
Measuring Social Progress in Africa

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Declaration

I, Nehemiah Eremiye, declare that this Master's thesis entitled 'Measuring Social Progress in Africa' is my original work completed under the supervision of Professor Jaromír Harmáček. I confirm that the work and all ideas are my own unless stated otherwise. All borrowed ideas and texts are duly cited and referenced. I further declare that I have honestly conducted and presented all analysis without engaging in any misrepresentations or malpractice.



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Abstract

Globally, social progress of countries is being measured through the Global Social Progress Index (SPI). However, social progress being a complex phenomenon can be interpreted differently by different societies. This necessitate the need to measure social progress of African countries, capturing the reality of social progress in Africa by employing indicators that are representative of the African society and contextually relevant to the geographic region.

The study borrowed largely the standard methodology of the global Social Progress Index, and the principal result of the study is the construction of a Social Progress Index for Africa (SPI-Africa). Through the measurement of the social progress in Africa, the study addressed the issue of possibility of Western bias in measurements against Africa by comparing African countries among themselves based on African standards and not global standards.

Various insights and conclusions were drawn from the study, and the results showed that Africa is progressing socially but at a slow rate. Also, the study showed that the variability of results in global SPI is smaller than in the African SPI, suggesting that comparing African countries using the global standards of the global SPI can lead to the false conclusion that “Africa is the same” in terms of their level of social progress. However, the Africa Social Progress Index clearly demonstrates that there is a wide range of performance of African countries in social progress when measured against African standards. This led to the conclusion that there is a possibility of unfairness in the measurement of Africa’s social progress by the global SPI.

Keywords: Social Progress, Africa, Western Bias, Composite Index

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List of Abbreviations

ASDI	African Social Development Index
AUC	African Union Commission
AU	African Union
BLI	Better Life Index
EU	European Union
GDP	Gross Domestic Product
GNP	Gross National Product
HDI	Human Development Index
HPI	Happy Planet Index
IIAG	Ibrahim Index of African Governance
ISP	Index of Social Progress
JRC-COIN	Joint Research Centre's Competence Centre on Composite Indicators and Scoreboards
MAR	Missing at Random
MCAR	Missing Completely at Random
MDPI	Multidimensional Poverty Index
OECD	Organization of Economic Cooperation and Development
OPHI	Oxford Poverty and Human Development Initiative
PCA	Principal Component Analysis
SDSN	Sustainable Development Solutions Network
SPI	Social Progress Index
UNDP	United Nations Development Programme
UNECA	United Nations Economic Commission for Africa
WASH	Water, Sanitation and Hygiene
WISP	Weighted Index of Social Progress

CHPATER ONE

Introduction

Social progress has gained significant attention among researchers, government, policymakers, and civil societies, based on the notion that conventional economic indicators such as the Gross Domestic Product (GDP) for measuring economic growth do not reflect the overall state of wellbeing within a given society. Over time, researchers have indicated that economic indicators offer valuable insights into macroeconomic performance. However, such measures and their proxies fail to capture the nuances of citizens' lives and overall wellbeing. This shortcoming has prompted the need for measures of progress and overall wellbeing devoid of economic growth. With the 'Beyond GDP Initiative,' countries are making a paradigm shift towards measurement of progress devoid of economic indicators, as they attempt to build capacity to meet the fundamental needs of their citizens and sustain their quality of lives (European Commission, 2014).

In Africa, progress has been characterized within the proxies of economic growth, with expectations that improvements and transformation in social development and progress would result. However, there have been no remarkable transformation as the continent is plagued with myriads of environmental and social problems and this is evident in low rankings and performance in human development, environmental protection, and other development metrics. From the Human Development Report 2022, many African countries are characterized with low human development as evident in their poor rankings from 160th to 191st and scores of 0.5 and below (UNDP, 2022). Furthermore, fifteen African countries have human development scores less than 0.5, with countries such as South Sudan (0.385), Chad (0.394), Niger (0.400), Central African Republic (0.404), Burundi (0.426), Mali (0.428), Mozambique (0.446), Burkina Faso (0.449), Guinea (0.465), Sierra Leone (0.477), Democratic Republic of the Congo (0.479), Liberia (0.481), Guinea-Bissau (0.483), Eritrea (0.492), and Ethiopia (0.498) leading the pack of low social and human development. Overall, sub-Saharan African countries have an average score of 0.547 in human development, with the continent being characterized with low human development (UNDP, 2022). For African countries, there is a need to look beyond GDP and focus on the inherent social and environmental needs of her citizens, with emphasis on outcome-based solutions as policy priorities.

Efforts have been made to measure social progress through various composite indices. One of such measures is the Social Progress Index (SPI), a global composite index which ranks countries on their performance across three broad dimensions of progress which include: 'Basic Human Needs,' 'Foundations of Wellbeing,' and 'Opportunity.' SPI aggregates only social and environmental indicators in measuring social progress dissociating from the proxies of economic growth and has served as a tool for decision and policymaking among provinces, businesses, and governments (Social Progress Imperative, 2022).

Despite the global standard of measuring social progress through the SPI, there is a need for a localized approach of measuring what matters based on country-context with consideration of geopolitical and geographical dynamics, as social progress can be interpreted differently by different societies (Annoni and Bolsi, 2020). This argument is important when measuring social progress in Africa, as we need to ensure a comparable measurement metric among African countries and comprehensively answer the question: What really matters for Africa when measuring social progress? This may be a complex phenomenon but the diverse and unique societal dynamics in Africa require a distinctive consideration of relevant priorities and issues when measuring progress in Africa.

More so, there have been assertions of Western Bias in various social measurement and indices, as it is believed that most social measurements capture the egalitarian and paternalistic approach of the West while representing such notion as global for even non-West countries. This argument is not far-fetched, as the West has been believed to be the standard of knowledge based on the post-Enlightenment order that projects the Western perspective as the preeminent worldview for conceptualization of intellectual thoughts. As such, the achievements and developments made by African societies and other civilizations have been disregarded due to the dominant influence of post-Enlightenment ideology (Craig, 2008). In addressing this situation as it relates with the measurement of social progress in African societies, there is a need to ensure a measurement that captures the diverse realities of the African societies based on ideologies that are inherent in explaining Africa's dynamics and notion of progress.

1.1 Justification of the Research

This research is justified for two major reasons. First, there have been limited studies conducted in investigating the measurement of social progress in Africa. Most literature contains studies focused on measurement of social progress based on European values and Western ideologies. The study addresses a critical gap in the existing literature on social progress, particularly as it pertains to African countries.

Second, there has been some research on social development and progress in Africa, much of it has focused on specific aspects of development, such as economic growth, governance, and has not taken a holistic approach to understanding social progress in the region devoid of economic metrics and its proxies. There is a need to conduct a study that focuses on comparable metric of measurement of social progress that captures African realities, dynamics, and diverse societies, and address the issue of possibility of Western Bias. This will provide a more comprehensive understanding of the challenges and opportunities facing African countries relating to social progress.

1.2 Research Objectives

The aim of the study is to measure social progress in Africa and assess the possibility of a Western Bias in its measurement of social progress. The principal result of this study is the construction of a Social Progress Index for Africa (SPI-Africa) that measures social progress in the lens of African realities and comparing African countries among themselves based on African standards.

The objective of this study is to measure social progress capturing the realities of Africans in meeting their environmental and social needs. The research will try to answer three key questions:

- (i) Is there a possibility of Western Bias in the measurement of social progress in Africa and how can it be addressed?
- (ii) What indicators are representative and contextually relevant in measuring social progress of African countries?
- (iii) Is Africa declining or progressing socially?

This study draws heavily from the standard methodology of the Global SPI with some modifications to suit the data requirements in constructing the SPI for Africa. Indicators selected were sourced from global and verifiable sources with comprehensive national coverage. This is due to the challenge of availability of African data sources which poses issues in the construction of the Social Progress Index for Africa.

The research is divided into six chapters. Chapter one presents the introduction to the topic, justification of the research, and research objectives. Chapter two reviews literature on social progress, definition, measurement of the indices, and western bias concepts, and western bias in social measurement. Chapter three presents a thorough insight into the indicator selection framework, brief discussion on the relevance of selected indicators, and data sources. Chapter four explores the methodology for the index construction, data treatment, and data aggregation. Chapter five presents the analysis and results. The sixth chapter draws out important conclusions from the study and suggestions for further research.

CHAPTER TWO

Literature Review

This section examines the evolution of the concept of social progress, with a critical review of various measurements of social progress by researchers, and tools and methodologies developed to capture social progress in societies. Also, the section discusses various social measurement tools developed specifically to capture the African notion of progress and development and its impact in the African society. Furthermore, it evaluates the assessment of social progress in Africa, and identifies gaps in the literature of social progress in Africa. The section also gives an overview of western bias and its influence on social measurements.

2.1 Social Progress: Definition

Over time, various authors have conceptualized progress based on diverse contextual understandings and perspectives related to societal values and ideologies. There is no precise definition for social progress, as it is a complex and multifaceted concept that can be interpreted differently by various societies (Annoni and Bolsi, 2020). This has given rise to debates by various researchers and scholars on the concept of social progress, with each interpreting the notion of social progress through varying contextual underpinnings.

Bernard (1992) opines that progress denotes an approach to an end that is deemed to be closer to perfection or completion than the previous stage in the development process. Osberg (2001) posits that the notion of social progress is contingent on the understanding of the concept of good and what constitutes a desirable outcome and a means of assessing the extent to which society is moving towards or away from it. Henderson (1940) attributes a specific connotation to the term “social progress” and characterizes its meaning as subjective, contingent upon the dominant ideology, technologies, and social framework. Interestingly, sociologists are often sceptical about defining social progress, to avoid making universal judgements that are not sensitive to cultural relativism (Best, 2001). Despite this assertion, other definitions of social progress have been ascribed.

According to Estes and Morgan (1976), social progress can be defined as an outcome that emphasizes a society’s ability to fulfil the fundamental and material demands of its expanding populace. This definition of social progress captures the needs of the people and the abilities to meet such needs. This definition gave rise to other definitions that incorporate sustainability,

with the ability of a generation to meet their needs and sustain a decent quality of life. Porter (2013) captured this concept in his definition of social progress, as he defined social progress as “society's ability to fulfil the fundamental human needs of its populace, establish the necessary foundations for individuals and communities to improve and maintain their standard of living, and facilitate an environment that enables all members of society to achieve their maximum potential.” This is a comprehensive definition and is adopted by the Social Progress Imperative as the building block of their construction of the global Social Progress Index (SPI).

2.2 Measurement of Social Progress

2.2.1 Monetary and Non-Monetary Indicators of Social Progress

There has been a debate regarding the suitability of monetary metrics, such as Gross Domestic Product (GDP) and Gross National Product (GNP) per capita, as a reliable measure of societal advancement. It is pertinent to note that the measurement of social progress serves as a significant indicator for comprehending the effects of policies and programmes, as well as identifying areas that require progress within societies or nations. The Gross Domestic Product (GDP) has been traditionally acknowledged as a reliable indicator of well-being and continues to be widely employed for the purpose of characterizing and contrasting the standard of living of populations across nations. Policymakers and economists frequently regard GDP as an all-encompassing indicator of both economic growth and social well-being (Kapoor and Debroy, 2019). Notwithstanding its significance, GDP in isolation fails to offer a comprehensive representation of societal advancement due to its inability to consider distributive concerns or non-economic variables such as healthcare and education (Estes, 2014). It is imperative to acknowledge that the efficacy of indicators measuring progress and well-being should align with a society's ability to sustainably meet basic human needs, food, shelter, freedom, and participation. According to Constanza et al. (2009), it is not advisable for these indicators to exclusively depend on the assessment of the amount of financial economic activity, as it is only a tool to achieve the goal. Despite criticisms, there are proponents who advocate for the use of GDP as a measure of social progress, citing its significant association with commonly accepted indicators of social progress, infant and maternal mortality rates, and life expectancy among others (Oulton, 2012).

Constanza et al. (2009) challenged the use of GDP or GNP as a measure of social progress, arguing that it fails to account for certain social factors and other elements that are relevant to evaluating social progress. Therefore, it can be argued that the Gross Domestic Product (GDP) metric was not originally intended to serve as an indicator of societal progress or overall welfare. According to Stiglitz (2019), the concept of Gross Domestic Product (GDP) as a measure of well-being is flawed and should not be used to equate economic progress with social progress. This is because GDP fails to account for the negative impact of economic growth on the environment, including resource depletion and environmental deterioration.

Recent developments suggest an increase in the adoption of a balanced methodology for assessing social advancement, which integrates both monetary and non-monetary indicators. This approach is purported to offer a more all-encompassing evaluation of societal progress, encompassing not only economic factors but also social aspects.

2.2.2 History of Composite Indices of Social Progress

Various tools for measuring social progress have been developed through varying indices which are exclusively based on social indicators, whereas others are a blend of social and economic indicators. This section will discuss the evolution of the various measurements of social progress through the construction of composite indices.

Weighted Index of Social Progress (WISP – 1973)

In 1973, Richard J. Estes created one of the first metrics of social progress, the Index of Social Progress (ISP) (Estes and Morgan, 1976). Over time, the ISP has been refined into the Weighted Index of Social Progress (WISP) and used to evaluate the changing capacity of countries to fulfil the fundamental social and material requirements of their population.

The current iteration of the ISP comprises of forty-six social indicators, which have been further categorized into ten subindexes: Education, Health Status, Women Status, Defence Effort, Economic, Demographic, Geography, Political Participation, Cultural Diversity, and Welfare Effort (Estes, 1997). These indicators have been deemed valid indicators of social development, as they have been consistently used by other scholars in the field of socioeconomic development. WISP distinguishes itself from other metrics of social progress in the number, range, and relevance of the indicators used in its construction (Estes, 1997).

Although WISP is not a direct measure of the quality of life, its objective is to evaluate the extent to which societies are successfully addressing the barriers to progress that hinder individuals' capacity to improve their general well-being (Estes, 2014).

Human Development Index (HDI - 1990)

Economist Mahbub ul Haq proposed the idea of measuring development beyond economic growth. He believed that GDP was not an adequate measure of development and proposed the Human Development Index (HDI) to measure a country's progress in areas such as health, education, and income. The HDI was later adopted by the United Nations Development Programme (UNDP) and has become a widely used measure of social progress (UNDP, 1990). The Human Development Index (HDI) is a composite indicator that provides a concise evaluation of the overall progress in fundamental dimensions of human development including a long and healthy life, being knowledgeable and having a decent standard of living (UNDP, 2022). The composite index is obtained by aggregating the scores of the three HDI dimension indices through the application of geometric mean (UNDP, 2022).

Multidimensional Poverty Index (MDPI - 2010)

In 2010, the Oxford Poverty and Human Development Initiative and the United Nations Development Programme jointly introduced the Multidimensional Poverty Index (MDPI). MDPI is tailored to measure poverty in developing countries based on ten indicators such as nutrition, child mortality, years of schooling, school attendance, cooking fuel, sanitation, drinking water, electricity, housing, and assets (OPHI & UNDP, 2022). MPI takes a multidimensional approach to measuring poverty and acknowledges poverty as a social concept and not only a monetary concept. It is a composite index that integrates both income and non-income-based metrics using an approach developed by Townsend (1979) and consequently Sen (1985). The UNDP comprehensive definition of poverty is intricately linked to social progress, as it gauges an individual's lack of across three dimensions of equal significance: health, education, and standard of living. The MDPI is commonly acknowledged and employed as a more significant indicator of poverty in comparison to the poverty threshold. The index provides a comprehensive framework that is tailored to reflect specific national priorities through the modification of its dimensions, indicators, and aggregate methods (OPHI, 2020).

Happy Planet Index (HPI – 2006)

The Happy Planet Index is a measure of well-being and sustainability that considers factors such as life expectancy, well-being, and ecological footprint. The Happy Planet Index (HPI) was created and published by the New Economics Foundation (NEF) with the aim of assessing a nation's ecological efficiency in providing for human welfare. The composite index comprises three distinct measures, namely life expectancy at birth, life satisfaction, and ecological footprint. (Abdallah, Marks et al., 2014). A noteworthy outcome arising from the comparison of the HPI and HDI methodologies is that despite having similar HDI results, two countries may exhibit disparate HPI outcomes (NEF, 2018).

Better Life Index (BLI – 2011)

The OECD launched the Better Life Index in 2011 as a measure to address the inadequacies of GDP as a measure of social progress (Stiglitz et al., 2009). BLI evaluates the progress and welfare of OECD countries in eleven components such as housing, income, jobs, education, community, environment, governance, health, life satisfaction, safety, and work-life balance (OECD, 2011). These components are subsequently subdivided into subcomponents of twenty indicators. The BLI is novel and distinctive in that it is an interactive index that allows users to modify the weights for dimension aggregation and see the influence on country rankings (OECD, 2020).

Social Progress Index

Social Progress Imperative introduced the Social Progress Index in 2013. The conception of the index was a reaction to the 'Beyond GDP' campaign and aimed to provide a comprehensive assessment of social progress. According to the Social Progress Imperative (2013), the SPI offers a comprehensive and objective evaluation of a nation's welfare through an outcome-based measure. The primary objective of the index is to establish a universally applicable tool that assesses social progress through direct evaluation of social and environmental indicators, without resorting to economic proxies. The index quantifies the level of Social Progress Index (SPI) across three distinct dimensions, namely Basic Human Needs, Foundations of Wellbeing, and Opportunity. The measurement of dimensions is conducted through twelve distinct components that encompass diverse facets of an individual's social life. The objective of the index is to elicit implementable policies that can effectively address distinct aspects of social progress (Social Progress Imperative, 2022). The index has garnered worldwide recognition

among policymakers and has established itself as a benchmark for assessing social progress owing to its all-encompassing methodology since its inception. On an annual basis, the Social Progress Imperative issues SPI reports that assess and contrast the social progress of nations on a global scale, as well as across various dimensions and components.

2.3 Measurement of Social Progress in Africa

In recent years, various tools or indices have been developed to measure social progress in Africa. These tools have been specifically developed for only African countries and with some of these tools making use of extensive global sources due to the issue of data availability in Africa whereas others employed a blend of African data sources and global sources for their measurement. This section will discuss about three of these measurement tools specifically developed for Africa, comprising of African Social Development Index (ASDI), Mo Ibrahim African Index of Governance (IIAG), and African SDG Index.

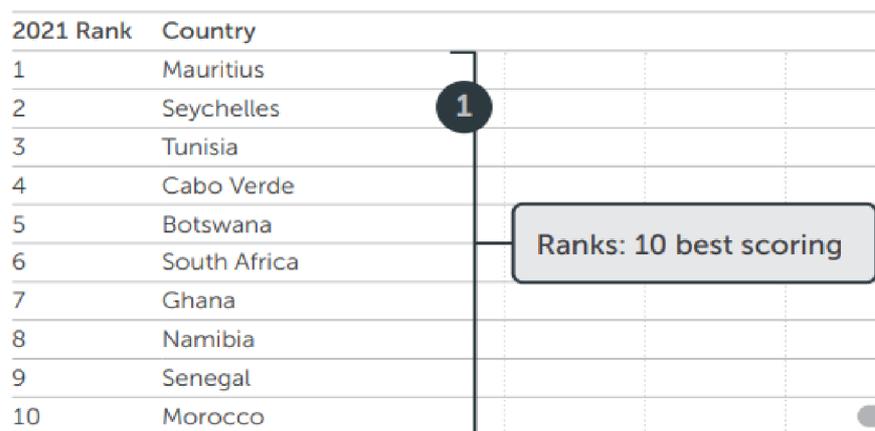
2.3.1 African Social Development Index (ASDI – 2013)

The Economic Commission for Africa (ECA) developed the African Social Development Index (ASDI), which assesses social advancement across five dimensions: human development, social welfare, productive activity, basic infrastructure, and institutional capacity. The index considers a variety of factors, including life expectancy, literacy rates, employment, access to energy, and political stability. The ASDI gives a thorough assessment of Africa's social progress, accounting for variables other than economic growth (AUC; UNDP, 2018). Correspondingly, the Index is concerned with human inclusion throughout the life cycle. Its adaptation to Africa's development concerns allows it to capture the specific expressions of exclusion that African countries face today as they transform. The indicators were chosen through high-level consultations with member states, and weights were defined using strong statistical approaches (Principal Component Analysis and Factor Analysis) (UNECA, 2013). The Index measures existing disparities and patterns of exclusion within African countries and among various demographic groups. It also evaluates national efforts and the efficacy of social policies in decreasing human exclusion over time (UNECA, 2013).

