

Advances in African Economic,
Social and Political Development

Samuel Ojo Oloruntoba
Mammo Muchie *Editors*

Innovation, Regional Integration, and Development in Africa

Rethinking Theories, Institutions, and
Policies



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Editors

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and Policies

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Editors

Samuel Ojo Oloruntopa
Thabo Mbeki African Leadership Institute
University of South Africa
Pretoria, South Africa

Mammo Muchie
Tshwane University of Technology
Pretoria, South Africa

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Reframing the Debates on Innovation and Regional Integration in Africa



Samuel Ojo Oloruntoba

Innovation has been very critical and central to the establishment of modern industrial societies. The transformation of former agrarian societies of Europe, United States of America in nineteenth and twentieth centuries and of recent, Asia was largely due to the development of National Systems of Innovation. In order to facilitate development, the State in these countries formulated public policies that prioritised investment in research and development with focus on innovation. In the United States of America for instance, investment in technology was initially focused on building military capability. Although such investments did not have commercial orientation as the overriding objective, they laid the foundation for the future industrial and technological innovations that the country has witnessed over the past two centuries (Moweri and Rosenberg 1993). Innovation has been defined as the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organisational method in business practices, workplace organisation or external relations (OECD 2005, 2012).

Although governments usually provide the leadership and appropriate enabling environments for innovations, they are not the only agent in the process of deploying innovation for development. Other agents involved in generating innovation include firms and universities. Scholars like (Lundvall 1992, 1994, 1997; Nelson 1993) emphasise the role of the firm in fostering innovation, while Adeoti (2016) stresses the critical role of universities in innovation and development. Etzkowitz and Leydesdorff (2000) explicate on what they call the Triple Helix of university-industry-government relations in fostering innovation. In this respect, they argue that ‘as the role of the military has decreased and academia has risen in the institutional structures of contemporary societies, the network of relationships among academia, industry, and government have also been transformed’ (p. 109).

S. O. Oloruntoba (✉)

Thabo Mbeki African Leadership Institute, University of South Africa, Pretoria, South Africa
e-mail: oloruso@unisa.ac.za

Since independence, African countries have suffered from low capacity for innovation and development due essentially to the nature and character of the state, its location in the global knowledge production flows and the skewed international capitalist system (see Oloruntoba 2016; Ake 1981). Africa occupies the least rank in the Global competitiveness index and scores very low in research and development. Mugabe (2011:5) identifies various features of National Systems of Innovations in Africa, which contributed to the low position of the continent in global competitiveness rankings. These features include the reality that: science and technology is narrowly defined to mean R&D, little emphasis on innovation aspects such as technology prospecting, procurement and diffusion, lack of explicit innovation policies, few and weak institutional linkages and collaboration, weak engineering and entrepreneurship capabilities, Limited financial resources for technological innovation, low levels of technological readiness and innovation capacities and generally poor and neglected R&D infrastructure.

Recent efforts at national, regional and continental levels to boost innovation through the establishment of National Systems of Innovation and regional systems of innovation have not yielded enough results. Yet, the United Nations Economic Commission for Africa (2013:11) notes in its study on innovation notes that, ‘innovation capacities are vital for diversifying and differentiating the production and trade portfolios, providing a chance to “leap-frog” -technological progress and factor efficiencies may well account for half the economic growth in dynamic economies”.

The weaknesses in the capacity of the state to foster innovation necessitates a regional integration approach to innovation, in which ‘networks of people, institutions and markets’ are brought together to ‘spur innovation and related creative activities’ (UNECA 2016:11). Mugabe (2011) notes in this respect that there is a renewed focus on accelerating regional economic and political cooperation in Africa. He adds that regional economic integration makes it possible for African countries to pool their economic diversity and assets together and build bigger markets as well as trading blocs. It is also an important mechanism for assembling resources for the production of regional public goods (p. 2).

Studies on innovation have traditionally been focused on building National Systems of Innovation through the formulation of appropriate policies and creation of the right environment through support for research and development (OECD 2011). However, given the weaknesses of many of the states in Africa, their extractive nature and dependence on foreign donors, it has become imperative to adapt a regional approach to building capability for innovation and competitiveness. This is very important for several reasons. One, despite the artificial boundaries, African states share many things in common. Two, there are diversities in the level of innovation and competitiveness of states. The similarities and the diversities among states can be harnessed to foster complementarities and synchronisation of policies and institutions geared toward building capacities for innovation and development. Three, various free trade agreements are being negotiated at the regional and continental levels with the overall aim of building synergy, creating value chains and boosting market access.

As UNECA (2016:13) notes, regional integration changes national incentive frameworks. Also, the deeper the integration and the larger the community created, the greater the potential benefits for innovation both for consumers who will have access to a range of products, outside their own localities and national governments that will have access to more taxable revenues. Various theories have been advanced in attempt to explain innovation and its links to socio-economic development, national competitiveness and structural transformations of different countries. One of the most important theories of innovation was Schumpeter's theory of innovation, which posits that innovation in business is the major reason for increased investments and business fluctuations (Schumpeter 1943). This theory is based on the assumption that the cyclical process is usually the result of innovation in any given organization, regardless of whether or not such organisations are industrial or commercial. Both industrial and commercial. Schumpeter sees innovation as the changes in the methods of production and transportation, production of a new product, change in the industrial organization, opening up of a new market and other forms of positive value additions. There is a commercial and profitability dimension to the theory of innovation in Schumpeterian terms. According to him, in order to qualified as such, innovation must encompass the commercial applications of new technology, new material, new methods and new sources of energy. Sengupta (2014) builds on Schumpeter's work in his economic theory of innovation, which mainly analyses the technology factor and its impact on economic growth. The theory takes into consideration how changes in technology have affected manufacturing, production and commercial services. To a great extent, these theories are limited to innovation at the firm level. However, countries have also developed national systems of innovation to enhance competitiveness and boost military capability at national levels.

