

EREGIE PERFORMANCE GAP INDEX (e-PGI): AN INNOVATIVE COMPUTED MULTI-DOMAIN TOOL FOR DEVELOPMENT RANKING OF NATIONS BASED ON RESOURCE UTILIZATION FOR SUSTAINABLE DEVELOPMENT.

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ABSTRACT

Most Development Ranking Tools (DRTs) do not reflect comprehensively Governance Variables for Sustainable Development and do not influence Development Improvement Process (DIP). The extant DRTs are briefly but critically reviewed. A new DRT is presented to reflect Governance Variables in several unique Domains for Sustainable Development. Considering Resource Utilization for Development as a Stochastic Process and ‘Performance Gap ‘with an assumed imperfect Linear Relationship with Resource Endowment and Generation (REG), the **Eregie Performance Gap Index (e-PGI)** is denominated as a Mathematical Equation reflecting 8 Domains and 20 Indicators for the computation of Performance Gap Score (PGS). The Domains are Resource Endowment and Generation, Leadership, Followership, Corruption Level, Electoral Credibility, Mortality of Women and Children, Inequalities and Sustainable Development. For comparison, the e-PGI and Human Development Index (HDI) for some 10 selected countries are USA with the highest GNIpc (highest HDI 0.910 and Highest e-PGI 0.674) while Nigeria with the seventh GNIpc (least HDI 0.471 and also the least e-PGI of 0.137) reflecting the comparative levels of Optimal Resource Utilization and possible study reliability and validity of the e-PGI for Development Ranking. The e-PGI also had a better **EPHISTLE-fit Index (EFI)** of 0.96 (HDI was 0.46) and, therefore, more **TEA TRIAD-Compliant (TTC)** for Development Ranking of countries. The e-PGI also had a better **MDGs-Fit Index (MFI)** of 0.88 (HDI was 0.50) also implying better **MDGs-Compliance (MC)**. These indicate that the e-PGI is a better DRT with Sustainable Development as the Goal. The comparative relationships of several DRTs (HDI, e-PGI, Global Competitiveness Index (GCI) etc) were also evaluated and the observations suggested possible validity and reliability for the e-PGI but with some reservations and critical query on the logic and science of validity and reliability issues with DRTs. However, e-PGI and GCI appear to have better agreement in the higher Human Development Category while the e-PGI and HDI had better agreement in the lower Human Development Category. Considering the small sample evaluated, a scaled-up Global Survey of ALL countries is advocated and could possibly be commissioned by UNDP and the resultant data for Development Ranking by e-PGI included in future Human Development Reports as e-PGI has comparative superiority over other DRTs and is also more user-friendly.

INTRODUCTION

The first three countries in the 2013 'World Economic Order Ranking' (WEOR) by Gross Domestic Product (GDP) are United States of America (USA), China and Japan in that order (Schwab 2013). However, the current first three Competitive Economies as gleaned from the 2013 Global Competitiveness Index (GCI) are Switzerland, Singapore and Finland out of the surveyed 144 countries while the last three are Haiti, Sierra Leone and Burundi (Schwab 2013). The widely regarded three most powerful economies of USA, China and Japan are ranked on the GCI by the World Economic Forum (WEF) as the 7th, 29th and 10th Competitive Economies respectively. Nigeria, a Sub-Saharan African country, is ranked 115th by the GCI and has a developmental vision to be among the first 20 economies by the Year 2020 i.e. Vision 20:2020. Countries are ranked to reflect their developmental attainment taking cognizance of several measurable variables and indicators. Some rankings are developed using single indicators while others use multiple indicators computed into a single measure. There have been critical reviews of these various and varied ranking tools/ measures and their capacity to influence and drive Development Improvement Process (DIP) depending on the measured variable (s), indices as development input or outcome data, indices as markers of resource endowment and/ or resource utilization and reflection of governance variables (Kurtz and Schrank 2007, Andrews 2008, Andrews et al 2010). The Development Ranking Tools (DRTs) are also developed by different Organizations for different purposes, focusing on different interests/ aspects of development and with varying emphasis on human development or, indeed, the more appropriately desired sustainable development. The extant DRTs have been variously criticized as deficient in several aspects desired of a universally appealing rating tool. This new DRT, the **Eregie Performance Gap Index (e-PGI)**, presents an innovative approach to the development of a tool that addresses several desired attributes of a Model DRT. Some current DRTs are reviewed briefly, the suggested Model Ranking Tool with its attributes is highlighted and the Eregie Performance Gap Index (e-PGI) is presented for a practical appreciation of its conceptual and intellectual development, application and usefulness. Such a new and appropriate DRT is a desired human intervention as it has the potential to address the first 'A' of the 'Triple-A Process' which is Assessment (the other 'As' being Analysis and Action in progressive order) (UNICEF 1990). The appropriate trajectory towards a DIP for sustainable development must start with the correct **Assessment** on the developmental situational reality of a country which is one of the protean benefits of a robust and commanding DRT.

SOME EXTANT DEVELOPMENT RANKING TOOLS (A Snapshot and Brief Review!)

The current Tools employed for the Development Ranking of nations either involve the use of computed single indicators focusing on single development domains/ dimensions of interest to the responsible and originating Organizations or the use of single measures computed from multiple aspects of a single domain/ dimension or from multiple indicators reflecting different aspects of different and varied multiple domains/ dimensions of development.

SINGLE INDICATORS

1) Income Domain

These reflect Resource Endowment and/ or Wealth Generation as a template for the take-off of development. They focus on the economic means/ base of development but not on their utilization for development. They do not strictly dictate the ultimate developmental attainment which takes cognizance of other confounding variables. Wealth Generation is different from Wealth Utilization and the difference is Governance! They, therefore in strict terms, do not alone influence or drive the DIP. The following Tools are harvested from a recently released Report (United Nations Development Programme Human Development Report (UNDP HDR) 2013).

- i) Gross Domestic Product (Purchasing Power Parity): Sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products expressed in 2005 international dollars using purchasing power parity rates.
- ii) Gross National Income Per Capita (Purchasing Power Parity) (GNIpc PPP): Aggregate income of an economy generated by its production and its ownership of the factors of production less the incomes paid for the use of factors of production owned by the rest of the world converted to international dollars using PPP rates divided by mid-year population.
- iii) Gini Index (Income Gini Coefficient): Measure of the deviation of the distribution of income (or consumption) among individuals or households within a country from a perfectly equal distribution. A value of 0 represents absolute equality and 100 absolute inequality.
- iv) Population below PPP \$1.25 a day: Percentage of the population living below the International Poverty Line \$1.25 (in Purchasing Power Parity terms) a day.

2) Health Domain (UNDP HDR 2013)

There are several single indicators which reflect the health situation of countries and are used for their ranking but they are largely development outcomes rather than inputs and, hence, do not alone drive DIP. They also reflect only a domain of sustainable development.

- i) Infant Mortality Rate (IMR): Probability of dying between birth and exactly age 1 and expressed per 1000 live-births
- ii) Under-Five Mortality Rate (U5MR): Probability of dying between birth and exactly age 5 and expressed per 1000 live-births
- iii) Maternal Mortality Ratio (MMR): Ratio of number of maternal deaths to number of live-births in a given year expressed per 100, 000 live-births
- iv) Life Expectancy at birth (LE): Number of years a newborn infant could expect to live if the prevailing patterns of age-specific mortality rates at the time of birth remain the same throughout the infant's life.

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- v) Population using Improved Drinking Water Sources: Percentage of the population using any of the following as their main drinking water source: drinking water supply piped into dwelling, plot, yard or neighbour's yard; public tap or standpipe; tube well or borehole; protected dug well; protected spring; rainwater; bottled water plus one of the previous sources as their secondary source.

3) Education Domain (UNDP HDR 2013)

- i) Adult Literacy Ratio: Percentage of the population 15 years and older who can, with some understanding, read and write a short simple statement on their everyday life
- ii) Population with at least Secondary Education: Percentage of the population 25 years and older who reached at least secondary education
- iii) Gross Primary Enrolment Ratio: Total enrolment in primary level of education regardless of age expressed as a percentage of the official school-age population for the primary level of education

4) Environment Domain (UNDP HDR 2013)

- i) Primary Energy Supply (Renewables): Percentage of total energy supply that comes from constantly replenished natural processes including solar, wind, biomass, geothermal, hydropower and ocean resources and some waste. Nuclear energy is not included.
- ii) Emissions Per Capita (Carbon Dioxide): Human-originated carbon dioxide emissions stemming from the burning of fossil fuels, gas flaring and the production of cement including carbon dioxide emitted by forest biomass through depletion of forest areas divided by the mid-year population

5) Innovation and Technology Domain (UNDP HDR 2013)

- i) Research and Development Expenditure: Current and capital expenditures as percentage of GDP (both public and private) on creative work undertaken systematically to increase knowledge and the use of knowledge for new applications. It covers basic research, applied research and experimental development
- ii) Patents granted to residents and non-residents: Number of exclusive rights granted for an invention which is a product or process which provides a new way of doing something or offers a new technical solution to a problem expressed per 1 million people.