2.3.2 Mo Ibrahim African Index of Governance

The IAG assesses the quality of governance in African countries using four dimensions: safety and rule of law, participation and human rights, sustainable economic opportunity, and human development. The index considers a variety of indicators, including political rights, corruption, the business environment, and health results (Mo Ibrahim Foundation, 2022). The index encompasses all 54 African countries in its assessments (Mo Ibrahim Foundation, 2016). In its recent iteration, the 2022 IAG comprises of 54 African countries and a collection of 265 variables from forty-seven sources and eighty-one indicators, 95% of which are clustered to provide governance evaluation supported by various proxy measurements (Mo Ibrahim Foundation, 2022). The IAG is considered as one of Africa's most comprehensive governance indicators. According to the Mo Ibrahim Foundation, governance is defined as the provision of political, social, economic, and environmental public goods and services that are deemed to be the fundamental rights of every citizen, and the responsibility of the state to ensure provision of these services to her citizens (Mo Ibrahim Foundation, 2010). The best and worst African countries based on the IAG ranking is illustrated in Fig 2.1 and 2.2 below.

Fig. 2.1: Best Ranking African Countries in IAG (2021 IAG Scores)



Source: Ibrahim Index of African Governance Methodology Report, 2022

Fig. 2.2: Worst Ranking African Countries in IIAG (2021 IIAG Scores)



Source: Ibrahim Index of African Governance Methodology Report, 2022

2.3.3 The African SDG Index

The African SDG Index, developed by the Sustainable Development Solutions Network (SDSN), tracks Africa’s progress towards meeting the Sustainable Development Goals (SDGs). The index considers variables including the prevalence of poverty, access to healthcare and education, and environmental sustainability. As part of the 2030 Agenda for Sustainable Development, the United Nations established a set of seventeen goals known as the SDGs in 2015 (United Nations, 2014). The African SDG Index tracks advancement on ninety-seven variables across the seventeen goals to determine how far Africa has come in reaching these objectives. The indicators were chosen based on their applicability to Africa as well as the quantity and quality of available data. The African SDG Index gives decision-makers a tool to evaluate the SDGs' progress and pinpoint areas that require more focus and financing. The index can be used to assess progress across nations and regions as well as to pinpoint best practices.

2.4 Social Progress Index—Theoretical Background

The Social Progress Index utilizes a set of twelve components to measure the three dimensions of social progress. Figure 2.3 provides a detailed overview of the component-level framework of the SPI, and shows the questions that SPI tends to address through its measurement. First, the Basic Human Needs dimension gauges whether the basic social requirements of individuals are being adequately addressed. The Foundations of wellbeing dimension evaluates whether a society has the necessary elements to augment and maintain wellbeing. The Opportunity

dimension assesses the extent to which a given society offers adequate opportunities to its populace to achieve their full potential (Social Progress Imperative, 2022).

Fig. 2.3: Social Progress Index Component-Level Framework

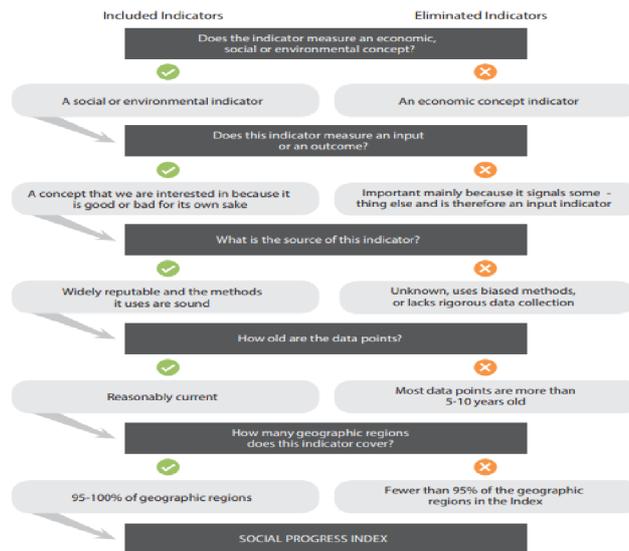


Source: Social Progress Imperative, 2022

2.4.1 SPI Indicator Selection

As shown in Figure 2.4, the global SPI 2022 uses the five principles in the selection of the indicators used in the index construction. Based on the principles, the indicators selected must be a social or environmental indicator, and the indicators should be of high quality that are measured with a consistent methodology globally. Also, the indicators utilized are based on outcomes and directly assess social progress, rather than relying on economic proxies (Social Progress Imperative, 2022).

Fig. 2.4: SPI Indicator Selection Tree



Source: Social Progress Imperative, 2022

Based on these principles, the 2022 global SPI employs a set of sixty indicators to represent the 12 components, with each component being characterized and assessed through 4 to 6 indicators. The selected indicators possess a uniform data source globally. The data sources used are from verifiable and reputable sources including global institutions, Non-Governmental Organizations, and global surveys (Social Progress Imperative, 2022). Figure 2.5 illustrates the selected indicators employed in the construction of the 2022 Social Progress Index.

Fig 2.5: Social Progress Index Indicator Level Framework



Source: Social Progress Imperative, 2022

2.5 Western Bias: Definition

Western bias refers to the privilege of Western perspectives, norms, and values in the production and dissemination of knowledge, often resulting in the marginalization or erasure of non-Western perspectives and experiences (Wallerstein, 1999). Said (1978) defines western bias as the tendency to view the world through the lens of Western civilization, history, and culture, and to generalize these perspectives as universal. This definition depicts the superiority of Western perspectives and ideologies as being the acceptable and universal standard. More so, Chimakonam (2019) describes Western bias as set of assumptions, values, and priorities that are commonly held in the Western world and that can limit the ability of individuals and societies outside the West to participate in and shape global discourse and decision-making. Nakayama and Halualani (2010) define Western bias as the tendency to see Western societies, values, and practices as normative and superior to other cultures, leading to the marginalization or exclusion of non-Western perspectives and practices.

Wallerstein (1999) argues that Western bias is an inherent characteristic of the modern world system, which is dominated by a Western-centric view of the world. This can be traced back to the eighteenth century where Enlightenment thinkers established a model for intellectual thoughts globally through the instilling of rationality, scientific principles, secularism, and modernity within respective societies (Craig et. al., 2008). This ideology gained relevance

owing to Europe's global dominance through colonization, economic productivity, military might deployment, and state formation (Osterhammel, 1998). This era had paved way for the emergence of the post-Enlightenment era, characterized by the dissemination of Western intellectual thought and its associated practices of power. This was accompanied by the marginalization and subordination of all other non-Western forms of knowledge, as Western perspectives were projected as the most legitimate worldview for conceptualizing and adapting to the universal self (Craig et al., 2008). As such, the accomplishments and advancements made by African societies and other civilizations have been disregarded due to the dominant influence of the post-Enlightenment narrative (Arowosagbe, 2014).

More so, Said (1978) posits that Western bias could be a product of Orientalism, a system of thought that represents the Orient (non-Western societies) as being passive and inferior in contrast to the superior West. Overall, bias can take different forms, including Afrocentrism, Eurocentrism, and Orientalism, as these ideologies reflect a particular way of understanding and representing non-Western societies in relation to Western ones.

Afrocentrism is an ideology that places Africa and its people at the centre of historical and cultural development, highlighting their contributions to human civilization. According to Asante (1987), Afrocentrism seeks to redress the Eurocentric bias that has dominated Western domain for centuries, by promoting a positive image of Africa and challenging the notion of European superiority. However, critics argue that Afrocentrism can be just as biased as Eurocentrism, as it tends to essentialize African cultures and overlook the diversity and complexity of the continent (Mudimbe, 1988). On the other hand, Eurocentrism refers to the view that European culture, history, and values are superior to those of other cultures. This ideology has been pervasive in Western sphere since the colonial era, as Europeans sought to justify their domination over non-European societies (Said, 1978). Eurocentrism often involves the universalization of European experiences and values, and the marginalization or erasure of non-European perspectives and contributions (Quijano, 2000). This can lead to a distorted and incomplete understanding of non-Western societies. Also, orientalism is a specific form of Eurocentrism that focuses on the representation of the East (Asia, the Middle East, and North Africa) as passive in contrast to the active and rational West. Said (1978) argues that orientalism is not just a collection of facts about the Orient, but a discourse that creates and perpetuates a particular image of the East as a backward and primitive region that requires

Western intervention and control. This discourse has been used to justify colonialism, imperialism, and other forms of domination over non-Western societies. To address Western bias, it is necessary to recognize the diversity and complexity of non-Western societies and to promote a more inclusive and equitable approach to knowledge production and consumption.

2.5.1 Western Bias in Social Measurement

Over time, various scholars have identified bias reflected in social measurement tools. The concept of Western bias in social measurement refers to the tendency of Western-designed methodologies and indicators to reflect Western cultural and ideological assumptions and priorities. Western-centric methodologies and indicators often fail to capture the unique cultural and social contexts of non-Western societies, leading to distorted and incomplete assessments of social progress. This bias is evident in many social measurement tools, including the Human Development Index (HDI), which is widely used to measure social progress. The HDI incorporates indicators such as life expectancy, education, and income, which reflect Western cultural values and may not reflect the priorities and values of non-Western societies (Mignolo, 2011).

In measuring social indicators as it relates with Africa, the question of who is qualified to speak for Africa begs for an answer as Western intellectuals portrays their social values and perspectives as being the global standard for the rest of the world (Arowosagbe, 2014). More so, we can ask what is the optimal approach for constructing a social measurement representing Africa? Arowosagbe (2014) argues that the responses to these inquiries, coupled with the ideological conflicts that underly the research conducted on Africa, elucidate the schism between African academics and their international counterparts.

The implications of Western bias in social measurement for Africa are significant. African societies have unique cultural and historical contexts that require social measurement tools that reflect their unique perspectives and values. Western-centric social measurement tools may lead to distorted assessments of social progress and fail to capture the complex realities of African societies. Moreover, Western-centric social measurement tools may perpetuate power imbalances and reinforce the dominance of Western cultures and ideologies (Mignolo, 2011). As such, it is imperative to ensure measurement of social and development factors that is

contextualized to avoid the erroneous generalization from one context to another without critically considering the unique case situations and peculiarities.

With the prevalence of global indicators that are specific to Western modernity being incorporated into social measurements, it is probable that Western modernity and values will continue to serve as a standard for progress among various stakeholders, and policy measures will be oriented towards it (Reddy and Lahoti, 2016). To ensure statistical viability for a broad spectrum of development trajectories, it is critical to de-Westernize the notion of Western values being universal (Ward, 2004). Mahlert (2018) supports the argument for the de-Westernization of global indicators as he claims that there is a need to differentiate between universal dimensions of well-being and specific methods of achieving them, most especially those incorporated in Western values, as this will render global indicators relevant to non-Western countries (Mahlert, 2018). However, to truly address Western bias in social measurement, there is a need for ongoing reflection and dialogue about the underlying assumptions and values that shape our understanding of social progress.

2.5.2 Possible Western Bias in the Social Progress Index

The twelve components of the Social Progress Index that measure its dimensions provide a thorough and rigorous characterization of social progress, and they play a significant role in establishing SPI as a holistic measure (Social Progress Imperative, 2022). However, there have been criticisms that the global SPI are based on Western values (Ruggeri, 2018). This necessitates an evaluation for the possibility of Western bias in the Social Progress Index.

Since the SPI is primarily based on indicators that are often collected and standardized in Western countries. This may lead to a possible bias towards Western perspectives and values, thereby ignoring or undervaluing social progress indicators that are more relevant or significant in non-Western contexts. This is evident in the SPI's indicator selection, which may reflect Western priorities and ideas about what defines social progress.

For instance, a detailed look at the indicators in the Inclusiveness component of the Social Progress Index, one could argue on what should constitute the indicators for the component. Acceptance of homosexuals and lesbians is one of such indicators in the component that could result in a probable bias. This, however, may not be universal globally, particularly among non-Western countries with cultural norms that differ from those of Western civilizations. This begs

the question of what should be measured to capture inclusiveness among countries, and how can such concept of inclusiveness be representative and universal among all countries? (Gupta et al., 2015). This is a major question that needs to be addressed in the global SPI measurement. The question on whether these indicators capture inclusiveness globally should be examined and answered. To answer this question, there is a need to define inclusiveness, what it constitutes globally, and how it can capture varying societal realities to give a better representation and relevance globally. This may be a challenging task due to the availability of data sources that could capture this concept globally.

More so, assessing the Access to Basic Knowledge component, some of the indicators may not fully capture the educational realities in non-Western contexts. For instance, it could be argued that SPI prioritizes formal education systems and overlooks the significance of informal or traditional knowledge transmission practices that are prevalent in non-Western societies such as Africa. Also, this can be the case in the Personal Rights component, where the interpretation of the indicators is influenced by Western perspectives and legal frameworks that may overlook the unique social, political, and cultural dynamics of non-Western societies, potentially leading to an incomplete or unfair assessment of social progress.

2.6 Gaps in the Literature of Social Progress in Africa

Measuring social progress in Africa has proven to be a herculean task owing to the promotion of Western values as being universal. As such, there will be need for a measurement of social progress in Africa that will capture the reality of Africans and encompass policy priorities that are fundamental in the progress of the continent. The study will attempt to address the issue of Western bias in its measurement of social progress through the following ways. First, the study will ensure a thorough indicator selection that are well fitted in defining Africa's context of social progress. Second, the study will ensure the calibration of the Index to capture the reality of Africa, and compare only African countries against each other, that is, not comparing them against the rest of the world which could hide the significant variability of social outcomes of African countries.

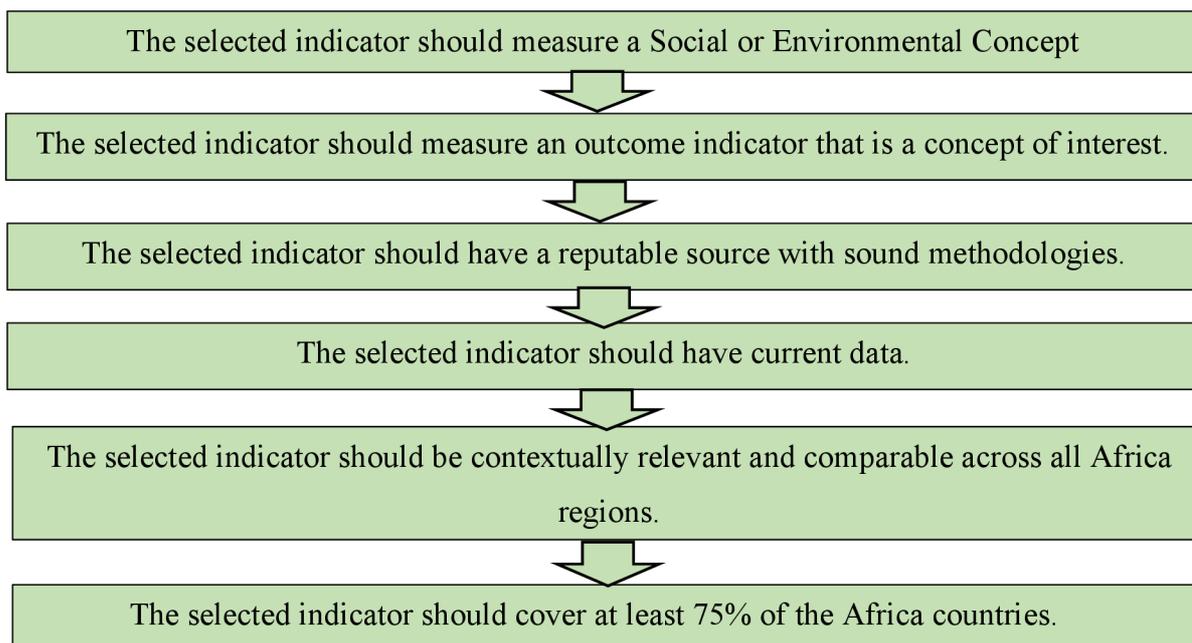
3.2 Indicator Selection

The selection of specific indicators entails the establishment of priorities and objectives, as it determines what is deemed significant, as one is defining goals. For an indicator to be useful, it must exhibit reliability and consistency, and the fundamental data must be accessible in a timely manner and at a suitable scale and scope. Furthermore, it is imperative that an indicator effectively communicates information to facilitate informed decision-making or to assess advancements made towards predetermined objectives. Based on this underlying, the study employed the conceptual framework of the Global SPI. Also, the study explored extensive data from multiple sources in selection of indicators that are important in defining the contextual realities of social progress in Africa, while retaining some indicators from the Global SPI that is also relevant for Africa. This section will discuss the Indicator Selection Framework and the various data sources adopted for the indicator selection, and the relevance of the selected indicators in capturing social progress in Africa.

3.2.1 Indicator Selection Framework for SPI-Africa

When defining social progress, answering the question of what should be measured and monitored is fundamental. To answer this question, a conceptual framework is needed that outlines the issues and dimensions of measurement that the indicators system will cover (Noli et al, 2010). In the indicator selection for the construction of SPI-Africa, the Global SPI concept, structure, and methodology was borrowed with few alterations to suit the African reality of social progress. The framework has been designed to ensure a minimum country coverage of 75%, owing to the challenges of data availability in Africa. The Global SPI framework provides a data coverage of 95% (Social Progress Imperative, 2022), whereas the JRC-COIN (JRC-COIN, 2021) on composite index construction allows for a data coverage of 50%. Therefore, this research falls under the purview of permissible data coverage authorization.

Fig. 3.2: SPI-Africa Indicator Selection Framework



Source: Author's Illustration

The selection framework emphasizes on the need for selected indicator to be contextually relevant and comparable across all geographical regions, as this is important in the measurement of social progress of Africa, as we aim at capturing the various diverse realities and translating them to policy priorities for implementation and advancement of the African people. This is evident in the construction of Social Progress Index in South Africa Provinces, as indicators which were of high policy priorities in South Africa were adopted such as the School Nutrition Programme Beneficiaries (Nutrition and Basic Medical Care), RDP Houses with compromised walls (Shelter), suicide rate (in Health and Wellness), Malicious Damage to property and other issues with personal safety as there is believed to be high levels of crime in South Africa (IQ Business, 2018). Also, in the EU-Social Progress measurement, indicators which are believed to be relevant for social progress within the EU regions were adopted such as housing quality due to dampness, which is an issue in Eastern Europe with consequential impact on respiratory diseases for children. Furthermore, other indicators such as Volunteering, making friends, tolerance towards immigrants, Leisure activities (for Health and Wellness) among other indicators were adopted (EU Commission, 2020).

3.2.2 SPI-Africa Indicator Level Framework

In constructing the framework for indicators in the SPI-Africa, the measurement adopted the dimensions and components from the Global SPI framework but adjusted for indicators that are contextually relevant in defining social progress realities in Africa. The Indicator Level Framework consists of fifty-three (53) indicators, with each component having four (4) to six (6) indicators.

