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Policy Brief

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Overview

This is the second in a series of workshops on the 'Design and Evaluation of Innovation Policies for Africa' (DEIP-Africa), reflecting the great interest of African regions in Science, Technology and Innovation (ST&I) policies and their social and economic impacts. Representatives of 12 countries from the Economic Community of West African States (ECOWAS) met in Côte d'Ivoire from 25-29 September 2017 to discuss existing policies and their development, in light of the African Union Science, Technology and Innovation Strategy for Africa (STISA-2024), and the broader African Union Agenda 2063. This event provided a platform to examine diversity within ECOWAS and common challenges to be met.

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Innovation for Development in West Africa: Challenges for Promoting ST&I Policy

Innovation policy is seen as a solution to economic and social challenges as circumstances change in Member States of the Economic Community of West African States (ECOWAS). Political stability has strengthened over the last decade through democratic elections in Nigeria, Togo, Côte d'Ivoire, Guinea and Burkina Faso in 2015, Niger, Benin, Cape Verde in 2016 and in Gambia in 2016 and 2017[1]. With this stability has come an expectation that science and technology (ST) and innovation (I) activities will address challenges faced by the region. An example is the outbreak of the Ebola virus in Guinea, Liberia and Sierra Leone when the region, and institutions beyond, collaborated to address common problems and build constructive international partnerships. To respond to the expectations in the AU Member States, the second[2] Design and Evaluation of Innovation Policies (DEIP) for Africa' course took place from 25-29 September 2017 in Abidjan, Côte d'Ivoire.

ECOWAS consists of 15 countries: Benin, Burkina Faso, Cape Verde, Côte d'Ivoire, Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Mali, Niger, Nigeria, Senegal, Sierra Leone and Togo. All but Cape Verde, Guinea-Bissau and Sierra Leone were able to participate. At the course, participants made presentations on the related activities of their governments. The resulting information, and information from secondary sources, gave rise to this Policy Brief.

The Policy Brief outlines the challenges and opportunities that face countries in the areas of Science and Technology and Innovation policy. It incorporates the views of course participants on how to overcome challenges and seize opportunities.

1. Characteristics of participating ECOWAS Member States

Background socioeconomic information on the ECOWAS countries that participated in the course is provided in Table 1. The table shows that participating countries were diverse in their scales and levels of development. For example, GDP per capita in US$ varies from the lowest being Liberia, with US $754 to the highest being Nigeria with US$ 5,439[3]. The size of economy varies from GDP US$ 3.2 billion in Gambia to US$ 1011.6 billion in Nigeria reflecting the size of populations that vary from 2 million in Gambia to 186 million in Nigeria. The economic growth rates in 2016 range from -1.6% in Liberia, which suffered the Ebola crisis, to 8.8% in Côte d'Ivoire which is recovering from internal political conflict. The growth rates of countries in the region,

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in general, are affected by the geopolitical situation and commodity prices. For example, the oil price causes fluctuation in the growth rate of the economy in Nigeria as do cotton prices for Burkina Faso. Similarly, the unemployment rate differs among the countries from 1% in Benin to 22% in Gambia.

(Kraemer-Mbula and Wunsch-Vincent, 2016). Hence the large presence of informal economy in these countries signals its importance as a topic for further research.

Thirdly, with the median age ranges between 14.9 in Niger and 20.4 in Ghana these countries have a young economically active population.

