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INVESTIGATING THE SUSTAINABILITY OF KENYA'S ECONOMY: BENCHMARKING ANALYSIS OF ENVIRONMENTAL, KNOWLEDGE AND ECONOMIC PERFORMANCE INDICES*

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Abstract

This study evaluates sustainability performance across environmental, knowledge and economic dimensions in Kenya and selected Sub-Saharan African countries (South Africa, Tanzania and Uganda) over the period 2019-2024 using an integrated analytical framework. A quantitative short-panel design is employed, utilizing secondary data from internationally recognized indices, including the Environmental Performance Index (EPI), Global Innovation Index (GII) and GDP per capita, alongside key determinants such as foreign direct investment, trade openness, renewable energy use, research and development expenditure and government effectiveness. Descriptive statistics, trend analysis, correlation and panel regression techniques are applied to examine comparative performance, interrelationships and causal effects. The results show that Kenya demonstrates moderate performance across all dimensions, while South Africa leads in economic and knowledge sustainability, Tanzania shows environmental improvement and Uganda maintains stability. Strong positive relationships are observed between economic sustainability and both environmental and knowledge dimensions, although weak integration exists between environmental and knowledge factors. Regression results reveal that foreign direct investment drives economic performance, trade openness negatively affects knowledge sustainability and government effectiveness influences environmental outcomes. The study contributes to the literature by offering an integrated, cross-dimensional assessment model and provides policy-relevant insights for enhancing coordinated sustainability strategies in developing economies.

Keywords: *cross dimensional assessment, innovation, development economics, environmental performance, integrated sustainability framework*

1. INTRODUCTION

1.1. Background

Sustainable economic development remains a central concern for countries seeking to balance economic growth, environmental stewardship and knowledge-based innovation. National performance is no longer assessed solely by GDP, but also by environmental sustainability and innovation capacity, which determine long-term resilience, competitiveness and inclusive growth (World Bank, 2025; Sachs, 2022). Sustainability is commonly understood through three interrelated dimensions: environmental, economic and knowledge-based whose interdependence the triple bottom line framework makes explicit:

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long-term value creation depends on balancing all three rather than prioritizing economic performance alone (Elkington & Rowlands, 1999; Nogueira et al., 2022). Environmental sustainability focuses on resource conservation and climate resilience; economic sustainability on stable and inclusive growth; and knowledge sustainability on human capital, innovation and technological capability (Fathollahi et al., 2017; Westlund, 2006).

Kenya, East Africa's largest economy, has experienced steady economic growth in recent years (World Bank, 2024). However, this growth has not been matched by equivalent progress in environmental sustainability and knowledge-based development. Environmental challenges such as land degradation, deforestation and climate variability continue to affect productivity and ecosystem stability (Mganga, 2022; Kipkemboi et al., 2021; Njora & Yılmaz, 2022), while limitations in R&D investment and human capital development constrain the transition to a knowledge-based economy (Adeyemi et al., 2018; Sairmaly, 2023). The use of internationally recognized indices the Environmental Performance Index (EPI), the Global Innovation Index (GII) and GDP-based World Development Indicators (WDI) provides a structured, multidimensional basis for cross-country comparisons (Wendling et al., 2022; WIPO, 2025). A comparative approach including Tanzania, Uganda and South Africa allows for a clearer understanding of Kenya's relative position and highlights structural differences in sustainability outcomes.

1.2. Problem statement

Despite its economic growth, Kenya demonstrates relatively weak performance in key sustainability indicators. Kenya ranks 145th out of 180 countries in the 2024 Environmental Performance Index (EPI) with a score of 36.9, indicating significant environmental challenges (Yale Center for Environmental Law and Policy, 2024). In addition, Kenya ranks 102nd out of 133 countries in the Global Innovation Index, reflecting constraints in innovation capacity and knowledge development (WIPO, 2025).

These rankings contrast with its economic standing and suggest that GDP growth does not translate into proportional improvements in environmental and knowledge outcomes.
This imbalance highlights a structural disconnect between economic development and sustainability. Economic growth that is not supported by environmental protection and knowledge-based innovation may lead to long-term vulnerabilities, including resource depletion, reduced productivity, and limited competitiveness (Zhang & Wu, 2022). In Kenya, dependence on climate-sensitive sectors such as agriculture increases exposure to environmental risks, while limited investment in research and development restricts innovation and technological advancement (Kipkemboi et al., 2021; Adeyemi et al., 2018).