Table 3.1: SPI-Africa Indicator Level Framework

Basic Human Needs	Foundation of Wellbeing	Opportunity
Nutrition and Basic Medical Care	Access to Basic Knowledge	Personal Rights
Maternal Mortality Malaria Under-five Mortality Undernourishment	Educational Equality Primary School Enrolment Proportion of people with No Education Out of School Children Secondary School Attainment	Freedom of Religion Freedom of Assembly Access to Justice Property Rights Freedom of Discussion Political Rights
Water and Sanitation	Access to Information & Communication	Personal Freedom and Choice
Access to Basic Sanitation Service Access to Basic Drinking Water Access to Handwashing Facilities Unsafe Water, Sanitation and Hygiene	Internet Users Access to Mobile Internet Mobile Phone Subscribers Access to Online Governance Internet Censorship Effort	Early Marriage Satisfied Demand for Contraceptives Freedom from Forced Labour Corruption
Shelter	Health and Wellness	Inclusiveness
Access to Electricity Access to Clean Cooking fuel and technology Household Pollution Population Living in Slum	Health Equality Access to Healthcare Immunization Satisfaction with quality of health	Exclusion by Socioeconomic Group Exclusion by Gender Exclusion by Urban-Rural Location Exclusion by Political Group
Personal Safety	Environmental Quality	Access to Advanced Education
Political Violence Conflict and Terrorism Transportation Injury Physical Violence Occupational Injury	Lead Exposure Non-Optimal Temperature Ambient Ozone Pollution Outdoor Air Pollution	Citable Documents Tertiary School Life Expectancy Women with Advanced Education Quality Weighted Universities

Source: Author's Illustration

3.3 Brief Discussion on the Relevance of Selected Indicators for Africa

In defining the realities of social progress, we ensured that indicators relevant for African countries were included into the framework. The relevant indicators selected in various components are discussed in the next section.

Malaria: Nutrition and Basic Medical Care (NBMC)

Malaria has been a critical issue among African countries due to the tropical weather and has caused a high disease of burden in the region. Globally, an estimation of 247 million malaria cases were recorded in 2021, with 234 million of such cases being recorded in Africa. African region accounts for about 95% of global cases, and countries such as Nigeria (27%), Democratic Republic of the Congo (12%), Uganda (5%) and Mozambique (4%) accounts for half of all malaria cases globally (WHO, 2022). The increase in malaria cases in Africa has resulted in 593,000 deaths, with 78.9% of deaths observed in children below the age of 5 (WHO, 2022). As such, malaria endemic has been an issue in Africa and has contributed negatively to social progress, with its adverse effects on children who are not able to access adequate medical care resulting in death.

Population Living in Slum: Shelter

Exacerbating socioeconomic conditions among people in Africa has resulted in increased migration of people from rural areas to urban areas in search of better opportunities. This has consequentially impacted the increase in the high number of people in urban areas living in slums under poor conditions. Globally, there has been an increased proportion of urban population living in slums, with high prevalence in Eastern and South-Eastern Asia (370 million), sub-Saharan Africa (238 million) and Central and Southern Asia (226 million) (UN-STAT, 2021). With the slums characterized by dense population, poor living conditions, and poor access to basic amenities, it has impacted social progress negatively among Africans (Marx et al., 2013).

Conflict, Terrorism and Political Violence: Personal Safety

There has been an increase in levels of violence, conflicts, and terrorism in Africa which has resulted in deteriorating security of lives and properties in Africa (Mo Ibrahim Foundation, 2022). Overtime, there have been insurgent groups in the eastern Democratic Republic of Congo and violence due to political transitions in Ethiopia and Sudan, which has resulted in

mayhem for citizens and residents of such countries. Furthermore, there have been consistent fight against terrorism in Somalia, Burkina Faso, Nigeria, Mozambique, Burundi, Niger, Chad among other countries due to the expansion of Islamic State (ISIS) and other terrorist groups such as Boko Haram, al-Shabaab, al-Qaeda (Peace Research Institute, 2021). The increase in conflict, terrorism, and political violence in African countries has impacted social progress negatively, with adverse effects on citizens.

Out of School Children: Access to Basic Knowledge

Globally, 244 million children and youth between the ages of 6 and 18 were estimated to be out of school in 2021 (UNESCO, 2022). Sub-Saharan Africa is characterized as the region with the highest and significant growth in out-of-school population. There has been significant increase in out-of-school population from 20 million in 2009 to 98 million in 2021, with the challenge being among adolescents and youth whose out-of-school rates have stagnated since 2010 at 33% and 48% respectively (UNESCO, 2022). The increase in out of school children has negatively impacted social progress in Africa, leaving many of Africa's young populace with no access to basic knowledge and vulnerability to crime and social vices.

Exclusion by Socioeconomic Group, Political Group, Urban-Rural Location, and Gender: Inclusiveness

Inclusiveness has been a matter of significant importance for Africa as many individuals have been disadvantaged based on social identity such as gender, age, sexual orientation, religion, ethnicity, and various social groups (World Bank, 2020). Inclusiveness in Africa is based on power relationships as attitudes, beliefs, and perceptions have been pertinent in societies decision in exclusion by gender, urban-rural location, and socioeconomic and political group. One of such evidence is in exclusion by urban-rural location as majority of Africa's population live in rural areas, and there have been significant rural-urban divide with the population in rural areas lacking access to basic amenities and other opportunities as compared to urban population (Scheil-Adlung, 2015). More so, there have been issues of exclusion by socioeconomic group as evident in South-Africa, where non-white women and those living in rural areas are less likely to receive antenatal care and pregnancy delivery assistance as compared to white women and those living in urban areas (Silal et al., 2012). As such, the issue of inclusiveness is important as it has a profound impact on the social progress of African

countries as exclusion could have long-term devastating effects on dignity and mindsets of excluded groups in the society (World Bank, 2020).

Chapter Four

Methodology

The study adopted the standard methodology used in the construction of the global Social Progress Index. This section will discuss extensively the steps used in the construction of the index for measuring social progress in Africa, SPI-Africa. It will explore issues of data treatment and data transformation, and the calculation of the component scores, dimension scores, and index scores. Also, it discusses on the Principal Component Analysis, the methodology used in the aggregation of the various indicators. Furthermore, it discusses the statistical integrity of the index through the usage of Cronbach's Alpha and Kaiser-Meyer-Olkin measure of sampling adequacy.

4.1 Data Treatment

Prior to the calculation of the index, we ensured data alignment by ensuring the data coverage for all indicators are identical to allow for ease of comparability and analysis. In the study, we ensured a data alignment for all indicators and African countries from 2013 to 2022 by shifting the years for some indicators forward to ensure data consistency among all countries and indicators. For instance, in the Institute of Health and Metrics Evaluation (IHME) data source, we were able to extract data from 2010 to 2019 for our analysis. As such, to ensure data alignment, we shifted the time value by 3 years, so we have $t_2 = t_1 + 3$. This procedure was also carried out for other indicators and data sources to ensure consistent data alignment.

More so, issues of missing values and outliers were treated to ensure completeness, consistency, and reliability of the index. The sections below will discuss extensively the process conducted for data treatment on missing values and outliers.

4.1.1 Missing Values

In the Indicator Selection Framework as discussed in Section 3.1, one of the criteria for selection of indicators is for the indicator to have a data coverage for at least 75% of the African countries. Due to this flexibility in our indicator selection, we had issues of missing values for some indicators as some countries do not have data available or incomplete reporting by the country.

In situations of missing values, such missing data can be classified into three distinct categories based on the plausible causes (Little and Rubin, 1987). The first type of missing data, known as Missing Completely at Random (MCAR), is characterised by the absence of any observable relationship between the missing data and both observed and unobserved factors (Rubin, 1987). The phenomenon of Missing at Random (MAR) represents a type of missing data that is contingent upon observed factors and remains uncorrelated with the unobserved data, as per Zhu's (2014) findings. According to Kang's (2013) explanation, missing at random (MAR) pertains to a situation wherein the likelihood of missing responses is contingent on the observed responses, but not on the actual missing values that are anticipated to be acquired. Accordingly, he proposes that this data category is a result of randomness. Nonetheless, given that randomness alone may not necessarily result in bias, it is imperative to avoid disregarding missing data and instead employ diverse techniques for managing missing data, as suggested by Kang (2013). The Missing Not at Random (MNAR) is a type of missing data that arises when the missingness is related to both observed and unobserved factors (Zhu, 2014). Missing Not at Random (MNAR) data can lead to biased estimation unless the missing data is appropriately modelled (Kang, 2013).

For this study, the missing data type is MAR, as some data values were missing at random due to the issue of incomplete reporting at the country level and other random data availability issues. Collins (2001) posits that in most research, the MAR approach is more plausible than MCAR in practice and can be dealt with using various missing data handling approaches. The global SPI employs various imputation approaches before and during the index construction which will be discussed in the next section.

4.1.2 Data Imputations

In the global SPI, missing data are imputed before calculations under two distinct scenarios. The first scenario pertains to instances where a country lacks certain, but not all indicators within the time analysed. The second scenario pertains to situations where there exist gaps in the years of data for the indicators (Social Progress Imperative, 2022). The global SPI ensures that missing values are few to maintain the statistical quality of the index.

In the study, we had indicators with missing values for some countries. The missing values in our dataset fell into the two scenarios identified by the global SPI, and they were treated accordingly. The data imputation approach for handling the missing value is discussed below.

4.1.2.1 Carry Back Future Value & Carry Forward Historical Value

To treat the missing data in our study, we carried back future value for missing data used in the calculation of our index to ensure consistency. More so, we carried forward historical value in indicators where historical data is available. In the methodology of global SPI, they carry values forward or backward for five consecutive years at maximum (Social Progress Imperative, 2022). This imputation approach differs from the Last Observation Carried Forward (LOCF) approach, which substitutes the latest observed value for missing data (Kang, 2013).

4.1.2.2 Linear Interpolation

Based on the second scenario of imputations prior to calculations, linear interpolation was used in imputing gaps between years to ensure smoothing of year-to-year estimates. Linear interpolation estimates missing values based on the assumption of a relationship between a set of data points by using historical and future known data points, where only the prior values are considered for imputing missing values (Satyam, 2022).

4.1.2.3 Regression Imputation (during calculations)

Regression imputation was employed to impute data for countries that exhibit no more than one missing value per component in each of the twelve components. In the global SPI methodology, prior to the regression imputation, they categorized countries based on the number of missing values per component in each of the twelve components. Countries that have no more than one missing data point were classified as ranked countries while countries that have no more than one missing indicator data point in nine to eleven components were classified as partial countries (Social Progress Imperative, 2022). The regression imputation method involves performing a regression analysis on each indicator, using the remaining indicators within a given component as predictors (Kang, 2013). This approach is based on the data obtained from sample countries. Regression imputation has advantages as it retains a substantial amount of data compared to the listwise or pairwise deletion methods, while also preventing significant changes in the standard deviation and shape of the distribution (Acock, 2005). Overall, regression imputation increases the sample size and reduces the standard error.

4.1.3 Data Transformations

After the pre-calculation imputations have been completed for the fifty-three indicators, there is a need to transform the data before aggregation. First, there is a need to identify and treat extreme values (outliers) in the data to avoid distortion in the final values of the index. Treating outliers arising from either a distribution of values with heavy tails or measurement errors is essential as they have the potential to introduce bias in the descriptive statistics and correlations (JRC-COIN, 2021). The global SPI employs two approaches to normalize indicators that exhibit skewed distributions. The first method involves imposing a cap on the indicator by establishing an upper or lower boundary, while the second method involves log transformation of the indicator (Social Progress Imperative, 2022). The selection of the data transformation techniques is determined based on the distribution of the indicator. Indicators are transformed using capping to reduce the impact of a small number of outliers in the data. However, log or square root transformation is used in situations where the indicators are heavily skewed for which the caps will not be able to solve the problem (Social Imperative, 2022).

In the construction of the Social Progress for Africa, the two approaches of the global SPI alongside the use of square root transformation, as a square root transformation results in less skew and increase uniformity of variance (Kiely et al., 1995). We determined the indicators that required transformation by assessing the skewness and kurtosis of the indicator as recommended by JRC-COIN. Based on the JRC-COIN recommendation, there is a presence of outliers and the need for transformation if the absolute value of skewness is greater than two and the value of kurtosis is greater than 3.5 (JRC-COIN, 2021).

In our study, we further evaluated the skewness of the indicators to determine the need for transformation by classifying them into ‘highly skewed,’ ‘skewed,’ and ‘not skewed.’ Indicators are classified as ‘highly skewed’ if the absolute value of the skewness is greater than 2.5, and ‘skewed’ if the absolute of the skewness is greater than 1.5, and not skewed if otherwise. As such, based on this approach, we were able to determine the indicators that need to be transformed based on their skewness and kurtosis. Appendix B shows the values of skewness and kurtosis for all indicators and highlights those who met the stated conditions. Based on the conditionalities, we identified nine indicators that need to be transformed.

4.1.3.1 Capped Indicators

In treating outliers, we employed the use of capped indicators by setting an upper and lower boundary on the indicators. In our study, Ambient Ozone Air Pollution in Environmental Quality, Mortality due to unsafe water, sanitation and hygiene in Water and Sanitation, Transport Injury in Personal Safety were capped at 99th percentile to reduce the influence of few significant outliers as shown in Table 4.1

Table 4.1: List of Capped Indicators

Indicator	Cap
WASH Mortality	Capped to 89.82692 (Upper Cap)
Transport Injury	Capped to 4062.827 (Upper Cap)
Ambient Ozone Pollution	Capped to 98.50391 (Upper Cap)
Political Rights	Capped to 0 (Lower Cap)

Source: Author's Elaboration

4.1.3.2 Log-Transformed Indicators

Log transformation of an indicator makes the indicator's distribution spread more uniformly across the scale. Contrary to capping which only affects outliers, log transformation affects all the indicator's values while still maintaining the order relation of the values (JRC-COIN, 2021). We decided to log-transform the indicators based on the global SPI methodology if the outliers are believed to represent a distinctive feature of the countries they describe and must be retained (Social Progress Imperative, 2022).

Three indicators were log-transformed, Conflict and terrorism in Personal Safety, Citable documents, and Quality weighted universities in Access to Advanced Education. Before the log transformation, an alpha of 0.01, 0.1, and 1 percentage points was added to the indicators of citable documents, quality weighted universities, and conflict and terrorism respectively. Log-transforming these indicators allows us to maintain a distinctive variation in performance among countries, while concurrently establishing a more rational distribution that is comparatively less extreme (Social Progress Imperative, 2022).

4.1.3.3 Square Root Transformation

Square root transformation was used in transforming two indicators, Lead exposure and Non-optimal temperature in Environmental Quality. These indicators were too skewed for a cap, but less than the ones that needed the log transformation. The relationship between the variance and mean is removed when a square root transformation is used, and this leads to a less skewed distribution and uniform variance (Bland, 2000).

4.2 Calculation of SPI-Africa

There are five steps involved in the calculation of the Social Progress Index for Africa after the completion of the data treatment and transformation. First, all the indicators need to be calibrated and standardized. We calibrated the index through setting of utopias and dystopias. This process is important in the construction of the index, as the index addresses the issue of possibility of Western bias in the global SPI by calibrating the index to better fit the reality of African countries through the best and worst scenarios and comparing African countries among themselves and not the global standard. Second, indicators that are negatively related to social progress are inverted. Then the indicators are standardized using the z-scores to ensure a comparable scale among the countries. Moving further, we employed the Principal Component Analysis (PCA) to aggregate the indicators into components, then dimensions, then create the SPI scores for the African countries and transforming them. The details of the steps in the calculation of the index are discussed extensively in the next sub-sections below.

4.2.1 Standardization

4.2.1.1 Utopia and Dystopia

Prior to aggregation, all indicators must be transformed onto a single scale by standardisation, which is an essential stage in the construction of a composite index (JRC-COIN, 2021). This study adheres to the global SPI methodology and employs a system of assigning utopias and dystopias to each indicator, representing the best outcomes and worst-case outcomes prior to standardization (Social Progressive Imperative, 2022). The global SPI uses various rules and rationales in the setting of their utopia and dystopia. First, for indicators with pre-defined boundaries (such as indicators from the Variety of Democracy, Summary of Exposure Values among others), the pre-defined boundaries are used to set the utopia (best situation) and dystopia (worst situation). Second, the global SPI employs the natural boundaries for indicators

with a natural best-case scenario such as maternal mortality, mobile phone subscriptions, among others. More so, in cases where indicators lack a definitive worst-case scenario or where the likelihood of reaching an upper limit is highly improbable, a boundary is established based on the poorest recorded performance five years prior to the initial year of measurement (Social Progress Imperative, 2022).

The global SPI tries to achieve a global standard of measurement and comparable scale which is evident in the rationales behind the setting of utopias and dystopias. The study deviated from the rationales used in the global SPI and used the simplest method of assigning utopias and dystopias, which is the use of the maximum and minimum values from the data as the benchmark for utopias and dystopias. This is imperative as the purpose of the study is to compare African countries among themselves using the best and worst scenarios from the countries and not the global standard scale to capture the realistic measurement of social progress in Africa and address all possibility of Western bias in its measurement. For indicators that have a negative relation with social progress as listed in Table 4.2, the minimum values are utopias, and the maximum values are dystopias.

4.2.1.2 Inversion

After the setting of the utopias and dystopias, some indicators are inverted to ensure their correct orientation with the index. The inverted indicators are those that are perceived to have a negative relationship with social progress, which implies that a higher value of these indicators is associated with a negative impact on social progress. Table A-1 indicates the direction of the relationship between the indicators and social progress, whether positive or negative. 18 indicators were inverted and are listed in Table 4.2 below.

Table 4.2: List of Inverted Indicators

List of Inverted Indicators
Maternal Mortality
Malaria
Under-Five Mortality
Undernourishment
WASH Mortality
Household Air Pollution

Population Living in Slum
Conflict and Terrorism
Political Violence
Transport Injury
Occupational Injury
Out of School Children
No Education
Lead Exposure
Non-Optimal Temperature
Ambient Ozone Pollution
Outdoor Air Pollution
Early Marriage
Exclusion by Socio-economic Group
Exclusion by Gender
Exclusion by Political Group
Exclusion by Urban-Rural Location

Source: Author's Elaboration

4.2.1.3 Z-score Standardization

After the inversion of indicators, the indicators are standardized into z-scores before applying the Principal Component Analysis (PCA). With the standardization, each indicator value is standardized so that the scores have a mean of 0 and a standard deviation of 1 to ensure that the indicators are comparable across the dataset when being measured (Social Progress Imperative, 2022). The equation for standardizing each indicator's values into a z-score is shown below.

$$z_{ij} = \frac{x_{ij} - \mu_j}{\sigma_j} \quad (4.1)$$

Based on this equation, indicator j , z is the z-score of countries i ($i = 1, \dots, n$), x is the value of countries i , μ is the mean, σ is the standard deviation.

4.2.2 Aggregation

This study employs the use of Principal Component Analysis (PCA) in the aggregation of the indicators into components. The concept of the PCA is to apply weights based on the relative contributions of each of the components in explaining their overall variance (Boelhouwer and Stoop, 1999). The methodology of PCA is explained in the next subsections. Also, the

application of PCA in the aggregation into components, dimension and index scores is explained in detail below.

4.2.2.1 Principal Component Analysis

PCA is a statistical technique that is based on the analysis of factors. PCA effectively combines multiple indicators to capture the maximum amount of variance present in the data. This is achieved by minimizing redundancy between the indicators, resulting in a more efficient representation of the data (Vyas and Kumaranayake, 2006). PCA involves assigning weight to each indicator rather than equal weighting to ensure that the indicators contribute significantly to the component score while accounting for similarities between them (Social Progress Imperative, 2022).

The determination of weights for each principal component is based on the eigenvectors of the correlation matrix, or the covariance matrix is used if the original data were standardised (Vyas, 2006). The first generated principal component explains a greater proportion of the total variance from the data, whereas the second component explains a greater proportion of the total variance not captured by the first. (Dantas de Senna et al., 2019).

One of the advantages of PCA is its capacity to identify and explain disparities between areas. In PCA, each of the components is a weighted linear combination of the initial variables (Vyas and Kumaranayake, 2006; Saltelli and others, 2004). More so, PCA allows better comprehension of the data through identification of hidden relationship between the data. Also, it can be utilized as a preliminary approach when the analysis of independent variables is necessary for the final statistical tests (Milewska et al., 2014). However, one disadvantage of the PCA is that the presence of outliers can introduce bad variability in the data and when there is insufficient data, it may be challenging to identify statistical interpretation of unobserved facts (Vyas, 2006). As such, in our study, the issues of missing data and presence of outliers were dealt with before applying PCA.

4.2.2.2 Component Scores

The global SPI used the PCA for aggregation of indicators at the component level due to the quality and availability of data, as PCA ensures accurate measurement of what is intended to measure and ensure consistency across countries (Social Progress Imperative, 2022).