Table 1: General features of the 12 participating countries

Country	GDP (PPP)			Population	Median age of population	% of value added GDP				% of total employment			Unemployment rate (2016)	Unemployment rate 2016			GERD % of GDP
	billion	growth rate	per capita	million		Agriculture	Industry	Manufacturing	Services	Agriculture	Industry	Services		% of total employment	% of GDP	% of GDP (excl. agriculture)	
Benin	21.9	4.0	2,010	10.8	18.2	25.3	23.2	13.7	51.4	45.0	10.5	44.0	1.0	89.6		65-67	0.30
Burkina Faso	29.7	5.9	1,595	18.6	17.0	32.6	22.2	6.1	45.2				6.6	90.5	55.8	21.7	0.20
Côte d'Ivoire	87.7	8.8	3,448	23.7	18.3	21.2	33.4	15.2	45.3	48.0	6.0	46.0	2.3	69.7		30-40	0.36
Gambia	3.2	1.6	1,566	2.0	17.0	17.8	13.4	4.8	68.0	31.5	14.0	54.0	22.0				0.13
Ghana	112.3	3.6	3,980	28.0	20.4	19.6	28.2	5.6	52.2	42.0	15.0	43.0	5.2	80.0		90.0	0.38
Guinea	15.1	5.2	1,215	12.0	18.4	20.2	36.9	6.7	42.9				6.8	86.7		80.0	
Liberia	3.5	-1.6	754	4.6	18.6	34.2	13.0	3.0	52.8	46.5	10.5	41.2	4.2	68.0			
Mali	35.3	5.3	1,963	18.0	16.0	40.7	19.0	_	40.2				8.1	70.0		61.6	0.66
Niger	18.7	5.0	907	20.7	14.9	38.8	17.0	_	44.2				2.2	60.0	72.6	29.0	0.086
Nigeria	1011.6	-1.5	5,439	186.0	17.9	21.2	18.5	8.8	60.4	30.0	14.0	55.0	14.2	83.4		41.4	0.22
Senegal	36.7	6.6	2,380	15.4	18.3	18.0	24.0	_	58.0	46.0	18.0	22.0	10.2	48.8		41.6	0.54
Togo	10.5	4.9	1,382	7.6	18.9	41.3	16.9	4.7	41.8				6.8		72.5	32.2	0.27

For further references, please go to: www.merit.unu.edu/deipafricaii

While these countries vary in many aspects, they also share common characteristics. First, they have a large service sector, followed by agriculture, except for Senegal, Ghana, Côte d'Ivoire and Guinea where industry is the second largest economic sector in terms of GDP. Industries include mining and agriculture-based activities within manufacturing, rather than the rest of manufacturing (ECOWAS, 2017a).

Second, the largest segment of employment is in the agriculture sector, except for Ghana, Nigeria and Gambia where it is in industry. In all economic sectors, there is a large presence of informal activity, both in terms of GDP and in employment. The proportion of informality is particularly pronounced in the agriculture sector. This suggests potential labour surpluses, which are not being absorbed into the formal economy, creating the conditions for low productivity. At the same time, the informal economy has functions that are not provided by the public or private sector

Labour surpluses will therefore continue unless there are new economic activities to absorb them. This is a serious challenge.

2. ECOWAS Development Vision and S&T and Innovation Policy

Since 2007, ECOWAS has had a regional development vision, known as Vision 2020 (ECOWAS, 2010), which was influenced by the Consolidated Plan of Action (NEPAD, 2005). Vision 2020 aimed to realise the development aspirations of the people and achieve equitable and broad-based growth, sustainable development, and poverty eradication. Since the launch of Vision 2020, the African Union (AU) has released the Science, Technology and Innovation Strategy for Africa (STISA 2024) (AU, 2014) and the broader framework, AU Agenda 2063. These two documents provide a direction for ECOWAS policymakers as they move towards greater policy coherence with the developmental frameworks of the AU.

In its 2016 Annual Report (ECOWAS, 2016), the ECOWAS Strategic Planning Unit reported on the efforts to finalise the Community Strategic Framework (CSF) 2016 – 2020 and to ensure that it was aligned with the Agenda 2063 and the development strategies of member states. For ST&I concerns, the implementation of ECOPOST (ECOWAS, 2011) focused on making scientific information available to ECOWAS citizens for community development, personal growth, as well as for scientific production across the region. Prior to the adoption of STISA-2024, ECOPOST highlighted similar challenges that involve ST&I. These are described below.

Regional challenges

(a) Lack of modern technology in agriculture: raising agricultural productivity

A large proportion of the working population is still engaged in agriculture using old technology and the level of informal economic activity is high. Despite being a large sector, some countries still face food insecurity. All of this suggests low productivity of agriculture.

(b) Under-provision of social infrastructure such as water, sanitation and electricity

ECOWAS Member States suffer from insufficient social infrastructures such as electricity, water and sanitation[4] and lack of response to rapid population growth. The social infrastructures of water, sanitation and electricity are important to ensure the welfare and quality of life of citizens. In this context, ST&I can provide viable solutions for local needs.

