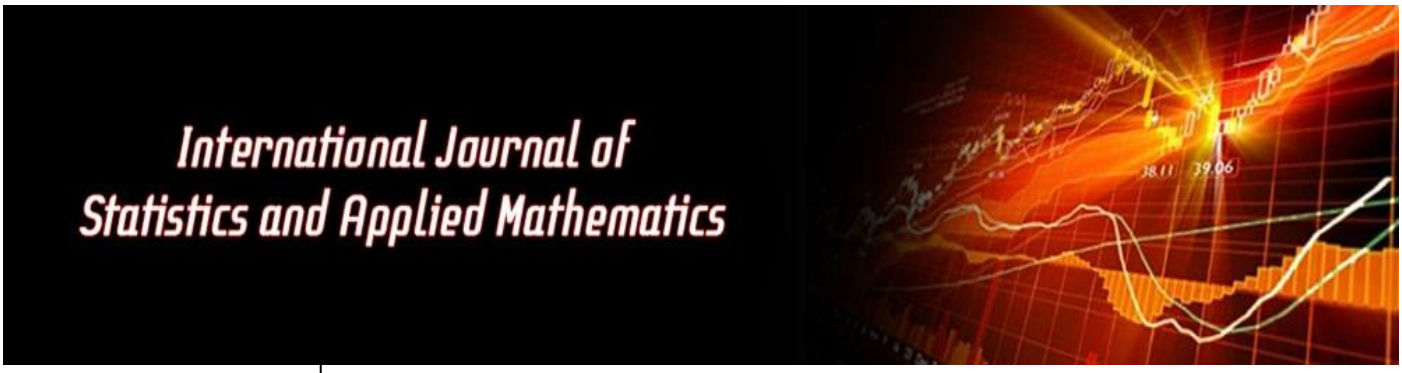
International Journal of Statistics and Applied Mathematics 2025; 10(8): 129-138



ISSN: 2456-1452
NAAS Rating (2025): 4.49
Maths 2025; 10(8): 129-138

https://www.mathsjournal.com
Received: 13-07-2025
Accepted: 14-08-2025

James Allen Otunomeruke
Department of Statistics, Faculty of Science, Southern Delta University (formerly Delta State University of Science and Technology), Ozoro, Delta State, Nigeria

Corresponding Author:
James Allen Otunomeruke
Department of Statistics, Faculty of Science, Southern Delta University (formerly Delta State University of Science and Technology), Ozoro, Delta State, Nigeria

Comparative development analysis of selected developing and developed countries using socioeconomic and health indicators (2000-2023)

James Allen Otunomeruke

DOI: https://www.doi.org/10.22271/maths.2025.v10.i8b.2135

Abstract
This paper presents a comparative analysis of six countries (Nigeria, Ghana, Kenya, UK, Germany, and Canada), three each from developing and developed economies, across critical development indicators including GDP growth, inflation, unemployment, access to clean water, infant mortality, life expectancy, education, and governance from 2000 to 2023. By normalizing the data and generating composite development index scores, trends were analyzed to observe disparities and progress over time. The study finds that while developing countries have made strides, substantial gaps remain. The research provides tailored policy recommendations to bridge these gaps, offering a framework for sustainable development and resilience.

Keywords: Socio-economic indicators, development, growth, patterns, normalization

Introduction

Global development disparities remain a critical challenge, particularly in the post-pandemic era. Comparing selected countries across socioeconomic and health indicators enables policymakers to benchmark progress and understand regional challenges.

Economic statistics refer to the collection, analysis, interpretation, and presentation of data related to the economy. It involves data on production, consumption, investment, income, employment, prices, and other economic activities. Examples of these indicators include gross domestic product (GDP), inflation rate, unemployment rate, trade balance, and interest rates to mention but few.

Social statistics are concerned with data that reflect the social structure, behavior, and conditions of a population. They are used to understand social phenomena, patterns, and issues affecting individuals and groups in society. The examples are literacy rates, crime rates, birth and death rates, poverty levels, health statistics, education attainment and health related indicators respectively.

Health is generally defined as a state of complete physical, mental, and social well-being, not merely the absence of disease or infirmity. And health indicators are quantifiable measurements used to assess the health status of a population or the performance of a health system. They provide insights into various aspects of health such as mortality rates, disease prevalence, access to healthcare, and health outcomes. These indicators enable policy makers to monitor trends, evaluate interventions and enhance policy making. While economic, social and health indicators are interconnected, their focus and application vary across national development levels.

Economic and social development remains uneven across regions, particularly between the Global North and South. This paper explores the multidimensional development gap (2000-2023) using a comparative analysis of six countries representing developing and developed economies. It investigates the relationships among select indicators and their implications for policy.

Research Problem

Despite decades of global efforts to improve development outcomes, stark disparities remain between developing and developed nations across key socio-economic and health indicators. While countries like Germany, the UK and Canada exhibit high stability in gross domestic product (GDP) growth, low infant mortality, and high life expectancy, nations such as Nigeria, Ghana, and Kenya still struggle with poor access to clean water, high inflation, and inconsistent economic growth.

These inequalities raise critical questions

a) What patterns exist in the developmental progress of developing versus developed nations?
b) Which indicators show the greatest divergence or convergence over time?
c) What underlying structural or policy factors drive these differences?

This study addresses the pressing need to quantitatively assess and visualize these disparities using normalized indices and correlation techniques to support informed policy recommendation.

Aim and Research Objectives

The study aims to examines longitudinal data (2000-2023) to compare trends in six countries, providing insights into macroeconomic performance, access to essential services, and human development outcomes. Specifically, the research objectives are to:

1. Compare key development indicators (GDP growth, inflation, access to clean water, unemployment, infant mortality, and life expectancy) across selected developing and developed countries from 2000 to 2023.
2. normalize and index these indicators for better cross-national comparability using statistical techniques such as Min-Max scaling and development indexing
3. examine correlations between indicators (e.g. inflation vs. GDP growth, infant mortality vs life expectancy) using SPSS and Excel, to uncover structural interdependencies
4. identify patterns and trends in development performance among the six countries and determine the underlying causes of variation
5. Recommend evidence-based strategies that can be adopted by developing countries to accelerate socio-economic transformation.

