

Innovation in Africa: Measurement, Policy and Global Issues

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Abstract

This paper examines factors influencing the emergence of innovation strategies in Africa using three approaches: the influence of three phases of the African Science, Technology and Innovation Indicators (ASTII) initiative; the Science, Technology and Innovation Strategy for Africa and its influence on innovation policy and statistical measurement; and the implications of the revision of the Oslo Manual which has provided guidance on the measurement and interpretation of results on innovation in the business sector in Africa since 2007. The analysis of the three approaches leads to proposals for future work.

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1. Introduction

Innovation is linked to economic growth and promoting innovation is a policy objective in many countries. In Africa, innovation policy is becoming more prominent as a separate activity from science and technology policy.

Since 2007, the African Science, Technology and Innovation Indicators (ASTII) initiative has been supporting surveys of innovation, and of research and development, in participating countries. There have been two phases of the ASTII surveys with the results published in two editions of the African Innovation Outlook (AIO). The third phase of the initiative is in progress and this paper looks at what has come out of the work of ASTII over the last nine years, especially on innovation.

The paper is focused on innovation, although ASTII also supports surveys of the performance of research and development (R&D). R&D has been subject to statistical measures for much longer and innovation is now being seen as a separate activity from R&D with quite different implications for policy and its implementation. It is also timely to examine the work of ASTII in the area of innovation as there are two other current initiatives that will influence the measurement of innovation and the use of the findings in policy development.

In 2014, the African Union Heads of State and Government adopted the Science, Technology and Innovation Strategy for Africa – 2024 (STISA-2024) to provide a policy framework for science, technology and innovation (STI) policies in Member States of the African Union. How existing policies in AU Member States align with STISA-2024 is a current question which bears directly on the measurement of innovation in Member States and the use of the findings for policy development, monitoring and evaluation of implemented policy, and supporting policy learning.

In 2015, the Organisation for Economic Cooperation and Development (OECD) initiated the third revision of the Oslo Manual which provides definitions and guidelines for the measurement and interpretation of data on innovation. This is taking place at a time when the measurement of innovation is being seen as of global importance and not just a preoccupation of more industrialised countries. It is also an opportunity for Africa as, since 2007, the African Union has been an observer participant in the work of the OECD Working Party of National Experts on Science and Technology Indicators (NESTI) which has provided opportunities for the New Programme for Africa's Development (NEPAD) and the African Observatory for Science, Technology and Innovation (AOSTI) to influence the work of the OECD.

In what follows, there is an examination of the outcomes of two phases of surveying the activity of innovation in those African countries that conducted surveys (Section 2), a discussion of a meeting which considered the influence of STISA-2024 on countries with existing STI policies (Section 3), a review of the issues relevant to Africa in the revision of the Oslo Manual (Section 4), and then a discussion of where measurement of innovation and the use of the resulting indicators could go in the near future (Section 5).

2. The African Science, Technology and Innovation Indicators (ASTII) Initiative: The Place of Innovation

Innovation, as defined in the Oslo Manual (OECD/Eurostat 2005), is a business phenomenon. Countries in Africa, in many cases, do not have a strong business sector and the performance of R&D, in any sector, has been seen as a path to innovation. From a policy perspective, the focus has been on promoting science and technology activities, especially in public institutions. Innovation policy is still finding its place.

In 2007 the African Science, Technology and Innovation Indicators (ASTII) initiative began its first phase of surveys of R&D in all sectors and of innovation in the business sector. This led to a second phase and the publication of two editions of the African Innovation Outlook (AIO) (AU-NEPAD 2010, NPCA 2014). One objective of the ASTII initiative was to provide empirical evidence of the performance of R&D and innovation to support policy development, monitoring and evaluation. The third phase is in progress and a key question, discussed in this paper, is the outcome of the ASTII initiative¹.

In the first phase, ten countries undertook innovation surveys, eleven in the second, and seven were present in both phases, for a total of fourteen countries involved in surveying the activity of innovation (Table 1).

Table 1: African Countries Participating in ASTII Innovation Surveys

Countries	AIO 2010	AIO 2014
Burkina Faso	X	
Egypt	X	X
Ethiopia	X	
Gabon		X
Ghana	X	X
Kenya		X
Lesotho	X	X
Mozambique	X	
Nigeria		X
Senegal		X
South Africa	X	X
Tanzania	X	X
Uganda	X	X
Zambia	X	X

Source: AU-NEPAD (2010), NPCA (2014).

The surveys, through their questionnaires, played a role in teaching firms about innovation and they promoted discussion in the industries surveyed. This is an example of the active role of a statistical survey changing the behaviour of the population at which it is directed, in addition to its passive role of collecting data from the respondents².

¹ The Swedish International Development Agency Coordination Agency (Sida) has funded the three phases of the ASTII project with some countries providing either partial contribution or full contribution to the cost of carrying out national surveys. There is an expectation that after the third edition of the AIO is published there should be increased commitment by Member States of the African Union to develop this initiative further. This is discussed in Section 5.

² The change of behaviour or respondents, resulting from statistical surveys, has been seen in other areas (Gault 2013: 17).