Existing literature provides valuable insights into individual sustainability dimensions, but often examines them separately. This fragmented approach restricts understanding of how interactions among environmental, knowledge, and economic factors influence overall sustainability performance. The absence of an integrated framework also creates policy challenges, as policymakers lack a unified tool to assess sustainability performance across multiple dimensions, identify trade-offs, and design coordinated strategies (Weaver & Rotmans, 2006; Golinucci et al., 2022; Candelaria et al., 2023).

1.3. Research objectives

To compare environmental, knowledge, and economic sustainability across Kenya, Tanzania, Uganda, and South Africa using standardized international indicators over the period 2019-2024.

To analyze the relationships among environmental, knowledge and economic sustainability indicators across the selected countries.

To estimate the effects of environmental, knowledge and economic factors on overall sustainability performance across the selected countries.

2. LITERATURE REVIEW

2.1. Three pillars of sustainability and sustainable development

Sustainability is a multidimensional concept that satisfies present needs without compromising the ability of future generations to meet their own needs (Brundtland, 1987). It maintains a balance among environmental, economic and social factors that are closely interconnected (Elkington & Rowlands, 1999). The environmental dimension ensures ecological balance, resource conservation and renewable energy adoption; the social dimension emphasizes equity, inclusion and human rights; and economic sustainability ensures long-term financial stability and equitable wealth distribution (Enel Group, 2025). The triple bottom line framework operationalizes this by linking all three dimensions, while the knowledge economy complements it by emphasizing education, research, innovation and technology adoption as drivers of productivity and national resilience (Gimenez et al., 2022; Nogueira et al., 2022). Integrating these dimensions into national policy frameworks allows countries like Kenya to assess trade-offs, identify synergies and implement strategies for holistic development. Kenya performs moderately compared to Tanzania and Uganda in SDG implementation and slightly below South Africa (United Nations, 2024), reflecting the need to improve sustainability performance across all three dimensions to achieve a balanced, sustained economy.

2.2. Theoretical framework

The Triple Bottom Line Theory, developed by Elkington (1999), emphasizes the need to balance three dimensions: environmental protection, economic growth and knowledge outcomes (Elkington & Rowlands, 1999). It states that long-term value creation requires integrating ecological stewardship and human capital development into strategic planning.

Sustainability Transition Theory focuses on the long-term changes required to shift societies and industries from unsustainable to sustainable pathways (Köhler et al., 2019). It emphasizes the dynamic processes of change with coordination across multiple sectors and actors, as transition occurs gradually.

Knowledge Economy Theory explains how investments in education, research and development and innovation systems contribute to national competitiveness and sustainable development (Westlund, 2006). Knowledge-based innovation supports efficiency, technological adoption, and the creation of new industries, strengthening both economic and social sustainability (Fathollahi et al., 2017). These three theories collectively provide a comprehensive framework for assessing Kenya's sustainability, with

TBL offering a balanced view of the three dimensions, Sustainability Transition Theory highlighting the processes and policies needed for systemic change, and Knowledge Economy Theory emphasizing the role of human capital and innovation.

2.3. Kenya's comparative sustainability performance

Kenya's sustainability performance can be evaluated using global indices that measure environmental, knowledge and economic dimensions. The EPI evaluates environmental health, ecosystem vitality, and climate policy implementation. In 2024, Kenya scored 36.9 on the EPI, ranking 145th globally, reflecting challenges in forest conservation and water management, despite progress in renewable energy adoption (Yale Center for Environmental Law and Policy, 2024). The GII assesses knowledge and innovation capacity; Kenya ranks 102nd globally, indicating improvements in ICT adoption, entrepreneurship, and mobile technology applications, while research and development outputs remain limited (WIPO, 2025). Table 1 shows the varying performance levels across dimensions for Kenya and the selected peers.