In the study, the PCA produced comparable weights for the indicators included in each of the twelve components due to the implementation of a correlation threshold that ensures a reasonable level of correlation between indicators (neither too high nor too low).

As adopted from the global SPI methodology, formula below represents the aggregation of indicators into a principal component (Social Progress Imperative, 2022).

$$\text{Component value } c = \sum_i (w_i * \text{indicator}_i) \quad (4.2)$$

where c = Social Progress Index Component and i = indicator

Also, a simple min-max formula was used to convert each principal component into a component score on a scale of 0 to 100 based on the global SPI methodology (Social Progress Imperative, 2022).

$$\text{Component score } c = \frac{X_j - \text{Worst Case}}{(\text{Best Case} - \text{Worst Case})} * 100 \quad (4.3)$$

where x = Component value and j = country, c = Social Progress Component Score

4.2.2.3 Dimension Scores

For the calculation of the dimension scores, the arithmetic mean of the four components was used to determine each dimension score.

The formula for calculating the dimension score is given below as adopted from the global SPI methodology.

$$\text{Dimension } d = \frac{1}{4} \sum_c \text{Component score}_c \quad (4.4)$$

where d=dimension and c=component (Social Progress Imperative, 2022).

4.2.2.4 Index Scores

The Social Progress Index score for Africa is calculated as the arithmetic mean of the three dimensions as adopted from the global SPI methodology.

The formula for calculating the overall Social Progress Index score for Africa is given below.

$$\text{Social Progress Index score for Africa} = \frac{1}{3} \sum_d \text{Dimension}_d$$

4.3 Structural Integrity of the Social Progress Index for Africa

Statistical tests were conducted during the indicator selection and index calculation to maintain the Social Progress Index structural integrity. Based on the global SPI methodology, the aim is to ensure that a country's component, dimension, or overall scores are not significantly impacted by any single indicator and that the indicators within each component are statistically related and comparable (Social Progress Imperative, 2022).

To ensure the robustness of the index calculation, several statistical techniques were employed, including the assessment of correlations between indicators and aggregated scores, the computation of Cronbach's alpha, and the application of the Kaiser-Meyer-Olkin sample adequacy test. The study conducted a correlation analysis between the indicators utilising the Pearson Correlation Coefficient, and we ensure that all the indicators are positively correlated. The Cronbach's alpha was computed to evaluate the statistical adequacy of each component, as it quantifies internal consistency. According to Bland and Altman (1997), it is recommended that any suitable grouping of variables should possess an alpha value above 0.7.

More so, we used Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy to assess the goodness of fit, as Cronbach's Alpha do not provide such direct measurement of the goodness of fit of a factor analysis as noted by Manly (2004). Typically, KMO scores are deemed acceptable when they exceed 0.5. The twelve components in our study have been found to satisfy the requirements for the Cronbach's alpha of 0.7 and the KMO of 0.5, as depicted in Appendix H. This indicates that the components exhibit a statistically significant fit and provides a reliable measure of sampling.

Chapter Five

Analysis and Discussion

This chapter presents the results of the Social Progress Index scores for Africa. Also, a comparative analysis was conducted between the 2022 Africa SPI and 2022 global SPI results and assess if the global SPI had a Western bias in its measurement against Africa. Moreover, a trend analysis of Africa's dimension and index scores from 2013 to 2022 was conducted to investigate whether Africa is progressing socially or otherwise over time. Finally, to understand social progress across Africa, regional analysis was done. This chapter presents analytical results with maps and other illustrations.

5.1 Africa Social Progress Index Results

Table 5.1 below shows the 2022 Africa Social Progress Index Scores for the ten top and bottom countries in Africa. We constructed the Social Progress Index for 50 African countries. Comoros, Guinea-Bissau, Libya, and Niger were excluded from the final construction of the index. These countries have adequate data to compute nine to eleven of the twelve components, albeit insufficient data to calculate an overall Social Progress Index score.

Table 5.1 gives the scores and ranking of the top and bottom ten countries scores and rankings across various dimensions and overall Social Progress Index. From the result illustrated in Table 5.1, the top nine ranked countries had an index score above 70, except for Namibia with an index score of 68.77. Also, the top three ranked countries had an index score above 80, which shows a significant level of social progress in these countries. However, the bottom ten ranked countries given a different perception of social progress, as indicated in their low scores. Four out of the ten bottom ranked countries had an index score above 40, with three out of the ten bottom ranked countries scoring below 30.

Table 5.1: Top and Bottom 10 Countries Africa SPI Scores and Rankings

Country	Basic Human Needs		Foundation of Wellbeing		Opportunity		Africa SPI	
	Score	Rank	Score	Rank	Score	Rank	Score	Rank
Top 10 Ranked African Countries								
Seychelles	93.70	1	88.81	2	86.54	1	89.68	1
Mauritius	92.25	3	89.36	1	76.66	2	86.09	2
Tunisia	92.72	2	71.69	7	75.80	4	80.07	3
Botswana	79.86	9	77.83	4	76.15	3	77.95	4
South Africa	80.34	8	78.33	3	73.63	5	77.43	5
Cabo Verde	86.73	7	73.59	6	70.61	7	76.98	6
Algeria	88.70	5	66.36	14	65.69	9	73.58	7
Morocco	87.53	6	66.43	13	65.26	10	73.07	8
Ghana	70.65	13	74.26	5	72.75	6	72.55	9
Namibia	72.38	12	66.47	12	67.47	8	68.77	10
Bottom 10 Ranked African Countries								
Equatorial Guinea	63.42	19	43.75	42	29.84	41	45.67	40
Sudan	58.19	27	40.51	45	30.20	40	42.97	41
Burundi	46.22	41	49.97	37	32.25	39	42.81	42
Mali	51.46	35	41.64	44	35.09	38	42.73	43
Democratic Republic of the Congo	37.81	46	48.88	39	28.82	43	38.50	44
Guinea	43.11	44	41.65	43	25.43	45	36.73	45
Eritrea	47.55	39	39.65	46	13.98	49	33.73	46
Somalia	36.74	48	39.11	47	19.07	47	31.64	47
Chad	35.07	49	33.39	48	18.43	48	28.96	48
South Sudan	36.84	47	29.25	50	12.88	50	26.32	49
Central African Republic	23.40	50	30.44	49	22.93	46	25.59	50

Source: Author's Calculations

Furthermore, Fig. 5.1, 5.2, and 5.3 shows the illustration of the SPI scores for African countries based on the components, dimension, and index scores. The countries were grouped into six equal tiers based on their scores, and the countries with no data were those without complete data to calculate their dimension and overall SPI scores. The map shows how various countries perform across various dimensions in the Social Progress Index, with some countries faring better in some dimensions than others. For instance, Algeria had a score of 88.70 in the Basic

Human Needs but recorded a lower score in Foundations of Wellbeing and Opportunity with a score of 66.36 and 65.69, respectively. This shows that countries perform differently in various dimensions of social progress, and this is an important consideration when formulating a country’s policy recommendations for improving social progress.

Fig 5.1: 2022 Africa Social Progress Index Scores Map

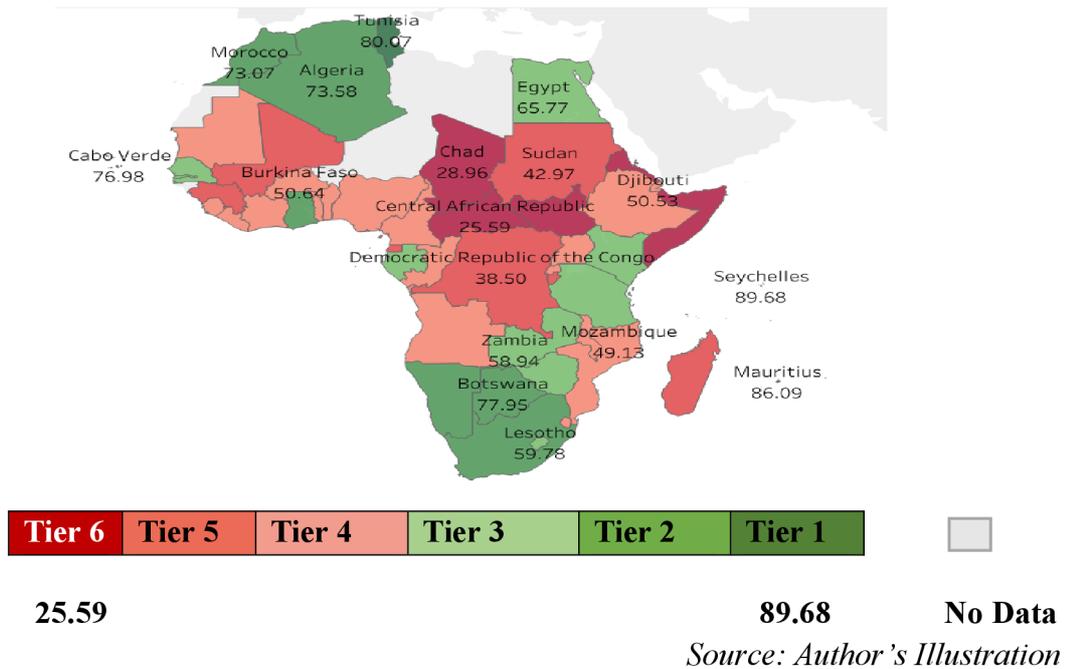


Fig 5.2: 2022 Africa Human Basic Need Scores Map

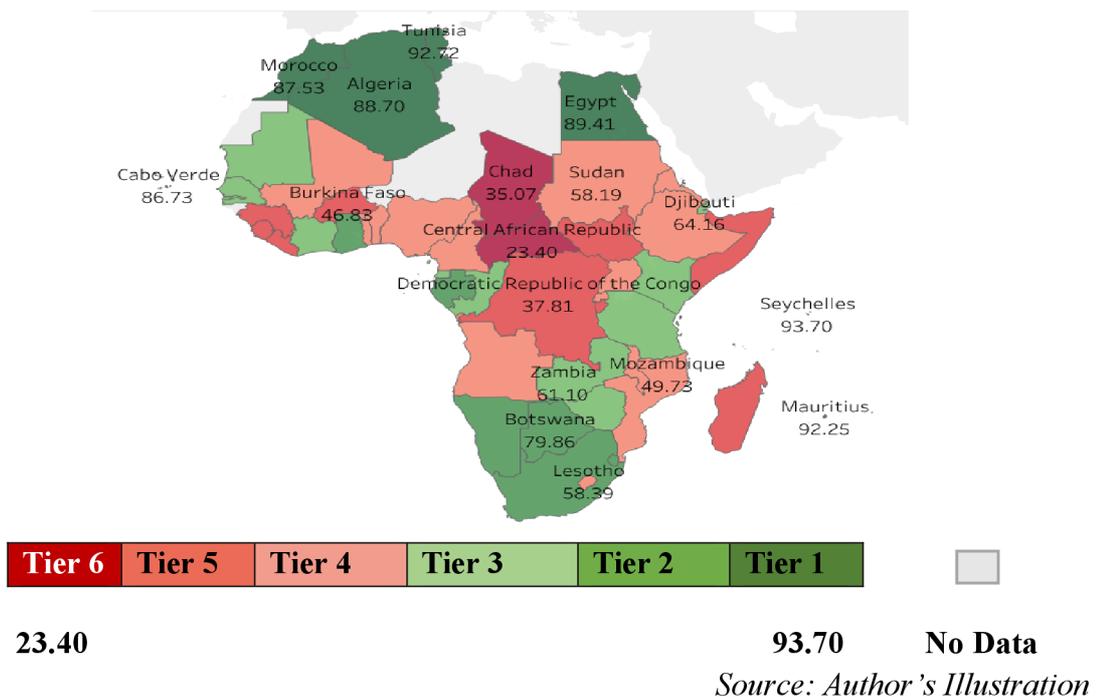


Fig 5.3: 2022 Africa Foundation of Wellbeing Scores Map

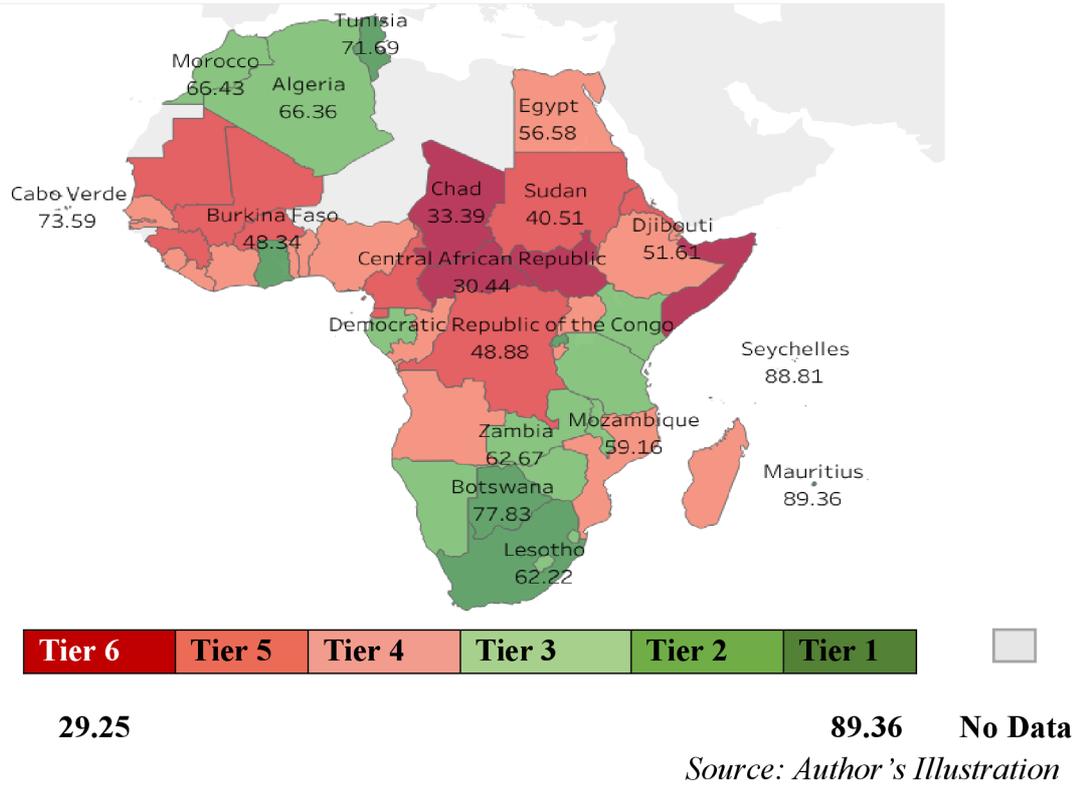
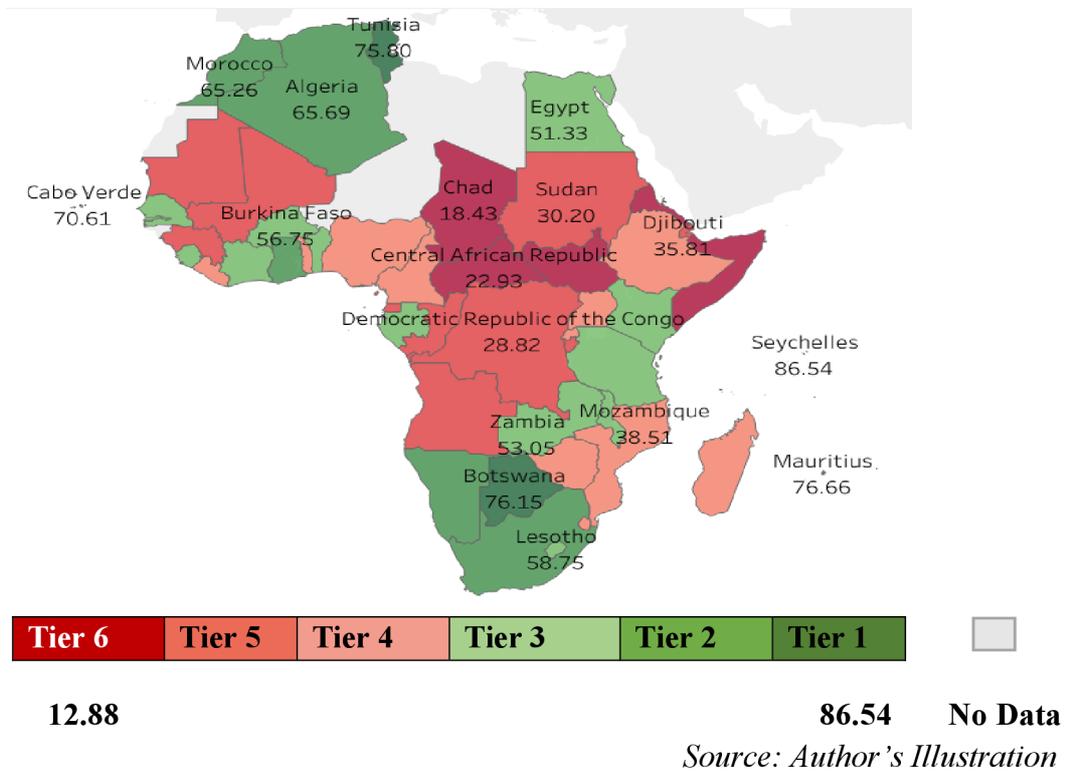


Fig 5.4: 2022 Africa Opportunity Scores Map



5.1.1 Descriptive Statistics of the 2022 Social Progress Index for Africa

Table 5.2: Descriptive Statistics of the 2022 Social Progress Index for Africa

	Mean	Standard Deviation	Minimum	Maximum
Social Progress Index	55.39	15.08	25.59	89.68
Basic Human Need	60.66	16.80	23.40	93.70
Foundation of Wellbeing	57.53	13.47	29.25	89.36
Opportunity	47.99	8.81	28.26	67.53
Nutrition and Basic Medical Care	70.30	15.85	34.35	98.54
Water and Sanitation	52.95	20.40	13.71	98.07
Shelter	53.46	22.68	15.81	99.98
Personal Safety	65.95	16.90	21.63	95.31
Access to Basic Knowledge	56.24	18.33	20.56	92.78
Access to Information & Communication	59.36	18.66	11.48	92.39
Health and Wellness	49.68	17.86	15.78	86.30
Environmental Quality	64.85	12.24	30.11	96.45
Personal Rights	60.60	21.89	7.82	94.03
Personal Freedom and Choice	48.77	20.55	5.92	94.92
Inclusiveness	46.92	23.22	5.27	91.63
Access to Advanced Education	35.66	18.49	10.60	82.21

Source: Author's Calculation

Table 5.2 presents the descriptive statistics of the 2022 Social Progress Index for Africa. From the descriptive statistics, Africa recorded a mean Social Progress Index score of 55.39. Although Africa performed above average on the Basic Human Need and Foundation of Wellbeing dimensions, its performance deteriorated moving towards the Opportunity dimension. Based on the descriptive statistics, Africa had a mean score of 60.66, 57.53, and 47.99 respectively on Basic Human Need, Foundation of Wellbeing, and Opportunity dimensions.