MULTI-DOMAIN INDICATORS

Recognizing that single indicators are unlikely to capture all the relevant determinant variables of development, and indeed sustainable development, it has become more imperative to compute measures from several domains/ dimensions which evaluate different aspects of performance towards developmental attainment for the countries of the world. Some authors differ and prefer single-domain measures (Andrews 2008, Andrews et al 2010).

- 1) **Human Development Index (HDI) (UNDP HDR 2013):** A composite index measuring average achievement in three basic dimensions of human development- a long and healthy life, knowledge and a decent standard of living. For health, Life Expectancy Index (LEI) is computed and for standard of living, Income Index (II) is computed using the GNIpc. Two indices are computed for knowledge (Education Index, EI): Mean Years of Schooling Index (MYSI) and Expected Years of Schooling Index (EYSI). The HDI is a complex geometric mean computation from the four calculated indices. The HDI is widely used by the UNDP in its annual HDR since its development in 1990 but has also been widely criticized for its inadequacy in comprehensively reflecting and capturing the totality of the essence and dimensions of development and, indeed, human development and sustainable development (McGillivray 1991, Srinivasan 1994, Wolff 2011). Only 3 Parameters or Dimensions of development, and specifically human development, are reflected in the HDI. Other aspects of the regarded Social Sphere or the relevant Moral Sphere, not captured, which impact on development are not addressed. Also, the reflected dimensions are not expanded and critically captured and scored. For example, the type (Science or Humanities) and achieved levels of Education are not dissected. The determinants of mortality (communicable, non-communicable or moral/ emotional regarding suicide as a case-in-point among several others) which impact on LEI are not highlighted to drive the DIP. It is even suggested that the HDI does not add value to the already existing parameters especially when the formula for computation is critically reviewed. The logarithmic treatment of data alters the real comparative relationships and differentials: the real magnitude of income differences between countries is diminished by the logarithmic differences. Also, Income Inequalities are not considered in the derivation of HDI with its implication for standard of living and human development. Ecological specifics, which are possible confounders of sustainable development, are also not reflected in the development ranking of nations. These are just a few of the florid criticisms regarding the use of HDI to rank nations developmentally. The UNDP, possibly appreciating these criticisms and taking cognizance of same, may have been guided in introducing a modification of HDI and, indeed, other compelling indices covering other domains of human development in its subsequent and recent HDRs especially from 2010. Some of these are reflected here-under.
- 2) **Inequality-adjusted Human Development Index (IHDI) (UNDP HDR 2013):** HDI value adjusted for inequalities in the three basic dimensions of human development. Only the same 3 dimensions are captured and the previous criticisms of HDI largely apply except for the adjustment for dimensional inequalities.
- 3) **Gender Inequality Index (GII) (UNDP HDR 2013):** A composite measure reflecting inequalities in achievements between women and men in three dimensions- reproductive health, empowerment and the labour market. The Reproductive Health is computed from the MMR and Adolescent Fertility Rate, Empowerment is computed from Seats in National Parliament occupied by women and Proportion of women 25 years and older

with at least Secondary Education and the Labour Market computed from the Labour Force participation Rate. The GII, introduced in 2010, is an overall derivation from these indicators. Several determinants of development are still not reflected as confounders of developmental attainments and ranking.

- 4) **Multi-dimensional Poverty Index (MPI) (UNDP HDR 2013):** Percentage of the population that is multi-dimensionally poor adjusted by the intensity of the deprivations. The MPI is computed from 10 Indicators covering deprivations in the same previous three basic dimensions of human development: Health, Education and Living Standards. Deprivation Headcount, Intensity of Deprivations, Population vulnerable to Poverty, Population in Severe Poverty, Population below Income Poverty Line and the Dimensional Deprivations and their Contributions to Overall Poverty are all data to be gleaned from the MPI. Although a significant improvement over HDI, it is still basically restrictive in the considered dimensions to the exclusion of other relevant determinants of sustainable development. It is currently considered as an experimental index implying that the need to construct a new DRT with a global compelling and commanding appeal is a real and urgent imperative.
- 5) **Corruption Perception I Index (CPI) (Transparency International 2012):** It is an aggregate indicator that reflects the perceived level of public sector corruption in a country and has been published annually since 1995 by the Transparency International. It is derived from data from different sources of information about corruption related to the bribery of public officials, kickbacks in public procurement, embezzlement of public funds and the effectiveness of public sector anti-corruption efforts. This index measures 'perception' and is largely confined to only an aspect of development factors or variables: Corruption.
- 6) **Worldwide Governance Indicators (WGI):** A composite indicator computed to reflect the level of governance in a country. It was developed in 1996 and derived from data on six dimensions: Voice and Accountability, Political Stability and Absence of Violence/Terrorism, Government Effectiveness, Regulatory Quality, Rule of Law and Control of Corruption (Kaufmann et al 1999, Kaufmann et al 2007). The WGI explores several domains for capture and inclusion in the Development Ranking Tool but, again, several other relevant determinant variables of sustainable development are not regarded for inclusion. Some authors have also had caustic criticisms of the WGI (Andrews 2008, Andrews et al 2010))
- 7) **Open Budget Index (OBI):** A composite measure of the openness, transparency and implementation of budgets by different countries. This was developed by the International Budget Partnerships (IBP) in 1983 and published by the Centre on Budget and Policy Priorities (IBP 2010). It is computed from data concerning Pre-Budget Statement, Executive's Budget Proposal, Enacted Budget, In-Year Reports, Mid-Year Review, Year-End Report, Audit Report and Citizens Budget. The indicators used for country's budget transparency are developed by multilateral organisations, such as the International Monetary Fund (IMF), the Organisation for Economic Co-operation and Development (OECD), and the International Organisation of Supreme Audit Institutions

(INTOSAI). The OBI is largely focused on Budget issues completely to the exclusion of other contending determinants of sustainable development.

- 8) **Global Competitiveness Index (GCI):** A composite score that defines the competitive level of a country's economy in the world and has been published since 2004 for the ranking of nations as a single index and developed by Xavier-Sala-i-Martin and Elsa V. Artadi (Sala-i-Martin and Artadi 2004, Schwab 2013). Before then, and since 1979, the World Economic Forum (WEF) had published annually two different Indices: macroeconomic 'Growth Development Index (GDI)' by Jeffrey Sachs and microeconomic 'Business Competitiveness Index (BCI)' by Michael Porter. The GCI is presented in the WEF annual Global Competitiveness Report within the framework of the Global Benchmarking Network. It is computed from over 110 variables organized into 12 differentially weighted Pillars in nominal order: Institutions, Infrastructure, Macroeconomic Environment/ Framework, Health and Primary Education, Higher Education and Training, Efficient Goods Markets, Efficient Labour Markets, Developed Financial Markets, Harnessing Benefits of Existing Technologies, Domestic and International Market Size, Sophisticated Production Processes and Innovation. The differential weighting of the pillars reflect the economic category of the different countries: Factor-driven, Efficiency-driven and Innovation-driven Economies. This is a robust Development Ranking Tool with over 110 indicators assessed but still excludes some determinant variables critical to development: Leadership, Followership, Population Dynamics, pervading critical measurable Environment Issues and others. Also, about 2/3 of the variables are harvested by the WEF through its survey, the Executive Opinion Survey (EOS) and are not publicly available while 1/3 are publicly available with widely acclaimed Organizations like the United Nations among several others. Recognizing the critical limitations of the GCI as a DRT for Sustainable Development, the WEF has now introduced in the 2013 Report two new Indices relating to the two components of Sustainability (Social and Environment): Social Sustainability Score /Social Sustainability-adjusted GCI and Environmental Sustainability Score/ Environmental Sustainability-adjusted GCI both integrated into the Sustainability-adjusted GCI. Furthermore, several GCI Pillars have been modified in the computation of the 2013 GCI: Interest Rate Spread removed from the 3rd Pillar, Mobile Broadband added to 9th Pillar, Patent data from Patents Cooperation Treaty now used for the 12th Pillar compared with previous data from US Patent and Trademark Office (USPTO). Some data from EOS are now also added to the 1st Pillar. Several data are also not 'hard data' with the implication for computation objectivity. All these point to the inadequacy of the very robust GCI and hence the urgent imperative to construct a new globally commanding DRT.
- 9) **Mo Ibrahim Index (MII) (Wikipedia 2013):** A composite score for African Governance and Leadership and ranks African countries according to their achievement of Good Governance. This has been published since 2007 by the Mo Ibrahim Foundation.

