# Tracking Progress towards Statistical Capacity Building Efforts: The African Statistical Development Index


**Abstract**

This paper presents the ongoing efforts to develop the African Statistical Development Index, a composite index that aims at supporting the monitoring and evaluation of the implementation of the Reference Regional Strategic Framework for Statistical Capacity Building in Africa. It also helps to identify, for each African country, weaknesses and strengths of the national statistical system so that support interventions can be developed. The paper first gives the rationale behind the development of the index as well as the context. It then elaborates on the methodology used to develop the index, including the selection of components and variables, the scaling of the variables, the weighting and aggregation schemes, and the validation process. The methodology is applied to a sample of African countries. Finally, the paper compares the proposed index to existing statistical capacity building indicators and highlights the related limitations.



**Keywords:** Composite index; statistical capacity building; statistical development; national statistical system.



Cette communication présente les efforts en cours pour le développement de l'Indice de développement statistique en Afrique, un indice composite ayant pour objectif d'appuyer le suivi et l'évaluation de la mise en œuvre du Cadre stratégique régional de référence pour le renforcement des capacités statistiques en Afrique. Cet indice permet, entre autres, d'identifier les forces et faiblesses du système statistique national de chaque pays africain en vue de favoriser des interventions ciblées de la part des intervenants. Pour ce faire, cette communication présente la raison d'être et le contexte du développement de l'indice. Elle s'attarde ensuite sur la méthodologie qui régissent son développement, y compris le choix des composantes et des variables, les pondérations et le processus d'agrégation ainsi que celui de validation. Elle présente, enfin, une application de la méthodologie sur un échantillon des pays africains et compare l'indice aux indicateurs de renforcement des capacités statistiques existants et met en exergue les insuffisances de son utilisation.



**Mots clés :** Indice composite ; renforcement des capacités statistiques ; développement statistique ; système statistique national.

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# 1. Introduction

In recent past, African countries and development partners have increasingly recognized the need for better statistics as a tool for evidence-based policy formulation, decision making and for a better support to monitoring progress and evaluation of outcomes and impacts of development initiatives such as the Millennium Development Goals (MDGs) and poverty reduction strategies. As a result of this increasing recognition of the importance of statistics, the demand for quality and timely statistics in Africa has seen unprecedented increase. This has challenged already weak and vulnerable National Statistical Systems (NSSs)[1] and presented new opportunities for raising public awareness about statistics.

In response to the challenges posed to African countries by the increased demand for quality statistics, stakeholders engaged in several initiatives to address them.Among these is the Marrakech Action Plan for Statistics (MAPS). It consists of a global agenda aimed at improving the availability and use of quality statistics in support of poverty reduction strategies according to a well-defined budget covering a specific period of time. In line with this international initiative and building on the lessons learned from past experiences, African stakeholders and partners developed a regional implementation version to the MAPS: the Reference Regional Strategic Framework for Statistical Capacity Building in Africa (RRSF). This framework is expected to strengthen the capacity of countries' national statistical systems to respond to the information needs in support of their development efforts.

The *African Statistical Development Index* (ASDI) was developed with the aim to support the monitoring and evaluation of progress--or lack thereof-- made in the implementation of the RRSF. It is a composite index that is expected to help not only African countries but also partners and other stakeholders in their quest to support African countries develop their statistical systems.Based on the consensual framework that is the RRSF, the index has the following objectives: support the monitoring and evaluation of the implementation of the RRSF; identify for each African country weaknesses and strengths in order to support interventions; and provide a general idea of the performance of African countries' statistical systems.

This paper presents the development of the ASDI. The paper first gives the rationale and context behind the development of the index. It then elaborates on the methodology used to develop the index including the selection of components and variables, the scaling of the variables, weighting and the aggregation schemes. The methodology is applied on a sample of African countries. The paper compares the index to existing statistical capacity building indicators and highlights the related limitations. Finally, some conclusions are drawn from the development and the potential use of the developed index.

[1]The national statistical system is made of statistical organizations and units within a country that collect process and disseminate official statistics on behalf of national governments. It includes the national statistical office, coordination bodies—if any, statistical units in line ministries, and other producers and users of official statistics within a country.

## 2. Overall Context and Rationale of the Development of the ASDI

The African continent has witnessed the emergence of a number of initiatives aimed at improving social, economic, and political conditions of its citizens during the 1990s. Indeed, since the adoption of the Abuja Treaty in 1991, African leaders have committed themselves to establish, via a common African market, the African Economic Community in order to increase economic self-sufficiency and promote an endogenous and self-sustaining development of the continent. Other initiatives include a number of agreed upon development plans such as poverty reduction strategies, the New Partnership for Africa's Development (NEPAD), and MDGs.