(c) Under provision of internet connectivity

Nearly 75% of Africa's population is still not online. Affordability remains a significant barrier to increased access across the continent, as broadband prices throughout many of the ECOWAS countries remain high[5]. While internet connectivity is considered economically important, it is low in some of the ECOWAS countries – Gambia 14%, Burkina Faso 4.4 % and Guinea 1.5% of the population are examples (Essegbey et al., 2015).

(d) Lack of diversification in economic activities (smart specialisation and global value chains)

Many ECOWAS countries rely heavily on either agricultural or mineral commodities, as seen in the contribution to GDP by the primary sector and the fact that the industry sector consists mainly of mining and resource-based manufacturing such as food processing and textiles. Reliance on commodities with limited value added contributes to economic instability (ECOWAS, 2016) especially when the commodities are exported at prices set by the global market. In fact, the major causes of fluctuation of GDP growth are caused by instability in commodity prices (e.g. Nigeria and Ghana to some extent, see Table 1).

(e) Small market size (with the exception of Nigeria)

Many ECOWAS countries have a small market size (except for Nigeria). Small market size does not allow the countries to benefit from economies of scale.

(f) Need for employment generation and strengthening the informal and SME sector through supporting entrepreneurship and start-ups

The demographic distribution of the population in ECOWAS countries shows a growing labour force with a significant number of young people (Table 1). The data suggest that the large 'labour surplus' in the agricultural sector and, more broadly, in the informal economy, shows potential for transition to the industry and services sector if adequate training is provided for the people involved.

(g) Strengthen higher education, related infrastructure and university-industry linkages

The importance for increasing highly educated or skilled personnel, especially in science and technology areas, is recognised by ECOWAS countries. Statistical measures are made at the ECOWAS level (e.g. The UNESCO-led African Centres of Excellence project; Essegbey et al., 2015, Table 18.1). Rapid population growth and underinvestment in higher education during the structural adjustment period in the 1980s to the early 1990s, followed by internal con-

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flicts, resulted in lack of investment in educational infrastructure and new higher education institutions. This had implications for both the quality and number of the educated population.

3. Policy options and actions

Efforts are being made to overcome the challenges identified in the previous section.

(a) Lack of modern technology in agriculture: raising agricultural productivity

At the global level, various technological changes – both incremental (e.g. irrigation, seed improvement, agricultural machinery) and radical (e.g. drones, satellites and Internet of things) – had already taken place to boost agricultural productivity. Many industrial activities are linked to agriculture in ECOWAS countries (e.g. textile industry with cotton in Burkina Faso; food processing industries with cacao in Côte d'Ivoire). Increasing productivity through the introduction of modern technology would have a positive economic impact.

The adaptation of modern technology requires a focus on institutional aspects as well as involvement of the private sector. For instance, the involvement of cooperatives and extension services and domestic and multinational firms to introduce modern technology are critical to a successful outcome. The example of developing rice and mango value chains in Mali demonstrates the importance of involving cooperatives. Similarly, the diversification of agriculture through smart specialisation by Togo also showed the importance of institutional settings. The role of research in identifying the local niche is important. For instance, agricultural research involving regional and local universities and public research institutions in meeting the local needs (geo-climate conditions, plant diseases and pests), especially climate change adaptation, can boost productivity and quality of the product as demonstrated in Togo.

(b) Under-provision of social infrastructure such as water, sanitation and electricity

The application of frugal innovations, as seen in the examples of installing off-grid renewable (e.g. solar & wind) energy facilities in rural areas, and simple water purifiers and toilets, helps meet essential needs by providing affordable technological solutions. Similar attempts can also be implemented in the ECOWAS Member States through strengthening the adaptation of technology to local needs. The ECOWAS Observatory for Renewable Energy and Energy Efficiency aims to improve existing knowledge and reduce information barriers hampering the development of the energy sector in the ECOWAS region.

(c) Under provision of internet connectivity

Information and communication technology (ICT) creates a common virtual platform where different users can exchange information, goods and services. This technology potentially creates opportunities for new services and goods related services to emerge, especially targeting unmet needs for marginalised populations. Information technologies introduced under so-called 'Industry 4.0' are considered essential tools for reaching the global market – as they create disruptive technological change, meet the needs of unserved populations (Perez and Soete, 1988), and support technology leap frogging.

