, 2025; Pratama & Caponecchia, 2025).

Clan Culture

Clan culture is defined as a family-like organizational environment that promotes collaboration, trust, and employee engagement, as well as a supportive atmosphere that nurtures loyalty and shared values among team members. In the aviation sector, such a culture strengthens communication and teamwork, which are vital in high-stakes operations like flight management (Kyrylenko et al., 2023). By fostering loyalty and shared purpose, clan culture enhances knowledge sharing and cooperation, leading to improved safety, efficiency, and overall performance (Raziq et al., 2024; Pratama & Caponecchia, 2025). Ultimately, cultivating clan culture drives employee commitment and sustainable organizational success (Gurung, 2025).

Hierarchy Culture

Hierarchical culture is defined as a structured system of authority characterized by clear lines of command and as a set of shared beliefs and values that emphasize order, control, and stability. In the aviation sector, this culture enhances operational efficiency through well-defined procedures but may simultaneously constrain communication and innovation (Wittmer & Roth, 2021). While a shared commitment to safety and compliance fosters a strong safety culture, excessive hierarchy can hinder feedback and continuous improvement (Tear et al., 2020). Furthermore, national cultural factors influence these dynamics, shaping safety perceptions, teamwork, and decision-making across aviation organizations (Pratama & Caponecchia, 2025; Hartman, 2022).

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Market Culture

Market culture in the aviation sector is defined by two key dimensions: a consumer-oriented focus and competition-driven dynamics. The consumer-centric perspective emphasizes tailoring services to meet passenger expectations, enhancing customer satisfaction, loyalty, and market share (Zhang, 2025). Conversely, the competitive dimension drives airlines to adapt continuously to market fluctuations, fostering efficiency, innovation, and strategic responsiveness (Zhou, 2024). Moreover, competition influences industry-wide practices, where safety protocols shaped by national culture strengthen operational standards (Pratama & Caponecchia, 2025). Collectively, these elements illustrate how market culture integrates customer focus and competitiveness to shape performance and strategic outcomes in aviation (Opiyo, 2023).

Sustainability Performance

Sustainability performance comprises three interrelated dimensions—economic, environmental, and social sustainability. Economic sustainability ensures financial viability and operational efficiency, enabling continued growth without compromising future value (Abdi, Li, & Càmara-Turull, 2020, 2022). Environmental sustainability in aviation focuses on reducing ecological impact through fuel efficiency, carbon offsetting, and sustainable aviation fuels, though high investment costs and regulatory pressures remain major challenges (Kucukvar et al., 2021; Gupta, Mishra, & Tandon, 2020). Social sustainability emphasizes workforce welfare, passenger experience, and community engagement but is often constrained by labor issues and community resistance to expansion (Dağli & Ayvaz, 2024; L'Abate et al., 2023). Achieving balance across these dimensions requires integrated strategies that align profitability, environmental responsibility, and social accountability (Sai, 2024; Al Sarrah, Ajmal, & Mertzanis, 2021).

Empirical Literature and Hypotheses Development

Adhocracy Culture and Sustainability Performance

Empirical research consistently demonstrates the pivotal role of adhocracy culture in driving sustainability performance across diverse industries through innovation and organizational adaptability. Elbaz and Iddik (2020) emphasize that adhocracy enhances green supply chain management by fostering creativity and innovative thinking conducive to sustainable solutions. Similarly, Medina-Álvarez and Sánchez-Medina (2023) find that the flexible structures characteristic of adhocracy promotes sustainability initiatives in ecotourism, yielding long-term environmental benefits. Ogundipe (2025) further reveals that adhocracy-oriented firms in the consumer goods sector achieve superior logistical effectiveness through creative problem-solving. Supporting this, Hafeez et al. (2025) link organizational ambidexterity to green innovation, arguing that adhocracy enables the simultaneous exploration and

exploitation of new sustainable practices. Additionally, Talaja and Vuković (2024) highlight that adhocracy mediates the relationship between environmental dynamism and innovativeness, reinforcing its strategic relevance in sustainability-oriented environments. Based on studies conducted by Elbaz and Iddik (2020), Medina-Álvarez and Sánchez-Medina (2023), Ogundipe (2025), Hafeez et al. (2025), and Talaja and Vuković (2024), the study hypothesizes that:

H1*: Adhocracy culture has a significant positive effect on sustainability performance.*

Clan Culture and Sustainability Performance

Clan culture, defined by its family-like atmosphere and emphasis on collaboration and shared values, has been found to enhance corporate natural resource disclosure, particularly among Chinese natural resource-based firms (Tang et al., 2024). Similarly, Woo and Kang (2021) report that employee environmental capability, nurtured within a supportive clan environment, positively influences corporate sustainability initiatives. In a study of SMEs in China, Wang and Huang (2022) revealed that cultivating a clan-like culture fosters eco-innovative practices and strengthens sustainable performance. Moreover, Abdulrahim et al. (2020) identified the mediating role of strategic posture in linking organizational culture to sustainability outcomes, while Shuliang et al. (2024) demonstrated that clan culture promotes eco-innovation at both individual and organizational levels. Collectively, these findings highlight the critical role of clan culture in embedding sustainability values within organizations and driving long-term environmental and social performance (Hung et al., 2022). Based on studies conducted by Tang et al. (2024), Woo and Kang (2021), Wang and Huang (2022), Abdulrahim et al. (2020), Shuliang et al. (2024), and Hung et al. (2022), the study hypothesizes that:

H2*: Clan culture has a significant positive effect on sustainability performance.*