The monitoring of the implementation of policies and activities contained in the Abuja Treaty and the NEPAD with a view to achieving Africa's sustainable development has increased considerably the demand for harmonized and reliable statistical data and information in all areas including peace and security, good governance, multilateral surveillance, and monitoring and evaluation of related programmes. As a result, African national statistical systems, sub-regional and continental organizations dealing with statistics and statistical development, have not only been challenged but also given the opportunity, *among others*, to raise the public awareness on the importance of statistics in the development of the continent and harness resources to build the capacities of African countries to meet the increased demand for quality and comparable statistics emanating from their development efforts.

To address these challenges, stakeholders in statistical development have engaged in the design of a number of initiatives aimed at boosting statistical capacities in African countries. The Addis Ababa Plan of Action for Statistical Development (AAPA)[2] was part of those initiatives. At the end of the 1990s, the AAPA was evaluated and it appeared that the problems encountered in its implementation were mostly related to the lack of ownership of the plan, the lack of leadership in countries, the lack of financial resources, and the inadequacy of institutional and human capacities. To overcome the shortcomings of past efforts aimed at enhancing statistical capacity in Africa, stakeholders agreed to launch the production of the RRSF. This framework is expected to create synergies, avoid duplication of efforts and lead to sustainable capacity for statistical development in Africa. The overall objective of the RRSF is to *contribute to improved development outcomes and good governance by strengthening national statistical systems in Africa*. Specific objectives of the framework are: raising awareness about the role of statistical information in society; increasing users' satisfaction by enhancing the quality and usability of statistical information; promoting greater use of statistical information; and achieving synergy and cost-effectiveness in national statistical systems. Specific strategies aimed at achieving the objectives, are: to invigorate statistical advocacy; mainstream statistics as a cross-cutting sector in the development process; update the legal and regulatory framework; assess and prioritize user needs; undertake data development; foster coordination, collaboration and partnership; enhance statistical infrastructure; harness Information and Communication Technologies (ICT); develop

[2] The Addis Ababa Plan of Action for statistical development aimed at: creating statistical awareness through, among others, the African Statistics Day celebrations; promoting the elaboration of statistical strategic development plans; strengthening the organization and management of statistical systems; coordinating statistical activities; improving the quality of statistics; developing databases; disseminating statistical products; promoting data analysis and research; and training and on the job training.

human capital; improve data analysis; improve data dissemination; and improve funding and sustainability of statistical activities.

The RRSF has a set of 79 recommendations in line with the above-mentioned objectives and strategies. These recommendations are directed to different stakeholders including national statistical offices (NSOs), national statistical councils or boards, line ministries, sub-regional organizations, regional organizations, and development partners. To ensure effective monitoring of the RRSF, there was a need to develop a tool aimed at assessing the progress made by African countries in the development of their statistical systems in support of their development initiatives. The ASDI is a composite index that is expected to help not only African countries but also partners and other stakeholders in their quest to support African countries develop their statistical systems.

## 3. Methodology

***Index Structure: Components and Variables Selection***

One of the most important and controversial steps of developing a composite index is the choice of components and variables. At this stage, a number of decisions have to be taken related to the determination of the components and selection of relevant variables.The determination of the components and selection of the variables is generally based on theory, empirical analysis, pragmatism, intuitive appeal or a combination of these. The number and nature of the components of the ASDI emanate directly from the 12 strategies and 79 recommendations of the RRSF[3]. In addition, the following criteria were used in variable selection: validity, comparability, simplicity, and data availability.

Validity requires that the variables measure the component they are intended to measure. As can be observed in Appendix 3, all the ASDI variables do indeed measure the components or sub-components they are representing. This is not a surprise as the RRSF and the related recommendations have been prepared following a thorough consultative process with all stakeholders including specialists in different areas. Therefore, the resulting recommendations have been selected to meet the challenges facing African countries in enhancing their capacity to produce and use reliable statistical information. As a result, the 79 recommendations (potential variables) are closely related to the 12 strategies (potential components/sub-components) and the four specific objectives. The potential variables (recommendations) have been designed to measure the components (strategies) they are supposed to represent. Moreover, improvement in each of the retained variables implies an enhancement in statistical development. This is an alternative way to test for validity.

Comparability deals with ensuring meaningful comparisons of indices through the standardization of concepts and methodologies employed in data collection. This was ensured by

[3] Details on the strategies and recommendations can be found in AfDB, PARIS21, UNECA & The World Bank. (2006). The Reference Regional Strategic Framework for statistical Capacity Building in Africa: Better Statistics for Improved Development Outcomes. *UNECA Documents Publishing and Distribution Unit*, Addis Ababa.

the design of a standard questionnaire[4] that is used to collect the information from all African countries.