At the Basic Human Need dimension, components of Nutrition and Basic Medical Care and Personal Safety performed well with an average¹ above 60, while the other components of Water and Sanitation, Shelter recorded an average score above 50. More so, at the Foundation of Wellbeing dimension, the Environmental Quality component had a mean score above 60,

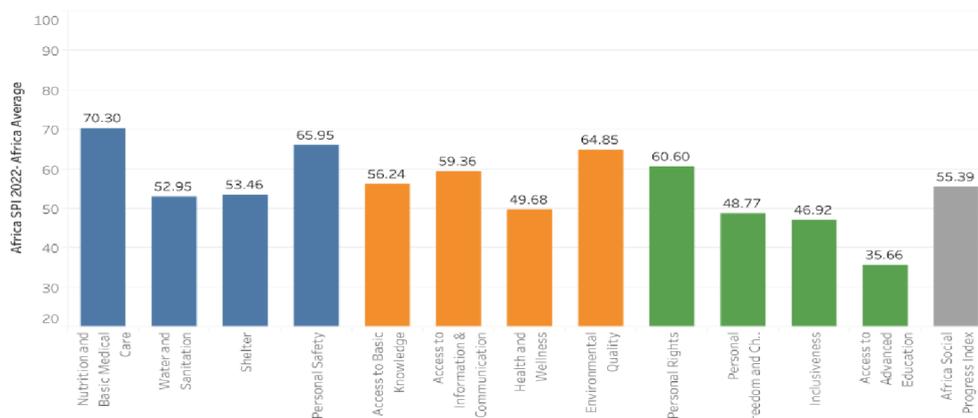
¹ This is a simple average and is not weighted by population.

with the components of Access to Basic Knowledge, Access to Information and Communication recording a mean score above 50 while Health and Wellness had a poor performance evident with the mean score of 49.68, which is below average. Also, the components of Personal Rights in the Opportunity dimension had a mean score above 60, with other components in the dimension deteriorating with mean scores of 48.77, 46.92, 35.66 in the components of Personal Freedom and Choice, Inclusiveness, Access to Advanced Education, respectively.

Despite the average performance recorded across the index, dimension and component scores, the maximum and minimum scores recorded in each component and dimension shows the disparities in performance of African countries in social progress. This implies that some African countries are performing significantly in social progress while others have poor performance, which then cumulatively result in the overall average performance recorded in Africa.

Furthermore, Africa had the highest score in Nutrition and Basic Medical Care component and recorded the lowest score in the component of Access to Advanced Education as shown in Fig. 5.5. Africa recorded an average score above 70 in Nutrition and Basic Medical Care (70.30), with three out of the twelve components has an average score above 60 in Personal Safety (65.95), Environmental Quality (64.85), Personal Rights (60.60), and four components have an average score above 50, while three components have an average score below 50, and only one component with an average score below 40.

Fig. 5.5: Africa Average Scores (0-100) across the 12 Components and 2022 Africa-SPI



Source: Author's Illustration

5.2 Comparative Analysis of the 2022 Africa SPI and 2022 Global SPI

This subsection compares the results of the index, dimension, component scores between the 2022 Africa SPI and global SPI to check for the differences in variabilities in the results and possibility of Western bias in the global SPI measurement.

Comparing the mean differences between the scores of the two indices could be misleading, as it is difficult to compare the scores of two different indices that are calibrated differently (using different Utopia and Dystopia) and employ different indicators. To check for the differences in variabilities between these two indices, we used measures of variability such as range, standard deviation, and Coefficient of Variation. Table 5.3 shows the results of the measures of variability between the Africa SPI and Global SPI.

Table 5.3: Measures of Variability between 2022 Africa SPI and 2022 Global SPI

	Minimum	Maximum	Range	Standard Deviation	Mean	Coefficient of Variation
Social Progress Index Score						
Africa SPI	25.59	86.09	60.50	14.39	54.69	0.26
Global SPI	30.65	75.44	44.79	10.06	52.26	0.19
Basic Human Need						
Africa SPI	23.40	92.72	69.32	16.28	59.99	0.27
Global SPI	28.96	85.83	56.87	12.21	57.96	0.21
Foundation of Wellbeing						
Africa SPI	29.25	89.36	60.11	12.83	56.89	0.23
Global SPI	30.05	75.58	45.53	9.48	52.08	0.18
Opportunity						
Africa SPI	12.88	76.66	63.78	17.29	47.20	0.37
Global SPI	22.25	69.56	47.31	11.72	46.74	0.25
Nutrition and Basic Medical Care						
Africa SPI	34.35	98.54	64.19	15.59	69.78	0.22
Global SPI	36.38	93.37	56.99	11.87	67.22	0.18
Water and Sanitation						
Africa SPI	13.71	98.07	84.37	19.83	52.16	0.38
Global SPI	21.97	94.64	72.67	16.25	59.36	0.27
Shelter						
Africa SPI	15.81	99.98	84.17	22.07	52.60	0.42
Global SPI	21.13	90.27	69.14	17.84	54.83	0.33
Personal Safety						
Africa SPI	21.63	95.31	73.68	16.65	65.42	0.25
Global SPI	35.67	72.17	36.50	8.11	50.41	0.16

Access to Basic Knowledge						
Africa SPI	20.56	90.92	70.36	17.74	55.50	0.32
Global SPI	25.30	88.65	63.35	16.38	57.80	0.28
Access to Information & Communication						
Africa SPI	11.48	92.39	80.92	18.37	58.76	0.31
Global SPI	8.16	83.42	75.26	16.72	52.77	0.32
Health and Wellness						
Africa SPI	15.78	86.30	70.52	17.27	48.95	0.35
Global SPI	18.21	67.91	49.70	9.29	44.67	0.21
Environmental Quality						
Africa SPI	30.11	96.45	66.34	11.87	64.36	0.18
Global SPI	20.35	66.54	46.19	8.23	53.08	0.16
Personal Rights						
Africa SPI	7.82	92.53	84.71	21.58	59.92	0.36
Global SPI	13.07	90.06	76.99	18.92	61.09	0.31
Personal Freedom and Choice						
Africa SPI	5.92	81.38	75.47	19.64	47.83	0.41
Global SPI	28.64	70.68	42.04	11.55	52.04	0.22
Inclusiveness						
Africa SPI	8.37	88.49	80.12	22.40	45.95	0.49
Global SPI	14.13	64.83	50.70	14.36	39.70	0.36
Access to Advanced Education						
Africa SPI	10.60	82.21	71.61	18.26	35.11	0.52
Global SPI	17.64	56.09	38.45	9.60	34.14	0.28

Source: Author's Calculation

From Table 5.3, the Coefficient of Variation (which is the ratio of the standard deviation and mean) shows the differences between relative variabilities of the two indices as it is dimensionless and without any units of measurement. Based on the Coefficient of Variation, there is a difference in variability between the Africa SPI and the global SPI.

In the overall Social Progress Index scores, there is a difference between the coefficients of variations of the Africa SPI and global SPI of 0.07. More so, at the dimension level, the highest difference is exhibited in the Opportunity dimension with a difference of 0.12. The Basic Human Need and Foundation of Wellbeing showed smaller differences of 0.06 and 0.05, respectively. Furthermore, on the component level, the highest difference is evident in the Access to Advanced Education component (0.24). This is followed by the Personal Freedom and Choice, Health and Wellness, Water and Sanitation components with differences of 0.19, 0.14, and 0.11, respectively. The smallest difference is evident in the Access to Information

and Communication component (0.01), followed by Environmental Quality (0.02). In most cases is the variability higher for the African SPI than for the global SPI (except for Access to Information and Communication component, and to some extent Environmental Quality component) which shows a possible bias in the global index against African countries when compared with the African SPI.

To further compare the 2022 Africa-SPI and 2022 global SPI results, we investigated the differences in ranks between the two indices. The global SPI results were filtered only for African countries and ranked according to their overall scores and dimension scores. The assumption is that since only African countries are compared, the rankings of the countries should be the same between these two indices. Table 5.4 shows the differences in ranks in the overall social progress scores between the two indices.

Table 5.4: Differences in Ranks in Social Progress Index Scores

Country	Africa-SPI		Global SPI		Differences in Ranks
	Value	Rank	Value	Rank	
Algeria	73.58	6	65.59	6	0
Angola	48.43	32	46.87	38	6
Benin	57.4	21	55.59	15	-6
Botswana	77.95	3	65.89	5	2
Burkina Faso	50.64	29	49.83	28	-1
Burundi	42.81	41	42.91	42	1
Cabo Verde	76.98	5	69.01	4	-1
Cameroon	47.61	35	51.4	26	-9
Central African Republic	25.59	49	32.39	48	-1
Chad	28.96	47	34.69	47	0
Congo	48.11	33	47.54	34	1
Cote d'Ivoire	56.95	22	54.01	19	-3
Democratic Republic of the Congo	38.5	43	42.7	43	0
Djibouti	50.53	30	49.39	29	-1
Egypt	65.77	12	58.73	12	0
Equatorial Guinea	45.67	39	46.58	40	1
Eritrea	33.73	45	34.85	46	1
Eswatini	56.1	23	49.19	31	8
Ethiopia	47.53	36	47.43	35	-1
Gabon	66.47	11	62.18	10	-1
Gambia	60.78	15	54.68	17	2

Ghana	72.55	8	64.8	7	-1
Guinea	36.73	44	42.41	44	0
Kenya	62.85	13	57.96	13	0
Lesotho	59.78	17	52.9	21	4
Liberia	47.94	34	49.03	32	-2
Madagascar	46.56	38	47.07	36	-2
Malawi	57.57	20	54.29	18	-2
Mali	42.73	42	46.93	37	-5
Mauritania	47.49	37	46.6	39	2
Mauritius	86.09	1	75.44	1	0
Morocco	73.07	7	64.04	8	1
Mozambique	49.13	31	48.27	33	2
Namibia	68.77	9	62	11	2
Nigeria	50.91	28	52.97	20	-8
Rwanda	55.68	24	52.18	22	-2
São Tomé and Príncipe	68.47	10	62.49	9	-1
Senegal	60.72	16	57.7	14	-2
Sierra Leone	51.06	26	50.48	27	1
Somalia	31.64	46	35.85	45	-1
South Africa	77.43	4	69.95	2	-2
South Sudan	26.32	48	30.65	49	1
Sudan	42.97	40	45.41	41	1
Tanzania	61.27	14	54.87	16	2
Togo	53.55	25	51.58	25	0
Tunisia	80.07	2	69.77	3	1
Uganda	51.01	27	49.34	30	3
Zambia	58.94	18	52.07	24	6
Zimbabwe	58.62	19	52.17	23	4

Source: Author's Calculation

As shown in Table 5.4, Cameroon showed the highest differences in ranks with an absolute difference of 9, followed by Nigeria and Eswatini with difference of 8. Countries such as Angola, Benin, and Zambia have a difference in ranks of 6. Conversely, countries such as Algeria, Congo, Democratic Republic of the Congo, Egypt, Guinea, Kenya, Mauritius, Togo did not have any difference in their ranks between the two indices. The differences in ranks across the dimensions between Africa-SPI and global SPI is shown in Appendix F.

Furthermore, we compared the Africa SPI and global SPI using the Spearman rank correlation and differences in ranks as shown in Appendix G. The Spearman Rank Correlation shows that the relationship between the rankings of Africa-SPI and Global SPI are strongly associated. There is a strong association between the Africa-SPI and global SPI overall score ranking exhibited with a Spearman correlation coefficient ($\rho = 0.9766$). Also, there is a strong association between the Africa-SPI and global SPI dimension score ranking exhibited with Spearman correlation coefficients ($\rho = 0.9395$, $\rho = 0.9410$, $\rho = 0.9512$) across the dimensions of Human Basic Needs, Foundation of Wellbeing, and Opportunity, respectively. Moreover, the rank correlation coefficients are statistically significant at 1% with a p-value of 0.000 as shown in Appendix G. Also, a matrix plot was constructed to evaluate the results' consistency; this plot crosses the rankings of Africa-SPI and global SPI, with each pair of rankings being represented by a separate x-y scatterplot. As shown in Appendix G, most of the points fall within or close to a straight line at 45 degrees, indicating that the variations are concordant.

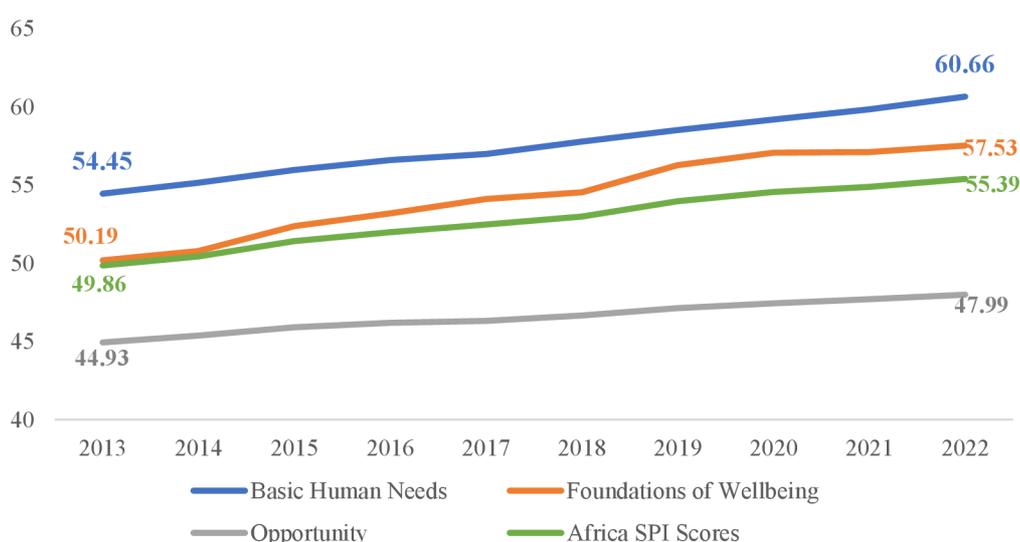
To conclude, the comparative analysis of the 2022 Africa SPI and 2022 global SPI results shows that there are some differences between the variabilities in the African SPI and in the global SPI results for the African countries. In most cases, the variability of results in global SPI is smaller in the African SPI. From this we could infer that using the global standards of the global SPI tend to compress the difference among African countries, which could result in assumption that "Africa is the same" with respect to their performance in social progress. Whereas the Africa SPI show the differences among African countries and shows evidence that Africa is quite different in their performance in social progress when compared against the African standards. In this sense, we could see an unfairness in the calibration against Africa in the global SPI. On the other hand, the two indices provide similar (but not the same) rankings of African countries which is also confirmed by the rank correlations results.

5.3 Trend Analysis of Africa Social Progress Index 2013 – 2022

The trend analysis of Africa Social Progress Index was constructed to identify if Africa has improved or declined in social progress. We used an unweighted average² to show the progress of Africa as the whole region over time. As shown in Fig 5.6, Africa has improved in the Social Progress Index from 2013 to 2022, however the improvement has not been dramatic. The Human Basic Needs dimension showed a significant improvement over time, with an increase of 11.40 percent across the 10-year trend. This improvement in the Human Basic Needs dimension comprising of Nutrition and Basic Medical Care, Shelter, Water and Sanitation, Personal Safety components could be attributed to the great works carried out in fulfilment of the Sustainable Development Goals (SDGs) in Africa, as these components closely correlate with the SDGs. Also, there was improvement in Foundations of Wellbeing dimension, with an increase of 14.6 percent across the 10-year trend.

Compared to the other dimensions, there have been a slow improvement in Opportunity dimension over the 10-year trend, which shows that Africa needs to put in effort to improve the components of Personal Rights, Personal Freedom and Choice, Access to Advanced Education components, and most especially Inclusiveness.

Fig 5.6: Average of Africa SPI Scores and Dimension Scores Trend from 2013 to 2022



Source: Author's Illustration

² A simple average not weighted by population.

Fig. 5.7 shows us the performance of African countries in social progress across the 10-year trend. Overall, there have been increase in social progress among African countries except from Mauritius which has remained stable over time. Fig 5.10 shows that forty-nine countries (98% of the countries measured) have improved by one or more points. Of the forty-nine countries, 34 countries (69%) have improved by five or more points.

The significant improvers of social progress in Africa from 2013 to 2022 include Gambia (13.66), Sierra Leone (10.73), Ethiopia (10.42), Cote d'Ivoire (9.33) and Sudan (9.05).

Furthermore, Fig. 5.8 shows that the most improved countries in social progress since 2013 have been low and middle-income countries. However, richer countries in the Africa Social Progress Index, improved more slowly with exception from Mauritius which remained stable over time.

However, the gains in social progress in Africa have not been evenly distributed across the components of dimension as shown in Fig. 5.8.

Fig. 5.7: Performance of African Countries in SPI-Africa Scores from 2013 to 2022

Country	2013	2022	Performance
Gambia	47.12	60.78	13.66
Sierra Leone	40.32	51.06	10.73
Ethiopia	37.11	47.53	10.42
Cote d'Ivoire	47.63	56.95	9.33
Sudan	33.92	42.97	9.05
Ghana	63.83	72.55	8.72
Zambia	50.35	58.94	8.59
Kenya	54.49	62.85	8.36
Angola	40.09	48.43	8.34
Seychelles	81.49	89.68	8.19
Nigeria	42.75	50.91	8.16
Democratic Republic of the Congo	30.72	38.50	7.78
Tanzania	53.72	61.27	7.55
Djibouti	43.10	50.53	7.43
Togo	46.13	53.55	7.42
Malawi	50.20	57.57	7.37
Rwanda	48.53	55.68	7.15
Morocco	66.06	73.07	7.02
Somalia	24.90	31.64	6.74
Congo	41.37	48.11	6.73
Sao Tome and Principe	62.08	68.47	6.39
Lesotho	53.52	59.78	6.26
Senegal	54.67	60.72	6.05
Burundi	36.96	42.81	5.85
South Africa	71.69	77.43	5.74
Mali	37.04	42.73	5.69
Mauritania	41.82	47.49	5.68
Algeria	67.93	73.58	5.65
Mozambique	43.51	49.13	5.62
Botswana	72.33	77.95	5.62
Burkina Faso	45.17	50.64	5.47
Egypt	60.33	65.77	5.44
Benin	52.12	57.40	5.28
Zimbabwe	53.43	58.62	5.19
Uganda	46.55	51.01	4.46
Guinea	32.39	36.73	4.34
Gabon	62.29	66.47	4.18
Namibia	64.64	68.77	4.13
Liberia	43.81	47.94	4.13
Chad	24.87	28.96	4.09
Cameroon	43.79	47.61	3.82
Madagascar	42.75	46.56	3.81
Equatorial Guinea	41.96	45.67	3.71
Eswatini	52.50	56.10	3.60
Central African Republic	22.38	25.59	3.21
Cabo Verde	73.96	76.98	3.02
Tunisia	77.46	80.07	2.61
Eritrea	31.90	33.73	1.83
Mauritius	86.01	86.09	0.08

Source: Author's Illustration

Fig. 5.8 shows the trend performance of Africa across the components of the Social Progress Index. Since 2013, Africa has improved on eight components: Access to Information and Communication (+27.66), Access to Advanced Education (+10.49), Shelter (+8.18), Nutrition and Basic Medical Care (+6.96), Water and Sanitation (+6.61), Access to Basic Knowledge (+4.08), Personal Freedom and Choice (+3.76), and Personal Safety (+3.10). However, Africa

is declining in Environmental Quality (-2.70), Personal Rights (-1.13), Inclusiveness (-0.89) and stagnating in Health and Wellness (+0.34).

Fig. 5.8: Change in Social Progress in Africa 2013 – 2022: Component Scores



Source: Author's Illustration

Cumulatively, we can infer that Africa is progressing, though at a slow rate. As such, efforts should be concentrated on dimensions and components where Africa scores low, most especially in the Opportunity Dimension, and Environmental Quality, Personal Rights, Inclusiveness and Health and Wellness components.