Emerging trends in Europe and other regions of the world show that innovation and regional integration have some relationships, which require a new approach to theorising. This become even more important in developing countries in Africa where adherent to state led development or market orthodoxy has not facilitated improvement in the living conditions of the majority of the citizens (see Morgan 1997). Scholars have also shown that the weakening capacity of the state and the contradictions within the multilateral capitalist system have thrown up new challenges that require complementary, if not alternative governance arrangement for fostering socio-economic development. The regionalisation processes taking place across the world are evidence of the multiple approaches to governance and development. (Soderbaum 2004, 2016).

In addition to the need for rethinking theory, institutions of innovation require new analysis, especially in the light of the limitations of most institutions of innovation at national levels. UNECA (2016:46) notes that formal and informal institutions drive regional integration. Regional integration in turn enhances the framework conditions for innovation. In this context—formal and informal institutions facilitate market opportunities—for economic actors to leverage the knowledge generated through research and development (R&D) and through routine learning and practice of economic activities.

As innovation assumes a regional approach in Africa, it becomes pertinent to incorporate a regional dimension to the relevant institutions, in such a way that will allow for cost-sharing, learning curve and experience as well as boosting productivity along regional value chains (Morgan 1997). As Mugabe (2011:viii) notes although there are a number of regional and international institutions with programmes focussing on helping African countries advance in the area of STI, such as the African Union (AU), the New Partnership for Africa's Development (NEPAD), the African Development Bank (AfDB), the World Bank and the United Nations Educational, Scientific and Cultural Organization (UNESCO), these institutions are not well coordinated as to add value to the building of national and regional systems of innovation.

At the level of policy, a new thinking is required, which transcends restricting policies on innovation to what obtains at the national level designing regional policies on innovation in Africa. Within the context of the regional integration agenda of the African Union as encapsulated under agenda 2063, there is an increasing need for regional policies on innovation and regional integration on the continent. Some regional economic communities like the East African Community and Southern African Development Community have established regional policies on innovation in order to foster higher levels of innovation in the subregions. However, the same cannot be said of other regional economic communities in Africa. As a region in transition with urgent need for structural transformation, opportunities exist for regional innovation in several areas such as space, energy, road, air and sea transports, telecommunication, mobile finance, satellite transmission, education, agriculture and resource management. In order to harness the massive potentials that are inherent in these areas, it is imperative to have develop appropriate regional policies and institutions. Given the low level of economic development among many states in Africa, challenges remain as to how these policies and institutions can be established and implemented.

The dynamics of innovation and regional integration require new thinking in such a way that can enhance higher level of technological diffusion, knowledge sharing, competitiveness, and ultimately, socio-economic development in Africa. Papers in this volume were presented at the first colloquium on innovation and integrated Africa development held at the University of South Africa, Pretoria, South Africa from March 9–11, 2016. These papers have been edited in line with the overall theme of the colloquium. The authors engage with the universe of the debates around the theory and practice of regional innovation and regional integration in Africa. After the introduction, the book was divided into four interrelated parts, including the conclusion where we set a future research agenda on innovation, regional integration and development in Africa. Papers in part one examines the theoretical underpinnings of innovation and regional integration, with due regard to the past and present experiences on these related issues in Africa. Part two covers regional institutions as they relate to innovation, while papers in part three focus on sectoral issues. The fourth part sets agenda for future research for this emerging area of knowledge in Africa.

The first eight chapters address the theoretical and conceptual underpinnings of innovation and regional integration in Africa. Mammo Muchie reviews existing theories of innovation, arguing that both evolutionary economics theory and systems of innovation perspectives have been used to frame alternative conceptual frameworks to neo-classical economic theory. The need for an alternative discourse was informed by the limitations of the neo-classical economic theory to foster inclusive development. To further this alternative discourse, Muchie advances an argument which shows how a system of innovation that combines knowledge, learning, research, innovation, and capability building can provide an alternative framework to the study of development and underdevelopment in Africa. In concluding the chapter, he argues for constructing a theory around the System of Innovation and Development, which can help to incorporate knowledge, learning and competence building in the process of an integrated African development. In other words, systems of innovation should not be an end in itself but as a tool for fostering socio-economic transformation and development in Africa. Olorunfoba establishes a link between the theories of innovation and regional integration as well as its practice in Africa. After reviewing existing theories of regional integration, he agrees with Muchie that innovation and regional integration should have socio-economic transformation as the core objective. The need for a regional approach to innovation is particularly important in Africa because of the diversities in the capacity of the states on the continent. While relatively developed states such as South Africa, Egypt and Kenya have managed to develop national systems of innovation, which has contributed to their productivity and competitiveness, the same cannot be said of majority of other countries in Africa. Thus, a regional approach to innovation is proposed, which can assist in pooling resources and fostering competitiveness through greater interactions of the states at higher level of innovative capacities with those at lower levels. The regional value chains that will result from such interactions could lead to increase in productivity and development across the continent.

Moges Girma and Mammo Muchie bring a Pan-Africanist perspective to the theory of innovation and regional integration. They argue that the current fragmented economies of Africa, which were built on the artificial states that the colonialists created are incapable of fostering socio-economic development on the continent. In order to avoid this problem, they develop a political economy argument on the necessities and challenges of establishing a vibrant and integrated continental economic space. They also explore new areas of initiatives that would address the limitations of current approaches. Given the continued dominance of the politics of difference and narrow nationalism, Girma and Muchie conclude that it is imperative for Africans to develop the power of imagination and African consciousness for the true renaissance of Africa. Such consciousness could lead to the emergence of the institutional, political, and social pillars that support sustainable and inclusive development for Africans. Two aspects of the recommendations above merit further interrogation. First, the power of imagination is very central to moving beyond what is assumed to be given in terms of the spatial delineation of Africans into artificial borders to what is possible through an integrated continent. It would appear that the long years of violent encounters that Africans had with the West have

wrecked a psychological damage in the minds of people in ways that thinking beyond the abnormal normal is considered anachronistic. There is an increasing proclivity to think that the limit of development is to attain the level of development in the West (Mkandawire 2010). For instance, the decision of African leaders at the Cairo Conference of 1963 and the Accra Conference of 2007, to maintain the artificial borders created by the colonialists is an unwitting submission to the dictates of imperial design. Two, the dominance of ethnic and to a large extent, national consciousness at the expense of Pan-African consciousness among majority of Africans is a testimony to the feebleness of imagination on the possibility of constructing a Pan-African identity. In order to achieve regional systems of innovation and translate this to development outcomes, the above issues must be addressed. As Oloruntoba (2018b) argues, this requires liberation of thought from the current pre-occupation with ethnic and national interests .