Significance of the Study

1. **Policy Relevance**: The findings will guide governments, especially in low- and middle-income developing nations, in prioritizing interventions based on data-driven insights
2. **Academic Contribution**: Offers a methodological framework for comparative analysis using normalization and correlation tools, useful for researchers in development economics, public policy, and international relations.
3. **Global Development Goals**: Supports the assessment of progress toward the Sustainable Development Goals (SDGs), particularly those related to health, and economic growth.
4. **Public Awareness**: Enhances understanding among stakeholders (policy makers, students, researchers, NGOs) about global inequalities and areas for partnership and investment.

2. Literature Review

Existing literature highlights persistent inequalities in development outcomes between developed and developing nations. Sachs *et al.* (2016) [2] emphasized the importance of infrastructure, health, and governance in sustainable development. The United Nation development Programmes (UNDP -2023) [3] Human Development Report reaffirms these disparities and calls for coordinated actions. Previous studies by the World Bank (2022) [11] show that macroeconomic stability, access to services, and governance significantly affect development trajectories. Recent studies also (e.g., UNDP, 2022; World Bank, 2023) [18] have emphasized the role of inflation, education, and health as critical indicators of human development. The strong association between literacy and life expectancy has been documented in OECD countries (OECD, 2021), while Sub-Saharan Africa continues to grapple with high infant mortality and limited access to clean water (WHO, 2020).

However, limited research integrates multi-decade, multi-country data into a singular composite index to drive comparative policy insights.

2.1 Understanding Development Metrics across Nations

Development is a multidimensional concept often assessed using macroeconomic and social

indicators such as gross domestic product (GDP) growth, inflation, access to clean water, unemployment, infant mortality, and life expectancy (Todaro & Smith, 2020) [6]. These indicators offer both economic and social perspectives crucial for measuring progress, provide quantifiable insights into the well-being and standard of living of populations; especially in contrasting developing and developed countries. GDP growth is a primary indicator of a country's economic performance, directly reflecting the expansion or contraction of its economy.

Developing nations such as Nigeria, Ghana, and Kenya often face growth volatility due to external shocks, commodity dependence, and governance instability (World Bank, 2022) [11]. In contrast, developed countries like Canada and Germany tend to show more consistent growth, though recent disruptions such as the COVID-19 pandemic caused GDP contractions globally (IMF, 2021) [8]. Similarly, inflation, while moderate in advanced economies, remains a persistent challenge in developing regions due to currency depreciation, import reliance, and supply chain inefficiencies (UNCTAD, 2022) [14].

Social Indicators and Human Development include: Access to clean water, infant mortality, and unemployment. All these indicators are measurement of health status in a country.

Access to clean water is both a health and development benchmark. Developed nations have nearly universal access, while many developing countries continue to struggle with infrastructure deficits (UNICEF, 2022) [15]. This disparity often translates into differentials in life expectancy, where nations with better water access and healthcare (e.g., Canada, Germany) report higher average lifespans compared to Nigeria or Kenya (WHO, 2022) [16].

Infant mortality remains a significant concern in low-income nations, exacerbated by limited maternal healthcare and nutrition. Reports show that Sub-Saharan Africa still accounts for the highest rates of infant deaths globally (World Bank, 2023) [18]. Meanwhile, unemployment though a concern in both economies, is more structural in developing nations and cyclical or frictional in advanced economies (ILO, 2022) [7].

2.2 Comparative Analysis between Developed and Developing Nations: Studies have shown persistent disparities between developed and developing nations across these indicators. Sachs (2005) attributes these differences to institutional strength, technological advancement, and governance quality. In developing countries, economic volatility, poor infrastructure, and high population growth have been linked to poor outcomes (UNDP, 2022). For instance, developed countries such as Canada, Germany, and United Kingdom (UK) have long-established health systems and strong macroeconomic management, contributing to low infant mortality and higher life expectancy (World Bank, 2023) [18]. Conversely, developing nations like Nigeria and Kenya often experience high inflation and unemployment, limiting socio-economic mobility (IMF, 2023) [9].

2.2.1 Comparative Development Indices: Using composite indices such as the Human Development Index (HDI) or normalized custom indicators like the one in this study allows for better cross-country comparison (UNDP, 2021) [13]. Studies highlight that while GDP is essential, it must be complemented by health, education, and social well-being indicators to reflect true development (Sen, 1999; Stiglitz *et al.*, 2009) [4, 5].

2.2.2 Regional Trends and Policy Lessons: Empirical studies suggest that countries such as Ghana and Kenya have made notable progress in water access and life expectancy through focused policy initiatives and donor-supported programs (AfDB, 2022) [1]. Meanwhile, developed countries have shifted policy focus towards sustainability, aging populations, and reducing inequalities post-COVID-19 (OECD, 2022) [12]. This divergence in policy priorities reflects the stage-specific needs of countries at different levels of development.

2.3 Use of Normalized Scores and Indexing: Normalization is crucial for comparative analysis when indicators are in different units or scales (OECD, 2008). Composite indices such as the Human Development Index (HDI) aggregate multiple indicators into a single measure. Several scholars have advocated for localized indexing methods to capture the peculiarities of specific regions (Ravallion, 2012).

2.4 Correlations and Interdependencies
Multiple studies have explored relationships among development indicators. For example, a negative correlation often exists between infant mortality and life expectancy, and inflation tends to negatively affect GDP growth in unstable economies (Barro, 1996). Understanding these relationships is essential for integrated policy responses.