The choice of the variables took also into account a good balance between the complexity of the phenomenon and simplicity of the index. The complexity of the phenomenon at stake is reflected in the number of recommendations made in order to enhance statistical capacity building efforts in African countries. Among the 79 recommended actions, some are not suitable for index construction. This is the case of recommendations such as "*ensuring that the framework is endorsed by countries and other stakeholders and by relevant governance bodies"* and "*ensuring that stakeholders understand their roles in the framework and mobilize them to support it"*. A careful look at the 79 potential variables using this criterion brought the number of relevant quantifiable variables to 42. This process simplified the construction of the index and ensured parsimony.

Data availability is of paramount importance in the development of an index. This question needs to be assessed in terms of timeliness and coverage. As far as timeliness is concerned, there is a need to ensure that data required for index computation are recent and available on a regular basis following the agreed upon periodicity. By virtue of the proximity of the African Centre for Statistics (ACS) to African countries, it is likely that data on the variables will be obtained on a regular (annual) basis and will be up to date. The coverage of the index refers to samples being large enough to ensure statistically valid results. In this regard, the index computation is expected to cover all African countries. Nevertheless, it is well known that not all countries respond to questionnaires from international organizations and ACS is not an exception. But recent experience shows that the response rate to the ASDI questionnaire is quite high: in 2010, the ACS received 37 responses out of 53 African countries for a notable 70% response rate. It is likely that this rate will increase once African countries recognize the importance and usefulness of the index.

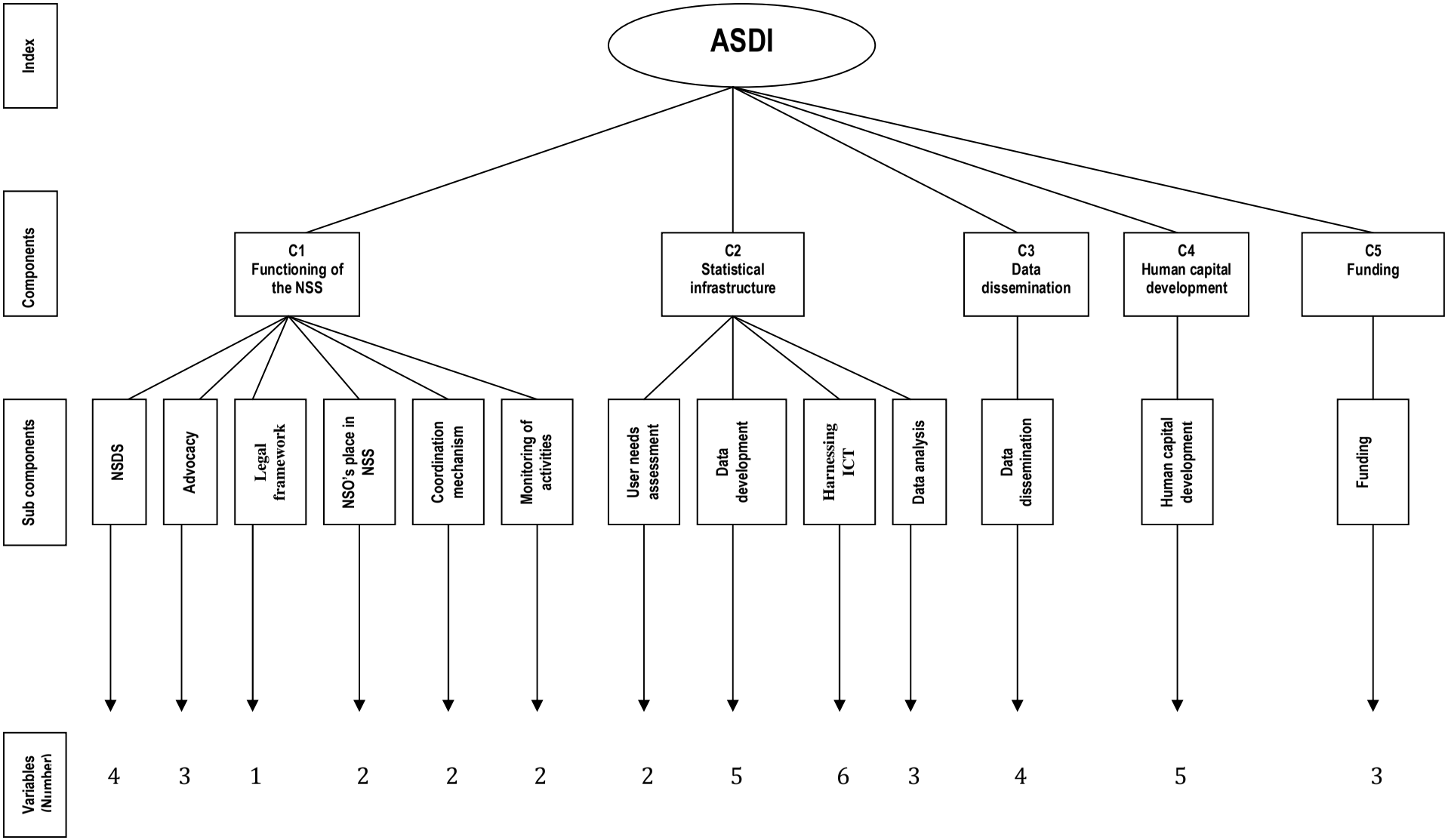
Following the above procedure, the ASDI structure is as depicted in Figure 1**.** It comprises the following five components:

- Functioning of the national statistical system: organization and coordination of the statistical system;
- Status of statistical infrastructure;
- Data dissemination;
- Human capital development; and
- Funding.