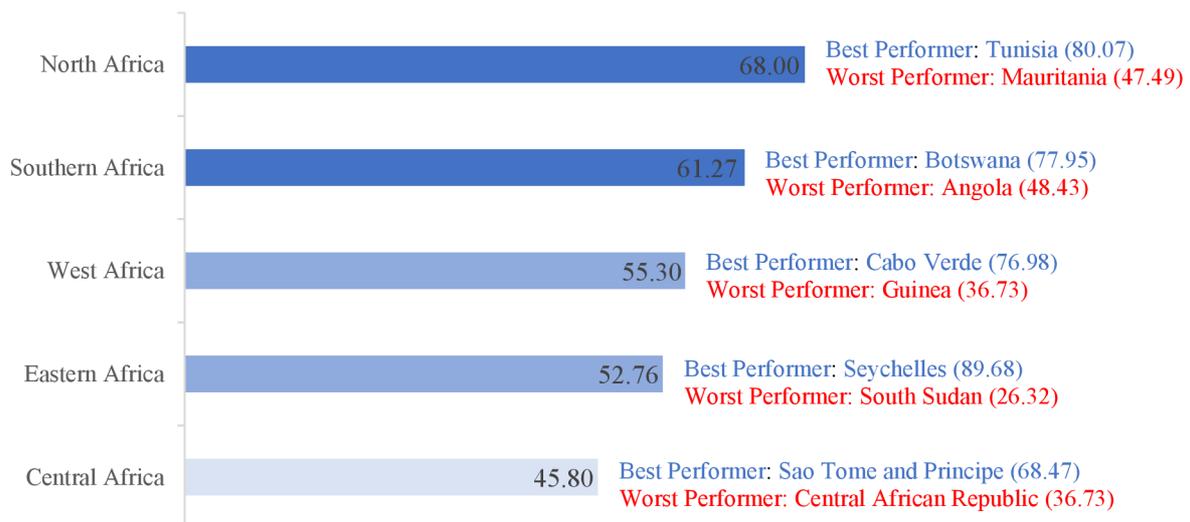
5.4 Regional Insights

The average regional Social Progress Index scores³ for the five African regions are illustrated in Fig. 5.9. North Africa, which had the lowest number of countries, outperforms all other regions with an average Africa Social Progress Index score of 68.0. It is followed by Southern Africa with a score of 61.27. From scores of above for North Africa and Southern Africa, there is a drop to 55.30 for the next highest scoring region, which is West Africa (55.36) and followed by Eastern Africa (52.76), and the lowest scoring region Central Africa (45.80). For context, Africa's average Social Progress Index score is 55.39.

³ This is a simple average of the scores of the countries in each region and is not weighted by population.

Also, acute disparities in Social Progress Index score within the regions are observed, particularly for Eastern Africa with scores ranging from 89.68 for Seychelles to 26.32 for South Sudan. This is followed by West Africa with a difference of 40.25 in the best (Cabo Verde) and worst (Guinea) performing countries. Southern Africa (29.52), Central Africa (31.74), and North Africa (32.58) exhibit the least disparity in Social Progress Index scores, in that order.

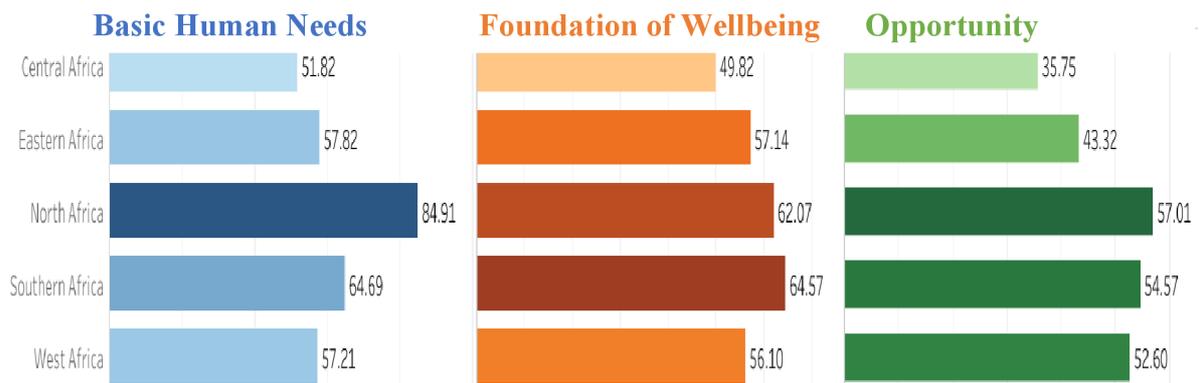
Fig. 5.9: Regional Average Africa-Social Progress Index Scores (2022)



Source: Author's Illustration

Similar regional trends can be observed in average dimension scores, with North Africa leading other regions across all three dimensions, followed by Southern Africa. In the Human Basic Needs dimension, North Africa performed exceptionally well followed by Southern Africa, but average performance was recorded in Southern Africa, Eastern Africa, and Central Africa. In the Foundation of Wellbeing, there was a drop in the performance of the regions, with Southern Africa (64.57) and North Africa (62.07) performing better than other regions in the dimension. Eastern Africa and West Africa performed on average with Central Africa performing below average in the dimensions. Interestingly, the performance of the regions deteriorated in the Opportunity Dimension, with North Africa (57.01), Southern Africa (54.57) and West Africa (52.60) performing averagely with Eastern Africa and Central Africa performing below average. Conversely, Central Africa performed poorly in all dimensions. Overall, all the African regions need to improve across all the dimensions with specific improvement in the Opportunity dimension.

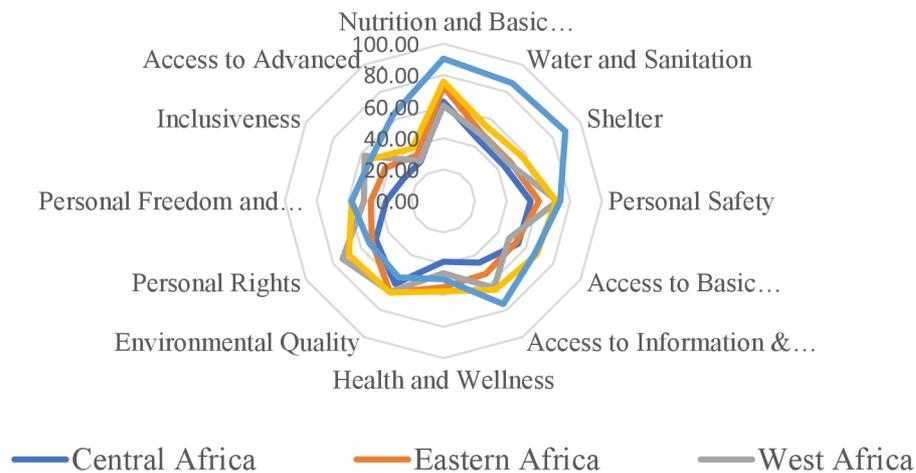
Fig. 5.10: Regional Average Dimension Scores (2022)



Source: Author's Illustration

Figure 5.11 presents a breakdown of the component scores for various African regions, offering valuable insights into inter-regional comparisons across each component, as well as the overall performance of all regions across components. Overall, all regions perform worst in the component of Inclusiveness with all regions having a score below 60 and the lowest score of 28.84 being recorded for Central Africa.

Fig. 5.11: Regional Average Component Score (2022)



Source: Author's Illustration

Also, the regions did not fare well in the Health and Wellness component as all regions have a score below 60 and the lowest score of 38.59 for Central Africa. West Africa and North Africa had scores below 50 for Health and Wellness component scoring 45.99 and 49.86, respectively. Central Africa is specifically weak across all components and is especially lacking in Access

to Advanced Education, Inclusiveness, Personal Freedom and Choice, Personal Rights, Health and Wellness, Shelter, Water and Sanitation. Eastern Africa also performed in some components, specifically in Access to Advanced Education, Inclusiveness, Personal Freedom and Choice, Water and Sanitation, and Shelter. Overall, North Africa performed better than other regions, however, it is lacking especially in Health and Wellness, and needs improvement also in Environmental Quality, Personal Rights, Personal Freedom and Choice, and Inclusiveness.

Chapter Six

Conclusion

There have been speculations of social measurements using Western standards to serve as the universal and global standard in measuring various social outcomes in countries. These speculations have birthed the assertion of Western Bias in most social measurements. As such, in answering the research question as to whether there is Western Bias in the global Social Progress Index, this study measured social progress in Africa by constructing a Social Progress Index for Africa, comparing African countries, calibrating the index based on the best and worst scenarios among African countries. The results from the study were interesting as it provides answers to the research questions.

First, is there a possibility of Western Bias in the measurement of social progress in Africa and how can it be addressed? We address this issue by examining the difference in variabilities between the African SPI and global SPI results for the African countries. In the overall Social Progress Index scores, there is a difference of 0.07 between the coefficients of variation of the Africa SPI and global SPI. More so, Opportunity Dimension showed the highest difference of 0.12. More so, at the component level, highest difference in variability is recorded in Access to Advanced Education component (0.24) followed by Personal Freedom and Choice, Health and Wellness, Water and Sanitation components with differences of 0.19, 0.14 and 0.11, respectively. Conversely, Access to Information and Communication component and Environmental Quality recorded the smallest difference in variability between these two indices. In most cases, the variability of results in global SPI is smaller than in the African SPI. This suggests that comparing African countries using the global standards of the global SPI can lead to the false conclusion that “Africa is the same” in terms of their level of social progress. However, the Africa Social Progress Index clearly demonstrates that there is a wide range of African countries’ social progress when measured against African standards. We can conclude on a possible unfairness in the calibration against Africa in the global SPI as indicated by the measures of variability. However, the two indices provided similar (but not the same) rankings of African countries as shown by the Spearman rank correlation results.

Second, is Africa progressing or declining in terms of social progress? The results from the study analysis show that Africa is improving slowly in social progress. This slow improvement should be a cause of concern for the continent, as efforts should be made to formulate and

implement policies that will accelerate social progress on the continent. More so, specific attention should be given to Health and Wellness, Environmental Quality, Personal Rights, and Inclusiveness to ensure that no one is left behind. As there has been improvement in Nutrition and Basic Medical Care due to progress made in the SDGs, other social progress components should be considered in various development plans in Africa.

Third, what indicators are representative and contextually relevant in measuring social progress of African countries? The study ensured that indicators that are relevant in capturing social progress are included in the framework. However, the lack of availability of African data sources compelled the use of indicators that are relevant for Africa but are from global data sources. This resulted in some indicators which are contextually relevant to be excluded from the construction of the index. The study adopted indicators that are contextually relevant for Africa from various global data sources as shown in Appendix A but also used African data sources such as the Ibrahim Index of African Governance data portal.

Further improvement can be made in measuring social progress in Africa and examining the possibility of a Western bias in its measurement. This will be fully achieved if African data sources with adequate data coverage are used in the study, as this will ensure that all the indicators selected are statistically coherent and consistent and fully adopted for the proposed methodology of construction of a composite index. From the result, insights and relevant conclusions can be drawn on the possibility of Western bias in its measurement.

Overall, the global SPI is doing an excellent job in measuring countries performance in social progress using global standards. However, to better understand the varying realities of social progress, a disaggregated measure of social progress within countries and regions should be encouraged. This will provide deep insights and relevant conclusions into the country and region's performance while capturing all relevant context and diverse realities within the country and region.

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Appendix A
Indicator Definitions and Sources for SPI-Africa

Component	Indicator	Long Definition	Data Source	Year of Measurement	Relation to Social Progress
Basic Human Needs					
Nutrition and Basic Medical Care	Maternal Mortality	Maternal deaths per 100,000 livebirths in women aged 10-54 years.	Institute for Health Metrics and Evaluation	2010 -2019	Negative
	Under-Five Mortality	Probability of dying between birth and exactly 5 years of age, expressed per 1,000 live births	UN Inter-agency Group for Child Mortality Estimation	2012-2021	Negative
	Malaria	Age-standardized Disability-Adjusted Life Years (DALYs) rate caused by Malaria, per 100,000 people	Institute for Health Metrics and Evaluation	2010 -2019	Negative
	Undernourishment	The prevalence of undernourishment expresses the probability that a randomly selected individual from the population consumes an amount of calories that is insufficient to cover her/his energy requirement for an active and healthy life.	Food and Agriculture Organization of the United Nations	2011- 2020	Negative
Water and Sanitation	WASH Mortality: Mortality due to Unsafe Water,	Age-standardized Disability-Adjusted Life Years (DALYs) rate attributable to unsafe water, sanitation, and hygiene per 100,000 people.	Institute for Health Metrics and Evaluation	2010 -2019	Negative

	Sanitation and Hygiene				
	Access to At Least Basic Sanitation	Proportion of population with access to at least basic sanitation as defined by the Joint Monitoring Program (JMP)	World Health Organization - Joint Monitoring Program (JMP)	2011- 2020	Positive
	Access to At Least Basic Water Sources	Proportion of population with access to at least basic water sources as defined by the Joint Monitoring Program (JMP)	World Health Organization - Joint Monitoring Program (JMP)	2011- 2020	Positive
	Access to At Least Basic Handwashing Facilities	Proportion of population with access to at least basic handwashing facilities as defined by the Joint Monitoring Program (JMP)	World Health Organization - Joint Monitoring Program (JMP)	2011- 2020	Positive
Shelter	Access to Electricity	The percentage of the population with access to electricity.	SE4ALL Global Tracking Framework (World Bank, International Energy Agency, and the Energy Sector Management Assistance Program)	2011-2020	Positive

	Usage of Clean Cooking Fuel	The proportion of population primarily using clean cooking fuels and technologies for cooking.	World Health Organization	2011-2020	Positive
	Population Living in Slum	Population living in slums as percentage of urban population	United Nations Human Settlement Program (UN-HABITAT)	2011-2020	Negative
	Household Air Pollution	Age-standardized Disability-Adjusted Life Years (DALYs) rate caused by household air pollution from solid fuels per 100,000 people.	Institute for Health Metrics and Evaluation	2010 -2019	Negative
Personal Safety	Political Violence	We understand political violence as the use of physical force to achieve political objectives by non-state actors. Political violence against persons excludes psychological and symbolic violence (e.g. destruction of objects).	Varieties of Democracy (V-Dem), Dataset Version 13	2013-2022	Negative
	Conflict and Terrorism	Age-standardized Disability-Adjusted Life Years (DALYs) per 100,000 people due to injuries related to conflict and terrorism	Institute for Health Metrics and Evaluation	2010 -2019	Negative

Physical Violence	Physical Violence Index. The index is based on indicators that reflect violence committed by government agents and that are not directly referring to elections. The index was estimated by averaging two indicators: freedom from torture and freedom from political killings	Varieties of Democracy (V-Dem), Dataset Version 13	2013-2022	Positive
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Transport Injury	Age-standardized Disability-Adjusted Life Years (DALYs) per 100,000 people due to transportation related injuries	Institute for Health Metrics and Evaluation	2010-2019	Negative
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Occupational Injury	Age-standardized Disability-Adjusted Life Years (DALYs) per 100,000 people due to occupation related injuries	Institute for Health Metrics and Evaluation	2010 -2019	Negative
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Foundation of Wellbeing

Access to Basic Knowledge	Education Equality	Country experts' aggregated evaluation of the question: "To what extent is high quality basic education guaranteed to all, sufficient to enable them to exercise their basic rights as adult citizens?"	Varieties of Democracy (V-Dem), Dataset Version 13	2013-2022	Positive
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Secondary school attainment	Population with at least some secondary education (% ages 25 and older)	United Nations Development Programme (UNDP)	2013-2022	Positive
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	Primary school enrolment	Total number of students of official primary school age who are enrolled in any level of education, expressed as a percentage of the total population of official primary school age.	UN Educational, Scientific, and Cultural Organization (UNSECO) Institute for Statistics	2013-2022	Positive
	Out of School Children	Children out of school are the number of primary-school-age children not enrolled in primary or secondary school.	UN Educational, Scientific, and Cultural Organization (UNSECO) Institute for Statistics	2011-2020	Negative
	Population with no schooling	Proportion of population (age-standardized) with no schooling.	Institute for Health Metrics and Evaluation	2010 -2019	Negative
Access to Information and Communication	Internet Censorship Effort	Country experts' aggregated evaluation of the question: "Does the government attempt to censor information (text, audio, or visuals) on the Internet?" Censorship attempts include Internet filtering (blocking access to certain websites or browsers), denial-of-service attacks, and partial or total Internet shutdowns.	Varieties of Democracy (V-Dem), Dataset Version 13	2013-2022	Positive

	Access to online governance (E-participation)	The availability of e-participation tools on national government portal for the following uses: e-information – provision of information on the Internet; e-consultation – organizing public consultations online; and e-decision-making – involving citizens directly in decision processes.	UN Department of Economic and Social Affairs E-Government Survey	2013-2022	Positive
	Internet users	The estimated number of Internet users out of the total population, using the Internet from any device (including mobile phones) in the last 12 months.	International Telecommunications Union	2013-2022	Positive
	Access to Mobile Internet	Proportion of the population with access to mobile internet	Ibrahim Index of African Governance Data Portal	2012-2021	Positive
	Mobile telephone subscriptions	Subscriptions to a public mobile telephone service using cellular technology, including the number of pre-paid SIM cards active during the past three months, expressed as the number of mobile telephone subscriptions per 100 inhabitants.	International Telecommunications Union	2013-2022	Positive
Health and Wellness	Health Equality	Country experts' aggregated evaluation of the question: "To what extent is high quality basic healthcare guaranteed to all, sufficient to enable them to exercise their basic political rights as adult citizens?"	Varieties of Democracy (V-Dem), Dataset Version 13	2013-2022	Positive

	Access to Basic Healthcare	Proportion of Population with access to basic healthcare	Ibrahim Index of African Governance Data Portal	2012-2021	Positive
	Immunization	Child immunization rate, percentage of children ages 12-23 months who received hepatitis B, measles, DPT (Diphtheria-pertussis-tetanus vaccine).	World Health Organization	2012-2021	Positive
	Satisfaction with availability of quality healthcare	The proportion of respondents answering 'satisfied' to the question, In the city or area where you live, are you satisfied or dissatisfied with the availability of quality healthcare?	Gallup World Poll	2013-2022	Positive
Environmental Quality	Lead Exposure	Age-standardized Disability-Adjusted Life Years (DALYs) per 100,000 people attributable to lead exposure. Lead exposure is defined as acute exposure, measured by micrograms of lead per decilitre of blood, and chronic exposure, measured by micrograms of lead per gram of bone	Institute for Health Metrics and Evaluation	2010 -2019	Negative
	Non-Optimal Temperature	Age-standardized Disability-Adjusted Life Years (DALYs) per 100,000 people attributable to non-optimal temperature	Institute for Health Metrics and Evaluation	2010 -2019	Negative

Outdoor Air Pollution	Age-standardized Disability-Adjusted Life Years (DALYs) per 100,000 people resulting from ambient particulate matter pollution, including emissions from industrial activity, households, cars and trucks	Institute for Health Metrics and Evaluation	2010 -2019	Negative
Ambient Ozone Pollution	Age-standardized Disability-Adjusted Life Years (DALYs) per 100,000 people attributable to ozone pollution	Institute for Health Metrics and Evaluation	2010 -2019	Negative

Opportunity

Personal Rights	Freedom of Religion	Country experts' aggregated evaluation of the question, "Is there freedom of religion?"	Varieties of Democracy (V-Dem), Dataset Version 13	2013-2022	Positive
	Freedom of Peaceful Assembly	Country experts' aggregated evaluation of the question, "To what extent do state authorities respect and protect the right of peaceful assembly?"	Varieties of Democracy (V-Dem), Dataset Version 13	2013-2022	Positive
	Freedom of Discussion	Country experts' aggregated evaluation of the question, "Are citizens able to openly discuss political issues in private homes and in public spaces?"	Varieties of Democracy (V-Dem), Dataset Version 13	2013-2022	Positive
	Access to Justice	Country experts' aggregated evaluation of the question, "Do citizens enjoy secure and effective access to justice?"	Varieties of Democracy (V-Dem), Dataset Version 13	2013-2022	Positive

	Freedom of Property Rights	Country experts' aggregated evaluation of the question, "Do citizens enjoy the right to private property?"	Varieties of Democracy (V-Dem), Dataset Version 13	2013-2022	Positive
	Political Rights	An evaluation of three subcategories of political rights: electoral process, political pluralism, and participation, and functioning of government on a scale from 0 (no political rights) to 40 (full political rights). Some countries and territories score below zero on the questions used to compose the indicator.	Freedom House	2013 - 2022	Positive
Personal Freedom and Choice	Early Marriage	The percentage of women aged 15-19 years who are married or in-union.	United Nations Population Division	2013 - 2022	Negative
	Freedom from Forced Labour	Country experts' aggregated evaluation of the question, "Are adult citizens free from servitude and other kinds of forced labour?"	Varieties of Democracy (V-Dem), Dataset Version 13	2013-2022	Positive
	Perception of corruption	The perceived level of public sector corruption based on expert opinion, measured on a scale from 0 (highly corrupt) to 100 (very clean).	Transparency International	2013-2022	Positive
	Satisfied demand for contraception	The percentage of total demand for family planning among married or in-union women aged 15 to 49 that is satisfied with modern methods.	United Nations Population Division	2013-2022	Positive