Connectivity alone will not automatically cause leap frogging (Hallward-Driemeier and Nayyer, 2017, Bell and Pavitt, 1993). The strengthening of the S&T and I capability over and above the provision of educated human resources is important to take full advantage of internet connectivity.

(d) Lack of diversification in economic activities (smart specialisation and global value chains)

The diversification of economic activities can bring about more stability. Increasing value added along the global value chains (GVCs) is one example. Creating niche markets by integrating goods and services to address unmet needs in growing local and regional markets is another example. This can be managed through smart specialisation as one of the existing strategies for diversifying the economy. To enable these strategies, it is important to promote micro and small enterprises, as these firms are often at the margin of the informal economy (as per the Ghana and Liberia cases). By increasing the diversifi-

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cation of economic activities, promotion of entrepreneurship and start-ups can be encouraged by involving local universities, as well as public research institutions. An example is the YouWIN Connect Project in Nigeria[6].

(e) Small market size (with the exception of Nigeria)

To compensate for the small scale of market in many ECOWAS countries, strategic coordination of export policies and investment promotion are needed through advancement of regional integration. The ECOWAS Common External Tariff (CET) has already been introduced in 10 countries (Benin, Burkina Faso, Côte d'Ivoire, Mali, Niger, Nigeria, Senegal, Togo, Ghana and Guinea Bissau – with Sierra Leone to follow). Harmonisation of indirect domestic tax and fiscal transitions and a single currency programme are underway at the regional level (ECOWAS, 2016). To lower the export barrier, compliance with international standards is also important and several options are already being considered.

The scale of the market also has a negative effect on the overall size of research budgets. Bibliometric analysis by AOSTI has shown that little collaborative research has taken place among countries in the region, even though these countries share various common research agendas (ECOWAS, 2017b). Visa-free mobility, introduced by ECOWAS ahead of other regional economic communities, may encourage regional collaborative activities and may apply to researchers and students in tertiary education. In the longer term, the African Continental Free Trade Area will provide an opportunity to expand the market scale for ECOWAS countries.

(f) Need for employment generation and strengthening the informal/SME sector via entrepreneurship and start-ups

Job creation and skills development are essential to keep the productive population active in the labour market. The ongoing harmonisation of Technical and Vocational Education and Training (TVET) at the ECOWAS level would enable an optimal allocation of human resources at the regional level.

On the demand side, the encouragement of entrepreneurship and start-ups would also contribute to generating employment. Targeted policies can also help a great deal: for example, Nigeria's YouWIN Connect, a public-private initiative to support young entrepreneurs to plan, start and grow their businesses by building capacity, mentoring and funding. Senegal also has examples of policy to promote micro and small business development.

(g) Strengthen higher education, university infrastructure and industry linkages

To meet the demand for highly skilled members of the labour force in the ECOWAS region, better alignment of higher education and industry is needed. For instance, Senegal, having found that little research is applied in industry, is making efforts to improve university-industry linkages. This involves the legal reform of governing bodies of public universities to increase private sector participation in the decision making of universities. To strengthen university-industry linkages, Senegal is promoting incubators and a FabLab. These initiatives raise awareness about intellectual property rights and encourage entrepreneurship. Similar attempts have also been made in Burkina Faso, whose 'Law of Orientation of Scientific Research and Innovation' (LORSI) was reformed to enable the financing of research and innovation.

4. Overview of current status of ST&I policy in selected ECOWAS countries

Table 2 (overleaf), using primary and secondary sources, demonstrates the progress made by the 12 participating countries on the strategic activities outlined in ECOWAS (2011). The activities are grouped into six categories:

1. Institutional framework;
2. Financing ST&I;
3. Research and higher education;
4. Scientific research, infrastructure, technology transfer and intellectual property rights (IPR);
5. Private sector and entrepreneurship;
6. Data and indicators.