Christopher Nshimbi adds an interesting dimension to theorising the relationship that exists between innovation and regional integration. While noting that National Systems of Innovation have naturally been the purview of the state, he introduced a novel idea that informal and cross border traders could act as non-state actors in fostering innovation across states. In other words, these actors should be incorporated into the design of innovation policies in ways in which their activities will be given recognition and the required support. This perspective is particularly germane in the African context in which informal trade along borders constitute significant part of economic activities. For instance, in a recent report, the Medina et al. (2017) notes that informal economic activities contribute between 50% and 65% to Gross Domestic Product in countries like Benin, Tanzania and Nigeria. Although these activities are not usually captured in official statistics, this does not detracts from the important contributions that they make to economic development in Africa.

In what he calls Transnational simultaneity, Adebusuyi Isaac Adeniran introduces another fledging theoretical import to the understanding of regional integration in Africa. The author notes that the regional integration agenda on the continent has been ineffective due to lack of implementation of agreed protocols. Following in the line of the argument of Christopher Nshimbi above, he argues that the informal practice of “transnational subsistence dualism” along the Nigerian-Ivorian migratory corridor has continued to present a veritable leverage to the sub-regional integration project in Africa. In this regard, he uses the case study of a group of cross-border transporters, who are usually of Ejigbo-Yoruba extraction, to show that non-state actors can facilitate inter-community development across the borders. That this practice of cross border movement has existed between the Ejigbo-Yoruba and their host communities in Cote d’Ivoire has existed for over a century indicates its resilience and capability of contributing to an attempt at fashioning out regional innovation policy in Africa.

In the last chapter in this section, Saidi Trust questions the orthodox and dominant practice in Africa, where scholars are required to publish specific numbers of scientific papers in order to qualify for promotions. Although the author agrees that publication of research papers is necessary for dissemination of scientific knowledge,

he argues that emphasis on numbers at the expense of quality undermines the possibility of achieving breakthrough in research in ways that can add to innovation and integrated development in Africa. This argument is very pertinent, if one considers that major scientific breakthroughs and innovation in other parts of the world may take several years to achieve. In the particular case of Africa, where there is huge gap in innovation and development, sufficient attention must be paid to conducting ground-breaking research that can bring about innovation in the various sectors of the society.

The five chapters in Part two examine how regional economic institutions are fostering innovation in Africa. This part is very important as it evaluates the successes and the weaknesses of these institutions in the context of the continental agenda of building capacity for innovation, productivity and competition, under the aegis of the African Union, Agenda 2063. Using the Tripartite Free Trade Area (TFTA) which was signed by three regional economic communities in Africa, namely Southern African Development Community, Common Market for East Africa and East Africa Community in June 2015, as a point of interlocution, Moorosi Leshoele chronicles the history of regional integration in Africa, in terms of its prospects and challenges. He argues that despite the huge advantage that may accrue to the regional economic communities that signed the TFTA, it will only be meaningful for regional integration if movement of people is actualised. His argument is premised on the fact that movement of people will trigger better mutual understanding of peoples across the boundaries. This argument is also very salient against the premises that factor mobility is critical for socio-economic development. The chapter also departs from the current dominant theoretical orientation on integration, in which emphasis on factor mobility is on capital at the expense of labour. Despite its challenges, free movement of people will help to address skill shortages that is currently affecting some countries in Africa.

Adeoye Akinola examines the relationship between regionalism and innovation in Economic Community of West African States (ECOWAS). He argues that despite the lofty objectives that underpinned the establishment of the sub-regional organisation, it has lacked the capacity to drive innovation. The author recommends that in order to drive socio-economic development in the sub-region, ECOWAS should deploy more resources to funding innovation. Alumona and Azom engage further with the institutional aspect of regional institutions, in this case, the ECOWAS Parliament. The chapter examines the effect of lack of democratic credentials in the composition and powers of the Community Parliament. This has implications on the prospects of deepening regional integration in West Africa. They conclude that the provisions of ECOWAS legal instruments on Community Parliament should be overhauled to democratize the ECOWAS Parliament for effective and meaningful law making to effectively make laws to deepen integration in West Africa. Tola Odubajo was more specific on how ECOWAS can drive innovation. Using the ECOPOST as a point of departure, he argues that the faulty educational system and lack of adequate infrastructure have negatively affected the development of Science, Technology and Innovation in West Africa. Odubajo concludes that in the context of

building regional innovation architecture, regional economic communities are very important both in the design and implementation of programmes.

Lang Loum and Dikeledi Mokoena adopt a scientific approach through which regional integration can be fostered in West Africa. In this regard, they examine the role of Cloud-Based mHealth Disease Surveillance System in promoting higher level of interaction in the sub-region. The authors argue that this system will enhance sharing of information on health issues. As in any other initiative, the usefulness of the Cloud Based mHealth Disease Surveillance at the national level has been affected by the weak capacity of the state. They conclude that information sharing on health issues can be better managed at a regional level, in ways that can foster regional integration. The success of this initiative will also be a function of availability of infrastructures as well as qualified manpower.

Eurico Josué Ngunga, examines the relationship between the Higher Education sector, Research and Development as well as innovation in Angola. The author analyses the problems that confront the higher education sector in Angola and how the problems feed into low ranking of the universities. Like previous contributors to this volume, the author recommends investment in education, research and development, as means fostering innovation and sustainable development, not only in Angola but in Africa in general.

Part three of the book deals with sectoral issues on innovation and integrated development in Africa. Issues covered by contributors include, manufacturing, agriculture, knowledge flows and informal economy. The contributors show that while innovation may be a national or regional undertaking, their application is best understood when considered from a sectoral perspective.

