The Role of Institutional Indicators on Achieving Sustainability in Algeria

دور المؤشرات المؤسساتية في تحقيق الاستدامة في الجزائر

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Abstract: The aim of this paper is to examine the relationship between institutional indicators and sustainability in Algeria during the period of 1996 to 2022. The author employs OLS to examine the effect of institutional indicators, foreign direct investment, trade openness, total natural resource rents and gross fixed capital formation on adjusted net savings. The outcomes show that Algeria is far from achieving sustainability due to weak infrastructure, environmental management, and economic and political challenges. Therefore, there is a need for a strong governance and effective legislation to build a solid foundation for the journey to achieving sustainability.

Keywords: institutional indicators; sustainability; adjusted net savings; Algeria.
JEL Classification Codes : Q01, Q56, E02, E21

ملخص: تهدف الدراسة الى تحليل العلاقة بين الاستدامة والمؤشرات المؤسساتية في الجزائر خلال الفترة 1996–2022. قام الباحث بتطبيق طريقة المربعات الصغرى (OLS) لاختبار تأثير المؤشرات المؤسساتية، الاستثمار الأجنبي المباشر، الانفتاح التجاري، اجمالي الإيرادات من الموارد الطبيعية، وإجمالي تكوين الرأسمالي الثابت على صافي الإدخار المصحح. بينت النتائج بأن الجزائر لازالت بعيدة على تحقيق الاستدامة نظرا لضعف البنية التحتية، الادارة البيئية والتحديات الاقتصادية والسياسية. بالتالي لابد من وضع حوكمة صلبة وتشريعات فعالة لكي تبني قاعدة قوية لرحلة تحقيق الاستدامة.

كلمات مفتاحية: المؤشرات المؤسساتية.، الاستدامة، صافي الإدخار المصحح، الجزائر.

تصنيفات JEL : Q01, Q56, E02, E21

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1. INTRODUCTION

The appearance of "sustainable development" term was not direct, but rather came gradually and in several stages. Now, sustainable development remains a towering figure for each country as it takes an increasing place in global discussions and form the basis of policies and legislation. Several researchers and thinkers delve deeper into the dimensions of sustainable development, where its scope expanded to include environment, social and economic dimensions. Achieving sustainable growth or sustainability has become a basic requirement and an indispensable imperative in all sectors and fields as the world faces the triple environmental crisis, for instance climate change, biodiversity loss, pollution, and waste. The World Resources Outlook 2024 reports[1] indicate that continuing current patterns of consumption and production could lead to a 60% increase in resource extraction by 2060. This calls for bold policy measures to shift towards more sustainable practices to ensure a balance between the economy, environment, and society on the one hand, and fairness and justice in the distribution of development returns and wealth among present and rising generations on the other.

In this context, institutional indicators (governance, the effectiveness of administrative, judicial and legislative processes, combating corruption and so on) can be the key factor for achieving sustainable growth (**Polasky et al., 2019)**. The duty of states is to coordinate efforts between various government sectors and civil society to move towards achieving sustainable growth that benefits all segments of society and preserves the environment for future generations. **Yildirim and Gokalp (2016)** show that many MENA countries (including Algeria) develop redistribution activities rather than production activities, monopolies rather than competitive conditions, and opportunities rather than development. These institutions seldom result in investments that will boost productivity. Therefore, Algeria is heavily dependent on foreign income, such as aid, remittances, and labour wages from oil earnings. However, according to **Ross (2015)**, petroleum income enhances the severity of corruption, strengthens authoritarian regimes, and contributes to violent

[1] - https://www.unep.org/resources/Global-Resource-Outlook-2024

conflict. In this regard, and in line with global trends in adopting the philosophy of sustainable growth, Algeria has sought to achieve the restoration of sustainable development locally by implementing a series of reforms and development programs aimed at achieving a triple balance of development. But in reality, it still faces a number of challenges, especially in light of the economic transformations. Therefore, Algeria must take the necessary steps to confront these challenges on the one hand and improve the current situation to build a better future on the other hand. This is based on institutional indicators, which are considered a crucial game in achieving sustainability.

In light of this brief summary, we will focus on "the Development of Political Economy" and attempt to understand the causes of Algeria's economic reforms' ineffectiveness.

This study's main contributions can be summed up as follows: first, it tries to establish a model of the connection between institutional indicators and sustainable development in Algeria. Second, this innovative work expands the corpus of knowledge by adding new factors (adjusted net savings and total natural resource rents) in comparison to previous studies. Lastly, no prior studies in this area, particularly in Algeria, have been conducted.