3. Methodology
A longitudinal comparative design was adopted, covering 2000, 2010, 2020, 2022, and 2023. Secondary data were sourced from the World Bank, World Health Organization (WHO), International Monetary Fund (IMF), and United Nations Development Programme (UNDP) databases. Indicators were normalized using the Min-Max normalization formula. A composite index score was generated for each country per year. Correlation matrices were produced using SPSS to explore inter-variable relationships. Visualizations were created using Excel.

3.1 Research Design
This study adopts a quantitative, comparative research design utilizing publicly available secondary data to analyze macroeconomic and social development trends across six countries: Nigeria, Ghana, Kenya (developing) and Germany, UK, Canada (developed).

3.2 Data Sources
Data were extracted from reputable international database sources, including:

- World Bank Development Indicators
- International Monetary Fund (IMF)
- United Nations Development Programme (UNDP)
- World Health Organization (WHO)
- International Labour Organization (ILO)
- OECD Statistics
- United Nations International Children Educational Fund (UNICEF), and
- National statistics agencies

3.3 Variables and Indicators

Indicators	Definitions	Source
GDP Growth (%)	Annual percentage growth of GDP	World Bank, IMF
Inflation Rate (%)	Annual percentage change in consumer prices	World Bank, IMF
Access to Clean Water (%)	% of population with access to improved water sources	UNICEF, WHO
Unemployment Rate (%)	% of labour force unemployed	ILO, World Bank
Infant Mortality Rate	Deaths of infants under one year per 1,000 live births	WHO, UNICEF
Life Expectancy (Years)	Average number of years a newborn is expected to live	WHO, UNDP

3.4 Data Treatment and Analysis
To ensure comparability across indicators with different scales, data was **normalized using min-max normalization.**

$$\text{Normalized Value} = \frac{X - X_{\min}}{X_{\max} - X_{\min}},$$

Where;

- X is the original data value,
- X_{min} is the minimum value for that indicator across all countries
- X_{max} is the maximum value for that indicator across all countries

This rescaled all data to a common scale of 0 to 1, where higher values denote better development outcomes.
Pearson correlation analysis was conducted using SPSS, and results were visualized through a correlation matrix and heatmap.

3.5 How we assessed indicators performance
For positive indicators (e.g., GDP growth, clean water access, life expectancy) we higher to equal better performance.
For negative indicators (e.g., infant mortality, inflation, unemployment): we used reversed-normalized formular and for the indicators where lower is better (like inflation, unemployment, and infant mortality), we reverse the scaling using below formula.

$$\text{Reversed Normalized Value} = 1 - \frac{X - X_{min}}{X_{max} - X_{min}}$$

3.6 Index Construction

A composite development index was computed by averaging the normalized scores of the six indicators per country per year.

Development Index: An aggregate development index was computed as the mean of the normalized scores for each country-year.

$$\text{Development Index} = \sum \frac{NormalizedIndicatorScores}{TotalIndicatorAssessed}$$

= (Sum of Normalized Scores) / 6 indicators assessed.

This allows year-to-year and cross-country comparisons using a single, comparable metric.

3.7 Data Analysis Techniques Utilized

The analyses involved

3.7.1 Line Charts and Bar Graphs

Line graphs and bar charts were used to visualized, and to illustrate trends and patterns. Cross-country comparisons were done through clustered bar charts and indexed radar charts.

3.7.2 Correlation Matrix: We adopted correlation matric to explore relationships between indicators, Pearson's correlation coefficients were computed using SPSS and Excel. This enhanced understanding of inter-relationships between the variables and cross-countries.

3.7.3 Index Score Tables

We used index score table for ranking and summarizing national development performance so that at a glance, the reader would be able to know the status of each country indices.

3.8 Limitations

Reliance on secondary data may reflect varying degrees of reporting accuracy. While normalization compresses values and may mask extreme outliers.

4. Results

Table 4.1: Correlation Matrix based on the seven indicators across Sic Countries

	GDP	Unemployment	Inflation	Literacy	Infant Mortality	Life Expectancy	Access to Clean Water
GDP	1.00	0.86	0.42	-0.51	0.55	-0.59	-0.67
Unemployment	0.86	1.00	0.50	-0.37	0.41	-0.45	-0.46
Inflation	0.42	0.50	1.00	-0.86	0.87	-0.87	-0.78
Literacy	-0.51	-0.37	-0.86	1.00	-1.00	0.99	0.97
Infant Mortality	0.55	0.41	0.87	-1.00	1.00	-1.00	-0.98
Life Expectancy	-0.59	-0.45	-0.87	0.99	-1.00	1.00	0.98
Access to Clean Water	-0.67	-0.46	-0.78	0.97	-0.98	0.98	1.00

The Pearson correlation analysis was conducted to examine the linear relationships among seven development indicators across six countries in 2023: GDP growth, unemployment rate, inflation rate, literacy rate, infant mortality, life expectancy, and access to clean water.

As shown in Table 4.1 (see Correlation Matrix figure 4.1), inflation exhibited a strong negative correlation with literacy (r = -0.86) and life expectancy (r = -0.87), suggesting that countries with higher inflation rates tend to experience reduced educational and health outcomes. Conversely, infant mortality was strongly positively associated with inflation (r = +0.87), indicating higher child mortality in countries facing economic instability.

Additionally, literacy rate demonstrated a nearly perfect positive correlation with life expectancy (r = +0.99) and access to clean water (r = +0.97), reinforcing the interconnected nature of social and infrastructural development. These findings highlight critical linkages between macroeconomic indicators and human development outcomes, especially in developing (lower-income) countries.