Alexis Habiyaemye considers the effects of regional integration and knowledge flows on manufacturing in Southern Africa. The author shows how a regional integration approach to knowledge diffusion can facilitate improvement in the productivity of the manufacturing sector of a less technologically developed country through interaction with a more advanced country. He adopts the NIS-based approach to analyse the role played by the interaction between South Africa and Botswana in fostering technology diffusion between the two countries. The paper also shows how this is contributing to Botswana's effort to reduce its dependence on diamond exports. He concludes that the results from industry-level panel data analysis show that productivity in Botswana's manufacturing sector has been an increasing function of their interactions with their South African neighbour, namely by imports of capital goods that embody technological knowledge. This could serve as an example to other countries both in Southern Africa and other parts of the continent. While there might be a cost element to the more advanced countries in diffusing knowledge to the less advanced countries, in the long run, the sub-region and the continent as a whole, will derive immense benefits (see Oloruntoba 2016). This analysis was followed by Deus Costantine Shirat's which examines the missing gap between regional integration and manufacturing in Africa. He argues that although regional integration in Africa has industrial development as one of its major objectives, this has not been met due to a multiplicity of factors. The core of the paper was the imperative of formulating and implementing appropriate policies that could help

to transfer technology from one part of Africa to the other. This is very critical for knowledge sharing and learning experiences as two preconditions for continental integration and industrial development.

Akinsola and Akinsola examine the relationship between intra-Africa trade and innovation in the agricultural sector. They argue that the challenges of food security can be addressed through an innovative approach to agriculture in Africa. Although intra-Africa trade might have been very low, this can be increased if sufficient attention is paid to investment in agriculture. They also made the important point that trade integration in Africa can only thrive when countries produce what other countries in the continent are eager to buy. This will allow for complementarity and priority in allocation of resources. Kingstone Mujeyi and Wilbert Sadomba examine informal economy and entrepreneurship in Zimbabwe and the implications of these on regional integration. They argue that informal entrepreneurship continues to flourish to the extent that informal has become normal in Zimbabwe. Over the past few years, the informal sector in the country has grown and currently employs close to 90% of the country's labour force and contributes over 60% of GDP. The authors recommend that the informal economy should be formalised in an integrated manner. This recommendation is particularly important for regional integration in the context of cross border trade in which many Africans engage in the informal economic activities. Formalisation of informal economic activities will provide opportunity for the operators to receive incentives from the government. The bottlenecks around the movement of factors of production will also be streamlined in ways that will foster higher volume of economic activities. In the context of the increasing need for revenue by the government, formalisation of economic activities will make it easier for government to collect taxes and increase revenue base.

The next chapter by Ayinde, Abdoulaye, Muchie and Ajewole was more specific as it examines an innovation approach to maize production in Nigeria, using a gendered approach. The authors argue that maize farmers face various challenges in their operations. These challenges affect their capacity to innovate. The study recommends that; innovation usage should be promoted; social network should be intensified and gender consideration in decision making be made a priority in innovation process.

Chrisa, Mukarwi, Matamanda and Maphosa establish a link between social innovation as a way out of municipal failures in Africa. They examine social and environmental sustainability in the light of the approaches and institutions engaged by African municipalities to address social innovations in urban areas on the continent. They conclude that because the current approach to social innovation at the municipal level is not sustainable, government should formulate policies that can lead to a win-win situation among stakeholders.

Swapan Kumar Patra investigates the relationship between economic development in the light of Science and Technological Capability building in global south by comparing India and South Africa. The author selected the two countries because they share similar socioeconomic and demographic conditions; secondly, both are multilingual, multicultural and plural society. Thirdly, both India and South Africa have colonial legacy and inherited most of their present S&T infrastructures from

the colonial periods. Fourthly, S&T infrastructures of both countries are similar. Despite these similarities, Patra concludes that from various indicators, India is well ahead of South Africa. He recommends more investment in Research and Development as a way of building capability in Science and Technology in the two countries.

In the conclusion, Oloruntoba and Muchie sets the agenda for the future of innovation and regional integration as two complementary processes for socio-economic development in Africa.

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Part I
Theories and Concepts of Innovation
and Regional Integration

Networked System of Innovation for African Integrated, Smart and Green Development



Mammo Muchie

Introduction

We suggest in Africa an innovation system for integrated development as an alternative to all existing development approaches to address the persistent challenges of underdevelopment Africa continues to face: How can Africa come out of the raw material resource trap? How can development theory be geared to address the challenges and failures of African integration? How can Africa generate an approach to development anchored on green industrialization and green urban habitats? How can reverse innovation and indigenous knowledge be integrated to promote Africa's integrated development?

Integrating these concerns with innovation system and development requires re-thinking both the whole innovation system approach and existing development economic theories. Innovation cannot be validated merely by commerce and market as it has been developed in the mainstream literature. In the African context, validation includes a combination of social, economic, environmental and deeper integration along with service provision and knowledge creation. A new approach to innovation is what the development challenges of Africa calls for. This chapter will take an original conceptual framework towards a networked approach applying a re-imagined innovation approach that explores development economics, knowledge learning, innovation, competence building and sustainable integrated development.

In the African context, combining development economics with systems of innovation in research requires suggesting a contextualised and specific re-articulation of both innovation and development. Innovation is not only validated by market but also by a combination of social, economic and environmental gains. It is an innovation synergy bringing both social and economic benefits and gains. Development in the

M. Muchie (✉)

DST/NRF Research Professor, Faculty of Management sciences, Tshwane University of Technology, Pretoria, South Africa

e-mail: muchiem@tut.ac.za

African context is re-defined to promote deeper African integration with sustainable industrialisation. Instead of using systems of innovation at a meta-level and try to draw or adapt it to address the dilemmas of underdevelopment, a new conceptual framework and approach can be proposed which refines the existing conceptual frames and theories. A new synthesis that combines development economics and the system of innovation with a refined re- definition will be needed to address the specific African development challenges. This re-conceptualization can link clearly development economics and systems of innovation by advancing research that combines the challenges that each side on its own may not fully capture. It enriches both development economics and the economics of innovation that innovation system approach has promoted by strengthening the focusing device for exploring and examining the problems of development and underdevelopment with a new refined synthesis that address real challenges such as economic industrialization without destroying the eco-system and reducing many people to a position of dis-advantage.