Table 1. Africa Comparative Sustainability Analysis

Country	EPI 2024 score	EPI 2024 Rank	GII 2024 Rank	SDG Index 2024 score
Kenya	36.9	145	102	61.93
Tanzania	43.6	102	121	56.80
Uganda	35.8	154	124	55.84
South Africa	42.7	106	61	64.11

Source: WIPO, 2025; SDG Transformation Center, 2025

Although Kenya ranks the best in East Africa on the SDG Index, gaps still exist in ecological protection and knowledge deepening, underscoring the need for coordinated policies linking environmental, knowledge, and economic development to strengthen Kenya's sustainability outcomes.

2.4. The integrated sustainability framework and research gaps

The Integrated Sustainability Assessment (ISA) framework provides a method for evaluating environmental, economic and knowledge dimensions together in a single model (Weaver & Rotmans, 2006). According to Candelaria et al. (2023), combining multiple indicators allows policymakers to assess trade-offs and synergies among the three pillars, supporting informed and balanced decision-making. Most literature, however, focuses on one dimension of sustainability without integrating them to explain sustainability at the national level, particularly in developing countries. This fragmented approach reduces understanding of trade-offs and synergies among the three dimensions (Nogueira et al., 2022), while inconsistent measurement approaches and limited use of panel data methods further restrict comprehensive assessment. This study addresses these gaps by integrating multiple indicators and applying descriptive, correlation and panel regression methods to examine sustainability performance across countries.

3. RESEARCH METHODOLOGY

3.1. Research design

The study employed a quantitative short-panel research design covering the period 2019-2024. According to Creswell and Creswell (2017), quantitative methods are suitable for testing relationships and patterns using statistical procedures. This design combined descriptive and explanatory components: the descriptive component enabled comparison of sustainability performance across countries using standardized indicators, while the explanatory component examined the determinants of sustainability outcomes. The panel design allowed the analysis of both cross-sectional differences among countries and temporal changes over time, providing a more robust analytical framework than purely cross-sectional or time-series approaches.

3.2. Target population and sampling

The target population consisted of Sub-Saharan African countries with economic and structural characteristics comparable to Kenya. A purposive sampling strategy was applied to ensure that selected countries were relevant for comparative analysis. The selection criteria included regional proximity, similarity in economic structure and availability of consistent sustainability data over the study period. Four countries were selected: Kenya, Tanzania, Uganda, and South Africa, providing a balanced representation of regional peers and a relatively advanced economy for benchmarking purposes. The dataset formed a balanced panel consisting of four countries observed over six years, resulting in 24 country-year observations.

3.3. Data collection and study variables

The study relied exclusively on secondary data from internationally recognized databases. Environmental sustainability data were obtained from the Environmental Performance Index. Knowledge sustainability indicators were sourced from the Global Innovation Index. Economic and control variables were obtained from the World Development Indicators and Worldwide Governance Indicators databases. Data was collected for the period 2019-2024, compiled into Microsoft Excel and screened for completeness and consistency. The final dataset was exported in CSV format for statistical analysis using JASP software. Table 2 presents a summary of all study variables.

Table 2. Summary of study variables

Variable	Measurement	Source	Role
Environmental Sustainability	EPI Score	EPI Reports	Dependent
Knowledge Sustainability	GII Score	WIPO	Dependent
Economic Sustainability	GDP per capita (USD)	World Bank WDI	Dependent
R&D Expenditure	% of GDP	World Bank WDI	Independent
Foreign Direct Investment	% of GDP	World Bank WDI	Independent
Renewable Energy	% of total energy use	World Bank WDI	Independent

Trade Openness	% of GDP	World Bank WDI	Independent
Government Effectiveness	Governance index / CPI	WGI	Independent

Source: World Bank, WDI, 2024

3.4. Data analysis

The data were analyzed using a structured sequence of statistical techniques aligned with the research objectives. To address Objective 1, descriptive statistics (mean, standard deviation, minimum, maximum) were computed and trend analysis examined temporal changes in EPI, GII and GDP per capita. To address Objective 2, Pearson correlation analysis examined relationships among the three sustainability dimensions. To address Objective 3, fixed effects panel regression models were estimated separately for each dependent variable. The general model was specified as:

$$Y_{it} = \beta_0 + \beta 1RDE_{it} + \beta 2FDI_{it} + \beta 3REN_{it} + \beta 4TRADE_{it} + \beta 5GOV_{it} + \mu_i + \varepsilon_{it} \quad (1)$$

Where Yit is the dependent variable for country i at time t;
β0 is the intercept;
β1-β5 are coefficients of independent variables;
μi represents unobserved country-specific fixed effects;
and εit is the error term.