Hierarchy Culture and Sustainability Performance

Hierarchical culture plays a multifaceted role in shaping sustainability performance, exerting both positive and negative influences across industries. A clearly defined hierarchy can enhance operational efficiency and streamline decision-making, thereby supporting the effective implementation of sustainability initiatives (Xu, Lin, & Duan, 2023). In the Egyptian hotel sector, for example, strong organizational structures have been shown to improve sustainable performance through well-coordinated outsourcing strategies (Gebril Taha & Espino-Rodríguez, 2020). However, excessive rigidity within hierarchical systems may suppress creativity and innovation—key drivers of sustainability transformation (Ahsan, 2024). Conversely, integrating green human resource management (GHRM) within hierarchical settings has been associated with improved environmental outcomes, as it cultivates a supportive green culture that aligns employees with organizational sustainability goals (Aggarwal & Agarwala, 2023). Moreover, studies on SMEs suggest that hierarchical elements of corporate culture

significantly influence overall sustainability performance, underscoring the importance of structured leadership and control (Wang & Huang, 2022). Ultimately, the effectiveness of hierarchical culture lies in its ability to balance procedural efficiency with innovative capacity to achieve sustainable success (Mal, Varma, & Vishvakarma, 2023). Based on studies conducted by Xu, Lin, and Duan (2023), Gebril Taha and Espino-Rodríguez (2020), Ahsan (2024), Aggarwal and Agarwala (2023), Wang and Huang (2022), and Mal, Varma, and Vishvakarma (2023), the study hypothesizes that:

H3*: Hierarchical culture has a significant positive effect on sustainability performance.*

Market Culture and Sustainability Performance

Empirical research increasingly highlights the complex relationship between market culture and sustainability performance across industries. Lăzăroiu et al. (2020) conducted a systematic review emphasizing that corporate culture—particularly market-oriented cultures—plays a vital role in enhancing environmental outcomes through strategic sustainability management. Similarly, Tsai, Huang, and Chen (2020) demonstrate that firm cultures promoting competitiveness and efficiency improve environmental metrics such as carbon reduction and waste management. Sharma et al. (2021) further reveal that cultivating a green culture within market-oriented firms fosters innovation, strengthens employee commitment, and enhances overall green performance. Complementing this, Fok, Zee, and Morgan (2022) show that market culture supports quality improvement practices that reinforce sustainability performance. Additionally, Akuma et al. (2025) highlight that market culture moderates the relationship between green marketing and financial outcomes, illustrating its pivotal role in linking competitive strategy with environmental responsibility. Collectively, these findings illuminate how market culture fosters sustainability through innovation, performance orientation, and strategic adaptability (Fok et al., 2023). Based on studies conducted by Lăzăroiu et al. (2020), Tsai, Huang, and Chen (2020), Sharma et al. (2021), Fok, Zee, and Morgan (2022), Akuma et al. (2025), and Fok et al. (2023), the study hypothesizes that:

H4*: Market culture has a significant positive effect on sustainability performance.*

Moderating role of Corporate Governance

The interplay between corporate governance and adhocracy culture is pivotal in promoting sustainability performance within organizations. Strong governance frameworks amplify the positive effects of adhocracy culture—marked by innovation and adaptability—on sustainability outcomes. Aldriweesh et al. (2022) reveal that organizational culture enhances the governance–performance relationship, while Kouaib et al. (2022) show that CEO behavior, guided by governance, drives sustainability success. Similarly, Peng and Zhang (2022) highlight national cultural influences on governance and sustainability, and Abdelwahed and Soomro (2024) stress that governance-integrated cultures enhance organizational

behavior. Furthermore, Duffour (2022) and Shaikh (2024) underscore leadership commitment and governance alignment as essential for sustainable development. Based on studies conducted by Aldriweesh et al. (2022), Kouaib et al. (2022), Peng and Zhang (2022), Abdelwahed and Soomro (2024), Duffour (2022), and Shaikh (2024), the study hypothesizes that:

H5*: Corporate governance positively moderates the relationship between adhocracy culture and sustainability performance.*

The interaction between corporate governance and clan culture plays a crucial role in enhancing sustainability performance across organizations. Aldriweesh et al. (2022) found that clan culture strengthens the effectiveness of governance, improving financial and sustainability outcomes in the Saudi manufacturing sector. Similarly, Abdelwahed and Soomro (2024) emphasize that governance frameworks integrated with supportive cultures foster ethical behavior and sustainability. Kouaib et al. (2022) further note that governance moderates' leadership influence on sustainability, while Peng and Zhang (2022) highlight national cultural effects on governance-driven environmental practices. Moreover, Tang et al. (2024) and Wang et al. (2022) demonstrate that clan culture enhances resource disclosure and governance reforms. Based on studies conducted by Aldriweesh et al. (2022), Abdelwahed and Soomro (2024), Kouaib et al. (2022), Peng and Zhang (2022), Tang et al. (2024), and Wang et al. (2022), the study hypothesizes that:

H6*: Corporate governance positively moderates the relationship between clan culture and sustainability performance.*

The interrelationship between corporate governance, hierarchy culture, and sustainability performance is complex yet vital to organizational effectiveness. Recent studies indicate that governance acts as a moderating mechanism that enhances sustainability outcomes within hierarchical settings. Kouaib, Bouzouitina, and Jarboui (2022) found that CEO behavior, guided by governance frameworks, strengthens environmental alignment in strategic decisions. Likewise, Aldriweesh et al. (2022) and Meidawati, Rosida, and Hudayati (2025) emphasize that supportive governance mitigates the rigidity of hierarchical cultures, fostering sustainability. Mishra, Mishra, and Sharma (2025) and Karn et al. (2023) further link governance to green innovation and environmental performance. Abdelwahed and Soomro (2024) advocate integrating governance and culture to enhance sustainability practices. Based on studies conducted by Kouaib et al. (2022), Aldriweesh et al. (2022), Meidawati et al. (2025), Mishra et al. (2025), Karn et al. (2023), and Abdelwahed and Soomro (2024), the study hypothesizes that:

H7*: Corporate governance positively moderates the relationship between hierarchy culture and sustainability performance.*

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Empirical evidence increasingly underscores the interplay between corporate governance, market culture, and sustainability performance across industries. Aldriweesh et al. (2022) highlight that organizational culture influences the relationship between governance dimensions and firm performance, particularly within the Saudi manufacturing sector. Similarly, Kouaib et al. (2022) reveal that effective governance aligns executive behavior with market-oriented sustainability goals. Abdelwahed and Soomro (2024) further emphasize governance's role in shaping organizational behavior to foster sustainability initiatives. Moreover, Mishra et al. (2025) link governance to green innovation, demonstrating how structured oversight directs market cultures toward sustainable practices. Akuma et al. (2025) and Meidawati et al. (2025) reinforce that integrating governance and culture enhances firm performance. Based on studies conducted by Aldriweesh et al. (2022), Kouaib et al. (2022), Abdelwahed and Soomro (2024), Mishra et al. (2025), Akuma et al. (2025), and Meidawati et al. (2025), the study hypothesizes that:

H8*: Corporate governance positively moderates the relationship between market culture and sustainability performance.*

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Conceptual Framework

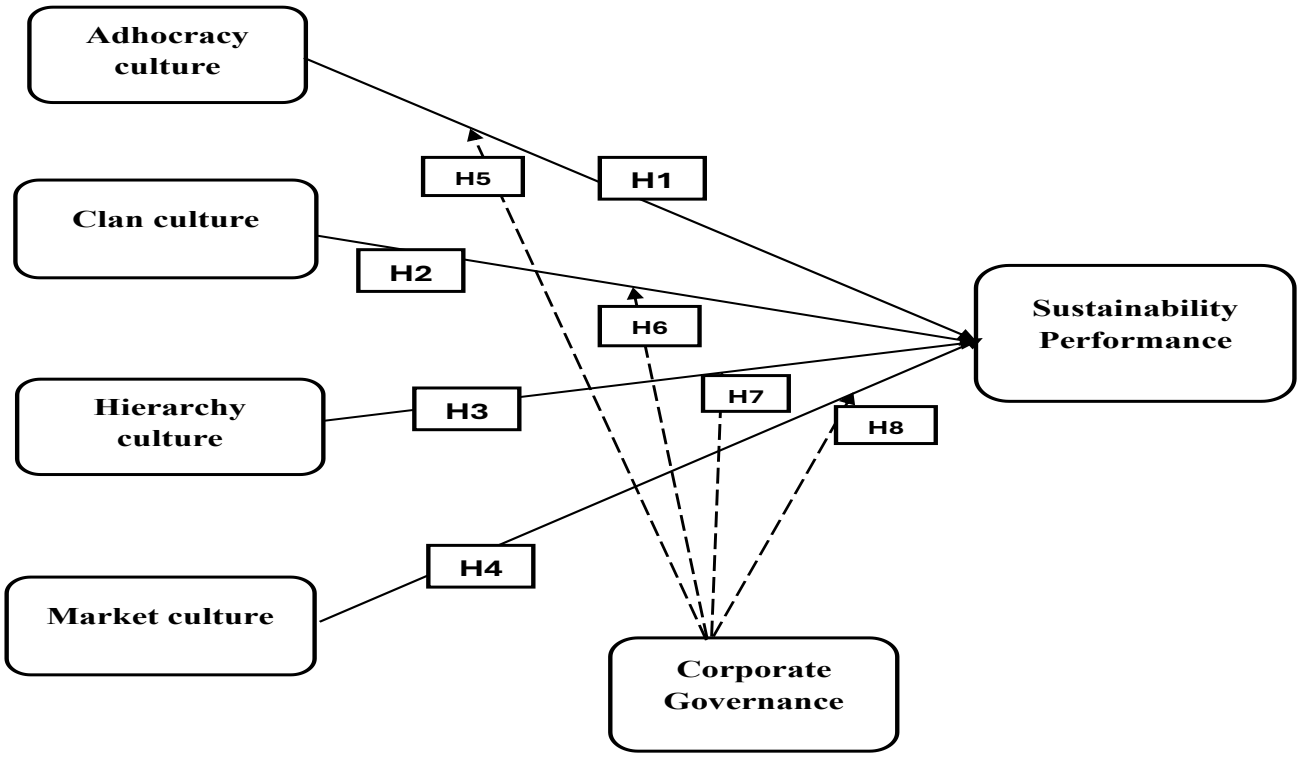

Figure 1: Conceptual Framework of the study based on empirical literature

Methods and Data

This study adopted a quantitative approach, consistent with its aim of explaining the predictive relationship between clan culture and sustainability performance dimensions (economic, environmental and social sustainability performance) of African Civil Aviation Authorities (ACAA). The adoption of the quantitative research approach enabled the researchers to gather numerical data and apply statistical techniques to test for hypotheses for both direct and mediating relationships among the variables (Saunders, Lewis & Thornhill, 2019). The study adopted the cross-sectional design, since data was collected within a specific timeframe among ACAAs. The target population consisted of 2,061 senior and junior managers from 54 civil aviation regulatory authorities across Africa, each with at least two years of experience. These managers were distributed across three regions: Western and Central Africa (WACAF) with 1,031 managers, Eastern and Southern Africa (ESAF) with 824 managers, and North Africa (NA) with 176 managers (AFCAC, 2019). Lower-level employees were excluded from the study

because they were assumed to lack adequate knowledge of organisational culture and sustainability issues. The sampling frame comprised Contracting States to the Convention on International Civil Aviation (ICAO, 2023) within these regions.