Many developing countries and some multilateral organizations like UNCTAD are beginning to use the system of innovation for policy learning. For example, South Africa used the system of innovation framework in 1996 to generate the White Paper on Science, Technology and Innovation Policy. The Department of Science and Technology of South Africa also produced a 10 –Year Plan on Innovation Towards a Knowledge Economy (2008–2018) based on the innovation system to confront the grand challenges of development that the country is confronted for spreading the benefits of knowledge to all its citizens.

There have been linkages between innovation systems and industrial economic development, but the inclusion of social and environmental challenges to economic development has still not taken place fully yet. China became a manufacturing hub at the cost of environmental consequences. If Africa has to become the next manufacturing hub, it has to undertake green led industrialization and manufacturing. The work we have started since we produced the book: *Putting Africa First: the Making of African Innovation Systems* (2003) highlights a critique of development economics, the need to find a critical application of innovation systems and the inclusion of an integrated or pan- African transformation. We have started to generate a number of models, based on the innovation conception as it has been used by the originators to capture as realistically as possible the uneven and lopsided existence of the innovation landscapes in developing countries like India, China, South Africa and Brazil and even smaller countries in Africa (Muchie and Others 2003; Baskaran and Muchie 2006). The model variations that are pertinent depend on the kind of research question that reseatchers have engaged with, for example NIS's impact on FDI, and FDI in R & D (Baskaran and Muchie 2007, 2008). A new model that integrates innovation system with sustainable and integrated development for Africa's green industrialization and green urban development is what the Africa Innovation Summit should address. Africa as a green manufacturing innovation hub for the world is what is waiting to be done now not as late as 2063.

We also suggest in Africa networked innovation system(NISED) to promote social entrepreneurship for an integrated development as an alternative to all exist-

ing development approaches: How can Africa escape the raw material resource trap? How can development theory be geared to address the challenges and failures of African integration? How can Africa generate an approach to development anchored on green industrialisation and green urban habitats? The African Union has produced Agenda 2063 to achieve agricultural revolution that will transform the wellbeing of the people of Africa. How can reverse innovation, engineering, technology and indigenous knowledge be integrated to promote Africa's integrated development? Integrating these concerns with innovation systems and development requires re-thinking both the whole innovation system approach as it is now as well as the existing development economic theories. Innovation combines novelty and usefulness. But how have novelty and usefulness been recognized? Both novelty and usefulness have been validated merely by commerce, market and private consumption in the mainstream literature. In the African context, the validation should include a combination of social, economic, environmental and deeper integration, along with service provision and knowledge creation. A new approach to innovation is what the development challenges of Africa calls for. This chapter will take an original conceptual framework towards a networked approach, applying a re-imagined innovation approach that explores development economics, knowledge, learning, innovation, competence building and sustainable integrated development. In the African context, a new theory of innovation and social entrepreneurship for a development process that combines economics with social and environmental considerations is much needed now more than at any time when new narratives like the rise of Africa are on the new intellectual and research horizon. We still have in Africa about 70 % of the people carrying out rural livelihood. No one will object Africa rising? But who in Africa is rising? How is the rising measured? Does it include the real development of Africa, its reconstruction, and its youth out of employment, poverty eradicated and inequality drastically reduced? We still have these challenges. The rising narrative is on now with us. Let us hope it will not turn to a failure narrative also. How does Africa transform from failure speak to innovation speak? Let us take this rising narrative as a provocation to reaffirm and focus in re-thinking the development challenges of Africa with the approaches of networked innovation system with social entrepreneurship. What we need is change the way we re-conceptualize innovation and also re-think to design the innovation systems with social entrepreneurship as a new model. We redefine innovation itself not only to be validated by markets, private preferences and commerce, but also by a combination of social(S), economic(E) and environmental (EN)and knowledge(K) gains. $F(I) = F(S) + F(E) + F(EN) + F(K)$. It is an innovation not purely defined by markets and economics, but also with the addition and synergy that can be validated by bringing both social, environmental, knowledge and economic benefits and gains. In Africa development in fragmented states is a real challenge opening African economies to continued and unending divide and rule; the rise of Africa within the framework of fragmented contexts is likely to fail. Inter-African trade is still very low. The opportunity of a rise of Africa within a united framework is a different story. But African development within a unity project has not received any chance

to be experimented; although there are theories of how significant, necessary and relevant unity is to make Africa to stand up by being fully independent and free. The need for African unity has been declared since 1963 formally by the meetings and protocols of the heads of states and the ministers; but there has not been any systematic implementation of at least even in a few areas, such as, for example, an African trade and investment area, to produce positive examples. We have now the Africa intercontinental free trade area but major economies have not yet signed to join. Unity is a process and should be on-going. Substantive commitment requires that action be taken to implement unity. The people in Africa must be involved in making African unity. Both history and the African narrative are made by the people and the people of Africa alone. The main challenge is to transform agriculture to change life in the rural areas that is very static and often essential services for wellbeing are unavailable or if they exist are also very often inadequate! There is a need to think differently- out of the box of linear progress into co-evolution through crafting a way to transform the agricultural/ rural economy by the application of critically synergised theoretical lenses. What is needed is a strategy of co-evolution and social entrepreneurship combined with the system of innovation, where transformation is driven to change rural communities to become modern, without necessarily becoming urban and industrial with all the services, education, health, energy, sanitation, clean water, transport and housing upgraded.. Science, Technology, Engineering and Mathematics and the innovation system with social entrepreneurship as synergy will transform at the grassroots level the livelihood of rural life from the state of ill-being into all the peoples comprehensive well-being whether the rural workforce remain in agriculture or join the manufacturing sector. The innovation system for social entrepreneurship can promote rural transformation with the co-evolutionary dynamics. Agriculture can be transformed by creating farmers as productive power to change selected sectors to a stage of manufacture whilst including the excluded rural communities by also modernising the agricultural sector and not necessarily industrialising it. The system of innovation with social entrepreneurship for development should combine both top end and bottom up processes in a not so linear path of development by choosing instead a co-evolutionary dynamic developmental and transformative trajectory. It is possible the Innovation System (IS) with co-evolution from evolutionary economics, capability and productive power from Amartya Sen and Fredrich List and social entrepreneurship can promote a new African development trajectory which is neither market nor planning anchored and driven. There is a need to create a new path of raw materials and agricultural transformation by making agriculture part modern and part transformable into manufacture at the same time and intelligently. African economies have to use different approaches to transform their predominantly economic system that is largely agrarian. Co-evolution and social entrepreneurship rather than relying on neo-liberal economics should be preferred to promote African agricultural development by creating synergy between private and public, state and market, economics and politics, collaboration with competition. They can create a new social-economic space by combing social and economic gain simultaneously. Creativity and innovation for