It is computed from 5 Main Categories, 14 Sub-Categories and 86 Indicators. The main categories are Safety and Rule of Law, Participation and Human Rights, Sustainable Economic Opportunity and Human Development. This Ranking Tool is restricted to African countries and, therefore, lacks global and universal applicability. It, in fact, initially did not regard the North African countries of Morocco, Egypt, Algeria, Libya and Tunisia among others until 2009. It has also been criticized as laying too much emphasis on, and reward for, individuals as leaders rather than on sustainable institutions, policies and citizens' participation. Also, the prescribed use of the index by Civil Society Organizations, most lacking critical means, funds and strength, to check their governments creates some impediment and difficulty with the final real impact of the tool.

MODEL DEVELOPMENT RANKING TOOL (Eregie 2013)

From the Snapshot Brief Review of extant Development Ranking Tools, it becomes imperative that the world urgently desires and needs a DRT with a global and universal applicability, captures the relevant domains of sustainable development and can influence and drive the DIP. It is here suggested that a Model DRT should demonstrate the following attributes listed here-under:

- 1 Reflect Development Process Inputs and Outcomes
- 2 Reflect Leadership-Followership-Development Triad (Eregie 2011)
- 3 Reflect Resource Endowment and Resource Generation
- 4 Reflect Resource Utilization
- 5 Reflect People-centred Development Process
- 6 Reflect Conceptual Understanding of the Goals, Means and Process of Development
- 7 Reflect a valid Computational Model that is globally applicable and reliable
- 8 Reflect an 'EPHISTLE-Fit' and 'TEA TRIAD-Compliant' Tool ; also 'MDGs-Fit' and 'MDGs-Compliant'
- 9 Reflect compliant use of other appropriate relevant development indicators/ indices
- 10 Reflect Governance Variables mostly directly and others indirectly

Considering the suggested attributes of a Model Development Ranking Tool, it is obvious that the extant Tools fall short of the Model and hence a new Tool needs to be urgently developed for universal applicability.

GOVERNANCE, GOVERNANCE VARIABLES AND SUSTAINABLE DEVELOPMENT

Governance has various and varied definitions (Odion-Akhaine 2008, Ozekhome 2013) but a simple functional understanding suggests that it is the process of using appropriately people-derived and accepted authority to manage public resources and affairs for the common good of the majority of the people. It includes focusing on the origin of Government, monitoring and assessing its activities and mechanism of its replacement or change. Essentially, it involves

setting goals of development and harnessing the means and resources to achieve the set goals. Sustainable Development is efficiently utilizing the resources of a country through sound processes and technologies that guarantee economic growth and human development with the protection of the environment and earth's resources for the use of future generations. The ability of a country to utilize its means and resources to achieve set goals can be denominated in 'Performance'. Performance is determined by means and resources with other confounding Governance Variables which include, among others, Leadership, Followership, Rule of Law and Constitutionality, Justice and Peace, Equity and Equality, Participation and Inclusiveness, Accountability and Transparency, Electoral Credibility, Trade and Competitive Markets, Health and Education, Security and Welfare. Tied to the issues of Accountability and Transparency are Corruption and Financial Indiscipline. Others variables are Research and Development, Technology, Innovations, Infrastructure, Investments and Partnerships, Institutional Capacity, Job Creation and Economic Growth with Sustainability concerning Safe or Green Environment using Cleaner Energy, Less Emissions with Reduced Global Warming. Productive Workforce requires a Healthy Population implying further variables concerning Education, Population Dynamics and Health Issues. The set Goal of Sustainable Development is the achievement of a Green Economy through the use of sound technological processes which protect the Environment and the Earth's Resources for the future Generations. Indeed, Sustainable Development is being pursued globally with Performance Milestones denominated in mostly Health-related Millennium Development Goals (MDGs) (United Nations 2000).

PERFORMANCE GAP

In the foregoing segment, Performance was reviewed as a reflection of the capacity to achieve national development or set development goals. Without means, man can possibly eke out Performance! Consider the 'Paralympics': a 'theatre' for the competitive demonstration of '**Ability in Disability**'. In Governance, this implies the ability to harness and optimize the utilization of limited or scarce resources to achieve set national development goals. Reciprocally, it is possible to conjecture '**Disability in Ability**' or '**Poverty in Wealth**': in Governance, this implies inappropriate or inefficient/ inadequate and sub-optimal utilization of abundant resource endowment. This latter scenario is denominated as '**Performance Gap**'. Performance Gap was popularized by United Nations Children's Fund (UNICEF) using U5MR for the Development Ranking of nations in its Progress of Nations Report (UNICEF 1996). Governance Variables which determine Performance also find determinant value in 'Performance Gap' with the appropriate consideration and appreciation of their influence on, and relationships to, 'Performance Gap (PG)': either directly or indirectly/ inversely. The new e-PGI is an intellectual conceptual extrapolation of this understanding. A Positive PG (+ve PG) is indicative of Inappropriate Resource Utilization or Poor Performance and a Negative PG (-ve PG) indicates Optimal Resource Utilization or Good Performance. Figure 1 presents a graphic illustration of PG as an example.

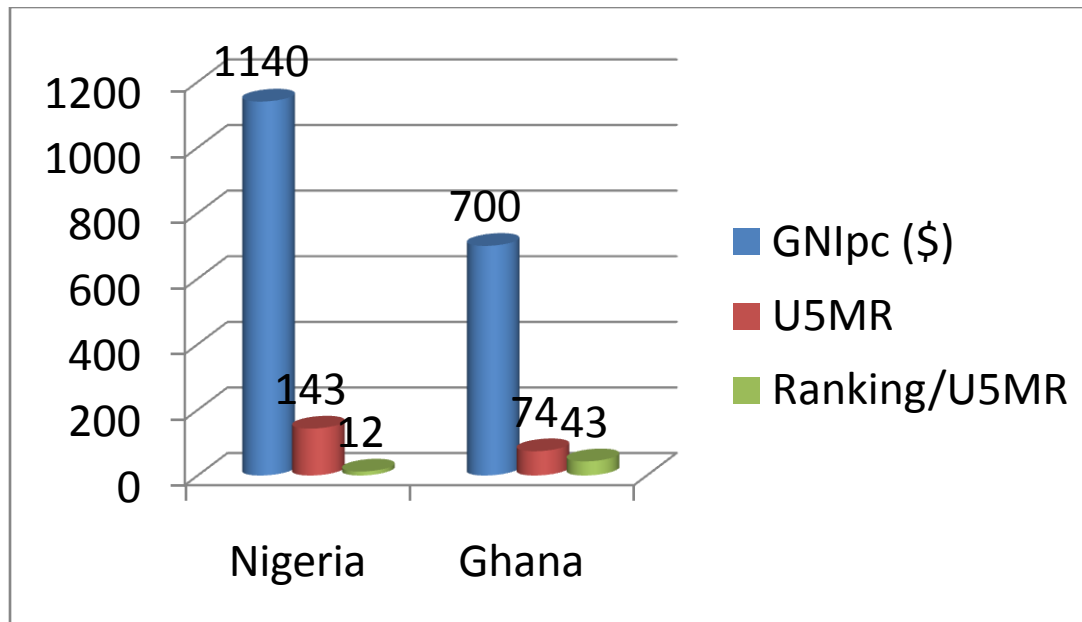


Figure 1: Nigeria and Ghana with their GNIpc and U5MR to illustrate PG (Data from UNICEF State of the World Children Report 2012)

Nigeria with a higher GNIpc of \$1140 has a higher U5MR of 143 per 1000 live-births ranked 12th highest in the world compared with Ghana with a much lower GNIpc of \$700 and yet a lower U5MR of 74 per 1000 live-births ranked 43rd depicting qualitatively, for Nigeria and Ghana comparatively, +ve PG and -ve PG respectively. Additionally, Nigeria has the 42nd largest GDP out of 144 countries in the world but is ranked 115th by GCI and 153rd of 186 countries by HDI while Ghana with the 78th largest GDP of 144 countries is ranked 103rd by GCI and 135th of 186 countries by HDI (UNDP HDR 2013, Schwab 2013).

EREGIE PERFORMANCE GAP INDEX (e-PGI): Conceptual Development and Application

The impetus to develop a new Development Ranking Tool was serendipitously exposed in my Inaugural Lecture delivered at the University of Benin in 2009 (Eregie 2009). Conceptually, PG was assumed to have an imperfect Linear Relationship with Resource Endowment (RE) and other confounding variables were considered to influence the ultimate ‘Gap’ and included Leadership, Followership, Corruption and Electoral Credibility. Considering Resource Utilization over time, and hence Performance Gap (PG), being undetermined as a Stochastic Process, PG was denominated in a Mathematical Equation viz:

$$PG = (BILBI/FRCE) RE + C/K \quad (\text{Eregie 2009})$$

Equation was likened to : $y = bx + a$; a Linear Equation

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Where:

PG = Performance Gap

BILBI = Bad Insensitive Leadership with Budgetary Indiscipline

FRCE = Followership with Responsible Constitutional Expectation

RE = Resource Endowment

C = Corruption

K = Electoral Credibility,

For a given RE, mathematically, $PG \rightarrow 0$ or beyond as:

‘BILBI’ reduces

‘FRCE’ increases

‘C’ decreases

‘K’ increases.