A multistage sampling design was used, combining probability and non-probability techniques to ensure a representative and informative sample. In the first stage, stratified random sampling was applied to divide the population into three strata based on the regional groupings of civil aviation institutions, ensuring that each stratum was proportionally represented. In the second stage, purposive sampling was used to target top, middle, and operational managers directly responsible for sustainability initiatives, capitalising on their knowledge and experience. This approach allowed the study to benefit from the strengths of both probability sampling, ensuring statistical representativeness and purposive sampling, which focused on gathering insights from key decision-makers. Using Yamane's (1967) formula with a 95% confidence level and 3% margin of error, the study determined a final sample size of 371 managers. Data was collected using a structured questionnaire based on the Organisational Culture Assessment Instrument (OCAI) by Cameron and Quinn (2006), which was used for questionnaire items on adhocracy culture, clan culture, market culture and hierarchy culture. Questionnaire items for measuring sustainability performance indicators of economic, environmental and social performance were adopted from (Gupta et al., 2020), while items for measuring corporate governance were adopted from (Karaman et al., 2018). The questionnaire was reviewed by human resource practitioners and industry experts in ACAAs to ensure content validity, clarity, and alignment with industry standards.

A pilot test was conducted with 75 postgraduate students of Human Resource Management at the University of Ghana to assess reliability. Using Cronbach's alpha, the internal consistency of the measurement items was evaluated, and adjustments were made to improve clarity and remove ambiguities. Ethical clearance was obtained from the heads of the participating organisations to ensure compliance with ethical standards and to safeguard participant privacy. Consent was sought from participants, and email and phone contacts were collected to facilitate questionnaire distribution and follow-up. Questionnaires were distributed electronically, and reminder calls helped improve response rates and adherence to deadlines. Data collection process was done within two (2) months. Data were entered, cleaned, and processed using SPSS and Microsoft Excel for descriptive statistical analysis, summarising data through frequencies and percentages. Inferential analysis was conducted using Partial Least Squares Structural Equation Modelling (PLS-SEM) with SmartPLS version 4. PLS-SEM was selected for its ability to handle complex models with both formative and reflective constructs. This approach allowed the researcher to model and test the direct and mediating relationships among adhocracy culture, clan culture, market culture, hierarchy culture, corporate governance, and sustainability performance among ACAAs.

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Results

Data gathered from questionnaires was analyzed using Statistical Package for Social Sciences (SPSS) version 28 and Smart PLS 4. Demographic data was analyzed using descriptive statistics such as frequencies and percentages. However, Partial Least Squares (PLS) Structural Equation Modelling (SEM) was used to test for the direct and mediating relationships among the variables.

Variable	Category	Frequency	Percentage
Gender	Male	267	72.0%
	Female	104	28.0%
	Total	371	100%
Age	Less than 35 years	50	13.5%
	36–40 years	115	31.0%
	41–45 years	120	32.3%
	46–50 years	51	13.7%
	More than 50 years	35	9.5%
	Total	371	100%
Position	Safety Regulation Officers	35	9.4%
	Aviation Safety Inspectors	80	21.6%
	Personnel License Officers	25	6.7%
	Aerodrome & Ground Aid Managers	40	10.8%
	Air Navigation Services Managers	90	24.3%
	Flight Operations Managers	71	19.1%
	Airworthiness Inspectors	30	8.1%
	Total	371	100%
Tenure	1–3 years	60	16.2%
	4–6 years	130	35.0%

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	7–10 years	120	32.4%
	More than 10 years	61	16.4%
	Total	371	100%

Table 1: Demographic Characteristics of Respondents

The demographic profile of the 371 respondents shows that males (72%) outnumber females (28%). The age distribution indicates that the majority are in their mid-career stages, with 36–40 years (31%) and 41–45 years (32.3%) dominating, reflecting a relatively experienced workforce. In terms of positions, Air Navigation Services Managers (24.3%), Aviation Safety Inspectors (21.6%), and Flight Operations Managers (19.1%) make up the majority, suggesting representation from key operational and safety functions. Tenure analysis shows most respondents have worked between 4–6 years (35%) and 7–10 years (32.4%), highlighting stability and significant professional experience within the aviation regulatory and operational environment.

Construct Validity

Construct validity refers to the degree to which measurement items accurately represent the theoretical constructs they are intended to assess. It ensures that each indicator correlates strongly with its underlying construct and not with unrelated constructs. In table 2, all factor loadings exceed the recommended threshold of 0.70, confirming strong indicator reliability and convergent validity. Items for adhocracy, clan, hierarchy, market culture, corporate governance, and sustainability performance load highly on their respective constructs, demonstrating that each set of indicators consistently measures its intended latent variable. Hence, the measurement model exhibits excellent construct validity across all constructs.

	Adhocracy culture	**Clan culture**	**Corporate Governance**	**Hierarchy culture**	**Market culture**	**Sustainability Performance**
AC1	0.893					
AC2	0.857					
AC3	0.854					
CC1		0.707				
CC2		0.812				
CC3		0.877				

CC4		0.805				
CC5		0.786				
CC6		0.854				
CC7		0.875				
CC8		0.783				
CC9		0.749				
CG1			0.868			
CG2			0.858			
CG3			0.812			
CG4			0.839			
CG5			0.883			
CG6			0.877			
CG7			0.884			
CG8			0.881			
EcSP1						0.836
EcSP2						0.847
EcSP3						0.807
EcSP4						0.749
EcSP5						0.856
EnSP1						0.745
EnSP2						0.728
HC1				0.800		
HC2				0.806		
HC3				0.729		
HC4				0.831		

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HC5				0.771		
HC6				0.829		
HC7				0.868		
HC8				0.884		
HC9				0.806		
MC1					0.919	
MC2					0.902	
MC3					0.840	
SoSP2						0.842
SoSP3						0.813
SoSP4						0.902
SoSP5						0.819
SoSP6						0.871
SoSP7						0.856

Table 2: Construct validity

R-Square Statistics

R-square (R^2) in Structural Equation Modelling (SEM) represents the proportion of variance in an endogenous (dependent) construct explained by its exogenous (independent) variables. It indicates the model's explanatory power and predictive accuracy. The R^2 value of 0.929 and adjusted R^2 of 0.927 show that 92.9% of the variance in Sustainability Performance is explained by the predictors—organizational culture dimensions and corporate governance. This reflects an exceptionally strong model fit and high predictive relevance of the structural model.