social entrepreneurship is critical to undertake African agricultural transformation to remove simultaneously poverty, unemployment and inequality and environmental problems. Infusing development with creativity and innovation for co-evolution with social entrepreneurship is to combine the following: 1. Compassion with competition 2. Philanthropy with business 3. Buy one to give one 4. Buy what you need while giving to those in need 5. Make profit with non-profit; 6. Economic gain with social gain 7. Spend less, give more 8. Doing good while doing good business 9. Giving with selling 10. Giving can serve as brand for profit making 11. Charitable with growing the bottom line and so on... African economies can promote better economic opportunities by linking the quadruple conceptual frameworks of innovation system, co-evolution from evolutionary economies and combining social capital, capability and productive power, and social entrepreneurship to transform rural life without changing it all into agro-manufacture. The African economy is predominantly agricultural and if we explore how agriculture can be transformed, we will undoubtedly cover how the African transformation process can be pursued with thought and intelligence. African agriculture is in a state where it exists with a non-linear, chaotic, complex phenomena where the need to make products, technologies, innovations, institutional arrangements and incentives requires re-thinking, re-learning and adding new conceptual frames to re-imagine an innovative agricultural sector endowed with rich knowledge resources and dynamics. In dealing with the problem of agricultural transition and transformation of the African economy we should be approaching agricultural transformation with co-evolutionary rather than linear processes. In the specific African context agricultural transformation is critically dependent on existing conditions and path dependence. Agriculture transformation can co-evolve with processes that involve creative construction by transforming the skills and knowledge of the framers and the farms. The linear transformation dynamics in agriculture historically has displaced rural farmers forcing them to be unemployed and migrate to urban areas to seek jobs. It is critical this co-evolution is managed as not to create such forced displacements focusing to find ways to address the livelihood and wellbeing of the ordinary farmers. What is much needed is transformation that upgrades the farming skills of the framers along with all the techniques of farming. The linear process of transforming entirely agriculture on the path of manufacture and services needs to be re-assessed and questioned. A new paradigm of transforming agriculture without destroying agriculture whilst also adding manufacture and services is very relevant given the current ecological, spatial, population, social and economic challenges and constraints where prioritising one at the expense of another is unlikely to bring overall structural transformation characterised by a balanced and sustainable new African social-economic and environmental developmental path. That is why Africa needs to create a networked system of innovation to promote a co-evolutionary and integrated novel development path.

A new African-centred Innovation and Development System for integrated and sustainable industrialization is necessary (Fig. 1).

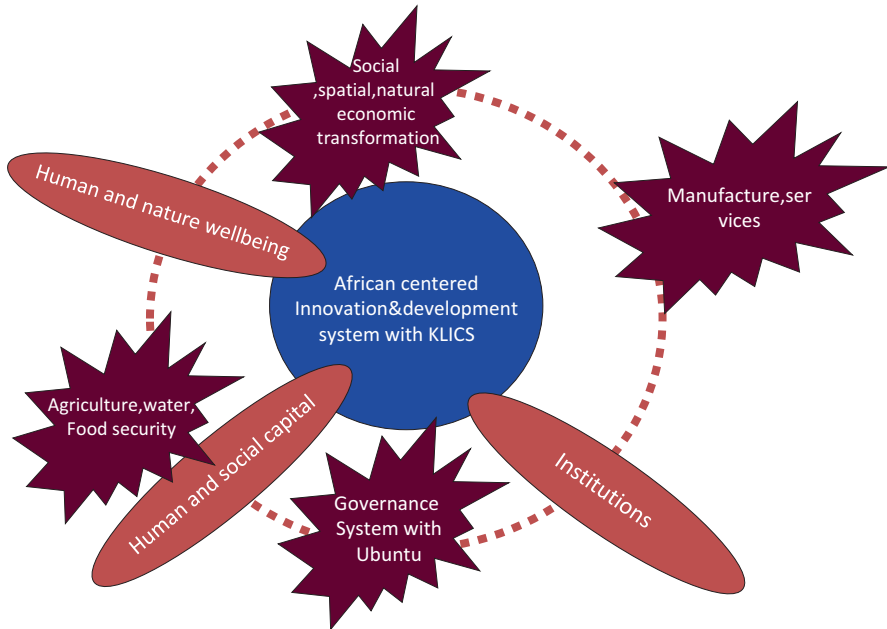


Fig. 1 Source: author

Building a New Synergy from Development Economics and Innovation System

Two major re-articulations are needed: the first is synergizing development economics with systems of innovation. The second is to develop the Africa-centered innovation and development system that links knowledge, innovation, learning and competence building as critical in creating an African-centered Innovation and Development System.

Development economics evolved in the post-war world when many colonies were granted political independence and the issue of development confronted both the elites and the former colonial powers. It continued during the Cold War and still exists to this day.

The most popularized version of the innovation system framework originated in the North. It evolved in search of how to organize science, technology, engineering and innovation systems effectively for both policy learning and managing economic development. Friedrich List (1856) and his concept 'national production system' may be seen as the historical origin of the national system of innovation (Freeman 1995). Perhaps he is the first to use the system of national economy of production. The innovation system concept has evolved over the years since List's time and its application has been evolving to different sets of problems and areas. Some analysts who work with systems of innovation draw affinities to it with the French Regulation

School, and theories of evolutionary and institutional economics in the tradition of Schumpeter (1934) and Veblen (1919).

Innovation system has varied definitions. Of the influential definition, we mention the following: Innovation system has been defined as “the network of institutions in the public and private sectors whose activities and interactions initiate, import, and diffuse technologies” (Freeman 1987:1). There has been an accent and emphasis on organizations that support R & D and promote the creation and diffusion of knowledge as the main sources of innovation. Some stress: “All important economic, social, political, organizational, institutional and other factors that influence the development, diffusion and use of innovations” (Edquist 1997:14).