Some components are further divided into sub-components and the sub-components into variables. It is worth noting that the below sub-components and related variables emanate directly from the 12 strategies and 79 recommendations of the RRSF. These were agreed upon during the consultation process leading to the preparation of the RRSF.

[4] A copy of the questionnaire can be found on the RRSF Website at: http://ecastats.uneca.org/acsweb/rrsf.

**Figure 1: Structure of the ASDI**



***Scaling of the Variables***

Variables that form a composite index are not necessarily of the same nature nor are they measured using the same scale. In order to meaningfully add/subtract/aggregate variables, there is a need to have them into the same scale. The scaling can be performed in different ways including use of standard scores, ordinal response scaling, and linear scaling transformation.

No scaling is also an option and is appropriate in some situations. This is the case for variables reported in percentage terms or some ordinal response scale. Most of the retained variables (38) for the ASDI are reported using a scale going from 1 representing the lowest value to a certain maximum value. Two variables are reported as percentages (the proportion of the statistical plan implemented and the proportion of the statistical budget financed by the government) and two are absolute numbers (Number of computers per staff of the national statistical office and number of computers per professional staff of the national statistical office).

Out of the 42 variables composing the ASDI, only two are absolute numbers while the remaining are either percentages or follow some ordinal response scale. Accordingly, the non-scaling option can be considered for most of them. Nevertheless, a linear scaling was performed to ensure proper aggregation given the mix of number, percent, and some ordinal scaled variables (not necessarily on the same scale) among the 42 retained variables. The linear scaling consists of a scaling from 1 to 100. It requires points of reference relative to which the indicator has to be scaled. A minimum and maximum possible are set for the variable and the index values are obtained by subtracting the minimum to the observed value and divided by the difference between the maximum and the minimum. Because of the existence of a minimum level of statistical activities in all African countries, the minimum value for each of the variables is set to 1. Further, the index is calculated by dividing the observed value by the maximum value, in order to prevent the distortion of the index in cases where the minimum and maximum are wide apart. This is a practice that has been used in the computation of many composite indices.

***Weighting and aggregation schemes***

Aggregation consists of putting together the variables into sub-components, sub-components into components, and components into the composite index. To aggregate, one has to decide on the weighting system and the method to be used.

Weights are expected to reflect the relative importance of each of the variables, sub-components, and components. One potential option is not to use any weights. This consists of taking simple averages of the corresponding variables and sub-components. In using weights, the conventional practice has been to select weights following consultations with experts. Experts are asked to assign a given score to components and the scores are used to derive the weights. Weights can also be derived using analysts' perceptions, agreements between policymakers etc. These are relatively subjective methods.These ad hoc expert-based approaches have been criticized because of possible bias introduced by the experts depending on their expectations from the index (Gwartney et al. 1996).There are also formal statistical approaches based on multivariate techniques to derive weights deriving from the data at hand. The most common one is the Principal Component Analysis (PCA). However, such statistical techniques do not allow for the control over the selection and weighting of the components, introducing conceptual rigidity in composite indexing. Morris (1979) and Gwartney et al (1996) note that *"since different weighting*

*systems imply different results, and given the subjectivity of many of the weighting systems, no weighting system is above criticism."* In the same vein, Babbie (1995) argues that *"equal weighting should be the norm and the burden of proof should fall on differential weighting."*

***Scores of the Variables***

In the computation of the ASDI, we dealt with three main categories of variables namely absolute numbers, percentages, and categorical variables. Categorical variables are mainly questions with sub-items. The score of such variables is computed as:

$$S_j = \frac{1}{n_j^2} \sum_{k=1}^{n_j} V_k \ , \quad \textbf{(1)}$$

where $S_j$ is the score of the $j^{th}$ categorical variable, $n_j$ the total number of sub-items in the $j^{th}$ variable, and $V_k$ the value of the score corresponding to the $k^{th}$ sub-item of the variable. If the value of the sub-item is "Yes", then its score is $n_j$ while if the value of the sub-item is "No", its score is 1.

The treatment of absolute numbers depends on the phenomenon at stake. The number of computers belonging to the national statistical office was rescaled by dividing it by the total number of staff. It was also assumed that the maximum number of computers per staff is one. The number of staff by category and sex was transformed into proportions using the total number of staff of the national statistical office as the basis.