	R-square	R-square adjusted
Sustainability Performance	0.929	0.927

Table 3: R-Square statistics

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F-square Statistics (Effect Size)

F-square (f^2) in Structural Equation Modelling (SEM) measures the effect size of an exogenous variable on an endogenous construct, indicating how much an independent variable contributes to explaining the variance of a dependent variable when included in or removed from the model. Values of 0.02, 0.15, and 0.35 represent small, medium, and large effects, respectively (Cohen, 1988). From table 4, Clan culture (0.272) shows a medium-to-large effect on sustainability performance, while Market culture (0.134) and Hierarchy culture (0.112) show moderate effects. Corporate governance (0.122) contributes moderately, whereas Adhocracy culture (0.004) and its interaction effects are minimal.

	f-square
Adhocracy culture -> Sustainability Performance	0.004
Clan culture -> Sustainability Performance	0.272
Corporate Governance -> Sustainability Performance	0.122
Corporate Governance x Adhocracy culture -> Sustainability Performance	0.025
Corporate Governance x Clan culture -> Sustainability Performance	0.059
Corporate Governance x Hierarchy culture -> Sustainability Performance	0.035
Corporate Governance x Market culture -> Sustainability Performance	0.000
Hierarchy culture -> Sustainability Performance	0.112
Market culture -> Sustainability Performance	0.134

Table 4: F-square statistics (effect size)

Reliability and Convergent Validity

Reliability refers to the internal consistency of measurement items within a construct, indicating how consistently they measure the same underlying concept. Common indicators include Cronbach's alpha and Composite Reliability (CR), with values above 0.70 considered acceptable. Convergent validity, assessed through the Average Variance Extracted (AVE), measures how well items of a construct converge to represent it, with an acceptable threshold of 0.50 or higher. From the table, all constructs exhibit strong reliability (α and CR > 0.80) and high AVE values (> 0.65), confirming that the items

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consistently and accurately measure their intended constructs, demonstrating excellent reliability and convergent validity.

	Cronbach's alpha	**Composite reliability (rho_a)**	**Composite reliability (rho_c)**	**Average variance extracted (AVE)**
Adhocracy culture	0.836	0.836	0.902	0.754
Clan culture	0.933	0.936	0.944	0.652
Corporate Governance	0.951	0.957	0.959	0.745
Hierarchy culture	0.936	0.937	0.947	0.664
Market culture	0.864	0.865	0.917	0.788
Sustainability Performance	0.960	0.962	0.964	0.677

Table 5: Reliability and convergent validity

Discriminant Validity

Discriminant validity assesses how distinct a construct is from others in a model. Using the Fornell–Larcker criterion**,** discriminant validity is achieved when the square root of each construct's AVE (diagonal values) exceeds its correlations with other constructs (off-diagonal values). In this table, all diagonal values, ranging from 0.807 to 0.888 are higher than their corresponding inter-construct correlations. This confirms that each construct, adhocracy culture, clan culture, corporate governance, hierarchy culture, market culture, and sustainability performance is empirically distinct from the others. Therefore, the measurement model satisfies the Fornell–Larcker criterion, establishing adequate discriminant validity across all constructs.

	Adhocracy culture	**Clan culture**	**Corporate Governance**	**Hierarchy culture**	**Market culture**	**Sustainability Performance**
Adhocracy culture	0.868					
Clan culture	0.916	0.807				
Corporate Governance	0.707	0.757	0.863			

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Hierarchy culture	0.934	0.944	0.772	0.815		
Market culture	0.897	0.878	0.688	0.896	0.888	
Sustainability Performance	0.898	0.938	0.641	0.924	0.893	0.823

Table 6: Fornell-larcker criterion

Direct and Moderating Effects

The results presented in table 7 provide insight into both the direct effects of the four organizational culture types (adhocracy, clan, hierarchy, and market) on sustainability performance, as well as the moderating effects of corporate governance on these relationships.

Starting with the direct effects, the results show that adhocracy culture (B = –0.057, t = 0.872, p = 0.383) has an insignificant and negative relationship with sustainability performance, indicating that flexibility and innovation alone do not guarantee sustainable outcomes within the African Civil Aviation Authorities (ACAAs). This suggests that while creativity is valued, it may lack the necessary structure or governance alignment to translate into tangible sustainability results. In contrast, clan culture (B = 0.516, t = 7.318, p = 0.000), hierarchy culture (B = 0.425, t = 4.481, p = 0.000), and market culture (B = 0.248, t = 5.551, p = 0.000) all have positive and statistically significant effects on sustainability performance. This implies that collaborative, structured, and competitive organizational environments each contribute meaningfully to achieving economic, environmental, and social sustainability goals. Among these, clan culture exhibits the strongest influence, highlighting the importance of shared values, teamwork, and mutual trust in driving sustainable practices within aviation institutions.

Regarding the moderating effects of corporate governance, the findings reveal nuanced relationships. The interaction between corporate governance and adhocracy culture (B = 0.148, t = 2.130, p = 0.033) is significant, suggesting that effective governance structures can enhance the impact of innovative and flexible cultures on sustainability. This means governance can provide direction and accountability that channel creativity toward sustainable goals. Conversely, corporate governance negatively moderates the relationship between clan culture and sustainability performance (B = –0.454, t = 3.133, p = 0.002), indicating that excessive governance control may suppress the collaborative and relational strengths of clan-oriented organizations. This tension implies that overly bureaucratic governance may stifle the cultural cohesion that drives sustainability in such environments.