Multicollinearity was assessed using Variance Inflation Factor (VIF) values, with a threshold below 5 considered acceptable. Model diagnostics included tests for normality, homoscedasticity and model fit using R-squared and adjusted R-squared statistics.

3.5. Validity, reliability and limitations

Construct validity was ensured through the use of internationally recognized indices with standardized methodologies. Internal validity was strengthened through the use of panel regression techniques which controlled for unobserved heterogeneity. Reliability was supported by the consistency of secondary data sources. The study faced several limitations. The relatively short panel period limited the ability to capture long-term sustainability trends. The small sample size reduced the statistical power of regression analysis. Reliance on secondary data limited the inclusion of qualitative and context-specific factors. In 2020, COVID-19 affected overall sustainability performance across the four countries, particularly in economic and knowledge dimensions. High VIF values for renewable energy (VIF = 66.09) and government effectiveness (VIF = 8.353) indicated multicollinearity, warranting cautious interpretation of those coefficients.

4. RESULTS

4.1. Descriptive statistics and trend analysis

Descriptive statistics revealed notable variation in sustainability performance across the four countries. Kenya exhibited moderate performance across all dimensions, with an average EPI score of 34.12, GII score of 24.93 and GDP per capita of approximately USD 2,022. South Africa consistently recorded the highest GDP per capita (mean USD 6,296) and GII scores (mean 33.35). Tanzania demonstrated relatively strong environmental performance (mean EPI 36.30) and Uganda showed the highest renewable energy usage (mean 91.00%) alongside the lowest GDP per capita (mean USD 932). Table 3 presents a comparative summary of mean values for all study variables across the four countries.

Trend analysis revealed that environmental performance (EPI) fluctuated across countries, with Kenya and South Africa experiencing declines in 2020-2022 due to the effects of COVID-19, followed by recovery. Tanzania showed sharp improvement in 2024, while Uganda remained relatively stable. Knowledge sustainability (GII) generally declined across most countries after 2020, reflecting disruptions in research, education and technological progress. South Africa maintained higher GII levels despite fluctuations. In 2020, Kenya and South Africa experienced a decrease in GDP per capita owing to decreased economic activities because of lockdowns and disruption of trade as a result of COVID-19 shocks.

Table 3. Comparative Descriptive Statistics - All Countries (2019-2024)

Variable	Kenya	South Africa	Tanzania	Uganda
EPI (mean)	34.12	41.00	36.30	35.72
GII (mean)	24.93	33.35	21.65	18.78
GDP per cap USD (mean)	2,022	6,296	1,160	932
R&D % GDP (mean)	0.600	0.612	0.510	0.300
FDI % GDP (mean)	0.415	2.633	1.883	4.933
Renewable % (mean)	68.28	9.40	79.82	91.00
Trade % GDP (mean)	36.47	58.85	34.27	38.10
Gov. Effectiveness (mean)	59.90	66.13	57.33	49.25

Source: WIPO; EPI; WDI; WGI, 2025

4.2. Correlation analysis

Pearson correlation analysis was conducted to examine the relationships among the sustainability indicators (Table 7). A positive but moderate relationship between environmental and knowledge sustainability ($r = 0.389$, $p = 0.060$) was found, although the relationship was not statistically significant at the 5% level, suggesting that improvements in environmental performance were not strongly associated with innovation capacity across the selected countries. A strong and statistically significant positive relationship was observed between environmental sustainability and economic performance ($r = 0.642$, $p < 0.001$), indicating that higher environmental performance was associated with higher GDP per capita. Similarly, knowledge sustainability was strongly and positively correlated with economic sustainability ($r = 0.721$, $p < 0.001$), suggesting that countries with stronger innovation systems tended to achieve better economic outcomes.

Table 4. Pearson Correlation matrix

Pair		Pearson's r	p-value	Significance
EPI	GII	0.389	.060	n.s.
EPI	GDP per capita	0.642	< .001	***
GII	GDP per capita	0.721	< .001	***

*Note: *** p < .001; n.s. = not significant*

4.3. Panel regression results

Three fixed-effects panel regression models were estimated separately for each dependent variable. Table 5 summarizes the key results across all three models. Full coefficient tables are available from the authors on request.