***Scores of the Components***

In this paper, two alternatives are presented for the computation of components indices. First, components indices of the ASDI are calculated without weights. In this case, the score of a component is computed as the arithmetic average of scores of different variables as follows:

$$SC_i = \frac{1}{n_i} \sum_{j=1}^{n_i} S_{ij} \ , \quad \textbf{(2)}$$

where $SC_i$ is the score of component *i*, $S_{ij}$ the score of the $j^{th}$ variable of component *i* and $n_i$ the total number of variables in component *i*.

Second, for comparison purposes, we also considered an alternative where an explicit weighting system is used. These weights are derived using a PCA of the original dataset (See Appendix 1). The scores of the components are then computed as weighted arithmetic averages of the scores of different variables:

$$SC_i = \sum_{j=1}^{n_i} w_{ij} S_{ij} \ , \textbf{(3)}$$

where $SC_i$ is the score of component *i*, $S_{ij}$ the score of the $j^{th}$ variable of component *i*, $w_{ij}$ the weight of variable *j* in component *i,* and $n_i$ the total number of variables in component *i*.

***Aggregation of the Components into the ASDI***

The second issue to be considered is the aggregation scheme for the components where we can use an additive formula or a certain functional form. We first consider the computation of the ASDI using simple arithmetic or geometric means of scores of different components as follows:

$$ASDI = \frac{1}{n}\sum_{i=1}^{n} SC_i \,, \quad \textbf{(4)}$$

$$ASDI = \sqrt[n]{\prod_{i=1}^{n} SC_i} \,, \textbf{(5)}$$

where*n* is the number of components and $SC_i$ the score of component i, with n = 5.

Second, the ASDI was also computed as a weighted arithmetic and geometric mean of the scores of different components as follows:

$$ASDI = \sum_{i=1}^{n} w_i SC_i \,, \textbf{(6)}$$

$$ASDI = \prod_{i=1}^{n} SC_i^{w_i} \,, \textbf{(7)}$$

where $SC_i$ is the score of component i and $w_i$ the weight of component *i* in the ASDI.

**4. Empirical findings on the ASDI**

The four following indices were computed and compared:

**ASDIU-A**: This index is computed as asimple arithmetic average of different components (formula 4) while the scores of different components are computed as simple arithmetic averages of scores of variables (formula 2). This index does not use weights at different levels.

**ASDIU-G**: This index is computed as a simple geometric average of different components (formula 5) while the scores of different components are computed as simple arithmetic averages of scores of variables (formula 2). This index does not use weights at different levels.

**ASDIW-A**: This index is computed as a weighted arithmetic average of different components (formula 6) while the scores of different components are computed as weighted arithmetic averages of scores of variables (formula 3).

**ASDIW-G**: This index is computed as a weighted geometric average of different components (formula 7) while the scores of different components are computed as weighted arithmetic averages of scores of variables (formula 3).

The weights associated with variables and the components of the index have been computed using the PCA (See Appendix 1).

*Selection and Validation of the ASDI*

As can be observed in Table 2, the three indices are highly correlated. Therefore any of the indices can be chosen to assess countries' statistical development level without loss of information. For simplicity, we restrict further discussions to ASDIU-A computed using the aggregation formula (4) consisting of a simple arithmetic average of different components calculated as simple arithmetic averages of scores of variables. Although the four indices are highly correlated, the ranking of countries change slightly according to the index used (See Appendix 2). Therefore, the choice of the index to be used in practical policy oriented situations will require advices from experts of constituencies concerned by the index.

**Table 1: Correlation Matrix between Alternative Indices**

| | ASDIU-A | ASDIU-G | ASDIW-A | ASDIW-G |
|---|---|---|---|---|
| **ASDIU-A** | 1.000 | | | |
| **ASDIU-G** | 0.990 | 1.000 | | |
| **ASDIW-A** | 0.894 | 0.920 | 1.000 | |
| **ASDIW-G** | 0.831 | 0.877 | 0.985 | 1.000 |

The correlation matrix in Table 3 shows that the ASDI adheres to the item analysis validation test: the index is highly correlated with each of its components.

**Table 2: Correlation Matrix between ASDIU and its Components**

| | C1 | C2 | C3 | C4 | C5 |
|---|---|---|---|---|---|
| **C1** | 1.000 | | | | |
| **C2** | 0.543 | 1.000 | | | |
| **C3** | 0.512 | 0.627 | 1.000 | | |
| **C4** | 0.453 | 0.571 | 0.352 | 1.000 | |
| **C5** | 0.197 | 0.327 | 0.242 | 0.048 | 1.000 |
| **ASDIU-A** | 0.712 | 0.846 | 0.750 | 0.631 | 0.605 |

## 5. African Countries' Performances

Table 5 presents the results using the ASDIU-A. For analysis purposes, African countries' performances are grouped into quintiles as depicted in Table 4.