Furthermore, corporate governance positively moderates the relationship between hierarchy culture and sustainability performance (B = 0.314, t = 2.817, p = 0.005), suggesting that when governance frameworks align with structured, rule-based cultures, they reinforce accountability, stability, and

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compliance, which together improve sustainability outcomes. However, the moderating effect between corporate governance and market culture (B = 0.002, t = 0.048, p = 0.962) is insignificant, implying that governance mechanisms do not meaningfully influence the relationship between competitiveness-driven cultures and sustainability performance.

	B-value	**t-statistics**	**p-values**	**Decision**
H1: Adhocracy culture -> Sustainability Performance	-0.057	0.872	0.383	Not supported
H2: Clan culture -> Sustainability Performance	0.516	7.318	0.000	Supported
H3: Hierarchy culture -> Sustainability Performance	0.425	4.481	0.000	Supported
H4: Market culture -> Sustainability Performance	0.248	5.551	0.000	Supported
H5: Corporate Governance x Adhocracy culture -> Sustainability Performance	0.148	2.130	0.033	Supported
H6: Corporate Governance x Clan culture -> Sustainability Performance	-0.454	3.133	0.002	Supported
H7: Corporate Governance x Hierarchy culture -> Sustainability Performance	0.314	2.817	0.005	Supported
H8: Corporate Governance x Market culture -> Sustainability Performance	0.002	0.048	0.962	Not Supported

Table 7: Direct and moderating effects

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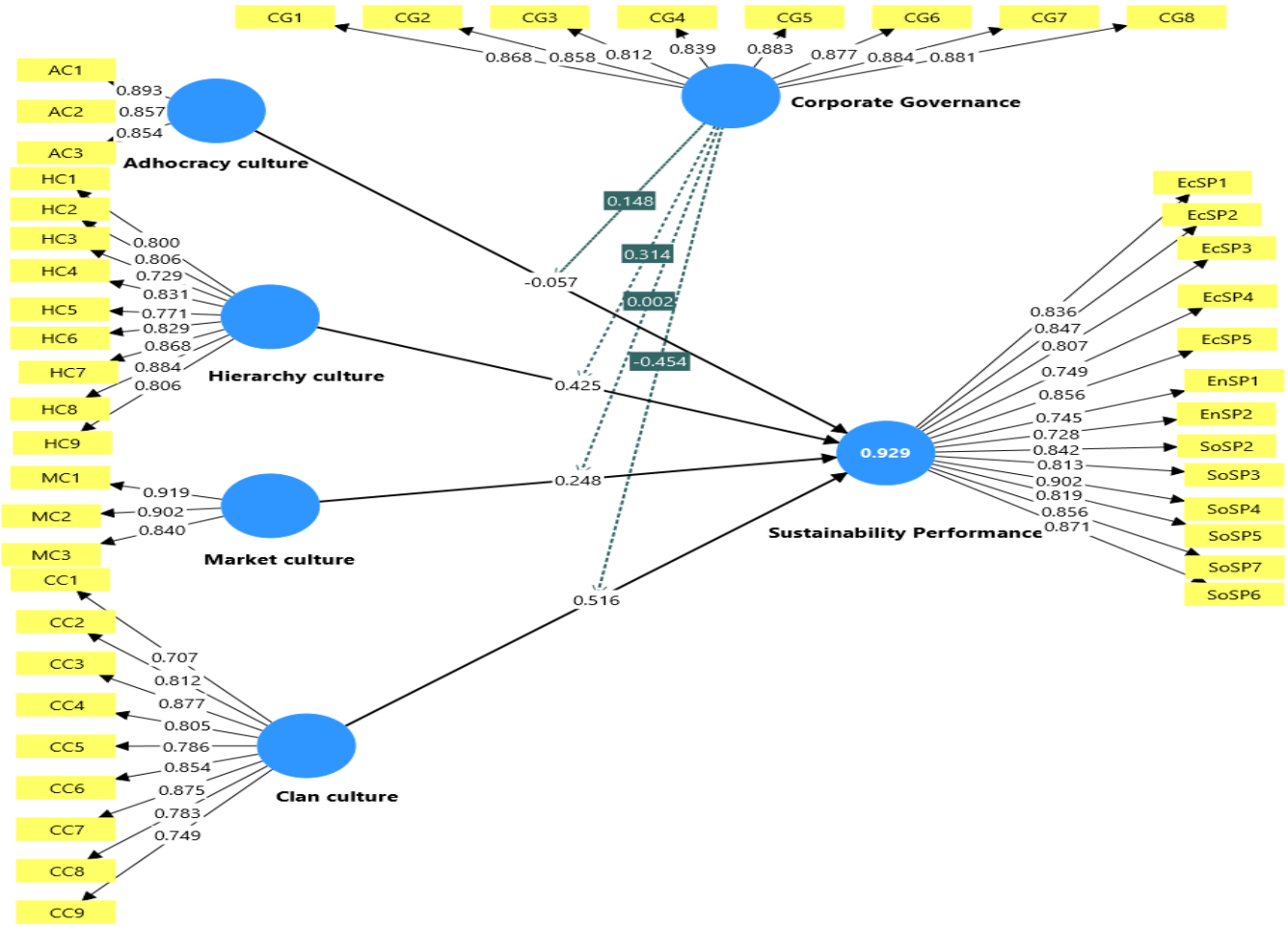

Figure 2: Structural Equation Modelling for Direct and Moderating effects between organizational culture, sustainability performance and corporate governance among ACAAs

Discussions

The findings reveal that adhocracy culture exhibits a negative and insignificant association with sustainability performance (B =–0.057, p=0.383), challenging dominant assumptions in prior scholarship. While earlier studies (Elbaz & Iddik, 2020; Medina-Álvarez & Sánchez-Medina, 2023; Hafeez et al., 2025; Talaja & Vuković, 2024) argued that flexibility and innovation stimulate sustainable innovation, the present results suggest that such cultural attributes lose traction in highly regulated domains such as aviation. This divergence underscores the primacy of coercive institutional pressures, stringent regulatory mandates, compliance routines, and audit protocols which restrict discretionary experimentation. In such contexts, adhocracy's creative potential becomes structurally constrained, indicating that innovative cultures may only translate into sustainability benefits when environmental dynamism outweighs regulatory rigidity.