When the data on innovation were compiled and published in the AIOs there were common findings of interest to policy makers from participating countries. For example, innovation was found to be pervasive in all countries and more firms innovated than did R&D. This is a finding in almost all innovation surveys, not just in Africa, and it has implications for innovation policy. Other findings are found in Chapter 4 of the AIOs (AU-NEPAD 2010, NPCA 2014).

There were methodological issues that prevented the ranking of the participating countries. These included the employment cut-offs used for the surveys and the industrial coverage. Innovation is dependent on the size of the firm, with larger firms being more innovative, at least until very large firms are examined. As a result, survey samples with firms employing one or more employees, five or more, or 10 or more are expected to yield different rates of innovation, all other things being equal. In addition, not all countries used the same industrial coverage. This influenced the aggregate rate of innovation as some industries have a higher propensity to innovate than others. While the results could not be used for ranking, there were sufficient findings to support policy debate.

To probe the extent to which the innovation survey results, and the AIO, were used in participating countries, a survey of those countries was undertaken and found that in all cases reported (eight of fourteen countries that did innovation surveys, including the two largest economies in the African Union) the findings of the surveys were used. In one case the use was the provision of data to the AIO. However, in six countries, the data were used in country reports published for general use and in seven countries the data were used in the department responsible for the survey in support of the developing and monitoring innovation policy, which, in some cases, was part of a science, technology and innovation policy.

Respondents were asked to elaborate on the uses of the data and of the AIOs. The data, in country reports, were used to inform actors in the innovation system about what was actually happening, while the AIO was used to make a comparison of how the country performed in relation to other countries on the African continent. In two cases, the data were used to support research on the activity of innovation which, in one country, led to academic publications.

In one country, the data were used to study the linkages in the innovation system to identify system failures which could be addressed by innovation policy. This is an important finding as it makes the point that innovation takes place in a system and the activity has to be analysed using a systems approach. This is one of the reasons why there is no headline indicator for innovation comparable to the ratio of gross domestic expenditure on research and development (GERD) to gross domestic product (GDP), a headline indicator which dominates reporting on research and development and gives rise to policies which set targets (1% in the African Union³, 3% in the European Union).

While six countries used the survey findings for the development of innovation policy within the country, there were two examples of countries that made their aggregate data available to international organisations, the World Bank in one case and the UNESCO GO-SPIN⁴ activity in the other. In addition, one country made its data available on an internationally supported

³ South Africa has now set a target of 1.5%

⁴ GO is the UNESCO Global Observatory and SPIN is the Science Policy Information Network.

data base for use by anyone. In one country the results were reviewed at the highest level of government.

The conclusion from the survey of use of innovation data and of the AIOs is that there is much use of the data and there were some uses that could be probed in more detailed surveys to examine the types of policy instruments used to implement policies suggested by the data and the analysis, and the availability, of the data for purposes other than inter-country comparison, policy development and monitoring and evaluation.

The wide range of activity in a sample of countries that have done innovation surveys suggests that the ASTII community could benefit by having a forum, or working party, that would facilitate the sharing of knowledge gained from conducting surveys, and using other data sources, in Africa and from using the resulting indicators in the policy process. Another reason for such a forum, for S&T as well as innovation activities, is the African Union initiative to bring coherence to science and technology and innovation (S&T and I) policies in Member States. That is the subject of the next section.

3. The Science, Technology and Innovation Strategy for Africa - 2024

In 2014, the African Union Heads of State and Government adopted the Science, Technology and Innovation Strategy for Africa – 2024 (STISA–2024) as a framework for ST&I policies in Member States, many of which already had policies in place which included innovation. STISA–2024 expects monitoring and evaluation of the policies that have been implemented, leading to a role for both ASTII and the African Observatory of Science, Technology and Innovation (AOSTI).

To review the interface between STISA-2024 and Member States a UNU-MERIT course on the Design and Evaluation of Innovation Policy (DEIP) was held in Kenya in 2014. It was co-hosted by AOSTI and the Pan African University – Institute for Basic Science, technology and Innovation (PAU-ISTI) and was attended by representatives of the AU Commission, eleven countries from Southern and Eastern Africa, NEPAD, and two regional organisations (Iizuka et al. 2015). Of the eleven countries present, four (Ethiopia, Kenya, Tanzania and Uganda) had conducted innovation surveys. All participating countries had developmental visions with varying target years, many had S&T policies and some had S&T and Innovation policies (Iizuka et al. 2015:Table 2). The authors of Iizuka et al. (2015) make the point that innovation policy, as a separate initiative, is a recent phenomenon in Africa.

From the measurement perspective STISA – 2024 specifies the need, in Chapter 7, for monitoring and evaluation (M&E) and outlines an implementation plan which invites the NEPAD Agency, AOSTI and the African Scientific Research and Innovation Council (ASRIC) to define a set of agreed targets (a policy objective) and performance indicators (a measurement challenge). The NEPAD Agency has taken the lead in identifying the indicators, some of which will draw on data collected from sources other than the current ASTII surveys.