Inclusiveness	Exclusion by Socio-Economic Group	Exclusion is when individuals are denied access to services or participation in governed spaces. It involves indicators such as power distributed by socio-economic group, socio-economic position equality in respect for civil liberties, access to public services by socio-economic group, access to state jobs by socio-economic group, and access to state business opportunities by socio-economic group.	Varieties of Democracy (V-Dem), Dataset Version 13	2013-2022	Negative
	Exclusion by Gender	Exclusion is when individuals are denied access to services or participation in governed spaces. It is an index that combines indicators such as power distributed by gender, equality in respect for civil liberties by gender, access to public services by gender, access to state jobs by gender, and access to state business opportunities by gender.	Varieties of Democracy (V-Dem), Dataset Version 13	2013-2022	Negative

Exclusion by Political Group	Exclusion is when individuals are denied access to services or participation in governed spaces. It is an index that combines indicators such as political group equality in respect for civil liberties, access to public services by political group, access to state jobs by political group, and access to state business opportunities by political group.	Varieties of Democracy (V-Dem), Dataset Version 13	2013-2022	Negative	
Exclusion by Urban-Rural Location	Exclusion is when individuals are denied access to services or participation in governed spaces. It is an index that combines indicators such as power distributed by urban-rural location, urban-rural equality in respect for civil liberties, access to public services by urban-rural location, access to state jobs by urban-rural location, and access to state business opportunities by urban-rural location.	Varieties of Democracy (V-Dem), Dataset Version 13	2013-2022	Negative	
Access to Advanced Education	Citable Documents	Citable documents - articles, reviews, and conference papers - per 1,000 population.	Social Progress Imperative Calculations	2013-2022	Positive

Quality Weighted Universities	The number of universities in a country weighted by the quality of universities, measured by university rankings on any of the three most widely used international assessments	Social Progress Imperative Calculations	2013-2022	Positive
Tertiary School Life Expectancy	Number of years a person of tertiary school entrance age can expect to spend within tertiary education	UN Educational, Scientific, and Cultural Organization (UNESCO) Institute for Statistics	2013-2022	Positive
Women with Advanced Education	Proportion of females (age-standardized) with 12–18 years of education.	Institute for Health Metrics and Evaluation	2010-2019	Positive

Appendix B
Indicator Skewness and Kurtosis

Indicator	Skewness	Kurtosis
Maternal Mortality	0.307543	2.348371
Malaria	1.073754	3.727096
Under-Five Mortality	0.3012406	2.330998
Undernourishment	0.7544971	2.867106
WASH Mortality: Mortality due to Unsafe Water, Sanitation and Hygiene	0.8420514	4.054242
Access to At Least Basic Sanitation	0.7738807	2.516902
Access to At Least Basic Drinking Water Sources	0.1999519	2.118097
Access to At Least Basic Handwashing Facilities	1.470019	4.749265
Access to Electricity	0.3080182	2.083075
Usage of Clean Cooking Fuel	1.245943	3.173114
Household Air Pollution	0.0649778	2.410075
Population Living in Slum	-0.3285535	2.81809
Political Violence	0.0524161	1.950696
Physical Violence	-0.3215548	1.671316
Conflict and Terrorism	5.143482	39.40877
Transportation Injury	1.632947	7.245482
Occupational Injury	1.416486	5.195916
Education Equality	0.3305095	2.035092
Secondary school attainment	0.8600562	3.247599
Primary school enrolment	-1.114411	3.716919
Out of School Children	0.2074009	1.843856
Population with no schooling	0.4324758	2.070214
Internet Censorship Effort	-1.072387	3.155177
Access to Mobile Internet	-0.3051978	1.816943
Access to online governance (E-participation)	0.7169702	2.58726
Internet Users	1.091209	3.42118
Mobile telephone subscriptions	-0.5002776	1.916308
Health Equality	0.7743582	2.81125
Access to Basic Healthcare	0.1024437	2.116566
Immunization	0.9620657	2.816494
Satisfaction with availability of quality healthcare	0.6143271	3.12922
Lead Exposure	2.118733	9.515782

Non-Optimal Temperature	1.947354	9.499749
Ambient Ozone Pollution	1.383298	7.226405
Outdoor Air Pollution	1.23978	4.891742
Freedom of Religion	-1.399741	3.975417
Freedom of Peaceful Assembly	-0.3499827	2.21082
Access to Justice	0.0646853	-0.4080859
Freedom of Property Rights	-1.053686	3.286784
Freedom of Discussion	-0.6703541	2.176017
Political Rights	0.1778625	1.81639
Early Marriage	1.285609	5.082419
Freedom from Forced Labour	-1.068154	3.353102
Perception of corruption	0.5311621	3.012449
Satisfied demand for contraception	0.1896144	1.999924
Exclusion by Socio-Economic Group	-0.1759579	2.102383
Exclusion by Gender	0.452053	2.509989
Exclusion by Urban-Rural Location	-0.412708	2.524601
Exclusion by Political Group	-0.2717261	1.913896
Citable Documents	3.473127	17.41713
Quality Weighted Universities	3.224404	14.83167
Tertiary School Life Expectancy	1.307251	4.057701
Women with Advanced Education	1.226651	4.078123

Appendix C

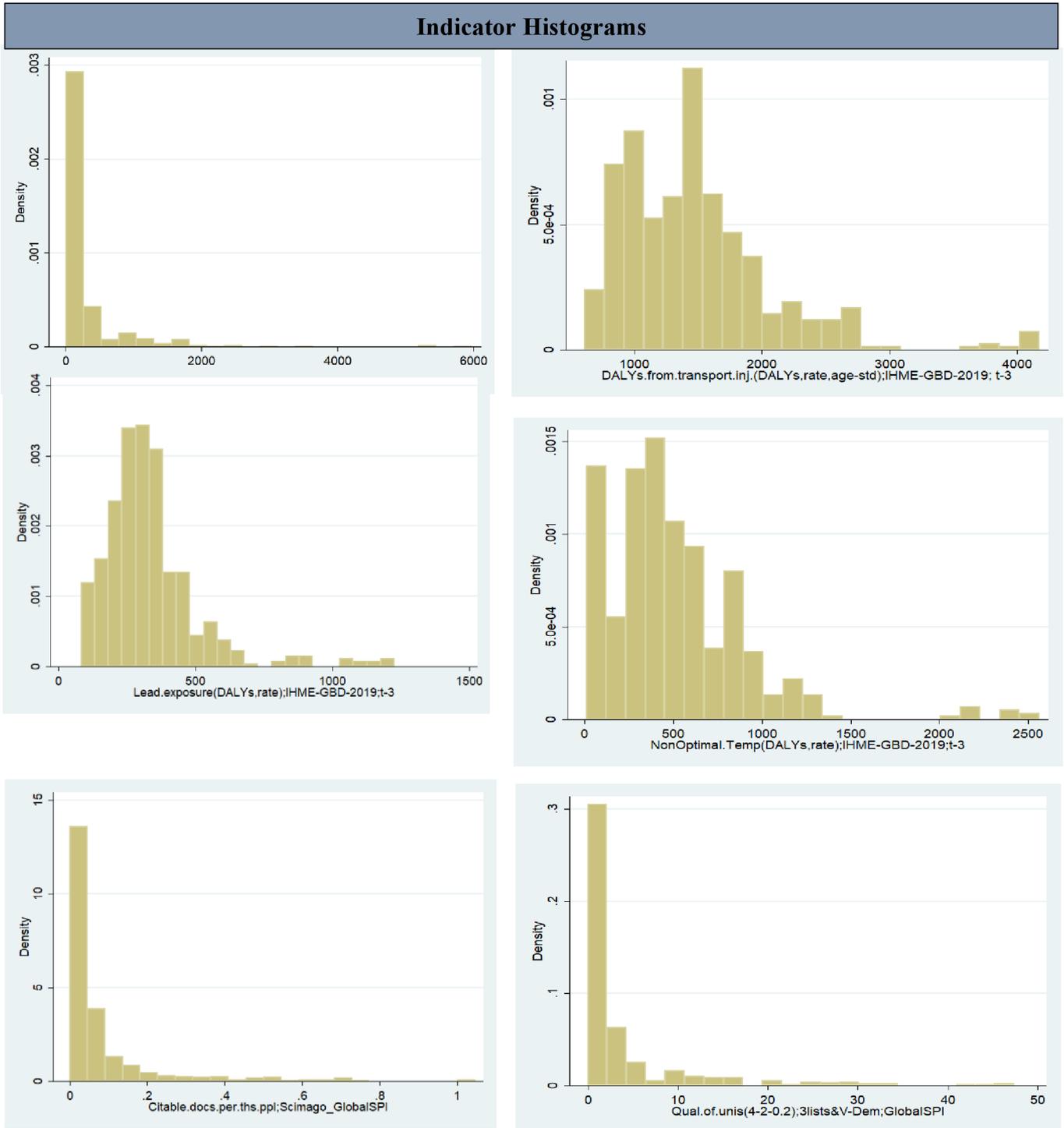
Indicators Boundaries (Utopia and Dystopia)

Indicator	Utopia	Dystopia
Maternal Mortality	32.95	613.47
Malaria	0.00	14017.84
Under-Five Mortality	10.77	148.12
Undernourishment	2.20	52.20
WASH Mortality: Mortality due to Unsafe Water, Sanitation and Hygiene	64.38	12851.53
Access to At Least Basic Sanitation	100.00	6.28
Access to At Least Basic Drinking Water Sources	99.89	35.78
Access to At Least Basic Handwashing Facilities	1.16	89.83
Access to Electricity	100.00	2.68
Usage of Clean Cooking Fuel	100.00	0.00
Household Air Pollution	3.46	10120.23
Population Living in Slum	0.90	94.20
Political Violence	0.10	3.99
Physical Violence	0.96	0.03
Conflict and Terrorism	0.00	5964.27
Transportation Injury	609.80	4174.44
Occupational Injury	45.18	1125.41
Education Equality	3.48	0.11
Secondary school attainment	90.50	5.20
Primary school enrolment	99.82	37.64
Out of School Children	0.00	71.75
Population with no schooling	0.05	0.84
Internet Censorship Effort	2.97	0.22
Access to Mobile Internet	100.00	0.00
Access to online governance (E-participation)	0.85	0.00
Internet Users	84.12	0.70
Mobile telephone subscriptions	100.00	7.53
Health Equality	3.76	0.05
Access to Basic Healthcare	89.70	4.60
Immunization	100.00	0.00
Satisfaction with availability of quality healthcare	0.81	0.21
Lead Exposure	84.07	1226.46
Non-Optimal Temperature	11.31	2563.71
Ambient Ozone Pollution	0.00	137.37
Outdoor Air Pollution	14.33	95.35
Freedom of Religion	3.93	0.43
Freedom of Peaceful Assembly	3.87	0.06

Access to Justice	0.99	0.03
Freedom of Property Rights	0.90	0.06
Freedom of Discussion	0.98	0.02
Political Rights	38.00	0.00
Early Marriage	0.85	61.00
Freedom from Forced Labour	0.91	0.01
Perception of corruption	70.00	8.00
Satisfied demand for contraception	86.20	9.00
Exclusion by Socio-Economic Group	0.96	0.09
Exclusion by Gender	0.97	0.07
Exclusion by Urban-Rural Location	0.96	0.03
Exclusion by Political Group	0.95	0.14
Citable Documents	1.05	0.00
Quality Weighted Universities	47.40	0.00
Tertiary School Life Expectancy	2.63	0.04
Women with Advanced Education	0.53	0.01

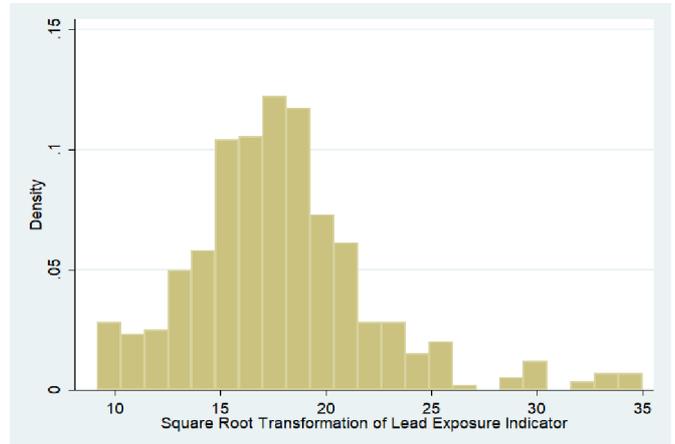
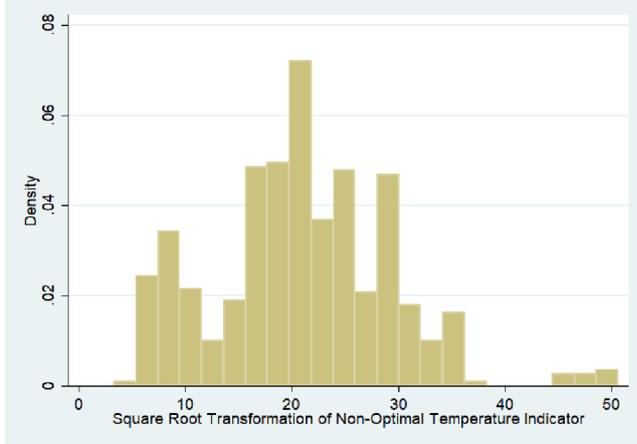
Appendix D

Distribution of Indicators having Outliers.



Distribution of Indicators after Square Root Transformation

Indicator Histograms



Appendix E
Indicator Correlations by Component after Data Treatment and Inversion

Nutrition and Basic Medical Care	Maternal Mortality		Malaria	Under-five Mortality	Undernourishment
Maternal Mortality	1.0000				
Malaria	0.4917		1.0000		
Under-five Mortality	0.5744		0.6213	1.0000	
Undernourishment	0.4723		0.1582	0.3688	1.0000
Water and Sanitation	WASH Mortality	Access to At Least Basic Sanitation		Access to At Least Basic Drinking Water Sources	Access to At Least Basic Handwashing Facilities
WASH Mortality	1.0000				
Access to At Least Basic Sanitation	0.6980	1.0000			
Access to At Least Basic Drinking Water Sources	0.7336	0.8046		1.0000	
Access to At Least Basic Handwashing Facilities	0.6160	0.7466		0.7214	1.0000
Shelter	Access to Electricity	Usage of Clean Cooking Fuel	Household Air Pollution		Population Living in Slum
Access to Electricity	1.0000				
Usage of Clean Cooking Fuel	0.8070	1.0000			
Household Air Pollution	0.8092	0.8063		1.0000	
Population Living in Slum	0.7453	0.7495		0.6414	1.0000
Personal Safety	Political Violence	Physical Violence	Conflict and Terrorism	Transportation Injury	Occupational Injury
Political Violence	1.0000				
Physical Violence	0.5808	1.0000			
Conflict and Terrorism	0.5088	0.5779	1.0000		
Transportation Injury	0.2622	0.2258	0.2190	1.0000	

Occupational Injury	0.4405	0.3551	0.5215	0.2744	1.0000
Access to Basic Knowledge	Education Equality	Secondary school attainment	Primary school enrolment	Out of School Children	Population with no schooling
Education Equality	1.0000				
Secondary school attainment	0.3175	1.0000			
Primary school enrolment	0.3704	0.3808	1.0000		
Out of School Children	0.3492	0.7206	0.6041	1.0000	
Population with no schooling	0.3385	0.6942	0.4763	0.6869	1.0000
Access to Information & Communication	Internet Censorship Effort	Access to Mobile Internet	E-participation	Internet Users	Mobile telephone subscriptions
Internet Censorship Effort	1.0000				
Access to Mobile Internet	0.2582	1.0000			
E-participation	0.1802	0.6283	1.0000		
Internet Users	0.1576	0.6749	0.5714	1.0000	
Mobile telephone subscriptions	0.2988	0.5252	0.406	0.6119	1.0000
Health and Wellness	Health Equality	Access to Basic Healthcare	Immunization	Satisfaction with availability of quality healthcare	
Health Equality	1.0000				
Access to Basic Healthcare	0.7609	1.0000			
Immunization	0.5628	0.5652	1.0000		
Satisfaction with availability of quality healthcare	0.4281	0.5501	0.3724	1.0000	

Environmental Quality	Lead Exposure	Non-Optimal Temperature	Ambient Ozone Pollution	Outdoor Air Pollution
Lead Exposure	1.0000			
Non-Optimal Temperature	0.4737	1.0000		
Ambient Ozone Pollution	0.4081	0.4804	1.0000	
Outdoor Air Pollution	0.3403	0.3568	0.4375	1.0000

Personal Right	Freedom of Religion	Freedom of Peaceful Assembly	Access to Justice	Freedom of Property Rights	Freedom of Discussion	Political Rights
Freedom of Religion	1.0000					
Freedom of Peaceful Assembly	0.4244	1.0000				
Access to Justice	0.5061	0.5636	1.0000			
Freedom of Property Rights	0.3773	0.6217	0.6817	1.0000		
Freedom of Discussion	0.4309	0.7862	0.6812	0.7095	1.0000	
Political Rights	0.5286	0.7046	0.7300	0.6658	0.7399	1.0000

Personal Freedom and Choice	Early Marriage	Freedom from Forced Labour	Perception of corruption	Satisfied demand for contraception
Early Marriage	1.0000			
Freedom from Forced Labour	0.1859	1.0000		
Perception of corruption	0.3227	0.5335	1.0000	
Satisfied demand for contraception	0.3833	0.4144	0.6420	1.0000

Inclusiveness	Exclusion by Socio-Economic Group	Exclusion by Gender	Exclusion by Urban-Rural Location	Exclusion by Political Group
Exclusion by Socio-Economic Group	1.0000			
Exclusion by Gender	0.7093	1.0000		
Exclusion by Urban-Rural Location	0.8871	0.6645	1.0000	
Exclusion by Political Group	0.8002	0.6700	0.7507	1.0000

Access to Advanced Education	Citable Documents	Quality Weighted Universities	Tertiary School Life Expectancy	Women with Advanced Education
Citable Documents	1.0000			
Quality Weighted Universities	0.3372	1.0000		
Tertiary School Life Expectancy	0.7340	0.4563	1.0000	
Women with Advanced Education	0.7368	0.2907	0.6288	1.0000

Appendix F

Differences in Rank for Dimension Scores

Differences in Rank in Basic Human Needs Dimension

Country	Africa SPI-HBN		Global SPI-HBN		Differences in Rank
	Value	Rank	Value	Rank	
Algeria	88.7	4	80.37	4	0
Angola	56.12	29	54.18	30	1
Benin	55.18	30	55.33	26	-4
Botswana	79.86	8	65.52	11	3
Burkina Faso	46.83	39	51.38	36	-3
Burundi	46.22	40	48.56	40	0
Cabo Verde	86.73	6	78.21	6	0
Cameroon	50.82	35	56.19	23	-12
Central African Republic	23.4	49	28.96	49	0
Chad	35.07	48	37.7	48	0
Congo	58.7	24	54.82	29	5
Cote d'Ivoire	62.22	19	60.54	18	-1
Democratic Republic of the Congo	37.81	45	44.69	45	0
Djibouti	64.16	16	62.58	14	-2
Egypt	89.41	3	80.64	3	0
Equatorial Guinea	63.42	18	65.11	13	-5
Eritrea	47.55	38	48.16	42	4
Eswatini	70.43	13	57.79	21	8
Ethiopia	48.03	37	51.66	35	-2
Gabon	75.63	9	67.17	10	1
Gambia	63.44	17	62.07	17	0
Ghana	70.65	12	69.14	9	-3
Guinea	43.11	43	49.13	39	-4
Kenya	59.49	23	58.81	19	-4
Lesotho	58.39	25	49.54	38	13
Liberia	45.41	41	48.31	41	0
Madagascar	45.34	42	45.67	43	1
Malawi	57.82	27	55.69	24	-3
Mali	51.46	34	52.29	33	-1
Mauritania	66.21	15	58.59	20	5
Mauritius	92.25	2	85.83	1	-1
Morocco	87.53	5	81.05	2	-3
Mozambique	49.73	36	50.81	37	1