This was presented as the ‘Operational Politico-Economico-Demographic Equation’ for PG and was purely a conceptual **Qualitative Equation**. Following several further presentations of this conceptual equation, it became imperative for me to rework the equation and develop a **Quantitative Equation** for a more practical and better application of the Concept in the Development Ranking of nations. This is the genesis of the **Eregie Performance Gap Index: ‘A comparative multi-domain indicator of optimal resource utilization for sustainable development computed from a set of scored governance- and development-related variables’**.

CONCEPTUAL DEVELOPMENT OF e-PGI AND DOMAIN SCORING SCHEMES

With a careful and extensive search and review of the literature, relevant indicators in the appropriate determinant domains of Sustainable Development were captured and scored for inclusion in the Scoring Schemes for the e-PGI. Some others were personally developed by the author and also included in the computation (indicated with ‘Author’ in parenthesis in the relevant Tables below). The assignment of scores reflected the direct or inverse relationship of the scored variables with PG and only the Leadership domain (BILBI) had scores ranging from zero purposely for a conceptual interpretation of the impact of variables on PG as will be further elucidated on subsequently. Continuous variables had 5 scored alternatives for indicators to enhance their discriminatory value while categorical variables had 3 scored alternatives to minimize their probable subjective impact on the overall computed scores. A combination of several variables also minimizes the error of assigned estimates from the computation. Also, current dataset ranges and realistic future possibilities, as appropriate, were considered in the

developed classifications and assigned scores. The inclusion of a few semi-subjective scored variables is justified and acceptable in the development of such Models (UNDP HDR 2013). Of the 20 Indicators, perhaps only a maximum of 4 are in this category.

CONCEPTUAL INCLUSION OF VARIABLES AND THE ANATOMY OF THE SCORING SCHEMES

For this Model, the Goal of development is Sustainable Development, the Means is ‘Resource Endowment and Generation’ with the ‘Leadership-Followership’ Interface setting the pace and trajectory (‘Velocity or Slope’) to Performance or ‘Performance Gap’ while the other relevant Governance Variables are Confounding Modulators. The e-PGI Model has 8 Domains and 20 Indicators. Some Indicators are original to the author while others were harvested from credible, valid and reliable datasets developed and/ or currently utilized by credible and responsible widely accepted reputable International Organizations including several United Nations Agencies (See appropriate Listing later). The 8 Domains detailed in Tables 1 to 8 below are Bad Insensitive Leadership with Budgetary Indiscipline (BILBI) (Leadership with Constitutionality, Technological and Investment Drive and Budgetary Discipline domain), Followership with Responsible Constitutional Expectation (FRCE) (Followership with Participation and Inclusiveness domain), Resource Endowment and Generation (REG) (Economic Means/ Income domain), Corruption Level (C) (Accountability and Transparency domain), Electoral Credibility (K) (Government Change with Constitutional Participation and Inclusiveness domain), Mortality of Women and Children (M) (Health domain), Inequalities (Q) (Socioeconomic and Gender Inequalities domain) and Sustainable Development (S) (Population Dynamics, Energy and Environment domain). The included Variables are largely self-explicit and only a few conceptually and intellectually cryptic parameters are further exposed and dissected here-under.

1. BILBI (Author): Domain has 7 Indicators with a Total Score of 0 to 26

Government Policies sensitive to Security & Welfare of all Citizens (Author)	Score	Government upholds rule of law and constitutionality (ROL/ WGI)	Score
Always	2	≥ 80	4
Occasionally	1	60 – 79	3
Never/ Rarely	0	40 – 59	2
		20 – 39	1
		< 20	0

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Budget Appropriation becomes Law (Author)	Preceding Year or Mid-Year Budget Openness, Transparency and Implementation (OBI/IBP) (%)	% GDP Expenditure on Research and Development	Patents granted to residents and non-residents (per million people)	FDI (Net Inflows) % GDP	Score
Before end of the preceding year to the Budget Year	≥ 80	≥ 3.5	≥ 1000	< 1.0	4
Within Q1 of Budget Year	60 - 79	2.5 – 3.49	700 - 999	1.0 – 15.0	3
Within Q2 of Budget Year	40 - 59	1.5 – 2.49	400 - 699	16.0 – 30.0	2
Within Q3 of Budget Year	20 - 39	0.5 – 1.49	100 - 399	31.0 – 45.0	1
Within Q4 of Budget Year	<20	< 0.5	<100	> 45.0	0

ROL/ WGI: Rule of Law from Worldwide Governance Indicators

OBI/ IBP: Open Budget Index by International Budget Partnerships

FDI: Foreign Direct Investment. The implication of this for Sustainable Development with long-term self-sufficiency in resource utilization and achievement of set development goals is quite controversial with some scholars arguing that it stimulates Investments, Infrastructure, Productivity and economic growth while others suggest a cautious approach with the potential to eclipse domestic economic development, long-term self-reliance and the potential emergence of the feared possibility of the development of the ‘Dutch Disease’ inimical to Sustainable Development (Corden and Neary 1982, Loungani and Razin 2001, Carmela 2011, Ebrahimzadeh 2012, Kline 2012). The Scoring Scheme takes cognizance of the latter worrisome disposition for Sustainable Development. FDI captures the desired Partnerships necessary for global collaboration and ‘Responsible Sovereignty’ (UNDP HDR 2013). With critical consideration of FDI, it has determinant implications for growth of local firms, Technology Transfer, Labour growth, harnessing Local Content, stimulating Innovation, engendering Inequality, upholding Rule of Law and rearing Corruption. This is all about People, Institutions and Capacities. Responsible Sovereignty and Partnerships guarantee the delivery of Public Goods for Sustainable Development: Clean Air and Stable Climate, Shared Resources, Stable Financial Markets, Progress on Trade Reforms and Financing Green Technologies (UNDP HDR 2013).

% GDP Expenditure on Research and Development: This suggests expenditure on education and research which stimulate and drive Technology, Innovation, Productivity and Development (UNDP HDR 2013).

Patents granted to residents and non-residents: This correlates with, and mirrors, Innovations in the economy.

Classification of data and scores were developed by the Author

2. FRCE (Author): Domain has 3 Indicators with a Total Score of 3 to 11

Government held accountable by Citizens/ Legislature (Author)	Confidence Vote on Government by Citizens/ Legislature (Author)	Score
Frequently	Frequently	1
Occasionally	Occasionally	2
Never/ Rarely	Never/ Rarely	3

Voice and Accountability (VA)/ WGI	Score
≥ 80	1
60 - 79	2
40 - 59	3
20 - 39	4
< 20	5

Voice and Accountability (VA)/ WGI: This captures the level of active participation of the citizenry and Legislature in determining the trajectory of Governance by the Leadership and is coupled with the other two indicators. Followership Participation is a critical determinant of Leadership Performance or lack of it (Ogbonna et al 2012).

Classification of data and scores were developed by the Author.

3. *REG (Author): Domain has 2 Indicators with a Total Score of 2 to 10

GDP (PPP) (\$Billion)	GDP (PPP) per Capita (\$)	Score
≥ 8000	≥ 60000	5
6000 - 7999	45000 - 59999	4
4000 - 5999	30000 - 44999	3
2000 - 3999	15000 - 29999	2
< 2000	< 15000	1

REG: Means are either endowed and/ or generated. The Model takes cognizance of the absolute quantum of GDP available to the Leadership (Endowed or Generated through Leadership efforts) and also considers the resultant moiety when it is related to the population and both are infused into the computation of Performance Gap. A country with a large GDP may have a small resultant GNIpc because of a huge population and both have implications for Performance/ Performance Gap re: Sustainable Development. For instance, China is ranked 2nd in GDP but ranked 80th in GNIpc among 144 countries (Schwab 2013). The Income Inequalities are addressed in another domain.

Classification of data and scores were developed by the Author.

Forum on Public Policy

4. C (Author): Domain has 1 Indicator with a Score of 1 to 5

Transparency International Rating (Corruption Perceptions Index) (CPI)	Score
< 2.0	5
2.0 – 3.9	4
4.0 – 5.9	3
6.0 – 7.9	2
≥ 8.0	1

CPI: Corruption Perception Index by Transparency International. This rates the perception of Corruption Level in the conduct of public affairs which, being largely a secret or hidden transaction/ encounter, is difficult to measure accurately but the CPI remains acceptable and widely in use.