According to Bengt-Åke the modern version of the concept appeared first in an unpublished contribution to OECD by Freeman (1982) and some years later Lundvall (1985) used the concept in formulating the importance for innovation of the concept of producer-user interaction and feedback for learning. Freeman used the innovation system concept in 1987 when he analyzed Japanese economic performance (Freeman 1987). Subsequently, Lundvall (1992) and Richard Nelson (1993) edited two books on the system of innovation that has become standard references on the subject.

Whatever variations exist, Edquist claims that all agree on the following:

- (a) Innovation is the key element and is linked to learning;
- (b) Innovation system is holistic and interdisciplinary by attempting to comprehend the selected object of study as a whole that include not just only economic, but also institutional, organizational, social, and political factors also;
- (c) Innovation system is path –dependent requiring the challenge that developing innovation is a long-term process; (d) Innovation system is also interdependent and non-linear and finally;
- (d) (e) In the innovation system organizations and institutions are critical (Edquist 1997)

The system of innovation is a concept utilized to describe the relationship between internal processes in firms and external processes in the wider environment in the context of knowledge creation, diffusion, and transfer. In the developed world’s economic development the IS framework is based on empirical evidence on technologies, knowledge, innovation and learning.

In many developing economies, we cannot expect the System of Innovation to be forged. There is a need to re-frame IS to make it relevant to embrace the development economics interactions in a specific and empirically valid way amongst relevant stakeholders that bring knowledge, learning, innovation and competence building as critical drivers to promote developmental-transformational outcomes.

There is a need to identify how development economics and the IS concept features can be re-worked. To begin with, this is how IS has been conceptualized. There are many types of *interactions* that take place both within firms and outside firms. Among the various elements the concept of innovation system identifies is related to *variation* of the *elements* that constitute *parts* of a *system*. A system of innovation is a concept to distinguish the most significant interactions from less significant

ones in relation to actors, activities, and institutions in the process of knowledge creation, exchange, diffusion and transfer. Interactions that promote or hinder knowledge diffusion, exchange or transfer are even more relevant in the development economics of innovation system constructions.

As a *heuristic* concept 'system of innovation' helps to focus on knowledge and learning activities among various actors and institutions that provide competitive advantage in the long-term. The main characteristic of this concept is its flexibility in terms of its application to various geographic regions as well as various organizations. In other words, the type of activity could change (simple or complex, small or big). The actors could change (small firm or large firm); institutions could vary (local or global, public or private). The space could vary (local or national, or regional or global). The sector/industry could vary. The concept of innovation relates knowledge creation, diffusion and transfer to the actors, activities, institutions, spaces and their interactions. The interactions in the process of acquisition, diffusion and transfer of knowledge can form different degrees and levels of systemic properties and functions around the creation of innovation as the core. The concept of innovation system captures the specific interaction of 'innovation-knowledge' as the independent variable and spatial, sectoral and institutional arrangements as the dependent variable in the context of the activities and actions to bring about transformation and development.

As a *critique*, the concept of 'system of innovation' can be used to challenge ideas about wealth accumulation based exclusively on static comparative advantage without products, markets, organizations, processes, innovation and learning imparting development features to a given national economy. Many developing countries depend on one or two main commodities for export, and they are advised to specialize in these commodities to earn the foreign exchange that may be ploughed back into the economy. Development is conceptualized as a consequence of the incremental growth that this export-orientated strategy based on the comparative advantage of agricultural and mineral producers might yield. The system of innovation perspective questions the significance of the development features, development dynamics and development effects of such an export-promoting specialization development strategy. It points direction and policy to the significance of the co-evolution of technologies, learning and institutions and incentives by bringing about systemic and significant interactions of the social, economic and political domains in order to embed development features and development effects by diversifying the product and process base of a national economy.

As a *metaphor*, 'system of innovation' orientates actors to integrate knowledge, innovation and learning to solve problems based on their own resources with self-reliance rather than resorting to dependency. Innovation system suggests that ideas, the domestic actors, institutions and incentives must interact in order to create new opportunities in production, distribution, markets and circulation. This can inculcate a mental attitude of 'can do it yourself', rather than waiting for external impulses to create dynamic activities in the economy.

A key attribute of the innovation system concept is the focus it provides in framing problems and the value it signifies to the domain of reality that mainstream economics neglects or underemphasizes. The innovation system concept makes

central, institutions, histories, territories, technologies, organizations and nations that are often neglected and treated as a residual in mainstream neo-classical economics. The concept has evolved by putting innovation and learning at the heart of the economics of development.

What has not been done is extend these innovation systems by focusing on the developing economics where institutions and organization, innovation and learning and all the other features of the innovation system have to be re-examined and reconstituted. In order to address these challenges that development economics has been trying to address for a half-century, we propose that what is needed is not merely Innovation System (IS) conceptual framework, but a more relevant and immediate focusing framework of IDS (Innovation and Development System).

We started to develop research that has led us to promote the IDS framework by exploring how the innovation and learning approach captured by Innovation System can be applicable for economies in the developing world in general including Africa in particular (Muchie and Others 2003).

Significance of Innovation System for Development

As stated in the above section, innovation system has its origins from Friedrich List concept of the system of national economy of production as opposed to the cosmopolitan theory of economics by Adam Smith. List regarded the productive power of the mind – what he referred to as *mental capital*- paramount relative to the productive power of matter and nature, and what he described as the mere accumulation of *wealth* per se. For List, accumulation of wealth unrelated to mental capital is purchased with severe deficiency of developmental *features, effects and dynamics* in a country's given national economy. Development is driven by the intellectual achievements, discoveries, inventions, transformations and progress that a nation has accumulated in its history.