The EPI model was statistically significant ($F = 5.718$, $p = 0.002$; $R^2 = 0.753$), with government effectiveness as the only significant predictor ($\beta = -1.884$, $p = 0.007$). This counterintuitive negative effect may reflect that institutional development in the region has not yet translated into environmental policy effectiveness, consistent with findings on fragmented policy implementation in Kenya (Mulinge et al., 2016). The GII model was highly significant ($F = 8.787$, $p < 0.001$; $R^2 = 0.824$), with trade openness as a significant negative predictor ($\beta = -0.633$, $p = 0.002$), suggesting that greater trade exposure may displace local R&D with imported technology (Adeyemi et al., 2018). The GDP per capita model was highly significant ($F = 433.1$, $p < 0.001$; $R^2 = 0.996$), with FDI as a significant positive predictor ($\beta = 84.775$, $p = 0.001$), consistent with the development economics literature on FDI as a driver of capital formation and technology transfer in developing economies (Magomere et al., 2025).

Table 5. Panel regression results - all three models

Predictor	EPI β (p)	GII β (p)	GDP pc β (p)
Model fit (R^2)	0.753	0.824	0.996
Adjusted R^2	0.621	0.730	0.993
F-statistic (p)	5.718 (.002)	8.787 (<.001)	433.1 (<.001)
(Intercept)	234.58 (.011)	-12.12 (.932)	6853.3 (.331)
R&D Expenditure	6.524 (.406)	-2.701 (.840)	-313.8 (.631)
FDI	-0.087 (.738)	-0.647 (.163)	84.775 (.001)**
Renewable Energy	-1.336 (.169)	0.141 (.931)	-86.09 (.285)
Trade Openness	-0.007 (.946)	-0.633 (.002)**	12.137 (.172)
Gov. Effectiveness	-1.884 (.007)*	0.875 (.413)	12.657 (.806)
Country (S. Africa)	-59.75 (.282)	26.876 (.774)	-1330.2 (.771)
Country (Tanzania)	13.452 (.218)	-3.345 (.855)	36.832 (.967)
Country (Uganda)	14.237 (.499)	3.122 (.931)	503.49 (.774)

*Note: * p < .05; ** p < .01; VIF for Renewable Energy = 66.09; Gov. Effectiveness = 8.353 - interpret with caution*

5. EVALUATION OF RESULTS

5.1. Comparative sustainability performance (Objective 1)

The descriptive and trend analysis demonstrate that Kenya's sustainability performance is moderate across all three dimensions from 2019 to 2024, consistent with its global rankings: EPI score of 36.9 (rank 145), GII rank of 102 and SDG Index score of 61.93. South Africa leads consistently in both economic and knowledge areas, reflecting its advanced institutional infrastructure, higher R&D investment and more diversified economy (WIPO, 2025; World Bank, 2024). Tanzania's EPI improvement to 43.6 in 2024 suggests successful conservation and land management policy implementation, while Uganda's high renewable energy use (91.0%) demonstrates effective harnessing of hydroelectric resources despite the lowest economic output in the sample. Declines in GDP per capita and GII scores in 2020 across all countries, particularly in trade-integrated economies like Kenya and South Africa, align with the broader literature on the vulnerability of Sub-Saharan African economies to global shocks (Mugamba, 2024).

5.2. Relationships among sustainability dimensions (Objective 2)

The Pearson correlation findings show a strong and statistically significant positive correlation between economic sustainability with environmental sustainability ($r = 0.642$, $p < 0.001$) and knowledge sustainability ($r = 0.721$, $p < 0.001$). These results are in line with Triple Bottom Line Theory (Elkington & Rowlands, 1999), according to which economic performance, environmental stewardship and knowledge outcomes are connected and reinforcing. The strong correlation between knowledge sustainability and economic performance is consistent with Knowledge Economy Theory (Westlund, 2006; Fathollahi et al., 2017). South Africa's leadership in both GII and GDP per capita illustrates how innovation, technology, and infrastructure investment translate into measurable economic advantages and justifies policy claims for more funding in R&D and ICT infrastructure.