Classification of data and scores were developed by the author.

5. K (Author): Domain has 1 Indicator with a Score of 1 to 5

Electoral Credibility and Government Change/ Stability (using emergence of current Government) (Author)	Score
Acceptable mechanism concluded in 24hrs, Peaceful Transition, Stable Government	1
Acceptable mechanism concluded after 24hrs but within 1wk, Peaceful Transition, Stable Government	2
Acceptable mechanism concluded after 1wk, Contested Transition, Government Stability uncertain	3
Disputed mechanism, Difficult Transition, Civil Strife and Violence/ War	4
Unconstitutional/ Unacceptable mechanism of Government Change	5

Electoral Credibility: Electoral Credibility confers legitimacy, confidence and power on an elected Government and germinates Governance Credibility, Stability, Form and Character which garner peace and people/ popular endorsement which, in turn, guarantee investment and development. It has become imperative to acknowledge and score any **‘Mechanism of Government Change’** (Democracy, Monarchy etc) which is acceptable to the people and galvanizes a stable and peaceful **‘Post-Change’** polity and economy.

Classification and scores were developed by the Author.

6. M (Author): Domain has 2 Indicators with a Score of 2 to 10

U5MR/ 1000 live-births	MMR/ 100, 000 live-births	Score
<10	<200	1
10-49	200 - 399	2
50-89	400 - 599	3
90-129	600 - 799	4
≥ 130	≥ 800	5

MMR and U5MR: These Mortality Rates are widely in use and are reflected in setting the targets for the MDGs undergirding the importance and relevance of the Health domain to Sustainable Development. ‘Health is Wealth’ as is popularly acclaimed implies the critical role of a healthy productive workforce for wealth generation and development. Women Empowerment is fundamental to Sustainable Development but they need to be alive to be empowered and hence the additional relevance of MMR. Also, to become women to be empowered, they must first survive childhood into adulthood and hence, again, the further relevance of U5MR to Sustainable Development.

Classification of data and scores were developed by the Author.

7. Q (Author): Inequalities: Domain has 2 Indicators with a Score of 2 to 10

Gini Index	Gender Inequality Index	Score
< 20.0	< 0.200	1
20.0 – 39.9	0.200 – 0.399	2
40.0 – 59.9	0.400 – 0.599	3
60.0 – 79.9	0.600 – 0.799	4
≥ 80.0	≥ 0.800	5

Inequalities: Equity and Equality are necessary for inclusiveness, participation, peace and stability which are all critical requirements for economic growth and Sustainable Development. Inequalities obliterate the potential of certain segments of the economy from fully participating and contributing their quota to Productivity and Sustainable Development. Reports have published quantified economic losses and loss in Development Ranks attributable to Gender-Inequality for example (UNDP HDR 2013). Equity and Inclusiveness are prescribed essentials for Sustainable Development.

Classification of data and scores were developed by the Author.

8. S (Author): Sustainable Development: Domain has 3 Indicators with a Score of 3 to 15

Renewable Energy (% Energy Supply)	Total Dependency Ratio on ages 15 – 64 years	CO ₂ Emissions (Tonnes pc)	Score
< 20	≥ 80	≥ 31.0	5
20 - 39	60 - 79	21.0 – 30.0	4
40 - 59	40 - 59	11.0 – 20.0	3
60 - 79	20 - 39	1.0 – 10.0	2
≥ 80	< 20	< 1.0	1

Sustainable Development: For Sustainable Development, the world desires international and trans-boundary collaboration and inter-connectedness in using Technologies and cleaner energy sources that protect the earth’s resources, reduce Carbon-laden Emissions and assure protection of the environment against Global Warming. The workforce must also be able to bear the burden of economically sustaining the populace in the long-term and saving reasonable resources for the future use of generations unborn (UNDP HDR 2013). The Scoring Scheme was developed to reflect progress towards the ideal set goals for Sustainable Development: the Green Economy for Tomorrow.

Classification of data and scores were developed by the Author.

The e-PGI has been developed to include Domains and Indicators that address the global set goal of Sustainable Development and are reflected in current topical issues and discourse and include the following issues: Command over Resources, Health, Education, Social Integration (Equity and Inclusiveness), International Trade Flows of Goods and Services, International Capital Flows and Migration, Innovation and Technology, Environment and Population Dynamics (UNDP HDR 2013). Ultimately, the world is geared towards Responsible Sovereignty, as highlighted previously, that will guarantee the delivery of additional Global Public Goods: Green Economy and Environment, Equitable Multilateral Trade Agreements, Visionary Leadership, Participatory Followership and Healthy Productive Population with the protection of the Earth’s expendable and plausibly exhaustible Resources for the future Generations unborn.

COMPUTATION OF THE e-PGI AND CONCEPTUAL DEVELOPMENT OF THE OPERATIONAL EQUATION

Two variables (y and x) with an imperfect inverse Linear Relationship are expressed mathematically

thus: $y = -bx + a$; y = dependent variable, x = independent variable, a = y-intercept, - b = velocity/ slope defining the inverse relationship (Wikipedia 2013).

PG, conceptually for the Model, is assumed to have an imperfect inverse Linear Relationship with REG expressed mathematically thus:

$$\text{PGS} = - (\text{BILBI/ FRCE}) \text{REG} + (\text{C} + \text{K} + \text{M} + \text{Q} + \text{S});$$

Where:

PGS = Performance Gap Score and represents 'y' in the Linear Equation

'BILBI/ FRCE' represents the 'b' in the Linear Equation

'REG' represents 'x' in the Linear Equation

'C + K + M + Q + S' represents 'a' in the Linear Equation

The inverse Linear Relationship is between 'y' (PGS) and 'x' (REG) with '-b' (- (BILBI/ FRCE)) as the velocity or slope of the inverse relationship and 'a' (C + K + M + Q + S) as the 'y-intercept' (PGS-intercept).

CONCEPTUAL JUSTIFICATION OF e-PGI EQUATION

In Governance with the set Goal as Sustainable Development, the assumed Means is REG and PGS reflects the measured Performance or 'Performance Gap (PG)' in this conceptual Model. The pace and trajectory (the velocity or slope) of the PGS is assumed conceptually to be determined by the 'Leadership-Followership' Interface with the relationships reflected: 'BILBI' directly related to PGS and 'FRCE' inversely related to PGS. The negative Slope (- 'b' = - (BILBI/ FRCE)) reflects the inverse relationship of REG with PGS. With the performance trajectory set by the 'Leadership-Followership' Interface, the other Confounding Governance Variables are reflected in, and subsumed within, the PGS-intercept ('y-intercept' = 'a' equivalent as (C + K + M + Q + S)). Ordinarily, 'y = a' when 'x = 0' but 'x' = REG which in economic sense cannot in reality be zero absolutely and also in the Scored Scheme to avoid numerical conceptual confusion. Therefore, and conceptually to be able to have and determine a PGS-intercept, 'b' (BILBI/ FRCE) had to be evolved to possibly be zero. Again, for 'BILBI/ FRCE' to possibly be zero, 'BILBI' necessarily had to be scored to possibly be zero as 'FRCE' cannot be zero as the resultant quantity 'BILBI/ FRCE' will be mathematically indeterminate and tend to infinity. Hence 'BILBI' is the only domain with scored alternatives ranging from and including zero representing conceptually, but not absolute numerical value, the worst score for each Leadership Variable. The mathematical implications of 'b' ranging from '-ve' through '0' to '+ve' are presented graphically in Figure 2.

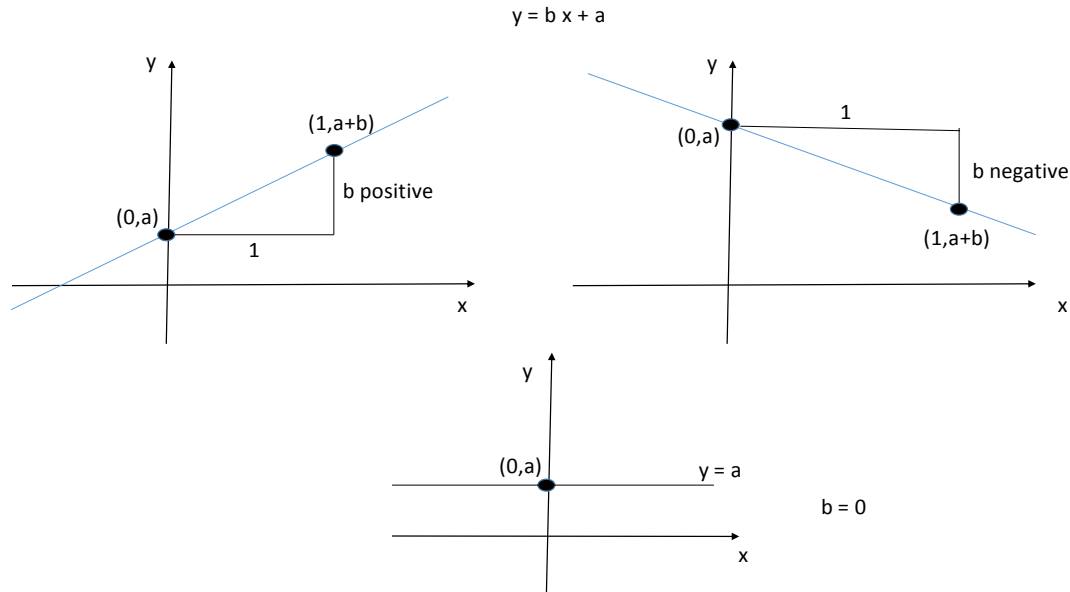


Figure 2: Graphic illustration of ‘b’ = ‘-ve’, ‘0’ or ‘+ve’ (Wikipedia 2013)