Notes

1. http://www.ecowas.int/elections-home

2. See Iizuka et al. (2015) for a Policy Brief on the first DEIP-Africa.

3. The source is World Bank data (https://data.worldbank.org/indicator/)

4. https://data.unicef.org/resources/progress-drinking-water-sanitation-hygiene-2017-update-sdg-baselines/

5. Alliance for Affordable Internet 2017 (http://a4ai.org/affordability-report/report/2017/)

6. See https://www.youwinconnect.org.ng/

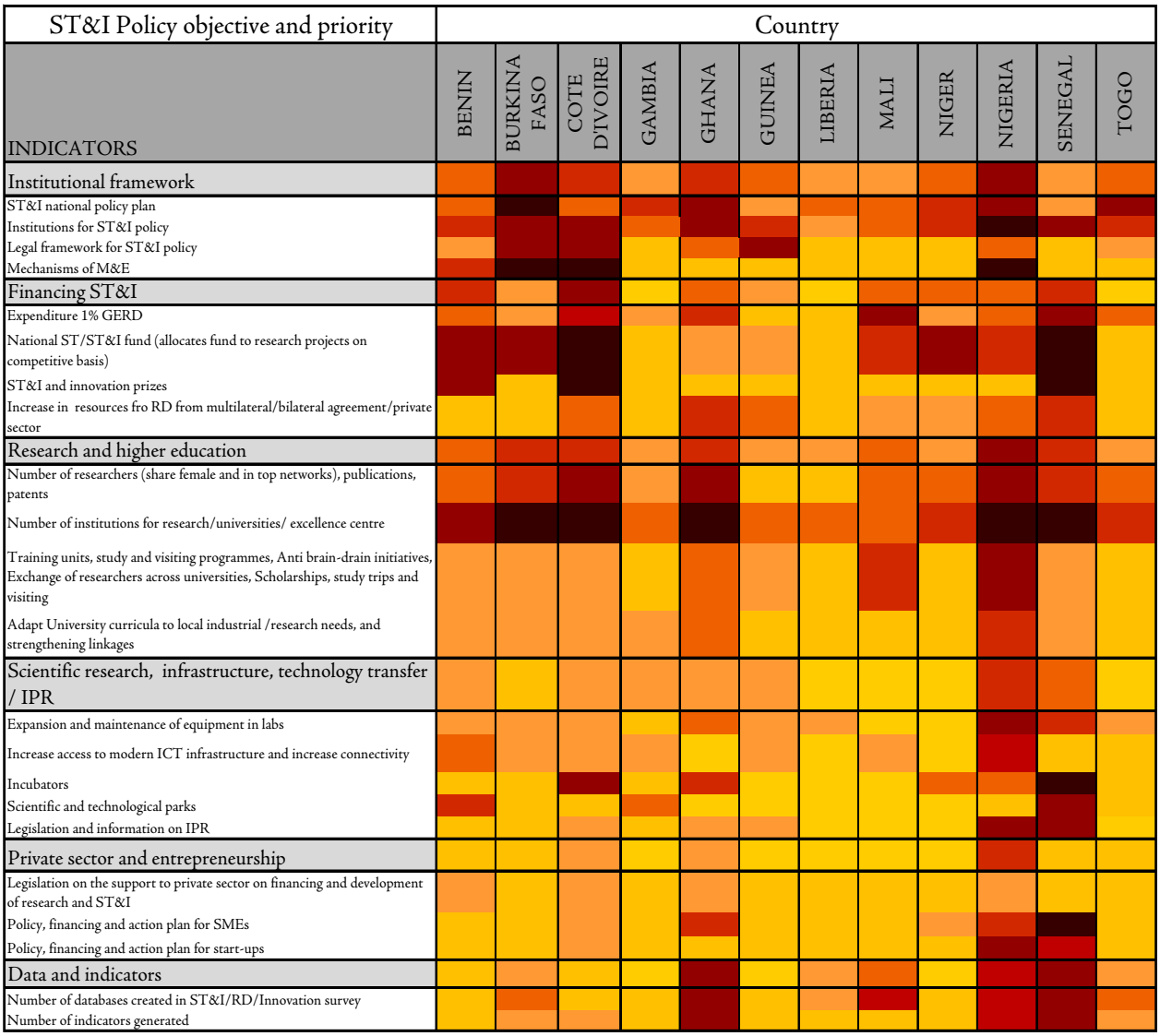
Table 2: General features of the 12 participating countries

(For references, please go to: www.merit.unu.edu/deipafricaii)

The criteria of evaluation are:
1. No existence/No mention of the activity;
2. Recognition of the activity mentioned;
3. In process of undertaking the activity but not completed;
4. Existence of the activity (policy, action plan, funds, etc.);
5. Implementation of the activity;
6. Monitoring and evaluation of activity taking place.