The introduction, literature review, methodology and data, empirical result and discussion, and conclusion are the five elements that make up this study.

2. Literature review

This study offers adjusted net savings (ANS) as a more appropriate sustainability variable focussing on the population's overall well-being than earlier studies that used GDP. It seems sense to call the outcome "sustainable development" if adopting eco-friendly technologies may save money for both individuals and local communities. While working at the World Bank, **Pearce and Atkinson (1993)** and **Hamilton (1994)** invented the ANS concept. It was developed as part of the World Bank's effort to provide more comprehensive sustainability indicators that go beyond traditional GDP metrics. Based on the ideas of extended national accounts, ANS, also referred to informally as true saving, is a good index to measure the SD in countries. Several scholars used ANS as the sustainability metrics for their

investigations (**Sari Hassoun and Ayad, 2020; Sari-Hassoun and Kahwi, 2024; Sari-Hassoun et al., 2025)**.

Dietz et al. (2007) investigate how ANS in nations with abundant natural resources relate to institutional indicators and sustainability. They use three indicators: corruption, bureaucracy quality, and the function of the law. They discover that the detrimental effects of the abundance of natural resources on ANS and low-level corruption are lessened when the amount of corruption declines. **Aidt (2009)** draws the conclusion that there is a significant inverse relationship between corruption and ANS. The results indicate that the low ANS in MENA nations could be explained by poor institutional quality and a lack of protection for private property rights. **Barbier (2010)** analyses the long-term effects of corruption on sustainability using board data from Asian and African countries from 1970 to 2003. The findings demonstrate that corruption has a detrimental influence on Africa's sustainability goal and that effective anti-corruption measures are essential to the continent's sustainable development. However, a comprehensive relationship between corruption and sustainability has been found in the Asian data set, while the African data set shows a noticeable degree of correlation. **Carbonnier and Wagner (2015)** establish that institutional indicators have a negative and very little effect on the sustainability of 104 developing countries. They find that overuse of resources has a negative effect on sustainability and the disintegration of institutions in underdeveloped countries has a negative impact on violence. **Azam et al. (2021)** use GMM and fixed effects to examine how institutional quality affects sustainability in 66 developing nations between 1984 and 2019. They conclude that the institutional quality and sustainability are positively correlated, particularly in lower middle-income nations—more so than in low-income nations. They establish that the primary problem in these nations is the lack of legislative support, as they must concentrate on institutional execution in order to create effective and fruitful policies related to environmental resource management. **Bergougui and Murshed (2023)** investigate the connection between institutional quality, natural resources, and ANS in developing countries between 1990 and 2018. They employ the new institutional dataset from VDEM along with the instrumental variable-

generalized approach of moment. They discover that institutional quality and sustainability are positively and significantly correlated, but natural resources and sustainability are negatively and significantly correlated. **Ahmad et al. (2023)** employ panel quantile estimations (MMQR) to investigate the relationship between rents from natural resources, energy transition, financial globalisation, ANS, and institutional quality in 21 developing countries between 1990 and 2020. They find that there is a need for a strong institution, which can ensure social justice, promote economic progress, and protect the environment in order to create an environment of sustainability. **Sari-Hassoun et al. (2024)** examine how institutional quality affected sustainable development in eleven MENA nations between 1996 and 2021. The results demonstrate that at the 1% level, there is a positive and substantial correlation between the institutional quality index and adjusted net savings using FMOLS, DOLS, and CCR estimates. Nevertheless, the association becomes negative when squared adjusted net savings are considered, suggesting that there is still proof of a weak political framework and a weak political comprehension in MENA countries.

3. Methodology and data

3.1 Data

The Worldwide Governance Indicators are the source of the institutional data, which includes a wide range of subjective evaluations. These are used as a gauge of current institutional indicators in the following analysis. Because such data was not available prior to 1996, this analysis only includes the years 1996–2022. Table 1 describes the study's variables as follows:

Table1. Variable definition

Variables	Units	Data source
ANS: Adjusted Net Savings (including particulate emission damage)	current US$ per capita	World Development Indicators
FDI: Foreign Direct Investment	current US$ per capita	World Development Indicators
TRADE: Trade Openness	current US$ per capita	World Development Indicators
GFCF: Gross Fixed Capital Formation	current US$ per capita	World Development Indicators
TNRR: Total natural resource rents	current US$ per capita	World Development Indicators
CC: Control of Corruption	Estimation ranging from approximately -2.5 to 2.5	Worldwide Governance Indicators
GE: Government Effectiveness	Estimation ranging from approximately -2.5 to 2.5	Worldwide Governance Indicators
PS: Political Stability and Absence of Violence/Terrorism	Estimation ranging from approximately -2.5 to 2.5	Worldwide Governance Indicators
RQ: Regulatory Quality	Estimation ranging from approximately -2.5 to 2.5	Worldwide Governance Indicators
RL: Rule of Law	Estimation ranging from approximately -2.5 to 2.5	Worldwide Governance Indicators
VA: Voice and Accountability	Estimation ranging from approximately -2.5 to 2.5	Worldwide Governance Indicators
Inst: Institutional Index	Estimation ranging from approximately -2.5 to 2.5	Mean of six measures of governance from Worldwide Governance Indicators

Source: Done by the author

3.2 Methodology

Kaufmann et al. (2008) provide six criteria for evaluating good governance: political stability, government efficacy, voice and accountability, regulatory quality, rule of law, and corruption control. A good political climate will have an index near 2.5, whereas a negative political environment will have an index near -2.5. These measurements have an expected range of 2.5 to -2.5. These six Kaufmann governance indicators are combined into one institutional index (Inst).

$$\text{Inst} = \frac{\text{six measures of governance}}{6}$$

The first model is to estimate ANS as endogenous variable followed by exogenous variables FDI, TRADE, GFCF, TNRR and the institutional indicators (CC, GE, PS, RQ, RL or VA)

$$\text{ANS}_t = \alpha_0 + \alpha_1 \text{ institutional indictators}_t + \alpha_2 \text{FDI}_t + \alpha_3 \text{TRADE}_t + \alpha_4 \text{GFCF}_t + \alpha_5 \text{TNRR}_t + \varepsilon_t \quad (1)$$

The second model is to estimate ANS as endogenous variable followed by exogenous variables FDI, TRADE, GFCF, TNRR and we combined the six institutional indicators into one institutional index (Inst)

$$\text{ANS}_t = \beta_0 + \beta_1 \text{ Inst}_t + \beta_2 \text{FDI}_t + \beta_3 \text{TRADE}_t + \beta_4 \text{GFCF}_t + \beta_5 \text{TNRR}_t + v_t \quad (2)$$

Where ε_t or v_t is the error term or the error of specification and it can describe all variables that are omitted in this study.
α_0 and β_0 are both the intercept term.
From α_1 to α_5 and β_1 to β_5 are the parameters of both models.
Both models will be estimated with the classical OLS, and then the validity of the results is examined with residual diagnostics test.

4. Empirical results and discussion

4.1 The estimation of the first model

The first model with several institutional indicators is estimated and the results are in the following table:

Table2. The estimation of the first model

Variable	Coefficient (prob)					
C	7.404 (0.417)	-1.790 (0.853)	-18.719** (0.0121)	-1.782 (0.709)	-6.551 (0.385)	-4.025 (0.700)
FDI	2.388** (0.033)	2.055** (0.049)	1.235 (0.1523)	2.478** (0.021)	2.317** (0.027)	1.888* (0.0825)
GFCF	-0.288** (0.046)	-0.184 (0.2105)	0.102 (0.426)	-0.416** (0.031)	-0.158 (0.167)	-0.196* (0.087)
TRADE	0.6005*** (0)	0.596*** (0)	0.473*** (0)	0.703*** (0)	0.594*** (0)	0.617*** (0)
TNRR	-0.4578* (0.098)	-0.333 (0.182)	0.043 (0.8487)	-0.478* (0.065)	-0.285 (0.236)	-0.350 (0.149)
CC	4.3313 (0.405)	…	…	…	…	…
GE	…	-1.25 (0.763)	…	…	…	…
PS	…	…	-6.703*** (0)	…	…	…
RQ	…	…	…	-4.554 (0.19)	…	…
RL	…	…	…	…	-3.992 (0.233)	…
VA	…	…	…	…	…	-2.699 (0.611)
R-squared	0.784	0.777	0.855	0.794	0.791	0.780
F-statistic	15.232*** (0)	14.669*** (0)	24.775*** (0)	16.23*** (0)	15.937*** (0)	14.825*** (0)
Akaike info criterion	4.813	4.842	4.414	4.763	4.775	4.834
Schwarz criterion	5.101	5.130	4.702	5.051	5.065	5.122
Hannan-Quinn criter.	4.899	4.928	4.500	4.848	4.863	4.920

Source: Done by the author on EViews 13

The results of six models show that the value of the coefficient of determination (R-squared) is between 0.777 and 0.855. Therefore, the explanatory power of the model was high, indicating that the equation explains between 77.7% and 85.5% of the changes occurring in sustainability

indicator (ANS), while the remaining percentage is due to other factors, which are not included in the model or are due to random error. Besides, the fisher coefficient indicates the overall significance of the model, so it is statistically acceptable at the 1% level.