From Figure 2, PGS equals the PGS-intercept when ‘b = 0’ i.e. when ‘BILBI/ FRCE’ and, therefore, ‘BILBI’ = 0’ and this is the Worst Possible Score (WPS) for PGS (i.e. the PGS-intercept). As the score for ‘BILBI’ improves and increases from zero, it implies improved Leadership Domain score and the PGS improves from the WPS. This scenario can be likened to the Scriptural Imperative: **“SEEK YE FIRST THE KINGDOM OF GOD AND ITS RIGHTEOUSNESS AND ALL THESE THINGS WILL BE ADDED UNTO YOU” (Mt 6:33)!!** In Governance and towards Sustainable Development, this means that each nation should seek first **‘Good Sensitive Leadership with Budgetary Discipline’ and its Governance and all the Governance Deliverables for Sustainable Development will be added unto the Populace.** This is **‘Scripture-Governance Concord (SGC)’**.

COMPUTATION OF e-PGI FROM PGS

The computation from the equation above yields the quantity PGS which is obtained by assigning the **‘most likely’** score for each Variable/ Indicator and infusing the resultant **Total Domain Scores (TDS)** in the appropriate loci in the equation. The PGS is converted or transformed to e-PGI as shown below.

Mathematically, to convert ‘X’ to an ‘Index’:

$$X_i = X - X_{\min} / X_{\max} - X_{\min} \text{ (Wikipedia 2011)}$$

Therefore, for the Model:

e-PGI = |(PGS –WPS/ BPS – WPS)|; range is ‘0 to 1’.

Note: positive and negative signs are not considered in the ‘absolute’ mathematical operation

where:

e-PGI: Eregie Performance Gap Index

PGS: Performance Gap Score

WPS: Worst Possible Score

BPS: Best Possible Score

PRACTICAL APPLICATION OF e-PGI FOR SOME SELECTED COUNTRIES

The e-PGI was computed for some 10 selected countries. Data for computation were harvested from several datasets currently in use and scores were assigned as in the Scoring Scheme. Table 9 shows the data utilized for the e-PGI computation.

TABLE 9: KEY/ GUIDE FOR e-PGI COMPUTATION AND THE DATA FOR SOME 10 SELECTED COUNTRIES

INDEX/ DOMAIN/ PARAMETER		SCORE/ VALUE
e-PGI	Eregie Performance Gap Index;	0 to 1
PGS	Performance Gap Score	As computed
BILBI	Bad Insensitive Leadership with Budgetary Indiscipline	0 to 26
FRCE	Followership with Responsible Constitutional Expectation	3 to 11
REG	Resource Endowment and Generation	2 to 10
C	Corruption Level	1 to 5
K	Electoral Credibility	1 to 5
M	Mortality Rates for Women and Children	2 to 10
Q	Inequalities	2 to 10
S	Sustainable Development	3 to 15
BPS	Best Possible Score	-77.67
WPS	Worst Possible Score	+45

Forum on Public Policy

The 10 selected countries represented different Human Development and Regional Categories to explore the possible practical universal applicability and utility/ usefulness of the new Development Ranking Tool.

Some data for e-PGI computation for 10 selected countries *

Country	HDI Rank (of 187 countries)	HDI	GDP (PPP) (\$Billion)	GNI (PPP)pc (\$)	CP I	U5MR per 1000 live-births	MMR	Gini Index (%)	GII
USA	3	0.937	13, 238.3	43, 480	7.3	8	21	40.8	0.256
Belgium	17	0.897	364.7	33, 429	7.5	4	8	33.0	0.098
France	20	0.893	1, 951.2	30, 277	7.1	4	8	38.7	0.083
UK	26	0.875	2, 034.2	32, 538	7.4	5	12	35.97	0.205
Indonesia	121	0.629	992.1	4, 154	3.2	35	220	34.0	0.494
Kyrgyzstan	125	0.622	11.7	2, 009	2.4	38	71	36.2	0.357
Ghana	135	0.558	41.3	1, 684	4.5	74	350	42.8	0.565
India	136	0.554	3, 976.5	3, 285	3.6	63	200	33.4	0.610
Madagascar	151	0.483	18.2	828	3.2	62	240	44.1	0.577* *
Nigeria	153	0.471	360.8	2, 102	2.7	143	630	48.8	0.577* *

Country	Renewable Energy (% Energy Supply)	CO ₂ Emissions (Tonnes pc)	Total Dependency Ratio on ages 15 – 64 years	% GDP Expenditure on Research and Development	Patents granted to residents and non-residents (per million people)	FDI (Net Inflows) % GDP	OBI/ IBP (%)
USA	5.4	18.0	50.7	2.8	707.6	1.5	79
Belgium	3.9	9.8	53.3	2.0	49.7	18.0	43**
France	7.7	5.9	55.7	2.2	157.7	1.5	83
UK	3.2	8.5	52.7	1.8	90.2	2.2	88
Indonesia	34.4	1.7	47.3	0.1	5.0	2.1	62
Kyrgyzstan	28.4	1.2	51.9	0.2	20.4	6.6	20
Ghana	76.2	0.4	73.0	0.2	5.0	7.9	50
India	26.1	1.5	53.8	0.8	5.1	1.4	68
Madagascar	25.0	0.1	83.7	0.1	2.7	9.9	43**
Nigeria	85.3	0.6	86.1	0.2	5.0	3.1	16

Forum on Public Policy

Country	VA/ WGI	ROL/ WGI
USA	88	91
Belgium	93	90
France	90	90
UK	91	92
Indonesia	48	30
Kyrgyzstan	28	10
Ghana	62	55
India	60	52
Madagascar	28	24
Nigeria	28	10

* SOME DATA SOURCES FOR TABLE 9

+2013 UNDP HDR (Several Data from Relevant Reputable Sources; see below))

2013 WORLDWIDE GOVERNANCE INDICATORS (WGI)

2013 OPEN BUDGET INDEX/ INTERNATIONAL BUDGET PARTNERSHIP (OBI/ IBP)

2013 CORRUPTION PERCEPTION INDEX/ TRANSPARENCY INTERNATIONAL (CPI/ TI)

Some data/ Scoring Schemes were developed by the Author

**For a few countries, data were for 2012 or 2013 regional/ human development category average.

Table 10 displays the computed e-PGI for the 10 selected countries and situated comparatively with their HDI, GNIpc and Development Ranking using the three different Tools.

TABLE 10: GNI (PPP)pc, HDI, e-PGI and Development Ranking(emboldened) among 10 selected countries in order of HDI*

Country	GNI (PPP)pc (\$)	HDI*	e-PGI
USA	43, 480 - 1	0.937 - 1	0.674 - 1
Belgium	33, 429 - 2	0.897 - 2	0.394 - 4
France	30, 277 - 4	0.893 - 3	0.438 - 3
UK	32, 538 - 3	0.875 - 4	0.530 - 2
Indonesia	4, 154 - 5	0.629 - 5	0.199 - 7
Kyrgyzstan	2, 009 - 8	0.622 - 6	0.206 - 6
Ghana	1, 684 - 9	0.558 - 7	0.217 - 5
India	3, 285 - 6	0.554 - 8	0.176 - 8
Madagascar	828 - 10	0.483 - 9	0.167 - 9
Nigeria	2, 102 - 7	0.471 - 10	0.137 - 10

DEVELOPMENT RANKING BY e-PGI AND INTERPRETATION/ CLASSIFICATION

With the computed e-PGI, different countries can be classified to reflect their Development Ranking based on the level of Resource Utilization for Sustainable Development since the PGS was determined from its assumed inverse imperfect Linear Relationship with REG. Table 11 shows the guide to such classification and interpretation

TABLE 11: Resource Utilization Rating/ Development Class using the e-PGI

e-PGI	Resource Utilization Rating/ Development Class
≥ 0.80	Excellent
0,60 – 0.79	Very Good
0.40 – 0.59	Good
0.20 – 0.39	Bad
<0.20	Very Bad