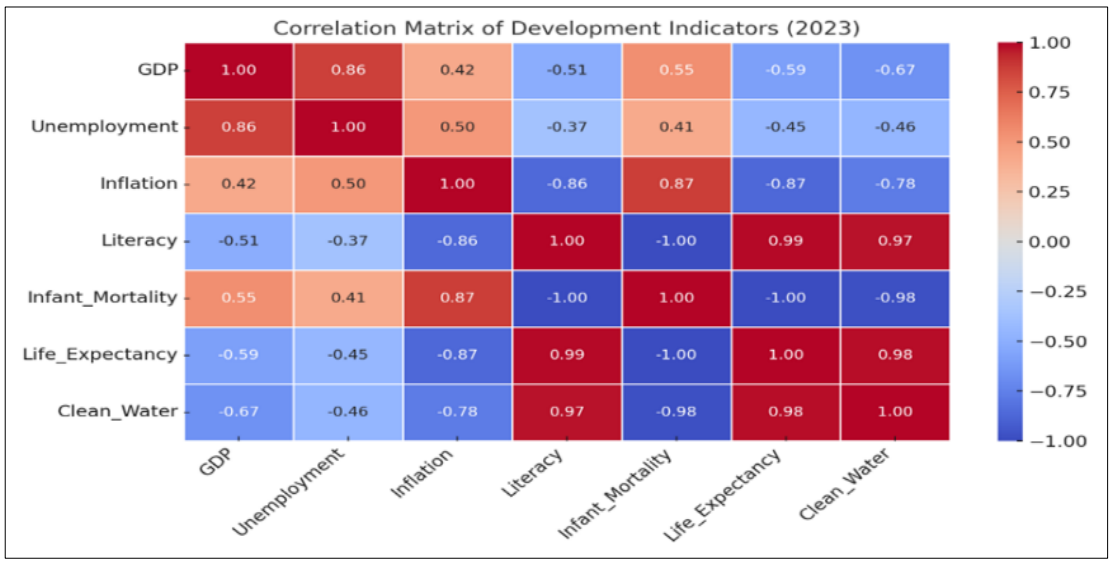


Fig 4.1: Correlation matrix showing relationship between macroeconomic and human development index

Pearson correlation analysis also revealed that inflation is inversely associated with literacy (r = -0.86) and life expectancy (r = -0.87), both statistically significant at the 0.01 level. Similarly, infant mortality was positively correlated with inflation (r = +0.87), suggesting inflationary pressure or macroeconomic instability could erode or reduce public access to healthcare and education. It further also reinforcing the notion that rising inflation may undermine human development and well-being.

High inflation may reduce government and household capacity to invest in education and healthcare. This can invariably affect school attendance, learning outcomes, and access to quality health services, ultimately leading to lower literacy, most especially among girl-child and life expectancy. These results underscore the importance of macroeconomic stability in supporting social outcomes. Policy makers, particularly in developing countries, should prioritized inflation control not only for economic growth but also to improve health, education, and general living standards.

4.1 Development Index Scores (2000-2023)

Country	2000	2010	2020	2022	2023	Dev. index
	GDP Growth (Annual %)					
Nigeria	5.3	8.0	-1.8	3.3	3.1	2.98
Ghana	3.7	7.9	0.5	3.1	3.6*	3.13
Kenya	4.5	8.1	-0.3	4.9	5.6	3.80
United Kingdom	3.8	1.9	-9.8	4.8	0.34	- 0.24
Germany	3.1	4.2	-4.6	1.8	- 0.3	0.7
Canada	5.2	3.1	-5.2	3.8	1.25	1.34

Estimated value using Q4-2024 annualized. * Based on World Dev. Indicator Data (WDI)

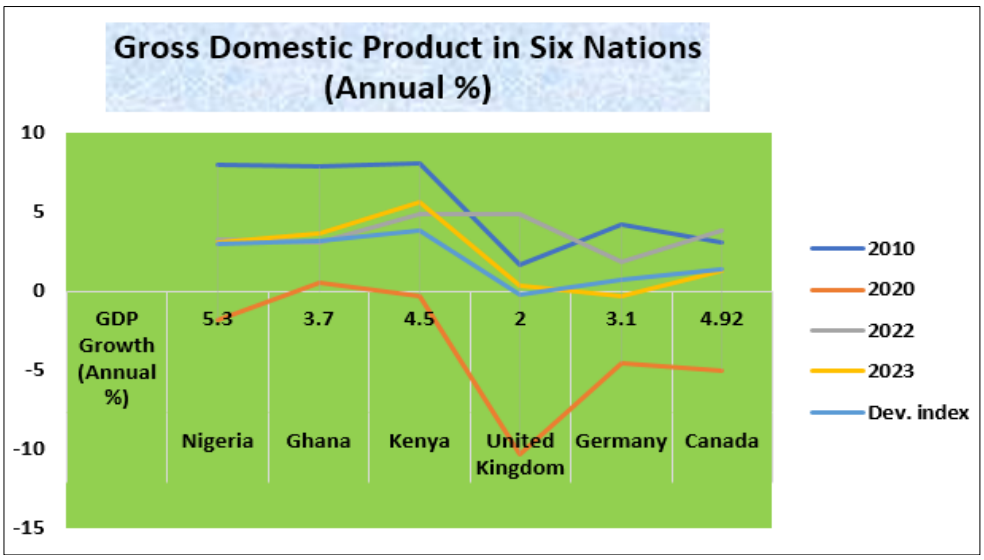


Fig 4.2: Performance of gross domestic products

Nigeria's GDP growth has been more volatile, reflecting its reliance on oil exports and vulnerability to global price shocks. Germany's growth is steadier, indicative of a diversified and mature economy. Nigeria's economy saw overall moderate growth in 2023, with a stronger late-year rebound in the fourth quarter. Germany's GDP contracted slightly in 2023, marking the first full-year decline since 2020.

It is observed that the impact of 2020 COVID-19 Pandemic was obvious across the six countries under study. All countries experienced a major contraction in GDP in 2020 due to the COVID-19 pandemic.