**Table 3: Classes of ASDI Based on Quintiles**

| Ranges for ASDI | Classes |
|---|---|
| <= 0.390 | Class 1 |
| ] 0.390; 0.441] | Class 2 |
| ]0.441; 0.507] | Class 3 |
| ] 0.507; 0.559] | Class 4 |
| > 0.559 | Class 5 |

Table 5 gives the performance of a country in each of the five fundamental areas (as defined by the RRSF) of statistical development constituting the components of the ASDI.The scores of different components provide a clear picture of the statistical development level of each

of the 43 African countries considered in this paper in the area of organization and coordination of the national statistical systems (C1); statistical infrastructure (C2); data dissemination (C3); human capital development (C4) and funding (C5). We provide below a brief analysis of the characteristics of countries falling under different quintiles of statistical development.

Class 5 constitutes the highest quintile. It comprises South Africa, Mozambique and Algeria. Countries within this class are generally characterized by indexes, on average, greater than the overall mean (of all participant countries) for each of the five components. These countries have made commendable efforts in each of the components (organization and coordination of the national statistical system; statistical infrastructure; data dissemination; human capital development; and funding). In these countries, the national statistical system is well organized and coordinated and disposes of a good statistical infrastructure for users' needs assessment, data collection, archiving, analysis and dissemination. Data are produced according to international standards and released to users according to an established calendar. The national statistical offices of these countries are generally well staffed and there exist a human capital development plan. They are relatively well funded through public budgets in recognition of statistics as a public good.

Comprising Botswana and Ghana, class 4 is made-up of countries characterized by indexes, on average, greater than the overall mean of each component except for the human capital one. Countries in this class have made commendable efforts in most of the five areas of statistical development described earlier but need to scale up efforts in some fundamental areas in order to efficiently respond to users' needs. One of the most critical areas where these efforts need to be made is human capital development. These countries need also to improve on the coordination of their statistical systems as well as government support to statistical plans for the sustainability of statistical development.

Characterized by the components functioning of the national statistical system and funding greater than the overall average, class 3 comprises Mali and Namibia. While these countries have made efforts to properly fund statistical activities through government budget and have put in place commendable coordination mechanisms, they still need to bring on board the entire statistical system to apply international standards in the production and use of statistical information.

Countries in class 2 that include Mauritania and Burundi are characterized by indices of human capital development components greater than the overall average. Countries in this class need to scale up their efforts in many areas including training. They are struggling in terms of organization and management of their statistical systems. Most of them have designed national strategies for the development of statistics but are experiencing problems in their implementation especially in terms of funding. The performances of these countries have also been dragged down by problems in statistical infrastructure and data dissemination.

The lowest quintile is made of countries characterized by indexes in all five components below the average of all countries that took part in the exercise. This class is made up of many post-conflict countries characterized by low commitment by governments to statistical production and use. This results in limited contribution to statistical activities and plans as well as to statistical infrastructure. There is limited investment in human capital resulting in the reduction of the capacity of the country to meet users' needs. Efforts are required in all areas of statistical

development as described earlier to bring these countries to a level of statistical development that will help them efficiently meet users' needs.