VALIDITY AND RELIABILITY OF e-PGI AS A DEVELOPMENT RANKING TOOL (DRT)

For a newly constructed DRT, it is necessary to establish its validity and reliability but these require the use of ‘**Reference or Gold Standards**’. Unfortunately, the extant DRTs are largely not robust and comprehensive enough for the assessment of Sustainable Development. Not even the widely published HDI in the UNDP HDRs. The GCI by the World Economic Forum has been critically reviewed previously in this presentation and, in spite of having over 110 variables which are cumbersome to handle, several other relevant Confounding Governance Variables for Sustainable Development are not captured. The first 3 countries with the highest HDI are Norway, Australia and USA (UNDP HDR 2013) and are ranked 15th, 20th and 7th respectively by the GCI (Schwab 2013) further raising the study strategic difficulties of validity and reliability. What, in fact, are we comparing or correlating for Reliability and Validity to establish the scientifically desired relationships between the DRTs? The contents of the two DRTs (HDI and GCI) are distinctly different and are, indeed, possibly measuring or assessing completely different goals, targets or issues. The Mo Ibrahim Index (MII) lacks universal applicability, has 86 variables and several are not ‘hard data’ (as with the GCI) with their subjectivity overlay coupled with other criticisms distilled previously. Compared to other DRTs, e-PGI uniquely encompasses the relevant Domains for Sustainable Development. The computations are less cumbersome compared with the HDI and GCI and it has only 20 Variables which have been painstakingly selected and span over the relevant Sustainable Development Domains compared with the other DRTs. In spite of the study strategic difficulty of not having a ‘Gold or Reference Standard’, a cursory review of Table 10 is revealing, instructive and exciting and could stimulate a scaled-up Global Survey using the e-PGI to further evaluate and verify the observations in this

Forum on Public Policy

presentation. For the moment, the HDI is adopted, with obvious limitations, for the comparative evaluation.

From Table 10, the USA was consistently ranked 1st by the two Development Ranking Tools (DRTs) and France, Kyrgyzstan, India, Madagascar and Nigeria also consistently ranked 3rd, 6th, 8th, 9th and 10th respectively among the 10 selected countries evaluated. With the probable 60% (6 out of 10) Development Ranking agreement, there appears to be some validity of the Development Ranking by e-PGI using HDI as a reference even though the evaluated sample of 10 countries is definitely small and, of course, the two DRTs clearly have different contents/variables for Sustainable Development and, therefore, may possibly not be assessing the same Goal (Sustainable Development for e-PGI and Human Development for HDI) with further difficulty for reliability determination. The scholarly criticized HDI actually evaluates nations for Human Development while the e-PGI evaluates nations for the more robust and all-encompassing Goal of Sustainable Development. This presentation substantially highlights and questions the logic and science behind the determination of Validity and Reliability of DRTs in the absence of a universal ‘Gold or Reference Standard’ and without uniformly set goal or issue (e.g. Sustainable Development) being measured or assessed. It is hoped that UNDP, for example, would find usefulness for this DRT (e-PGI) which is perhaps now the most comprehensive Multi-domain Tool conceptually developed to assess Sustainable Development with virtually all relevant Domains (not Indicators) of Sustainable Development Governance Variables included and possibly commission a Global Survey to more systematically evaluate its validity, reliability and universal applicability as feasible, practicable and deserving given the limitations in the circumstance. The small sample in this presentation spans across several Human Development and Regional Categories to stimulate and inspire such possible UNDP intervention. The data harvest from such intervention could also be infused into subsequent annual UNDP HDRs. In Table 12, some 6 selected countries, spanning across Human Development and Regional Categories, were compared by their comparative Development Ranking using several DRTs and the cursory observation is revealing and instructive. It appears that the e-PGI and GCI have better agreement in the higher Human Development Category (USA, UK and France: 1st, 2nd and 3rd respectively) while the e-PGI and HDI possibly have better agreement in the lower Human Development Category (Ghana, India and Nigeria: 4th, 5th and 6th respectively). Interestingly, the three DRTs consistently ranked USA and Nigeria the 1st and 6th with subtle implications for the Validity and Reliability of the e-PGI. The MII and e-PGI also show some agreement regarding the included African countries: Ghana consistently ranked higher than Nigeria as it is also with HDI and GCI. Again, the sample is quite small and a much larger scaled-up Global Survey would be an urgent imperative that could possibly be commissioned by UNDP, for example, as previously indicated and this will further investigate these cursory observations.

TABLE 12: Development Ranking of 6 selected countries using GNIpc, HDI, GCI, MII and e-PGI

Country	GNIpc	HDI	GCI	MII*	e-PGI
USA	1	1	1		1
France	3	2	3		3
UK	2	3	2		2
Ghana	6	4	5	1*	4
India	4	5	4		5
Nigeria	5	6	6	2*	6

MII*: Only for the African countries

ERROR OF ESTIMATION

The ‘Error of Estimation’ of PGS will be minimized with the inclusion of several relevant variables from different relevant domains for Sustainable Development and this is also further reduced by the inclusion of a greater proportion of precisely defined and scored variables. Continuous variables with more discriminatory scores were more reflected in the Scoring Scheme compared with Categorical Variables to minimize the error. The computed PGS and the data used for the computation are not true data but estimates of the Domains and Variables with the error reflecting the inherent uncertainty in the measurement. The error may be estimated, using and extrapolating from the WGI concept, thus:

For **95% Confidence Interval** (compared with 90% for WGI) on the precision of estimation of PGS, the mathematical expression is:

PGS ± 1.96 x SD (PGS estimates); SD = Standard Deviation (Kaufmann et al 2010).

Computation of ‘SD’ is predicated on observed data and the more the observed data, the less the error of estimation. Such SD will be determined and computed from a large-scale Global Survey of **ALL** the countries of the world for generation of datasets on PGS as a precursor to Development Ranking by e-PGI.

HDI, e-PGI, EPHISTLE-Fit INDEX (EFI) AND TEA TRIAD-Compliance (TTC)

The HDI and e-PGI are further compared in some other different, but innovative, spheres. An intervention for improvement with the desired impact should pass the ‘PESTLE’ Matrix Scan (Rapidbi 2009). In 2007, the World Bank reported that the bane of Developing Countries was the four ‘Is’: Investments, Infrastructure, Innovations and Institutional Capacity and these are also reflected in contemporary and conceptual discourse (Eregie 2007, 2009, UNDP HDR 2013). With the infusion of the ‘Is’ into ‘PESTLE’ and some modest intellectual permutation and re-combination, I developed a new Scanning matrix for interventions namely: ‘EPISTLE’ (Eregie

Forum on Public Policy

2009). Subsequently with the addition of **Health** to the Matrix, this was further modified to ‘**EPHISTLE**’ (See Table 13 for the Parameters). The EPHISTLE-Fit Index (EFI) defines the degree of appropriateness of an intervention or, in this case, a newly constructed DRT. Both HDI and e-PGI are compared using the EFI (Table 13).

TABLE 13: HDI, e-PGI AND EFI

EPHISTLE Parameters	0	1	2
Economic			X O
Political	X		O
Health			X O
Investments	X		O
Infrastructure	X	O	
Innovations		X	O
Institutional Capacity			X O
Social		X	O
Technical			X O
Legal	X		O
Environment	X		O

Key:

X = HDI; O = e-PGI

0 = Not covered, 1 = Indirectly covered, 2 = Directly covered.

EFI: HDI = 10/ 22 (0.46); e-PGI = 21/22 (0.96)

The interpretation of the EFI is gleaned from the classification in Table 14 and relates to the degree of **TEA TRIAD-Compliance (TTC)**. ‘**TEA TRIAD**’ is a conceptual reflection of the extent to which Technology in relation to the Ecology is not an Apology. It is also, therefore, the

Forum on Public Policy

degree to which an intervention or tool is appropriate to the ecology and this is determined by computing its EFI.

TABLE 14: Interpretation of EFI using TTC Classification

EPHISTLE-Fit Index (EFI)	TEA TRIAD-Compliance (TTC)
≥ 0.80	Highly Compliant
0.60 – 0.79	Very Compliant
0.40 – 0.59	Compliant
0.20 – 0.39	Poorly Compliant
< 0.20	Not Compliant

From Tables 13 and 14, e-PGI has an EFI of 0.96 and is highly TTC compared with HDI with an EFI of 0.46 and just Compliant. This means that e-PGI is a more appropriate and compliant DRT than the HDI for the assessment of Sustainable Development and is recommended for global/universal applicability.

HDI, e-PGI AND MDGs

The MDGs were developed and adopted to guide and drive countries towards the achievement of Sustainable Development. Just as was done for the HDI and e-PGI using EFI, both DRTs were compared for their compliance with the MDGs and, therefore, as Tools that could drive country DIP using the **MDGs-Fit Index (MFI)**. This is displayed in Table 16.