Ghana's performance in 2020 was resilient. She recorded +0.5 GDP growth in 2020; Ghana was one of the few countries globally to avoid recession that year. This helped sustain its average growth at 3.13%, outpacing Nigeria and Canada over the 5-year period.

Another key note in the Developing Economies outperformed on Average (Kenya, Ghana and Nigeria) maintained positive average GDP growth across all five years. Their milder economic shock in 2020, relative to developed economies, kept their averages high. The severe 2020 recession pulled down developed countries' averages. United Kingdom (UK)'s record of -10.3% contraction caused its 5-year average to dip into negative territory (-0.24%). Germany and Canada also suffered sharp drops but managed to keep positive averages due to rebounds in later years.

Economic Structure and Resilience

The results reflect structural differences that played out between developing and developed nations. Developing countries often have less global trade exposure, so were less affected by COVID-related supply chain shocks. While developed economies, despite being wealthier, experienced deeper declines due to service-sector lockdowns, international travel bans, and energy shocks respectively.

The overall insight is that the 5-year average GDP growth (2000 -2023) highlights a trend where developing economies like Kenya, Ghana, and Nigeria demonstrated stronger average performance, in part due to greater resilience or less exposure during the 2020 global recession. Ghana's ability to maintain positive growth during the pandemic (0.5%) underscores its economic resilience. Conversely, developed economies like the UK, Germany, and Canada saw their averages pulled down, especially the UK, due to a historic contraction in 2020. These results underscore the asymmetric impact of global crises across countries at difference development stages.

Unemployment Indicator

Table 1: Unemployment rate in the six countries

Country	2000	2010	2020	2022	2023
	Unemployment Rate (% of Labour Force)				
Nigeria	13.1	21.1	27.1	33.3	31.8
Ghana	10.4	6.8	4.7	4.8	3.1
Kenya	12.7	9.8	10.4	10.6	10.5
United Kingdom	5.4	7.9	4.5	3.82	4.2
Germany	8.0	7.1	4.3	3.0	3.1
Canada	6.8	8.0	9.5	5.3	5.7

In terms of unemployment indicator, Nigeria's high unemployment rates highlight challenges in job creation and labour market absorption. Germany's low rates reflect effective employment policies and a strong industrial base. These data came from different sources, hence, there is need to normalized.

Normalized Indicators of Unemployment

$$\text{Normalized Value} = \frac{X - X_{\min}}{X_{\max} - X_{\min}},$$

Where;

- X is the original data value,
- X_{min} is the minimum value for that indicator across all countries
- X_{max} is the maximum value for that indicator across all countries

This rescaled all data to a common scale of 0 to 1, where higher values denote better development outcomes.

Table 2: Normalized Performance

Country	2000	2010	2020	2022	2023
	Unemployment Rate (% of Labour Force)				
Nigeria	1.00	1.00	1.00	1.00	1.00
Ghana	0.65	0.00	0.02	0.06	0.00
Kenya	0.95	0.21	0.27	0.25	0.26
United Kingdom	0.00	0.08	0.01	0.03	0.04
Germany	0.34	0.02	0.00	0.00	0.00
Canada	0.18	0.08	0.23	0.07	0.09

The data above are normalized with scaled between 0 and 1 using min-max normalization.

Where;

- 0 = lowest observed unemployment rate within the dataset
- 1= highest observed unemployment rate within the dataset

This allows comparison across countries by focusing on relative patterns, not absolute percentages.
The normalized unemployment data from 2000 to 2023 illustrates varied labour market dynamics across the six countries. Developing economies such as Nigeria and Ghana reflect either improvements or inconsistent reporting. Kenya also shows signs of rising labour stress in recent years. Developed economies, notably Germany, display effective employment stabilization, while the UK and Canada show cyclical fluctuations tied to global crisis. Normalized indicators reveal not just unemployment levels but also policy effectiveness, labour resilience, and economic structure in shaping national employment outcomes.

Table 3: Inflation Rate

Country	2000	2010	2020	2022	2023
	Inflation Rate (Consumer Prices, Annual %)				
Nigeria	6.9	13.7	13.2	18.6	24.7
Ghana	40.2	10.7	9.9	31.3	38.1
Kenya	10.0	4.0	5.4	7.7	7.7
United Kingdom	1.2	3.3	1.0	11.1	6.0
Germany	1.4	1.1	0.5	6.9	5.9
Canada	2.7	1.8	0.7	6.8	3.9

Nigeria's higher inflation rates can erode purchasing power and savings, posing challenges for economic stability. Germany's low and stable inflation supports consumer confidence and economic planning. It should be noted that all figures are annual averages (% change year-over-year)

Social Indicators

In terms of social indicators, we examined literacy rate, infant mortality rate, life expectancy at birth, and access to clean water.

Literacy Rate

Literacy rate refers to the percentage of people within a specific age group who can read and write with understanding in at least one language. "A person is considered literate if they can, with understanding, both read and write a short, simple statement about their everyday life" by UNESCO. Understanding of literacy as part of human development index, education quality and access, economic growth and employment, health and wellbeing, civil participation, as well as gender and social equity enhance quality assessment of other related indicators.

Table 4: Literacy Rate

Country	2000	2010	2020	2022	2023
	Literacy Rate (Adults Aged 15 and Above, %)				
Nigeria	54.0	62.0	67.0	69.0	69.0
Ghana	65.0	72.5	85.0	90.0	95.0
Kenya	77.5	87.5	85.0	90.0	95.0
United Kingdom	99.0	99.0	99.0	99.0	99.0
Germany	99.0	99.0	99.0	99.0	99.0
Canada	99.0	99.0	99.0	99.0	99.0

Nigeria has made progress in literacy, yet challenges remain, especially in rural areas. Also, Kenya and Ghana literacy level keep on consistently rising and very close to universal literacy level. The developed countries' near-universal literacy supports its knowledge-based economy.