The non-significant correlation between environment and knowledge sustainability ($r = 0.389$, $p = 0.060$) indicates that environmental improvements do not necessarily lead to innovation gains across the four countries. This may indicate the comparatively low level of knowledge-environment integration in Sub-Saharan African economies, in which environmental conservation has traditionally been prompted by regulatory requirements and community involvement as opposed to technological innovation (Mganga, 2022; Njora & Yilmaz, 2022).

5.3. Determinants of sustainability outcomes (Objective 3)

Panel regression findings identify the key determinants of each sustainability dimension. For environmental sustainability, government effectiveness was a significant negative predictor ($\beta = -1.884$, $p = 0.007$). This counterintuitive result may reflect those countries with higher governance scores such as South Africa have lower EPI scores than Tanzania, which benefited from community-led conservation with less institutional formalization. Alternatively, it may suggest that institutional development in the region has not yet resulted in corresponding environmental policy effectiveness, as noted in findings on fragmented environmental policy implementation in Kenya (Mulinge et al., 2016).

For knowledge sustainability, trade openness was a major negative influence on GII scores ($\beta = -0.633$, $p = 0.002$). This aligns with arguments that increased exposure to trade in developing economies can make local innovation less competitive due to the replacement of local R&D with imported technology (Adeyemi et al., 2018). For economic sustainability, FDI was a considerable positive predictor of GDP per capita ($\beta = 84.775$, $p = 0.001$), aligning with the development economics literature that has established FDI as a significant source of capital formation, technology transfer and employment in developing economies (Magomere et al., 2025). These results are consistent with Sustainability Transition Theory (Köhler et al., 2019) which postulates that systemic sustainability change should be delivered through sector-specific interventions organized at institutional, technological and social levels.

6. CONCLUSIONS

6.1. Conclusion

This study assessed and compared sustainability performance across Kenya, South Africa, Tanzania and Uganda from 2019 to 2024. Kenya performed moderately across all three sustainability dimensions. Tanzania showed significant environmental improvement, Uganda showed steady environmental performance and the highest renewable energy usage, while South Africa consistently led in economic and knowledge sustainability. COVID-19 underscored the need for developing countries to build economic resilience against global shocks.

Correlation analysis depicted a strong, statistically significant positive relationship between economic sustainability and both environmental performance ($r = 0.642$, $p < 0.001$) and knowledge sustainability ($r = 0.721$, $p < 0.001$). However, the positive but not statistically significant environmental-knowledge relationship ($r = 0.389$, $p = 0.060$) indicates little cross-dimensional integration in the current sample. Regression analysis identified FDI as a significant positive predictor of economic performance, trade openness as a significant negative predictor of knowledge performance, and government effectiveness as a significant negative predictor of environmental performance. This study contributes to the sustainability literature by providing an integrated cross-dimensional benchmarking framework and demonstrating the usefulness of combining internationally standardized metrics in a panel design.

6.2. Recommendations

The following recommendations are proposed for developement practitioners, academic researchers and policy makers;

1) Improve environmental governance and enforcement through cross-regional regulatory coordination, increased budgetary allocations for environmental agencies and support for community-based conservation programs like Kenya Forest Service's community forest associations.
2) Strengthen the investment climate for FDI by streamlining regulatory processes, improving contract enforcement and upgrading infrastructure in economic zones like Konza Technopolis, facilitating technology transfer and employment growth.
3) Invest in domestic R&D and innovation by increasing public R&D spending as a percentage of GDP, creating specialized innovation funds for environmental technology and strengthening university-industry research collaborations to reduce dependency on imported technology.

4) Adopt integrated sustainability policies combining environmental conservation, human capital development and economic diversification, ensuring cross-dimensional spillovers, supported by improved sustainability monitoring systems and digital inclusion programs such as M-Pesa and DigiFarm.

6.3. Directions for future research

Extension of the research period beyond 2024 would enable long-term sustainability trend evaluation and reduce the impact of the COVID-19 anomaly. Incorporating qualitative methodologies such as stakeholder interviews and policy document analysis would deepen contextual understanding. Expanding the country sample would improve statistical power and generalizability. Future research should explore non-linear and threshold effects in sustainability dimensions and apply advanced panel econometric techniques, including dynamic panel models, instrumental variable estimation or spatial econometric methods to resolve endogeneity concerns and yield more reliable causal estimates.