TABLE 15: HDI, e-PGI AND MFI

No.	MDGs	0	1	2
1	Hunger/ Poverty Eradication			X O
2	Universal Primary Education		O	X
3	Gender Equality/ Women Empowerment		X	O
4	U5MR Reduction		X	O
5	MMR Reduction		X	O
6	Combating HIV/ AIDS and others		X O	
7	Environmental Sustainability	X		O
8	Global Partnerships for Development	X		O

Key:

X = HDI; O = e-PGI

0 = Not covered; 1 = Indirectly covered; 2 = Directly covered

MFI: HDI = 8/ 16 (0.50); e-PGI = 14/ 16 (0.88)

TABLE 16: Interpretation of MFI using MC Classification

MDGs-Fit Index (MFI)	MDGs-Compliance (MC)
≥ 0.80	Highly Compliant
0.60 – 0.79	Very Compliant
0.40 – 0.59	Compliant
0.20 – 0.39	Poorly Compliant
< 0.20	Not Compliant

Critical review of Tables 15 and 16 reveals e-PGI has MFI of 0.88 and, again, Highly **MDGs-Compliant (MC)** while HDI with MFI Of 0.50 is also, again, just Compliant as for the EFI and TTC. This is another and further suggestion of the superiority of e-PGI as a DRT over the HDI for ranking nations with the set Goal as Sustainable Development using MDGs as Performance Milestones Indicators (PMI).

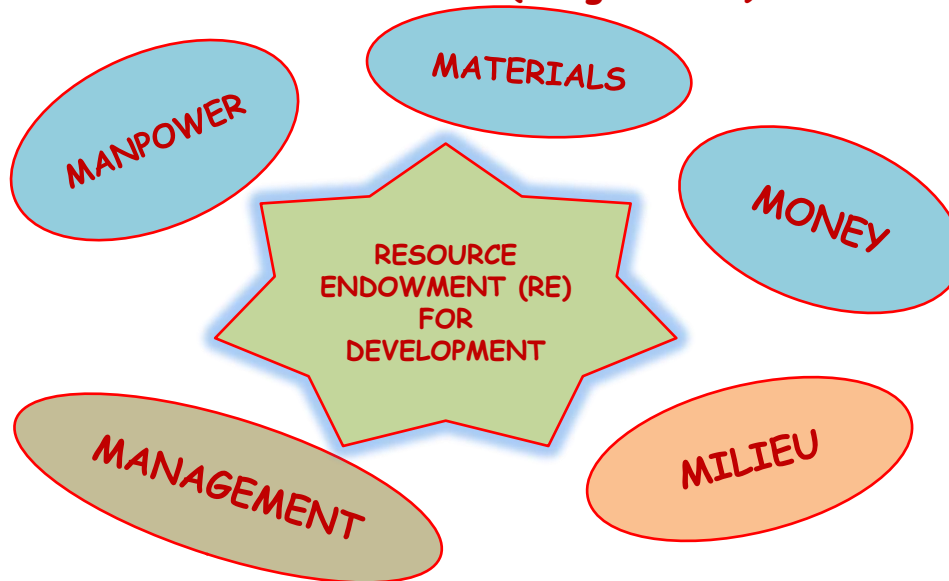
LEADERSHIP AND RESOURCES FOR SUSTAINABLE DEVELOPMENT

It is generally appreciated that the Resources needed to operationally rework a system or polity are the 3Ms: Manpower, Materials and Money. Conceptually for Sustainable Development, the space for Resources has been intellectually expanded to accommodate other ‘M’ possibilities. In 2008, I posited that the Resources critically needed for Sustainable Development are the **5Ms: Manpower, Materials, Money, Management and Milieu** (Eregie 2008) (Figure 3). The Governance Variables for Sustainable Development have a nexus with the 5Ms. It is not difficult to appreciate the nexus with the old 3Ms. **Management** and **Milieu** require more intellectual understanding for the appreciation of their nexus with Sustainable Development. Management is the harnessing of the ‘Ms’ for Sustainable Development and can be denominated as **Governance/ Leadership**. Milieu is the **Environment** and consists of the animate and inanimate moieties. The animate has to do with the Humans coordinating the Resources and such parameters as Accountability, Financial Discipline and the worrisome Corruption are determinant issues. The inanimate component relates with the Physical Environment and the issues of Environmental Protection for Tomorrow, The Green Economy and the Green Environment, become topical issues for discourse and matters to be harnessed for Sustainable Development. Concerning Leadership for Sustainable Development, and compliant with Total Quality Management (TQM), I have suggested a **TQM-Compliant Good Leadership** thus: **“Good Leadership is Resource Management by Credible Persons of a very high Moral Standing, Implementing Transparently Evidence-based Policies for the Delivery of Goods**

and Services (Democratic Dividends) which meet, and possibly, exceed, the Expectations of the People through a Continuous Improvement Process for the Attainment of Excellence while Upholding the Rule of Law, Constitutional Provisions and Zero-tolerance for Defects and Corruption” (Eregie 2007, Eregie 2009). This concept of Good Leadership takes cognizance of the plethora of Governance Variables for Sustainable Development and regards the People as the Hub around which Government’s Policies, Programmes and Partnerships must revolve.

Figure 3: RESOURCE ENDOWMENT (RE) FOR DEVELOPMENT

5Ms OF DEVELOPMENT (Eregie 2008)



CONCLUDING DISCUSSION

This presentation has reviewed DRTs currently in use worldwide except for the MII which is restricted to African countries. The inadequacies of using single-indicator DRTs have been exposed. Multi-domain DRTs have been developed as superior interventions but, from the critical but brief review in this presentation, also have critical drawbacks. Several DRTs, even though derived from Multi-domain infusion of data, tend to revolve around few domains and do not comprehensively address the plethora of Governance Variables that capture the vast expanse of the terrain of Sustainable Development. Even the widely published and utilized HDI in the UNDP HDRs addresses only 3 domains of Health, Education and Standard of Living. With the critical and scholarly criticisms of the HDI, efforts have been made to seek and achieve improvements but these have not gone far enough to achieve the desired intervention. Thus, the IHDI, MPI, GII and such other DRTs have not addressed the robust expanse of Sustainable Development domains. The interventions by other credible Organizations have also had their limitations: CPI, OBI, WGI, MII and GCI to recall but a few among several others.

Forum on Public Policy

The intervention of the e-PGI has been a courageous but modest effort to construct a DRT which significantly addresses virtually all the Domains (not Indicators) of the Sustainable Development Governance Variables. It uniquely utilizes the concept of Performance Gap previously popularized by UNICEF since 1996 and explores mathematically its relationships (direct and inverse imperfect Linear) with the various Governance Variables spanning the vast terrain of Sustainable Development. It has 8 Domains and 20 Variables/ Indicators and is more user-friendly than such other DRTs as MII with 86 variables in 5 Categories and 14 Sub-Categories and the GCI with over 110 variables organized into 12 Pillars.

Concerning Validity and Reliability issues, the strategic study difficulties have been critically discussed as the extant DRTs do not provide convincing and impeccable Reference Standards as they are limited by their contents and what they, in fact, measure or assess. Any further detailed pursuit of these determinations, at best and critically speaking, will be a scientific exercise in futility. A cursory comparison with the HDI, however, suggests the potential validity, reliability and usefulness of the e-PGI but a more promising and rewarding Global Survey could be commissioned by the UNDP, for instance, and the e-PGI could then be compared with the HDI, WGI, GCI and MII for the African region. Domain-specific Scores may be calculated for Domain-specific DIP but must have limited usefulness in overall Development Ranking as other DRTs.

Concerning more fundamental comparisons with the set Goal of Sustainable Development and MDGs as Performance Milestones Indicators, the e-PGI was a more appropriate DRT than the HDI using the pairs of EFI/ TTC and MFI/ MC. It is, therefore, recommended for universal applicability and should hopefully find a programmatic locus in future UNDP HDRs. This may certainly result in re-classification and Development Ranking of nations with the set Goal as Sustainable Development.

+The data published in the UNDP HDR 2013 were mostly 2012 figures harvested from several sources including, among several others, the following:

World Bank

World Health Organization (WHO)

International Monetary Fund (IMF)

United Nations Educational, Scientific and Cultural Organization (UNESCO)

United Nations Department for Economic and Social Affairs (UNDESA)

United Nations Conference on Trade and Development (UNCTAD)

United Nations Statistics Division (UNSD)

International Labour Organization (ILO)

Forum on Public Policy

United Nations Children's Fund (UNICEF)

Inter-Parliamentary Union (IPU)

Organization for Economic Cooperation and Development (OECD)

International Union for Conservation of Nature and Natural Resources (IUCN)

United Nations Population Fund (UNFPA)

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