In contrast, clan culture demonstrated the strongest positive influence on sustainability performance (B= 0.516, p=0.000). This finding reinforces the role of normative institutional pressures in shaping sustainability-oriented behavior. Collaborative, value-driven environments cultivate shared ethical commitments and social cohesion, which prior research has linked to enhanced environmental capabilities and eco-innovation (Tang et al., 2024; Woo & Kang, 2021; Wang & Huang, 2022; Abdulrahim et al., 2020). Thus, by embedding moral expectations and community-based norms, clan cultures align internal behavior with externally sanctioned standards of responsibility. Within aviation, this normative alignment appears particularly consequential: relational cohesion translates into collective accountability for sustainability, enabling organizations to meet rising societal expectations for transparency and stewardship.

Hierarchy culture also recorded a strong positive relationship with sustainability performance (B = 0.425, p=0.000). This outcome underscores the functional role of coercive pressures, where formalized structures, rule adherence, and administrative discipline ensure compliance with environmental regulations and safety protocols. Prior research (Xu et al., 2023; Gebril Taha & Espino-Rodríguez, 2020; Aggarwal & Agarwala, 2023) similarly notes that hierarchical clarity enhances operational efficiency and facilitates timely sustainability decisions. In aviation—an inherently rule-bound sector—such structures transform sustainability from an aspirational ideal into a measurable, auditable domain of practice. Thus, hierarchy culture's alignment with coercive pressures strengthens institutional legitimacy by embedding sustainability within standardized procedures.

Market culture further exhibited a significant positive association with sustainability performance (B = 0.248, p=0.000). This result reflects the powerful influence of mimetic pressures**,** whereby organizations emulate industry leaders and adopt sustainability practices to maintain competitiveness and external legitimacy. Studies by Lăzăroiu et al. (2020), Tsai et al. (2020), Sharma et al. (2021), Fok et al. (2022), and Akuma et al. (2025) similarly show that performance orientation motivates environmental initiatives aimed at differentiation and reputational advantage. Within ACAAs, competition is shaped by global benchmarks, certifications, and international aviation standards. Consequently, market culture drives sustainability by positioning it as a strategic performance criterion rather than a compliance requirement, reinforcing mimetic conformity with global best practices.

The moderating role of corporate governance further clarifies how institutional pressures interact with cultural orientations. Governance positively strengthened the effect of adhocracy on sustainability (B= 0.148, p=0.033), suggesting that formal oversight can channel creative tendencies into institutionally legitimate forms of innovation. This reflects the interplay between normative pressures—professional governance standards—and mimetic pressures, which encourage the adoption of governance frameworks associated with high-performing, sustainability-oriented organizations. When governance

formalizes decision pathways, innovative ideas gain legitimacy and alignment with regulatory expectations, enabling adhocracy to operate productively even in coercive environments.

Conversely, governance negatively moderated the relationship between clan culture and sustainability (B =–0.454, p=0.002). This finding highlights a tension between relational, trust-based cultural mechanisms and the formalization inherent in governance structures. Excessive governance may impose coercive control that inadvertently suppresses the informal communication and participatory decision-making central to clan environments. From an institutional theory standpoint, this misalignment reflects a clash between normative pressures (which celebrate collaboration and shared values) and coercive pressures (which institutionalize monitoring and compliance). In aviation, where governance tends to be rigid, such overformalization may therefore erode cultural mechanisms that otherwise support sustainability.

The positive moderation effect observed between governance and hierarchy culture (B=0.314, p=0.005) further illustrates the compatibility between structured cultures and formal governance systems. Here, coercive pressures amplify one another: governance reinforces hierarchical routines, strengthening accountability, procedural integrity, and alignment with regulatory mandates. This synergy bolsters sustainability as a systematically managed objective, consistent with research demonstrating that governance-integrated hierarchical systems enhance environmental performance (Kouaib et al., 2022; Mishra et al., 2025; Meidawati et al., 2025).

Finally, the interaction between governance and market culture was insignificant (B =0.002, p=0.962), suggesting that governance offers little added value in cultures already guided by mimetic forces. In performance-driven environments, sustainability is propelled by competitive benchmarking and reputational motivations; thus, governance does not significantly alter behavior already directed toward gaining institutional legitimacy through emulation of global leaders. Within ACAAs, market culture appears sufficiently motivated by mimetic pressures to pursue sustainability independently of governance reinforcement.

Conclusions

This study examined the moderating role of corporate governance in the relationship between organizational culture specifically adhocracy, clan, hierarchy, and market cultures and sustainability performance within African Civil Aviation Authorities (ACAAs), using institutional theory as the guiding framework. The study found that clan, hierarchy, and market cultures significantly and positively influence sustainability performance across economic, environmental, and social dimensions, while adhocracy culture exhibited an insignificant relationship. These results suggest that collaborative, structured, and performance-driven cultures are more effective in promoting sustainability within

regulated public institutions than flexible or innovation-oriented cultures. The moderation analysis revealed that corporate governance strengthens the sustainability effects of adhocracy and hierarchy cultures but weakens the influence of clan culture and has no significant impact on market culture. This indicates that governance mechanisms may enhance innovation and accountability in structured systems but constrain relational and collaborative dynamics when applied rigidly. Overall, the findings demonstrate that sustainability performance in ACAAs is contingent upon how governance frameworks align with institutional and cultural contexts, reinforcing the premise that organizational sustainability is shaped by institutional legitimacy, regulatory compliance, and shared values.