Most FDI coefficients have a positive and significant sign on ANS, indicating that the Algerian state take on series of reforms aimed at creating an investment environment and raising it to competitive levels, which contributed significantly to attracting foreigners. Also, enacting a number of laws encouraging foreign investments, as well as agreements concluded with the largest countries in the world, leaving them completely free to invest in their arenas, such as the Emirati company Emirates International Investment Company in the fuel sector, the Spanish company SA Repsola, the Swiss company Lafarge Holcim (Switzerland), the Qatari company Ooredoo (Qatar Telecom), and the Egyptian company Orascom Group.

Moreover, most GFCF coefficients have a negative and significant sign on ANS, showing that there is a weak local production capacity and a low efficiency of the production system as well as the lack of economic diversification. Despite the efforts made by the Algerian state to break out of the rentier economy, including economic recovery programs, development plans, etc., and move towards a more solid economy, it has not yet yielded the desired results, and the economy still depends on a single main resource, namely oil.

All coefficients of TRADE have a positive and significant sign on ANS, demonstrating that an increase in exports offset by an increase in corrected saving rates in line with the economic base. Since Algeria is among the countries unable to meet its market needs for investment goods, i.e. import them from abroad, its high economic growth rates in general and corrected savings in particular depend on an increase in its exports. Here the role of petroleum revenues appears, as the state's connection to this resource alone makes it more vulnerable to the fluctuations prevailing in global markets. Despite the efforts made to diversify the economy and improve business, it still faces challenges. However, there are great opportunities to improve the situation by investing in non-oil sectors such as agriculture, industry, and others

Most TNRR coefficients have a negative sign on ANS, signifying that the negative relationship between TNRR and ANS is due to unilateral dependency (unsustainable revenues), poor effective management of revenues, and the state's reliance on these revenues to finance large government expenditures such as supporting prices and public sector salaries instead of investing them in development projects, which leads to weak saving.

In the 1st equation, the coefficient of CC indicates a positive and insignificant effect on ANS. This implies that there is an evidence of the spread of the phenomenon of corruption. Its interpretation is that controlling corruption in Algeria is on the right track, but perceptions about the extent to which public authority is exercised to achieve private gains, including small and large forms of corruption, as well as the seizure of the state by elites and private interests, are all against the interest of achieving the sustainable development goals.

In the 2nd equation, the coefficient of GE has a negative and insignificant impact on ANS. This suggests that the government shortcomings due to the lack of efficiency and the spread of corruption, and thus the quality of public services, the quality of the civil service and its degree of independence from political pressures in a bad situation in Algeria, and the quality of policy formulation and implementation. Besides, the credibility of the government's commitment to these policies is not on the right track. Despite the efforts made by the Algerian state to eliminate corruption, it is still rampant in many departments and transactions in various fields. From here, we can conclude that it is an indicator of government effectiveness that does not lead to achieving sustainability.

In the 3rd equation, the coefficient of PS has a negative and insignificant impact on ANS. This advocates that there is an absence of political stability and the presence of violence within the state. This is due to political tensions (popular protests, doubts about the integrity of elections, etc.), the economic gap between rich and poor, rising crime, and increasing immigration rates, which deepens the crisis of confidence between citizens and the government and hinders progress towards stability and sustainable development.

In the 4th equation, the coefficient of RQ has a negative and insignificant impact on ANS. This indicates that the government's ability to formulate and implement sound policies and systems does not allow for the development of the private sector and reflects the challenges facing Algeria, most notably the widespread corruption at various levels of government in various fields, as well as the lack of effective decision-making and instability and heavy reliance on the oil sector: All of these factors contribute to creating an environment that is not suitable for regulatory quality, which hinders the government's efforts to achieve sustainable development and improve the quality of life of citizens.

In the 5th equation, the coefficient of RL has a negative and insignificant impact on ANS. This shows that workers' confidence in and commitment to societal rules, particularly the quality of contract enforcement, property rights, police, and courts, as well as the potential for crime and violence, do not contribute to achieving sustainability.