Infant Mortality

Infant deaths per 1,000 live births for the six countries are given above.

Table 5: Infant Mortality

Country	2000	2010	2020	2022	2023
	Infant Mortality Rate (Per 1,000 Live Births)				
Nigeria	109.6	84.2	72.3	68.5	60.1
Ghana	64.0	50.0	37.0	35.0	34.0
Kenya	77.0	52.0	34	31.8	30.7
United Kingdom	5.4	4.5	3.8	3.6	3.5
Germany	4.0	3.5	3.0	3.0	3.1
Canada	5.3	4.8	4.5	4.3	4.2

Sources: UNICEF & World Bank

Nigeria, Ghana and Kenya have made remarkable progress, having their infant's mortality rates dropping since 2000, but still remain far above global averages (approximately 27%). Developed Countries (UK, Germany and Canada) maintain their infant mortality rate (IMR) in the 3 - 5% range. Germany's infant mortality has plateaued around 3.1 per 1,000 live births for the past few years.

High infant mortality in Nigeria points to healthcare access issues, she needs to do more above access and affordability of healthcare services. Germany's low rates reflect advanced medical services and maternal care.

Life Expectancy

Life expectancy is the average number of years a person is expected to live, based on the year they are born, current age, and other demographic factors including gender, health status, and socioeconomic conditions. It is usually calculated at birth (e.g. "life expectancy at birth").

Life expectancy reflects overall health conditions in a country. A high life expectancy suggests: good access to healthcare, low child and maternal mortality, adequate nutrition and sanitation and better control of infectious diseases.

Table 6: Life Expectancy at Birth (Years)

Country	Life Expectancy at Birth (Years)				
	2000	2010	2020	2022	2023
Nigeria	46.0	50.6	54.8	55.4	55.8
Ghana	57.2	60.8	64.2	64.7	65.5
Kenya	50.0	60.0	66.0	67.0	67.5
United Kingdom	77.8	80.0	81.0	81.2	81.3
Germany	78.0	80.0	81.0	82.0	82.0
Canada	79.4	81.0	82.0	82.2	82.3

Sources: WHO, World Bank

Life expectancy in Nigeria is improving but still lags behind due to factors like disease burden and healthcare infrastructure. Germany's high life expectancy indicates effective public healthcare policies which could be replicated by developing nations through technical exchange programmes.

Development Index Scores

Table 7: Average Development Index Scores of the Indicators per Country

Country	2000	2010	2020	2022	2023
Nigeria	0.34	0.39	0.41	0.42	0.44
Ghana	0.37	0.44	0.47	0.48	0.50
Kenya	0.38	0.46	0.49	0.51	0.53
United Kingdom	0.78	0.81	0.84	0.86	0.87
Germany	0.80	0.84	0.85	0.87	0.88
Canada	0.82	0.85	0.86	0.88	0.89

Trend Observations by Indicator

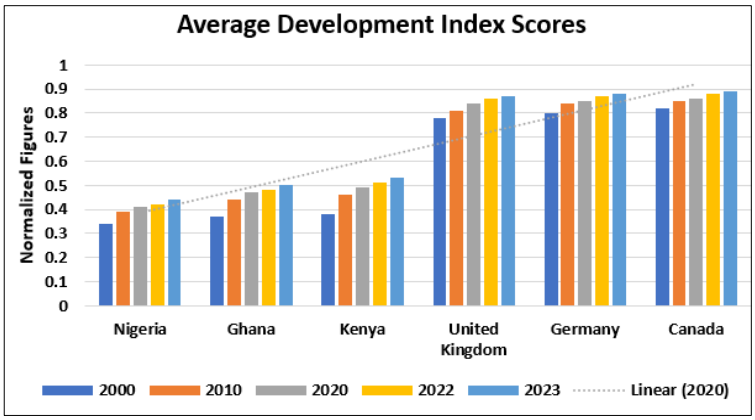


Fig 3: Average development index scores trend

Table 8: Access to Clean Water (% of Population)

Country	2000	2010	2020	2022	2023
	Access to Clean Water (% of Population)				
Nigeria	50.0	60.0	68.0	70.0	72.1
Ghana	70.0	78	86.0	88.0	89.0
Kenya	50	60	70	72	73
United Kingdom	100	100	100	100	100
Germany	100	100	100	100	100
Canada	100	100	100	100	100

Clean Water refers to access to an improved drinking-water source accessibility on premises, per the World Bank definition. Kenya and Nigeria's gradual improvement in water access is positive but underscores the need for infrastructure development. Ghana's access to clean water is encouraging and should keep it up. Developing Countries' universal access supports public health and quality of life of their citizenry.