Namibia	72.38	11	62.33	16	5
Nigeria	53.42	33	56.96	22	-11
Rwanda	53.85	31	55.49	25	-6
Sao Tome and Principe	75.36	10	72.75	7	-3
Senegal	66.36	14	65.39	12	-2
Sierra Leone	42.61	44	44.83	44	0
Somalia	36.74	47	43.34	46	-1
South Africa	80.34	7	71.29	8	1
South Sudan	36.84	46	38.7	47	1
Sudan	58.19	26	62.42	15	-11
Tanzania	61.83	20	54.97	28	8
Togo	56.34	28	53.28	32	4
Tunisia	92.72	1	80.34	5	4
Uganda	53.64	32	53.93	31	-1
Zambia	61.1	21	52.22	34	13
Zimbabwe	60.69	22	55.1	27	5

Differences in Ranks in Foundation of Wellbeing Dimension

Country	Africa SPI FOW		Global SPI FOW		Differences in Rank
	Value	Rank	Value	Rank	
Algeria	66.36	13	62.4	7	-6
Angola	52.99	30	47.02	35	5
Benin	58.17	24	55.41	17	-7
Botswana	77.83	3	66.14	4	1
Burkina Faso	48.34	40	48.88	33	-7
Burundi	49.97	36	44.47	41	5
Cabo Verde	73.59	5	63.81	5	0
Cameroon	48.75	39	51.63	26	-13
Central African Republic	30.44	48	33.29	48	0
Chad	33.39	47	36.68	46	-1
Congo	55.91	29	51.57	27	-2
Cote d'Ivoire	58.64	22	53.29	21	-1
Democratic Republic of the Congo	48.88	38	47.61	34	-4
Djibouti	51.61	32	42.91	42	10
Egypt	56.58	28	51.11	29	1
Equatorial Guinea	43.75	41	42.8	43	2
Eritrea	39.65	45	34.16	47	2
Eswatini	59.86	19	54	20	1
Ethiopia	50.38	35	46.17	37	2
Gabon	69.29	8	59.62	11	3

Gambia	59.06	21	49.97	31	10
Ghana	74.26	4	63.27	6	2
Guinea	41.65	42	45.56	38	-4
Kenya	68.63	9	61.49	9	0
Lesotho	62.22	17	51.57	28	11
Liberia	50.61	34	45.54	39	5
Madagascar	52.56	31	49.47	32	1
Malawi	60.18	18	52.8	22	4
Mali	41.64	43	44.81	40	-3
Mauritania	49.28	37	46.53	36	-1
Mauritius	89.36	1	75.58	1	0
Morocco	66.43	12	59.9	10	-2
Mozambique	59.16	20	51.03	30	10
Namibia	66.47	11	62.29	8	-3
Nigeria	50.63	33	52.69	24	-9
Rwanda	70.55	7	57.88	14	7
Sao Tome and Principe	67.99	10	56.56	15	5
Senegal	57.62	26	52.8	23	-3
Sierra Leone	56.89	27	52.49	25	-2
Somalia	39.11	46	37.44	45	-1
South Africa	78.33	2	69	2	0
South Sudan	29.25	49	30.05	49	0
Sudan	40.51	44	42.06	44	0
Tanzania	64.65	15	58.49	13	-2
Togo	58.18	23	54.24	19	-4
Tunisia	71.69	6	66.43	3	-3
Uganda	57.76	25	54.63	18	-7
Zambia	62.67	16	55.69	16	0
Zimbabwe	65.96	14	58.61	12	-2

Differences in Ranks in Opportunity Dimension

Country	Africa-SPI OPP		Global-SPI OPP		Differences in Rank
	Value	Rank	Value	Rank	
Algeria	65.69	8	54.01	15	7
Angola	36.19	35	39.41	36	1
Benin	58.85	13	56.02	11	-2
Botswana	76.15	2	66.01	2	0
Burkina Faso	56.75	17	49.23	22	5
Burundi	32.25	38	35.71	40	2
Cabo Verde	70.61	6	65.01	3	-3
Cameroon	43.25	29	46.37	26	-3

Central African Republic	22.93	45	34.91	41	-4
Chad	18.43	47	29.7	46	-1
Congo	29.71	41	36.25	37	-4
Cote d'Ivoire	50	23	48.2	24	1
Democratic Republic of the Congo	28.82	42	35.81	38	-4
Djibouti	35.81	36	42.68	34	-2
Egypt	51.33	22	44.45	29	7
Equatorial Guinea	29.84	40	31.84	44	4
Eritrea	13.98	48	22.25	49	1
Eswatini	38.01	34	35.76	39	5
Ethiopia	44.18	28	44.46	28	0
Gabon	54.48	19	59.74	8	-11
Gambia	59.84	12	52.01	18	6
Ghana	72.75	5	62	6	1
Guinea	25.43	44	32.54	43	-1
Kenya	60.43	11	53.59	16	5
Lesotho	58.75	14	57.6	10	-4
Liberia	47.81	26	53.25	17	-9
Madagascar	41.77	31	46.06	27	-4
Malawi	54.72	18	54.36	13	-5
Mali	35.09	37	43.68	30	-7
Mauritania	26.99	43	34.68	42	-1
Mauritius	76.66	1	64.91	4	3
Morocco	65.26	9	51.17	19	10
Mozambique	38.51	33	42.97	32	-1
Namibia	67.47	7	61.38	7	0
Nigeria	48.69	25	49.28	21	-4
Rwanda	42.66	30	43.17	31	1
Sao Tome and Principe	62.06	10	58.14	9	-1
Senegal	58.19	15	54.91	12	-3
Sierra Leone	53.66	20	54.11	14	-6
Somalia	19.07	46	26.77	47	1
South Africa	73.63	4	69.56	1	-3
South Sudan	12.88	49	23.19	48	-1
Sudan	30.2	39	31.75	45	6
Tanzania	57.34	16	51.14	20	4
Togo	46.13	27	47.2	25	-2
Tunisia	75.8	3	62.54	5	2
Uganda	41.63	32	39.47	35	3
Zambia	53.05	21	48.3	23	2
Zimbabwe	49.22	24	42.79	33	9

Appendix G

Spearman Rank Correlation Coefficients Values

Spearman Rank Correlation Coefficient for SPI Scores Rank between SPI Africa and Global SPI

```
. spearman africampirank globalspirank
```

```
Number of obs =      49  
Spearman's rho =      0.9766
```

```
Test of Ho: africampirank and globalspirank are independent
```

```
Prob > |t| =      0.0000
```

Spearman Rank Correlation Coefficient for HBN Scores Rank between SPI Africa and Global SPI

```
. spearman africa_hbnrank globalhbnrank
```

```
Number of obs =      49  
Spearman's rho =      0.9395
```

```
Test of Ho: africa_hbnrank and globalhbnrank are independent
```

```
Prob > |t| =      0.0000
```

Spearman Rank Correlation Coefficient for FOW Scores Rank between SPI Africa and Global SPI

```
. spearman africarank_fow globalspirank_fow
```

```
Number of obs =      49  
Spearman's rho =      0.9410
```

```
Test of Ho: africarank_fow and globalspirank_fow are independent
```

```
Prob > |t| =      0.0000
```

Spearman Rank Correlation Coefficient for OPP Scores Rank between SPI Africa and Global SPI

```
. spearman africarankopp globalspiopprank
```

```
Number of obs =      49  
Spearman's rho =      0.9512
```

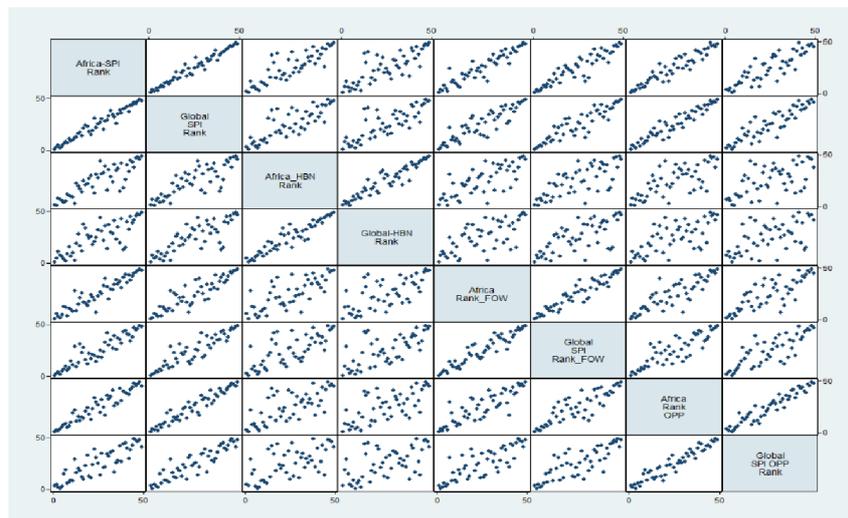
```
Test of Ho: africarankopp and globalspiopprank are independent
```

```
Prob > |t| =      0.0000
```

Spearman Rank Correlation Coefficient for the Rankings between the Africa-SPI and Global SPI

	af~irank	gl~irank	af~nrank	gl~nrank	afr~_fow	glo~_fow	afr~kopp	gl~prank
africaspir~k	1.0000							
globalspir~k	0.9766	1.0000						
africa_hbn~k	0.8587	0.8188	1.0000					
globalhbnr~k	0.7933	0.8059	0.9395	1.0000				
africarank~w	0.9326	0.8944	0.7548	0.6695	1.0000			
globalspir~w	0.9181	0.9095	0.7249	0.6735	0.9410	1.0000		
africarank~p	0.9430	0.9548	0.7114	0.6850	0.8544	0.8623	1.0000	
globalspio~k	0.8673	0.9078	0.6068	0.5814	0.8059	0.8080	0.9512	1.0000

Matrix Plot of the Spearman Rank Correlation Coefficient for the Rankings between the Africa-SPI and global SPI



Appendix H
Results for Structural Integrity of the Social Progress Index for Africa

Cronbach's Alpha for each Component

		Cronbach's Alpha
Basic Human Needs	Nutrition and Basic Medical Care	0.76
	Water and Sanitation	0.90
	Shelter	0.93
	Personal Safety	0.77
Foundations of Wellbeing	Access to Basic Knowledge	0.83
	Access to Information and Communication	0.79
	Health and Wellness	0.82
	Environmental Equality	0.73
Opportunity	Personal Rights	0.90
	Personal Freedom and Choice	0.76
	Inclusiveness	0.92
	Access to Advanced Education	0.82

KMO for each Component

		Mean KMO
Basic Human Needs	Nutrition and Basic Medical Care	0.69
	Water and Sanitation	0.83
	Shelter	0.83
	Personal Safety	0.77
Foundations of Wellbeing	Access to Basic Knowledge	0.78
	Access to Information and Communication	0.78
	Health and Wellness	0.75
	Environmental Equality	0.75
Opportunity	Personal Rights	0.88
	Personal Freedom and Choice	0.72
	Inclusiveness	0.82
	Access to Advanced Education	0.76

Appendix I

2022 Africa Social Progress Overall Scores

Country	Dimensions					Components										
	Africa-SPI 2022	Basic Human Needs	Foundation of Wellbeing	Opportunity	Nutrition and Basic Medical Care	Water and Sanitation	Shelter	Personal Safety	Access to Basic Knowledge	Access to Information and Communication	Health and Wellness	Environmental Quality	Personal Rights	Personal Freedom and Choice	Inclusiveness	Access to Advanced Education
Seychelles	89.68	93.70	88.81	86.54	95.41	91.72	95.77	91.89	92.78	88.29	85.56	88.60	94.03	94.92	94.73	62.46
Mauritius	86.09	92.25	89.36	76.66	95.67	92.13	94.68	86.54	90.92	85.82	84.26	96.45	81.44	72.09	82.87	70.24
Tunisia	80.07	92.72	71.69	75.80	98.54	96.70	97.87	77.77	74.09	90.75	57.66	64.25	75.08	73.91	80.95	73.25
Botswana	77.95	79.86	77.83	76.15	83.61	78.30	70.15	87.38	85.59	80.27	77.91	67.55	82.48	79.74	87.82	54.55
South Africa	77.43	80.34	78.33	73.63	89.17	76.99	85.46	69.76	79.26	92.39	68.95	72.72	90.53	68.91	62.19	72.89
Cabo Verde	76.98	86.73	73.59	70.61	85.20	79.60	86.81	95.31	61.94	80.51	69.89	82.01	92.53	81.38	66.33	42.21
Algeria	73.58	88.70	66.36	65.69	96.02	92.95	96.07	69.78	71.34	67.26	64.93	61.91	51.56	66.11	68.44	76.64
Morocco	73.07	87.53	66.43	65.26	94.46	83.88	96.12	75.64	63.14	89.92	55.48	57.20	61.67	66.23	68.62	64.52
Ghana	72.55	70.65	74.26	72.75	78.22	59.09	65.39	79.88	75.21	84.64	70.48	66.71	87.07	62.55	88.49	52.89
Namibia	68.77	72.38	66.47	67.47	82.84	62.06	62.06	82.56	73.38	73.99	52.38	66.11	86.37	75.19	55.13	53.21
Sao Tome and Principe	68.47	75.36	67.99	62.06	89.25	68.06	52.46	91.67	71.29	60.12	68.53	72.03	89.64	66.93	57.20	34.46
Gabon	66.47	75.63	69.29	54.48	76.34	67.04	76.95	82.20	74.42	76.12	48.24	78.39	67.00	52.58	48.93	49.39
Egypt	65.77	89.41	56.58	51.33	97.06	98.07	99.98	62.54	78.51	79.61	38.08	30.11	35.32	56.72	31.07	82.21
Kenya	62.85	59.49	68.63	60.43	71.28	45.94	53.64	67.12	63.78	73.41	64.83	72.50	74.91	62.61	61.68	42.52
Tanzania	61.27	61.83	64.65	57.34	70.76	52.70	43.32	80.55	43.91	63.72	74.00	76.98	69.75	56.60	74.31	28.68
Gambia	60.78	63.44	59.06	59.84	64.66	55.77	48.59	84.72	57.20	59.54	53.52	65.98	83.24	49.49	76.21	26.06
Senegal	60.72	66.36	57.62	58.19	72.17	58.95	59.00	75.32	33.32	73.35	56.97	66.83	83.65	54.15	68.90	26.04
Lesotho	59.78	58.39	62.22	58.75	61.33	43.37	56.46	72.38	71.47	66.84	68.86	41.71	80.61	64.99	60.86	28.53
Zimbabwe	58.94	61.10	62.67	53.05	71.14	44.49	45.08	83.69	65.48	59.96	53.97	71.28	73.82	55.09	47.19	36.10
Zimbabwe	58.62	60.69	65.96	49.22	72.40	51.18	57.19	62.01	79.76	62.96	50.33	70.77	55.02	57.25	48.33	36.30
Malawi	57.57	57.82	60.18	54.72	74.62	41.69	32.54	82.41	61.01	50.23	54.57	74.89	85.47	60.33	42.06	31.04
Benin	57.40	55.18	58.17	58.85	62.09	38.96	33.42	86.23	52.55	66.99	52.55	60.62	81.19	52.70	71.19	30.32
Cote d'Ivoire	56.95	62.22	58.64	50.00	70.12	49.20	52.17	77.40	47.73	71.27	41.62	73.93	69.70	50.94	56.54	22.82
Eswatini	56.10	70.43	59.86	38.01	85.71	55.44	76.39	64.19	59.24	53.64	58.64	67.92	22.97	45.50	46.77	25.84
Rwanda	55.68	53.85	70.55	42.66	67.72	49.16	46.39	52.12	66.64	66.97	86.30	62.29	32.44	76.51	35.84	36.80
Togo	53.55	56.34	58.18	46.13	66.02	37.27	48.60	73.48	72.79	61.74	34.25	63.95	58.13	52.55	49.49	24.36
Sierra Leone	51.06	42.61	56.89	53.66	34.35	39.32	32.01	64.77	46.10	58.24	49.65	73.58	81.96	53.67	59.52	19.50
Ghana	51.01	53.64	57.76	41.63	79.58	41.16	39.65	54.19	57.04	55.78	51.10	67.11	44.04	40.81	44.36	36.93
Nigeria	50.91	53.42	50.63	48.69	57.12	49.67	47.70	59.17	48.17	68.77	30.44	55.13	61.25	40.89	31.87	23.75
Burkina Faso	50.64	46.83	48.34	56.75	58.70	28.73	38.42	61.46	26.10	57.86	52.07	57.34	71.42	51.00	81.47	52.09
Djibouti	50.53	64.16	51.61	35.81	70.53	65.51	54.11	66.51	40.10	52.71	50.97	62.67	50.69	43.49	24.31	24.73
Mozambique	49.13	49.73	59.16	38.51	68.63	44.60	32.62	53.06	52.84	54.45	58.76	70.62	56.16	36.41	43.75	17.72
Angola	48.43	56.12	52.99	36.19	69.81	48.25	52.81	53.60	52.94	58.56	31.09	69.36	54.32	33.82	36.25	20.38
Congo	48.11	58.70	55.91	29.71	71.35	54.09	56.44	52.92	65.29	47.60	42.42	68.34	37.79	27.51	17.04	36.50
Liberia	47.94	45.41	50.61	47.81	38.25	38.83	33.24	71.33	47.82	41.69	31.89	81.04	80.26	53.18	30.85	26.93
Cameroon	47.61	50.82	48.75	43.25	39.40	49.28	58.69	55.91	57.43	51.97	30.53	55.08	57.68	46.04	31.42	37.86
Ethiopia	47.53	48.03	50.38	44.18	74.17	29.67	39.33	48.96	46.54	45.34	46.08	63.55	57.57	58.43	27.82	32.90
Mauritania	47.49	66.21	49.28	26.99	66.56	61.14	54.32	82.80	45.64	51.20	33.15	67.13	45.77	26.66	15.61	19.93
Madagascar	46.56	45.34	52.56	41.77	56.29	33.49	29.24	62.33	60.23	45.69	33.72	70.61	71.89	39.39	32.62	23.20
Equatorial Guinea	45.67	63.42	43.75	29.84	69.87	58.73	61.41	63.66	52.12	30.48	22.77	69.63	31.02	30.41	20.46	37.46
Guinea	42.97	58.19	40.51	30.20	78.79	46.17	53.21	54.59	38.82	50.83	35.65	36.74	34.19	21.21	26.56	38.86
Burundi	42.81	46.22	49.97	32.25	68.34	38.59	33.27	44.68	41.42	40.83	56.87	60.77	38.56	45.27	30.11	15.05
Mali	42.73	51.46	41.64	35.09	57.22	51.06	40.14	57.42	20.92	57.81	35.44	54.38	58.53	28.71	35.82	17.31
Democratic Republic of the Congo	38.50	37.81	48.88	28.82	49.45	33.58	25.74	42.45	68.06	34.46	33.39	59.59	41.02	25.83	24.36	24.08
Guinea	36.73	43.11	41.65	25.43	44.34	41.83	35.82	50.45	31.37	48.45	21.05	65.73	37.87	20.54	28.40	14.91
Eritrea	33.73	47.55	39.65	13.98	67.30	28.54	43.42	50.93	36.23	13.43	52.79	56.14	7.82	12.20	21.44	14.46
Somalia	31.64	36.74	39.11	19.07	54.22	37.75	29.42	25.58	29.11	43.56	25.72	58.05	32.49	10.74	11.54	21.60
Chad	28.96	35.07	33.39	18.43	63.27	18.88	17.24	40.88	25.00	34.75	28.81	45.00	37.47	11.72	13.92	10.50
South Sudan	26.32	36.84	29.25	12.88	63.79	24.20	15.81	43.55	20.56	11.48	23.03	61.94	23.96	5.92	8.37	13.27
Central African Republic	25.59	23.40	30.44	22.93	41.75	13.71	16.51	21.63	35.45	31.48	15.78	39.04	42.86	18.35	16.10	14.40