In the 6th equation, the coefficient of VA has a negative and insignificant impact on ANS. This implies that there is an existence of challenges in the integrity of the electoral process, which affects public confidence in the political system, that is, the ability of the country's citizens to participate in choosing their government and freedom to vote, including freedom of expression, freedom of association, and free media hinders achieving sustainability.

4.2 The estimation of the second model

The second model with several institutional indicators is estimated and the results are in the following table:

Table3. The estimation of the second model

Variable	Coefficient (prob)
C	-16.046 (0.127)
IQ	-9.447* (0.0813)
FDI	1.885* (0.0535)
TRADE	0.627*** (0)
TNRR	-0.217 (0.3573)
GFCF	-0.113 (0.3203)
R-squared	0.8072
F-statistic	17.585*** (0)
Akaike info criterion	4.698835
Schwarz criterion	4.986799
Hannan-Quinn criter.	4.784462

Source: Done by the author on EViews 13

This model gives the same results as previous one and confirm that there is a negative relationship between institutional indicators and sustainability in Algeria during the period of 1996 to 2022.

4.3 The robustness check

The first residual stability tests, which focus on testing the stationarity of error and if the model has long memory process is set in the following table:

Table4. Test of Box-Pierce and Ljung-Box

Residual			Squared Residual	
Lags	Q-Stat	Prob	Q-Stat	Prob
1	0.0852		0.0117	0.914
2	0.1781	0.673	0.8797	0.644
3	0.4639	0.793	1.6684	0.644
4	0.8124	0.846	1.7191	0.787
5	1.6764	0.795	2.4278	0.787
6	1.9452	0.857	4.9552	0.550
7	2.9938	0.810	5.7208	0.573
8	3.9038	0.791	7.1724	0.518
9	7.7607	0.457	7.4078	0.595
10	9.1076	0.427	7.4155	0.686
11	9.1102	0.522	7.4160	0.764
12	10.972	0.446	7.9690	0.788

Source: Done by the author on EViews 13

The results show that all coefficient from lag 1 to lag 12 are insignificant, meaning that errors are stationary and there is no long memory process.

The next one is to test whether the errors are autocorrelated or not

Table5. Test of Breusch- Godfrey

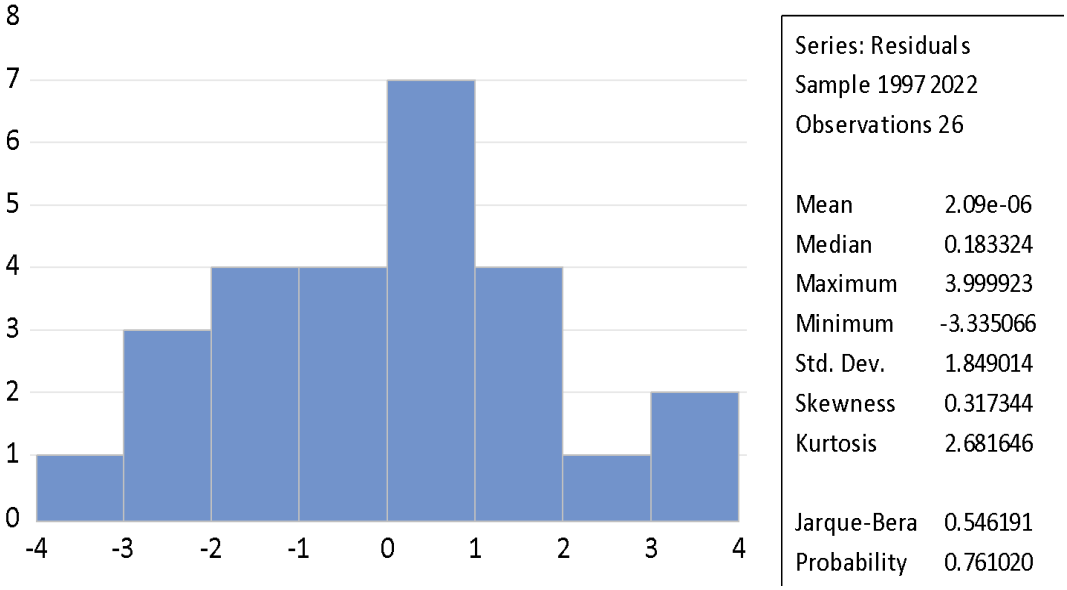
Lag 1	F-statistic	0.099	Prob F (1, 18)	0.7563
	Obs*R-squared	0.142	Prob. Chi-Square (1)	0.7057
Lag 2	F-statistic	0.058	Prob F (2, 17)	0.9440
	Obs*R-squared	0.175	Prob. Chi-Square (2)	0.9160
Lag 3	F-statistic	0.129	Prob F (3, 16)	0.9412
	Obs*R-squared	0.616	Prob. Chi-Square (3)	0.8928
Lag 4	F-statistic	0.276	Prob F (4, 15)	0.8886
	Obs*R-squared	1.785	Prob. Chi-Square (4)	0.7753