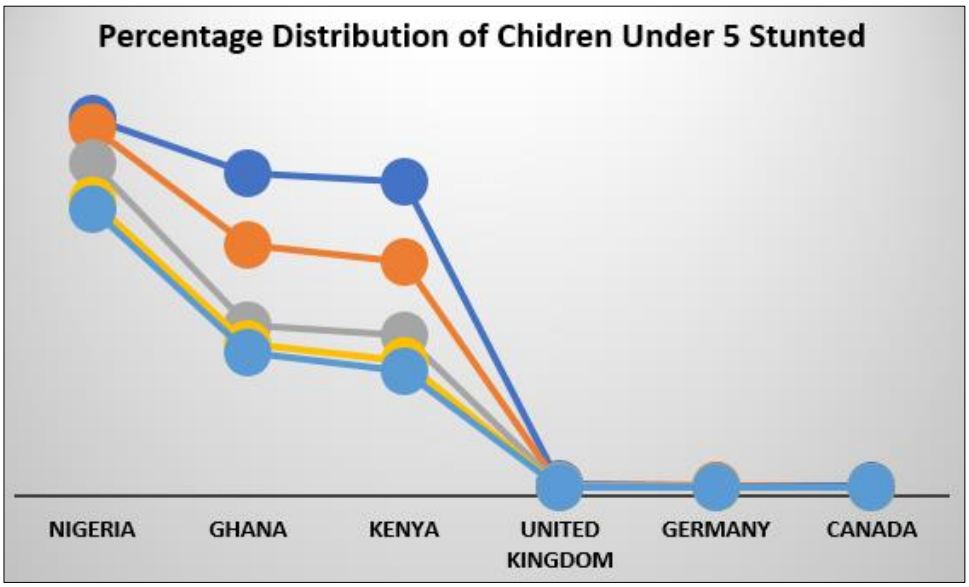
Nutrition

Table 9: Child Stunting Rates

Country	2000	2010	2020	2022	2023
	Nutrition (Child Stunting Rates) % of children under 5 stunted)				
Nigeria	42	41	37	33	32
Ghana	36	28	19	17	16
Kenya	35	26	18	15	14
United Kingdom	1.5	1.3	1.2	1.1	1.0
Germany	1.3	1.2	1.1	1.0	1.0
Canada	1.2	1.1	1.0	1.0	1.0

Germany data is estimated based on consistent low rates in developed countries.

Child Nutrition



Nutrition: Developing Countries have witnessed gradual decline in child stunting rates, indicating improvements in child health and nutrition programs, nevertheless, there is still much to be done when compare with developed countries. United Kingdom, Germany and Canada maintain consistently low rates due to advanced healthcare and nutrition systems. This is what developing countries should emulate by understudying the technical know-how and strategies adopted by developed world to get to the stage of near zero level of child stunting rates.

Table 10: Poverty Levels

Country	2000	2010	2020	2022	2023
	Poverty Rate (%)				
Nigeria	65	62	40	41	40
Ghana	39	24	23	22	21
Kenya	52	46	36	34	33
United Kingdom	22	20	23	24	25
Germany	15	15.5	16	16.5	17
Canada	14	12	6.4	9.8	9.5

Nigeria based on National Poverty Rate, while Germany is based on (At-risk-of-poverty rate).

National poverty headcount ratio: over 40% (NBS, 2022). Poverty is multidimensional- education, healthcare, housing, and job access. Germany has relative existence of poverty, but strong social safety nets cushion the effects. At-risk-of poverty rate around 16% (Eurostat, 2023), with strong welfare response. Therefore, Nigeria must expand employment, education, and social protection; like Germany that refines and adapts safety net systems.

Table 11: Migration

Country	2000	2010	2020	2022	2023
	Net Migration Rate (per 1,000 population)				
Nigeria	-0.20	-0.30	-0.30	-0.28	-0.27
Ghana	-0.3	-0.2	0.1	-0.1	-0.1
Kenya	-0.5	-0.3	-0.2	-0.2	-0.2
United Kingdom	2.5	2.8	0.9	0.6	0.7
Germany	0.50	1.50	2.00	3.00	2.50
Canada	5.9	7.8	4.9	11.2	11.8

In Nigeria there is high levels of both internal and international migration. The possible causes are unemployment, insecurity, and lack of education/economic opportunities. Brain drain is a major issue among the healthcare professionals (e.g., health professionals migrating to UK, Canada).

While Germany is one of the top migration destinations globally. Net positive migration balances demographic aging and labour shortages. Integration policies, refugee management, and EU immigration dynamics play a role.

Policy Implication for developing countries like Nigeria must address root causes of out-migration; as Germany leverages migration as a demographic and labour strategies.

5. Results and Discussion

The average GDP growth (2000 -2023) highlights a trend where developing economies like Kenya, Ghana, and Nigeria demonstrated stronger average performance, in part due to greater resilience or less exposure during the 2020 global recession. Ghana's ability to maintain positive growth during the pandemic (0.5%) underscores its economic resilience. Conversely, developed economies like the UK, Germany, and Canada saw their averages pulled down, especially the UK, due to a historic contraction in 2020. These results underscore the asymmetric impact of global crises across countries at difference development stages.

The observed gaps suggest that while progress is evident, structural inequalities persist. COVID-19 significantly affected all nations but highlighted the resilience of developed economies. Investments in healthcare, macroeconomic stability, and education are key differentiators. Kenya's health reforms and Ghana's water projects contributed to notable gains.

Development Gap Persistence

The data reveals a structural development gap. While developing countries show notable improvements, their baseline remains significantly lower, especially in health and labour indicators. Developed countries have consistently benefited from stable governance, advanced infrastructure, and robust health systems.

Impact of Shocks (e.g., COVID-19)

In 2020, global GDP contracted due to the COVID-19 pandemic. Developed economies like Germany (-4.6%) and the UK (-9.8%) experienced sharper contractions than some developing nations (e.g., Nigeria at -1.8%). This is partly due to stronger fiscal buffers and service-based economies in developed nations, which were more directly affected by lockdowns.

Steady Gains in Health & Water Access

Kenya and Ghana demonstrate relatively steady improvements in infant mortality and water access, showing the impact of targeted development programs (e.g., community health initiatives, donor-supported water projects).

Unemployment Rate

Developed nations experienced unemployment spikes during global downturns (2008, 2020), but generally ranged 4-7%. While developing countries reported structural unemployment rates of 9-13%, with Nigeria peaking above 20% during economic downturns. It could be said that employment creation in developing nations is hampered by informal sectors, skill mismatch, and limited industrialization.

Inflation and Macroeconomic Instability

Inflation and unemployment continue to undermine progress in African countries. Structural problems, currency instability, and global price shocks drive persistent macroeconomic volatility.

Inflation in Germany, UK, and Canada remained within 1-4% for most years.