This exercise does not measure progress towards the goals of the ECOPOST Strategic Action Plan but attempts to understand the status.

The overall trends across the 12 countries indicates progress in activities related to 'Institutional framework', 'Research and higher education' and 'Financing ST&I' and less progress in 'Private sector and entrepreneurship' and 'Scientific research, infrastructure, technology transfer and intellectual property rights (IPR)'.



Interpretation of scores

1.No mentions (in government document at all in the policy document mentioned by the participants and UNESCO science report, etc.)
2.Recognition of problem/issues (being mentioned in the policy document)
3.In process of making (mentioned)
4.Policy/action plan already exist
5.Actual implementation is taking place (with financing mechanisms if not by itself)
6.Actual monitoring and evaluation is taking place

For 'Data and indicators' there were large differences among countries like Ghana, Senegal and Nigeria followed by Côte d'Ivoire, Burkina Faso and Togo. The category, 'Institutional framework' consists of activities such as the provision of a national ST&I policy, the institutional setting with different organisations assigned for different ST&I policy tasks, and the presence of legal frameworks to support ST&I policy to ensure continuity over the political cycles.

These activities, particularly institutional ones and the development and provision of national ST&I policy, demonstrated some progress, while the rest made less progress. The degree of progress on Monitoring and Evaluation (M&E) was different among countries. For example, Burkina Faso, Côte d'Ivoire and Nigeria had implemented M&E while other countries had not.

The activities listed under the category of 'Financing ST&I', show overall progress. The most differences among countries are observed in the provision of national ST&I funds and prizes.

Under the category, 'Research and higher education', all countries show provision of information on research and higher educational facilities as well as researchers, publications and patents. Adapting universities to industrial needs seems to have less degree of progress.

Activities in the category 'Scientific research infrastructure and technology/ IPR' showed little advancement. This was also the case for the category 'Private sector and entrepreneurship' with some exceptions including Nigeria. The category, 'Data and indicators', shows a correlation between the countries that conducted innovation surveys and those that had indicators.

The analysis of the six categories suggest that the importance of ST&I is recognised, but there is limited engagement in linkages between public sector knowledge creation and private sector knowledge application. Policy is focusing more on science and technology in the public sector than on supporting innovation in the private sector.

5. Conclusion

This Policy Brief has identified both different and common agendas in the 12 countries in the ECOWAS Regional Economic Community that participated in the second DEIP-Africa course. There are several cross-cutting challenges involving ST&I. These are:
- Improving agricultural productivity;
- Diversifying economic activities;
- Generating employment through private sector development;
- Development of human resource capacity; and
- Enhancing the linkages between university and industry.

Using evidence from primary and secondary sources to examine progress of participating countries in respect of activities in the ECOPOST demonstrated that, while progress has been made by S&T institutions, there is still much to be done to enhance private sector innovation (I).

Possible initiatives include:
- Pre-competitive research collaboration at ECOWAS level;
- Enhanced collaboration in research among regional universities. Exchange of researchers, opening the opportunities of learning. This can go along with the ECOWAS centres for excellence in certain areas of research. Free mobility of goods and people within the ECOWAS region could enhance knowledge production and transfer.

Ongoing efforts are needed to:
- Enhance institutions for ST&I policy;
- Provide data needed to support evidenced-based policy;
- Engage the private sector and encourage entrepreneurship and start-ups.

Other issues that were not explicitly expressed in the ECOPOST but which arise from the figures in Table 1 are:
- The role of the informal economy;
- The impact of innovation in sectors other than the private sector (Gault, 2018);
- Exploring the response to challenges presented in the STISA-2024.

The call for proposals to conduct DEIP-Africa workshops is open to any governmental institution in Africa (www.aosti.org). For more details and references for this paper, please go to: www.merit.unu.edu/deipafricaii

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INSIDE:

Policy Brief

Innovation for Development in West Africa: Challenges for Promoting ST&I Policy

Discussing existing policies and their development in light of the African Union Science, Technology and Innovation Strategy for Africa (STISA-2024), and the broader African Union Agenda 2063.

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