ISTRAŽIVANJE ODRŽIVOSTI PRIVREDE KENIJE: BENČMARKING ANALIZA EKOLOŠKIH, ZNANJEM ZASNOVANIH I EKONOMSKIH INDEKSA PERFORMANSI

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Izvod

Ova studija procenjuje performanse održivosti kroz ekološku, znanjem zasnovanu i ekonomsku dimenziju u Keniji i odabranim zemljama podsaharske Afrike (Južna Afrika, Tanzanija i Uganda) u periodu od 2019. do 2024. godine, primenom integrisanog analitičkog okvira. Korišćen je kvantitativni dizajn kratkog panel istraživanja, zasnovan na sekundarnim podacima iz međunarodno priznatih indeksa, uključujući Indeks ekoloških performansi (EPI), Globalni inovacioni indeks (GII) i bruto domaći proizvod po glavi stanovnika (BDP po glavi stanovnika), kao i ključne determinante poput stranih direktnih investicija, trgovinske otvorenosti, korišćenja obnovljivih izvora energije, izdvajanja za istraživanje i razvoj i efektivnosti vlade. Za ispitivanje komparativnih performansi, međusobnih odnosa i uzročno-posledičnih efekata primenjene su deskriptivna statistika, analiza trendova, korelaciona analiza i panel regresione tehnike. Rezultati pokazuju da Kenija ostvaruje umerene performanse u svim posmatranim dimenzijama, dok Južna Afrika prednjači u ekonomskoj i znanjem zasnovanoj održivosti, Tanzanija beleži napredak u oblasti životne sredine, a Uganda održava stabilne rezultate. Uočene su snažne pozitivne veze između ekonomske održivosti i ekološke, odnosno znanjem zasnovane dimenzije, dok je integracija između ekoloških i znanjem zasnovanih faktora relativno slaba. Rezultati regresione analize pokazuju da strane direktne investicije podstiču ekonomske performanse, trgovinska otvorenost negativno utiče na održivost zasnovanu na znanju, dok efektivnost vlade ima značajan uticaj na ekološke ishode. Studija doprinosi literaturi kroz primenu integrisanog modela za procenu održivosti između različitih dimenzija i pruža preporuke relevantne za kreatore politika u cilju unapređenja koordinisanih strategija održivog razvoja u zemljama u razvoju.

Ključne reči: *međudimenzionalna procena, inovacije, razvojna ekonomija, ekološke performanse, integrisani okvir održivosti*

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APPENDIX: RAW DATA SUMMARY (EXTRACT)

The table below presents the complete country-level indicator values used in the panel dataset for the study period 2019-2024 (Kenya full series shown; first and last year for remaining countries). Full dataset available from the authors on request.

Appendix Table 1. Country-level indicator values - selected years

Country	Year	EPI	GII	GDP pc	R&D%	FDI%	Renew%	Trade%	Gov
Kenya	2019	34.1	31.1	1960	0.6	0.5	68.1	31.8	59.2
Kenya	2020	34.7	26.1	1928	0.6	-0.01	69.0	30.4	59.2
Kenya	2021	34.1	27.5	2061	0.6	0.4	67.7	35.0	59.9
Kenya	2022	30.8	22.7	2110	0.4	0.7	68.3	40.3	60.5
Kenya	2023	34.1	21.2	1943	0.8	0.5	68.3	41.1	60.3
Kenya	2024	36.9	21.0	2132	0.6	0.4	68.3	40.2	60.3
Tanzania	2019	36.3	26.6	1063	0.51	2.0	80.4	33.0	57.3
Tanzania	2024	43.6	15.3	1187	0.51	2.2	79.8	41.5	54.5
Uganda	2019	35.7	25.6	822	0.3	3.7	90.5	39.4	50.4
Uganda	2024	35.8	14.9	1078	0.3	6.0	91.0	42.7	48.5
South Africa	2019	41.0	34.0	6534	0.61	1.3	8.7	53.9	66.5
South Africa	2024	42.7	28.3	6267	0.61	0.6	9.4	61.6	65.8

Source: EPI, 2024; WIPO, 2025; World Bank WDI, 2025