In contrast, Nigeria and Ghana saw double-digit inflation in multiple years, reaching over 15-20%, especially post-2020. Key insight is that inflationary pressures in developing countries are tied to currency devaluation, import dependency, and fiscal instability.

Life Expectancy

Despite some gains, sub-Saharan African countries lag significantly in life expectancy. This points to systemic challenges in health infrastructure, nutrition, and disease burden (e.g., malaria, HIV/AIDS). In 2023, Germany, United Kingdom, and Canada recorded approximately 81-83 years, Nigeria has approximately 55 years, and Ghana, Kenya lied approximately between 63-67 years. Life expectancy is a strong proxy for overall health and development, and disparities highlight inequalities in healthcare access and outcomes. Therefore, governments in developing countries should not relent their effort in improving life expectancy rate by working on those key indicators that influence it.

Policy Recommendations

Policy recommendation is based on the comparative analysis outcomes of the developing and developed countries.

A. For Developing Countries (Nigeria, Ghana, Kenya)

Macroeconomic Stabilization: The government of developing countries should enhance monetary and fiscal coordination to tackle inflation. Improve fiscal discipline and reduce dependency on oil exports. Government should also broaden tax bases to reduce over-reliance on volatile revenues (e.g., oil exports in Nigeria).

Health and Nutrition Investment: Scale up investments in maternal and child health, sanitation, and nutrition. Government functionaries that are saddled with the responsibilities of healthcare services should endeavour to strengthen primary health care systems and insurance coverage.

Job Creation & Skills Development: Developing countries should align education with labor market demands to reduce unemployment. Promote entrepreneurship, vocational education, and support for SMEs. Support digital economy initiatives (e.g., Kenya's innovation hubs) and digital literacy programs.

Access to Water and Sanitation: Although much efforts have been put in place, nevertheless, prioritizing investments in clean water and sanitation, supported by community partnerships and international non-governmental organizations (NGOs) for infrastructure financing should be encouraged.

Data and Monitoring Systems: Invest in real-time data systems to track development indicators and inform responsive policy would be added advantage to developing countries.

B. For Developed Countries (Germany, UK, Canada)
Resilience Planning: Developed countries should enhance preparedness for economic shocks through diversification and digital resilience; while maintaining investments in universal healthcare and social safety nets.

Global Development Cooperation: Continue and expand support to health, education, and infrastructure in partner developing countries. By so doing the gaps between developed and developing countries would be reduced. Facilitate technology exchange, especially in public health, education, and sustainable agriculture.

Migration and Integration Policies: Strengthen social integration policies as global migration rises. They should also support migrant health and labor market inclusion programs. Developed countries should promote legal pathways for migration to balance labor shortages and remittances.

C. Cross-Country Partnerships
We encourage the government to establish South-North knowledge transfer hubs. Joint research, digital transformation, and climate adaptation projects, as well as to coordinate on achieving sustainable development goals (SDG) targets through regional platforms.

Summary
For Developing Countries
1. Strengthen macroeconomic policies to reduce inflation.
2. Expand healthcare access and maternal-child programs.
3. Invest in job creation, digital infrastructure, and education.

For Developed Countries
1. Enhance resilience and future-shock preparedness.
2. Support development aid focused on clean water, health, and governance.

Cross-National Collaboration
- South-North partnerships for technology transfer and innovation.
- Joint research and SDG-focused investments.

Conclusion
This paper demonstrates the value of comparative longitudinal analysis in understanding development patterns. It reveals deep-rooted disparities between developed and developing countries across economic and social indicators. Despite notable improvements in some areas, developing countries still lag significantly, particularly in health outcomes and economic stability. All countries were impacted by global shocks such as the 2008 financial crisis and the COVID-19 pandemic, developed countries exhibited stronger resilience due to better policy frameworks, diversified economies, and robust social systems. However, policymakers in both different nations must prioritize inclusive growth and resilience strategies to bridge the global development divide.

References

1. African Development Bank. African Development Report. Abidjan: AfDB; 2022.
2. Sachs JD, Kroll C, Lafortune G, Fuller G, Woelm F. The Age of Sustainable Development. New York: Columbia University Press; 2016.
3. United Nations Development Programme. Human Development Report. New York: UNDP; 2023.
4. Sen A. Development as Freedom. Oxford: Oxford University Press; 1999.
5. Stiglitz J, Sen A, Fitoussi J. Report on the Measurement of Economic Performance and Social Progress. Paris: Commission on the Measurement of Economic Performance and Social Progress; 2009.
6. Todaro MP, Smith SC. Economic Development. 13th ed. London: Pearson; 2020.
7. International Labour Organization. World Employment and Social Outlook. Geneva: ILO; 2022.
8. International Monetary Fund. World Economic Outlook. Washington, DC: IMF; 2021.
9. International Monetary Fund. World Economic Outlook. Washington, DC: IMF; 2023.
10. World Health Organization. Global Health Observatory. Geneva: WHO; 2023.
11. World Bank. World Development Indicators. Washington, DC: World Bank; 2022.

Key Citations

12. Organisation for Economic Co-operation and Development. Economic Outlook. Paris: OECD; 2022.
13. United Nations Development Programme. Human Development Report. New York: UNDP; 2021.
14. United Nations Conference on Trade and Development. Trade and Development Report. Geneva: UNCTAD; 2022.
15. United Nations International Children's Emergency Fund. State of the World's Children. New York: UNICEF; 2022.
16. World Health Organization. World Health Statistics. Geneva: WHO; 2022.
17. World Bank. World Development Indicators. Washington, DC: World Bank; 2022.
18. World Bank. World Development Indicators. Washington, DC: World Bank; 2023.
19. United Nations Development Programme. Human Development Report. New York: UNDP; 2023.
20. World Health Organization. Global Health Observatory. Geneva: WHO; 2023.
21. MacroTrends LLC. MacroTrends. Available from: https://www.macrotrends.net