**Table 4: Ranking and Scores of African Countries According to their ASDI**

| Countries | SC1 | SC2 | SC3 | SC4 | SC5 | ASDIU-A | Class-quintile |
|---|---|---|---|---|---|---|---|
| South Africa | 0.567 | 0.891 | 0.688 | 0.733 | 0.639 | 0.703 | 5 |
| Mozambique | 0.740 | 0.603 | 0.653 | 0.714 | 0.750 | 0.692 | 5 |
| Nigeria | 0.665 | 0.661 | 0.688 | 0.562 | 0.650 | 0.645 | 5 |
| Burkina Faso | 0.587 | 0.691 | 0.583 | 0.407 | 0.867 | 0.627 | 5 |
| Niger | 0.636 | 0.535 | 0.465 | 0.484 | 0.833 | 0.591 | 5 |
| Uganda | 0.648 | 0.540 | 0.590 | 0.322 | 0.833 | 0.587 | 5 |
| Malawi | 0.541 | 0.675 | 0.563 | 0.428 | 0.722 | 0.586 | 5 |
| Algeria | 0.460 | 0.538 | 0.493 | 0.336 | 1.000 | 0.565 | 5 |
| Botswana | 0.505 | 0.601 | 0.389 | 0.291 | 1.000 | 0.557 | 4 |
| Mauritius | 0.592 | 0.549 | 0.590 | 0.370 | 0.639 | 0.548 | 4 |
| Zimbabwe | 0.674 | 0.521 | 0.500 | 0.294 | 0.700 | 0.538 | 4 |
| Cameroon | 0.662 | 0.526 | 0.389 | 0.361 | 0.750 | 0.538 | 4 |
| Ethiopia | 0.445 | 0.512 | 0.472 | 0.322 | 0.917 | 0.534 | 4 |
| Cote d'Ivoire | 0.545 | 0.494 | 0.528 | 0.298 | 0.783 | 0.529 | 4 |
| Kenya | 0.611 | 0.449 | 0.465 | 0.400 | 0.717 | 0.528 | 4 |
| Tunisia | 0.475 | 0.556 | 0.639 | 0.250 | 0.722 | 0.528 | 4 |
| Ghana | 0.650 | 0.472 | 0.590 | 0.225 | 0.700 | 0.528 | 4 |
| Mali | 0.577 | 0.551 | 0.521 | 0.268 | 0.550 | 0.493 | 3 |
| Rwanda | 0.537 | 0.640 | 0.354 | 0.360 | 0.572 | 0.493 | 3 |
| Gambia | 0.504 | 0.464 | 0.583 | 0.325 | 0.572 | 0.490 | 3 |
| United Republic Of Tanzania | 0.512 | 0.494 | 0.389 | 0.341 | 0.700 | 0.487 | 3 |
| Chad | 0.534 | 0.462 | 0.354 | 0.303 | 0.750 | 0.481 | 3 |
| Congo | 0.611 | 0.344 | 0.306 | 0.368 | 0.767 | 0.479 | 3 |
| Liberia | 0.599 | 0.505 | 0.361 | 0.334 | 0.550 | 0.470 | 3 |
| Democratic Republic of Congo | 0.429 | 0.349 | 0.743 | 0.147 | 0.650 | 0.464 | 3 |
| Namibia | 0.416 | 0.363 | 0.389 | 0.228 | 0.833 | 0.446 | 3 |
| Mauritania | 0.609 | 0.383 | 0.458 | 0.273 | 0.439 | 0.432 | 2 |
| Guinea-Bissau | 0.376 | 0.360 | 0.361 | 0.339 | 0.689 | 0.425 | 2 |
| Benin | 0.585 | 0.418 | 0.431 | 0.419 | 0.244 | 0.419 | 2 |
| Lesotho | 0.424 | 0.564 | 0.389 | 0.278 | 0.439 | 0.419 | 2 |
| Equatorial Guinea | 0.528 | 0.388 | 0.431 | 0.389 | 0.356 | 0.418 | 2 |
| Central African Republic | 0.477 | 0.369 | 0.424 | 0.313 | 0.489 | 0.414 | 2 |
| Sudan | 0.442 | 0.470 | 0.271 | 0.504 | 0.356 | 0.408 | 2 |
| Madagascar | 0.335 | 0.290 | 0.403 | 0.437 | 0.522 | 0.397 | 2 |
| Burundi | 0.561 | 0.335 | 0.236 | 0.226 | 0.600 | 0.392 | 2 |
| Seychelles | 0.326 | 0.447 | 0.389 | 0.113 | 0.639 | 0.383 | 1 |
| Djibouti | 0.486 | 0.291 | 0.319 | 0.205 | 0.572 | 0.375 | 1 |
| Guinea | 0.466 | 0.370 | 0.326 | 0.239 | 0.422 | 0.365 | 1 |
| Togo | 0.445 | 0.429 | 0.410 | 0.240 | 0.244 | 0.354 | 1 |
| Comoros | 0.281 | 0.215 | 0.160 | 0.259 | 0.767 | 0.336 | 1 |

| Countries | SC1 | SC2 | SC3 | SC4 | SC5 | ASDIU-A | Class-quintile |
|---|---|---|---|---|---|---|---|
| Cape Verde | 0.406 | 0.376 | 0.347 | 0.304 | 0.244 | 0.336 | 1 |
| Eritrea | 0.253 | 0.286 | 0.194 | 0.234 | 0.639 | 0.321 | 1 |
| Swaziland | 0.365 | 0.239 | 0.326 | 0.304 | 0.356 | 0.318 | 1 |

# 6. Comparison to Other Statistical Capacity Building Indicators

There are two comparable, existing frameworks for the measurement of statistical capacities of countries: the Statistical Capacity Building Indicators (SCBI) developed by PARIS21 and the Statistical Capacity Indicators (SCI) developed by the World Bank.

The first framework, SCBI, was developed by the PARIS21 Task Team on Statistical Capacity Building as a set of indicators applicable across countries to assess their statistical capacities and the evolution of these capacities through time. The SCBI comprise 16 quantitative and 18 qualitative indicators. The sixteen quantitative indicators cover resources (domestically and externally funded, annual budget, staff, and equipment), inputs (surveys and administrative data sources), and statistical products. The eighteen qualitative indicators cover aspects of environment (institutional and organizational), core statistical processes and statistical products. In particular, the SCBI focus on selected data categories (National accounts, prices statistics etc.) and detailed information on funding, staff, and equipments needed to produce statistics on Gross Domestic Product (GDP), Population, and Household Income/Expenditure while the ASDI covers the budget of the entire statistical system as stated in the national strategy for the development of statistics or related plan. In addition, the ASDI covers pretty well the qualitative questions of the SCBI with emphasis on the specificity of Africa as underlined by the RRSF. The SCBI has been implemented in 2005 by the Eastern Caribbean Central Bank (ECCB), in the context of identifying capacity gaps in its member States and monitoring progress in building their statistical capacities. There is so far no published application of the SCBI in the context of Africa.