Developing the point made in the previous section, a committee, involving delegates from these groups, could provide a forum for discussion of policy issues related to science, technology and innovation, including issues related to their implementation. The forum, or working party, suggested in the previous section could be a sub-committee with a mandate to

develop and share knowledge of statistical measurement and the development of indicators for use in the policy process, the domain of the parent committee.

4. The Fourth Edition of the Oslo Manual

In parallel with these activities, the third edition of the Oslo Manual, published in 2005 and used since 2007 in Africa to guide the ASTII surveys⁵, is being revised. The fourth edition is expected in 2017. The final text has to be approved by the OECD Working Party of National Experts on Science and Technology Indicators (NESTI). The African Union has been part of NESTI, as an observer, since 2007. When the manual is approved, the African Union will have had a decade of experience of dealing with and contributing to NESTI deliberations across a broad agenda of science, technology and innovation activities.

A significant change in the fourth edition is that it will be a global manual accessible to all countries at all stages of development. The first step in this direction was taken in the third edition, where there was an annex interpreting the manual for use in developing countries. In the fourth edition, the entire manual will be accessible to users in developing countries.

While the Oslo Manual has provided guidelines for the collection and interpretation of innovation data in the business sector, it has acknowledged that innovation can take place in other sectors (OECD/Eurostat 2005: para. 27 and 28), examples of which are the public sector and the household sector. There is some expectation that this acknowledgement of innovation in other sectors will appear in the fourth edition along with comments on innovation in the informal as well as the formal components of sectors⁶.

While the fourth edition of the Oslo Manual is expected to focus on the measurement of innovation in the business sector, it should provide a basis for the development of guidelines for the measurement of innovation in other economic sectors of the System of National Accounts (EC et al. 2009) and in the formal and informal components of those sectors. These are activities that could, and should, be informed by experience of the measurement of innovation in African countries.

As in the previous sections, the contribution of Africa to the international discourse on measuring innovation and the interpretation of the results for policy purposes could be facilitated by an African equivalent of the OECD NESTI Working Group and its parent committee, the Committee for Scientific and Technological Policy (CSTP). The former would focus on sharing knowledge resulting from the measurement of innovation and the latter on the needs of the policy community for developing and implementing innovation policy and

⁵ The Oslo Manual for the measurement of innovation and the Frascati Manual for the measurement of R&D were adopted for use in the innovation and R&D surveys by the first Intergovernmental Committee on Science and Technology Indicators meeting in Maputo in 2007. The current editions of the manuals are OECD/Eurostat (2005), the third edition and OECD (2015), the seventh edition. A discussion of the outcomes of the meeting is found in Gault (2008).

⁶ Without prejudice to the process of revision, a discussion of innovation definitions for use in all sectors of the System of National Accounts is available in Gault (2015). The measurement of innovation in the informal sectors is discussed in the African Development Bank Group (2013) and in Kraemer-Mbula and Wunsch-Vincent (2016). Survey instruments for use in the informal economy are discussed in Charmes et al. (2016). In 1982, the Lagos Plan of Action (Organisation of African Unity (OAU) 1982) emphasised the importance of the informal sector for Africa.

for the monitoring and evaluation of implemented policies, resulting in policy learning. From the perspective of Africa this would entail strengthening the role and activities of the Specialised Technical Group on Science, Technology and Education (STG-STE) which is provided for in the Africa Union Strategy for Harmonization of Statistics in Africa (SHaSA)⁷. The NEPAD Agency has taken up the commitment of convening the STG-STE as part of institutionalising ASTII in the Member States. The last meeting was held in Cairo, Egypt in November 2015.

5. Conclusions and next steps

The outcomes of the ASTII, STISA–2024, and the Oslo Manual revision are expected to lead to more interest in innovation measurement in Africa, better monitoring and evaluation of innovation policy and progress towards the objectives of STISA- 2024 at a time when innovation policy is being recognised as a different activity from science, or science and technology, policy.

The survey of African countries that have undertaken innovation surveys demonstrates that the results of the surveys are being used for comparison purposes, for use in policy and for academic research. Knowledge has been generated as a result of this work that could be shared among countries engaged in, or considering being engaged in, innovation surveys. This would also be a means of building capacity for policy development (AOSTI 2013). The structure for this objective is already in place in the form of the Specialised Technical Group on Science, Technology and Education (STG-STE) and the NEPAD Agency is working with the STG-STE as part of institutionalising the work of ASTII.

The use of STISA-2024 as framework for bringing coherence to innovation (as well as science and technology) policy is an opportunity for African countries to review existing policies and visions and to share their thinking on policy issues. The suggestion here is that consideration be given to establishing a committee by the NEPAD Agency, AOSTI and ASRIC for this purpose.

Finally, the revision of the Oslo Manual is an opportunity for Africa to contribute to and benefit from the process of producing a global manual for use in countries at all stages of development. This would involve the consideration of innovation in economic sectors other than the business sector and in the informal as well as the formal parts of sectors.

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⁷ See African Union Commission, African Development Bank and United Nations Economic Commission for Africa; (2010). Strategy for Harmonization of Statistics in Africa – SHaSA.

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