Source: Done by the author on EViews 13

The outcomes indicate that all fisher and LM coefficient from lag 1 to lag 4 are insignificant, meaning that there is no autocorrelation of errors.

The following one is the normality test with Jarque-Bera.

Table6. Test of Jarque-Bera



Source: Done by the author on EViews 13

The findings indicate that errors are normally distributed.

The last one is the heteroskedasticity test with Breusch-Pagan- Godfrey, Glejser and White.

Table7. Test of heteroskedasticity

Breusch-Pagan-Godfrey	F-statistic	0.709	Prob. F(3,19)	0.6234
	Obs*R-squared	3.916	Prob. Chi-Square(3)	0.5615
	Scaled explained SS	1.758	Prob. Chi-Square(3)	0.8815
Glejser	F-statistic	0.846	Prob. F(3,19)	0.5335
	Obs*R-squared	4.538	Prob. Chi-Square(3)	0.4748
	Scaled explained SS	3.349	Prob. Chi-Square(3)	0.6463
White	F-statistic	0.437	Prob. F(9,13)	0.8452
	Obs*R-squared	3.151	Prob. Chi-Square(9)	0.7896
	Scaled explained SS	1.41	Prob. Chi-Square(9)	0.9649

Source: Done by the author on EViews 13

4.4 Discussion

These results show that Algeria still has a long path to go before reaching sustainability and stabilize its institutional indicators. First, Algeria has failed to reduce corruption rates, which constitute the biggest obstacle to

achieving sustainable growth. Second, Algeria's performance was not good enough in terms of reducing regulatory burdens, curbing government spending, and improving financial freedom. Third, Algeria continues to suffer from fluctuations in political conditions, which in turn affect the effective implementation of decisions and raise uncertainty among companies and investors. Fourth, there is an unstable political environment, due to factors including popular movement that created a high degree of expected risks in relation to security tensions that constituted a barrier to investment, specifically foreign direct investment and political changes. Fifth, the anti-corruption measures will lead to the withdrawal of land and projects from some investors, the review of some financial privileges, and the freezing of some financial assets of some businessmen. Sixth, the sustainability is not supported by the actual level of institutional quality because it is still below a certain threshold, meaning that infrastructure and management still face major challenges that hinder sustainable growth. Finally, the application of governance indicators in the Algerian state is just ink on paper. It has not achieved the desired results or the required effectiveness. This is due to the high level of corruption, bureaucracy, ethnic issues, and the effects of the Middle East-North Africa Spring of 2011. These factors have caused a decline in institutional quality or a poor institutional situation, as they hinder the implementation of necessary policies and reforms, reduce the attractiveness of national and foreign investments, and negatively impact the culture of the people and the international community.

5. Conclusion

Sustainable development means building a sustainable economy by making optimal use of natural resources in order to meet the needs and desires of current generations without compromising the ability of future generations, in other words achieving a balance between the trilogy of economy, environment and society.

Over time, this term has gained great importance due to awareness of the environmental, economic and social challenges facing the world today. Here, the key factor contributing primarily to achieving this weakness emerges: good governance. The ability to manage resources effectively and enhance transparency and accountability contributes to creating an

environment conducive to sustainable economic and social growth, ensuring long-term investment and development.

The reality of Algeria proves the failure of its efforts in this field, such that during the period studied (1996-2022), institutional indicators were not strictly implemented and did not achieve the desired results, but rather remained just ink on paper. This is due to the absence of an effective role for government agencies, as huge financial corruption cases have been broadcast in recent years, such as the Oran plastics case. Algeria, like other countries, has made efforts to establish rational governance in all its aspects by enacting a set of laws and ensuring political and security stability, in addition to implementing a set of economic reforms, development programs, and economic recovery programs. However, it has been and continues to suffer from weak governance and widespread corruption, which has become a barrier to achieving economic development.

In conclusion, we can say that if institutional indicators are the key to achieving sustainable development, then strengthening them represents the backbone that supports building a prosperous and sustainable future.

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