The SCI, developed by the World Bank, is based on three dimensions: (i) statistical practice represented by 10 indicators on the use of international standards and methods; (ii) data collection represented by five indicators on the timely undertaking of specific census (population, agriculture) and surveys (poverty, health), and vital registration coverage; and (iii) indicators availability represented by ten indicators on the production of MDGs indicators and the frequency of their production. As it stands, the SCI is limited in comparison to the SCBI or the ASDI as it is not covering the fundamental components of countries' statistical organization/coordination, human development and funding. In an effort to improve of the coverage of some of the components, the World Bank is currently revisiting the set of indicators and has used some of the inputs from the development of the ASDI.

The SCI was applied to African countries. The correlation matrix in table 6 shows that there is a weak correlation between the SCI and some of the components of the ASDI: namely SC1 (statistical organisation/coordination), SC3 (human development), and SC5 (funding). The component SC2 (Statistical infrastructure) of the ASDI is well correlated to SCI as it covers the dimensions related to statistical practice and data collection of the World Bank's indicators. The component SC3 (dissemination) of the ASDI is partially correlated with the data availability dimension of the SCI.

**Table 6: Correlation Matrix between SCI and Components of the ASDI**

| | *SCI* | *ASDIU-A* | *SC1* | *SC2* | *SC3* | *SC4* |
|---|---|---|---|---|---|---|
| **ASDIU-A** | 0.472 | 1.000 | | | | |
| **SC1** | 0.227 | 0.720 | 1.000 | | | |
| **SC2** | 0.562 | 0.822 | 0.489 | 1.000 | | |
| **SC3** | 0.340 | 0.717 | 0.420 | 0.540 | 1.000 | |
| **SC4** | 0.421 | 0.628 | 0.360 | 0.590 | 0.332 | 1.000 |
| **SC5** | 0.197 | 0.724 | 0.475 | 0.408 | 0.356 | 0.129 |

**Table 7: Components of Existing Statistical Capacity Building Indicators on African Countries**

| Major component | ASDI | SCBI | SCI |
|---|---|---|---|
| Organization and coordination of the statistical system | Covered | Partially covered | Not covered |
| Statistical infrastructure | Covered | Partially Covered | Statistical practice<br>Data collection |
| Data dissemination | Covered | Partially Covered | Indicator availability |
| Human development | Covered | Partially Covered | Not covered |
| Funding | Covered: Budget for the implementation of NSDS or related plan | Budget related to the production of indicators (GDP, Population, Household income/expenditure) | Not covered |

# 6. Conclusions

The ASDI is certainly a starting point for initiating discussions on and attracting public and expert interest to the progress (or lack of progress) made by African countries in terms of statistical development on the continent. It also allows for in-country and cross-country comparisons in this regard.

The development of the ASDI followed a rigorous methodological process that included the selection of components and variables, the scaling of the variables, weighting and aggregation schemes, as well as the validation process. In this process, special attention was devoted to variables selection. Variables and components of the ASDI were selected to ensure a balance between experts' knowledge of the phenomenon at stake and the use of statistical tools and methodologies. Using the PCA, a comparative analysis of different ASDI (weighted, unweighted, arithmetic average, geometric average) was performed. The four weighting schemes, ASDIU-A, ASDIU-G, ASDIW-A and ASDIW-G, were very highly correlated and produced similar results. Therefore, for parsimony and simplicity, the analysis of the results was based on just the ASDIU-A. However, constituencies affected by the use of the index might prefer to use a weighted index.

In this case, beside the statistically derived weights using PCA, we strongly suggest that a panel of experts from among the users of the index be constituted to judge the reliability of the derived weights taking into account their knowledge of the phenomenon at stake.

In terms of validation, the results clearly show that there is a strong correlation between various components and the ASDI. In addition, the ASDI covers pretty well the components of PARIS21 SCBI without going into details of the production of specific type of statistics. Components 2 and 3 of the ASDI are fairly correlated to the SCI developed by the World Bank.

## 7. Way forward

Based on the interest of partners in the domain of statistics, the United Nations Economic Commission for Africa (UNECA) intends to conduct a common assessment of the statistical system with Eurostat, the statistical office of the European Union.

**The Commission may wish to consider the following elements for discussion:**

- Recognize the need for a monitoring tool of the African Statistical Development Index (ASDI)

- Recognize the efforts made in developing the ASDI

- Comment on the methodology and the applicability of the tool:

    - Frequency of the data collection (one or two years); and

    - Baseline assessment in 2012 for which all the regional countries are requested to participate actively.