Theoretically, the study extends institutional theory by providing empirical evidence that sustainability in public-sector organizations is not merely a result of internal efficiency but also of conformity to institutional norms, coercive pressures, and societal expectations. The results reveal that governance structures are context-dependent and can either facilitate or hinder cultural strengths depending on how well they reflect institutional realities. The findings highlight that governance systems function as both enabling and constraining forces that shape how culture translates into sustainability outcomes. This reinforces the idea that legitimacy-seeking behavior—driven by coercive, normative, and mimetic pressures—determines the effectiveness of sustainability initiatives within the aviation sector. By emphasizing the importance of institutional alignment, the study refines Institutional Theory's explanatory power and underscores the need for context-sensitive governance frameworks that support innovation and cultural integration rather than imposing rigid compliance.

Practically, the findings highlight the need for aviation regulators and policymakers to adopt culture informed governance reforms that strengthen sustainability performance. Each type of organizational culture offers distinct leverage points for targeted policy interventions: First, adhocracy culture demonstrates unrealized potential in highly regulated aviation systems. Regulators should create structured innovation pathways that allow controlled experimentation without compromising compliance. This could include regulatory sandboxes, innovation task forces, and flexible procurement processes that encourage technological adaptation. Governance frameworks that incentivize calculated risk taking and reward novel sustainability solutions would enable adhocracy elements to flourish within regulatory boundaries.

Second, clan culture shows strong positive effects on sustainability but is susceptible to being constrained by rigid governance control. Regulators should design governance systems that preserve relational strengths by promoting participatory decision processes, collaborative communication channels, and employee driven sustainability initiatives. Policies that recognize and institutionalize knowledge sharing, mentorship, and internal community building can harness clan-based values to advance environmental and social objectives without imposing undue bureaucratic oversight.

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Third, hierarchy culture aligns strongly with sustainability performance due to its compatibility with coercive institutional pressures. Regulators should therefore enhance the effectiveness of hierarchical systems by integrating sustainability metrics into standard operating procedures, audit protocols, and performance management frameworks. Strengthening compliance monitoring, formal reporting structures, and capacity development programs will enable aviation authorities to translate institutional requirements into consistent sustainability outcomes.

Fourth, market culture contributes to sustainability through competition and performance orientation. Regulators can amplify these effects by embedding sustainability benchmarks into certification standards, ranking systems, and performance incentive schemes. Policies that encourage benchmarking against global environmental leaders, reward efficiency gains, and publicly recognize high performing authorities can intensify mimetic pressures and stimulate continuous improvement.

Across all cultural types, aviation regulators should prioritize adaptive governance frameworks that reflect institutional diversity rather than impose uniform compliance centered approaches. Integrated sustainability dashboards, transparent reporting mechanisms, and cross agency learning platforms can help authorities internalize international sustainability expectations while remaining sensitive to cultural dynamics.

Despite its contributions, this study is subject to several methodological limitations that should be considered when interpreting the results. First, the cross-sectional design restricts the ability to make strong causal inferences regarding the relationships among governance, culture, and sustainability performance. The simultaneous measurement of all variables introduces temporal ambiguity and raises the possibility that observed associations may reflect reciprocal or reverse causal effects. Future research would benefit from longitudinal designs that allow for temporal sequencing of governance reforms, cultural adaptation, and sustainability outcomes. Such designs would also provide insight into how institutional pressures intensify or diminish over time, shaping these relationships in dynamic ways.

Second, the study relies on perceptual measures derived from structured questionnaires. Although widely used in organizational research, perceptual indicators are vulnerable to measurement constraints such as common method bias, social desirability effects, and respondent interpretation errors. These limitations may inflate or obscure relationships among constructs. Future studies should incorporate multi source data, including archival sustainability performance indicators, governance audit reports, and independent assessments of cultural attributes. The use of mixed methods, such as interviews or panel evaluations, would also allow for triangulation and reduce reliance on single informant perceptions.

Third, the potential for endogeneity cannot be fully ruled out. Organizational culture, governance, and sustainability performance may influence one another simultaneously, creating omitted variable bias or

feedback loops that distort the estimated effects. For example, high performing organizations may adopt stronger governance practices or cultivate cultural orientations rather than governance or culture unidirectionally driving performance. Future research could address these concerns through methodological approaches such as instrumental variable estimation, structural equation modelling with temporal lags, or quasi experimental designs that exploit regulatory shifts or governance reforms as exogenous shocks.

Finally, the focus on African Civil Aviation Authorities may limit external validity. Although this context offers a rich setting characterized by strong coercive institutional pressures, the institutional structures of other regions or sectors may differ substantially. Comparative cross country or cross sectoral research could examine how variations in institutional maturity, regulatory stringency, and cultural norms condition governance related and culture related effects on sustainability. Incorporating these methodological refinements would significantly advance understanding of the complex interplay among governance, culture, and sustainability within diverse institutional environments.

In conclusion, this study demonstrates that sustainability performance in African Civil Aviation Authorities is deeply embedded in institutional alignment between culture and governance. When governance systems reflect institutional norms while remaining flexible enough to accommodate organizational culture, they create the balance necessary for innovation, accountability, and legitimacy. Sustainability in this context is not achieved merely through compliance but through adaptive governance that empowers culture to drive responsible and enduring organizational performance. By harmonizing governance with culture under the principles of Institutional Theory, ACAAs can strengthen their capacity to achieve long-term sustainability and serve as models for effective and culturally responsive governance across Africa's public institutions.

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