Institutionally, the deployment of government policy to bring about an effective education, training, science and engineering system; linking these systems of training to accelerate the national productive forces and protecting them from the cosmopolitan notions of free trade constituted List's categories or elements of a national system of innovation. The key for List was to bring about productive interaction of the mental capital with the capital of nature and matter to create manufactures on the foundation of an ever-spiraling scientific and technological advancement to augment wealth. This would not be the case for example for a country that relies on comparative advantage and exports the minerals and agricultural commodities it is endowed with, to accumulate wealth. List would not recognize the developmental features and dynamics in such economic activity unless it contributes to the buildup of mental capital.

Joseph Schumpeter in his theory of economic development in 1934 put the importance of innovation for economic development suggesting that innovation is critical for economic policy. Almost every thinker of economics dealt with economics development: from the classical economists such as Adam Smith's *Wealth of Nations* (1776), David Ricardo's *Comparative Advantage* (1817) to JM Keynes, *The*

Means of Prosperity, 1933 and others. But this theory of economic development is general. It is not development economics.

Economic development often goes through an uneven path. The development economics of innovation even goes with disruptive-constructive logic ebb and flow logic. The interesting question is how the development economics of innovation can address the lopsided connection between mental capital, social capital and development as wealth creation. Many developing economies export what they already have a comparative advantage in and/or rely on donor assistance to build their economies. Many developing economies, even those within middle to high income bracket, exhibit innovation systems that are often bifurcated, lopsided and dualistic with features that reflect contradictory disruption and construction.

Howsoever one defines a system of innovation, the relevant issue remains to be the significance of explaining how the co-evolution of technologies, institutions (as sets of habits, routines, established practices, rules of the game and so on), and organizations that relate to the structure of production systems, takes place. Such co-evolutions are often at variance with the kind of development economic thinking of the late 1950s and 1960s. The latter mainstream thinking de-contextualized technology by seeing it merely as embodied in machinery/equipment and embodied in training and skill. Mainstream thinking see technology for development to be transferable from those that keep it under their control through the use of intellectual property regimes, to those that are technology or knowledge poor. This approach violates List's key factor - building the capital of the mind, in order to build in development features and dynamics and sustain also development effects of a given national economy.

Catching up was conceptualized as borrowing and learning from the transfer of technologies and not as organizing a system of national productive economy spearheaded by the capital of the mind. Mainstream thought see catching up as possible and desirable with latecomers being able to *imitate, or use*; not *create or innovate/produce* the products and processes from the developed economies.

The innovation system framework suggests that theoretically development is not only a process of *production*, but also it is a process of *innovation*. In addition developing economies are not mere *users* of technology, but also their development should be conceptualized on the domain of active generators or *producers* of technology. Developing economies are not therefore passive recipients of technology from the industrialized economies. The assumption that development can be engineered or steered by technologies that can be transferred from those who control knowledge through intellectual property is a seriously inadequate proposition. There is also the problem that technology transfer cannot be assumed to take place easily. Often the proprietors of technology control knowledge, they do not readily spread it. This provides an additional reason for organizing a national system of innovation. Thus there is no alternative that those who wish to use technology must be prepared also to learn to produce it. A necessary condition for development from an innovation system perspective is that those who wish to embark on a sustainable developmental trajectory cannot afford to shy away from trying to develop by being

producers of technology, and not stay merely as diffusers, users, absorbers and implementers of technologies produced elsewhere.

The development economics of innovation system makes development a pillar where specific national economies become or specialize as both producers and absorbers, creators and diffusers, though at present they may still be at the stage where they are more diffusers and absorbers than creators and producers of technology at present time. Of course both producers and users of technology undertake different types of innovation. The broad classification of economies as those who are the technology producers as the *innovators*, those that are absorbers of created technologies elsewhere as the *diffusers*, and those that may be *excluded* from being either innovators or diffusers create how a new development economics of innovation system may capture the dynamics and variation of the development process.

The system of innovation perspective emphasizes the identification in any given economic setting, the interactions of the significant social-economic variables, and the dynamic co-evolution of institutions and technologies that result in imparting key development features and dynamics to a given national economy.

Our unified conception of IS makes the following contributions to the IS theory and literature:

1. Conceptual framing – our emphasis on the role of political factors such as political vision and direction at national level which can play a major or transformative role. These can be seen from both developed countries such as Japan (in the 1960s and 1970s), Korea (1970s and 1980s), India, China, Malaysia, Singapore, Brazil and so on.
2. Global Factors are identified and brought into the CORE of Innovation System, which were hitherto considered only partially and totally ignored.
3. Co-evolution dynamics are identified more clearly
4. The link between development and innovation is captured by unifying and creating a new focusing device that connects innovation, economics, system and development (Figs. 2, 3, and 4).

Some Concluding Remarks

For the system of innovation and development conceptual framework to add new contributions, its use and application needs to be understood with clarity where the relevant non-economic and economic structures, institutions and actors and their co-evolutions from the spectrum of developed to developing economies can be well specified, and the components those that need to be included are included, and those that do not need to be included are excluded.

What we did is extend the focusing device from mere systems of innovation to systems of innovation and development by reviewing the variety of ways of how the system of innovation has evolved in the first place in the developed economy context

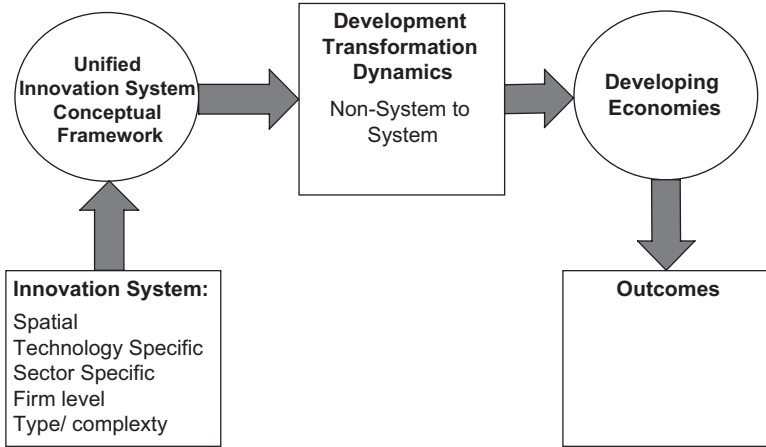


Fig. 2 Unified innovation system conceptual framework for new transformative development dynamics in developing economies

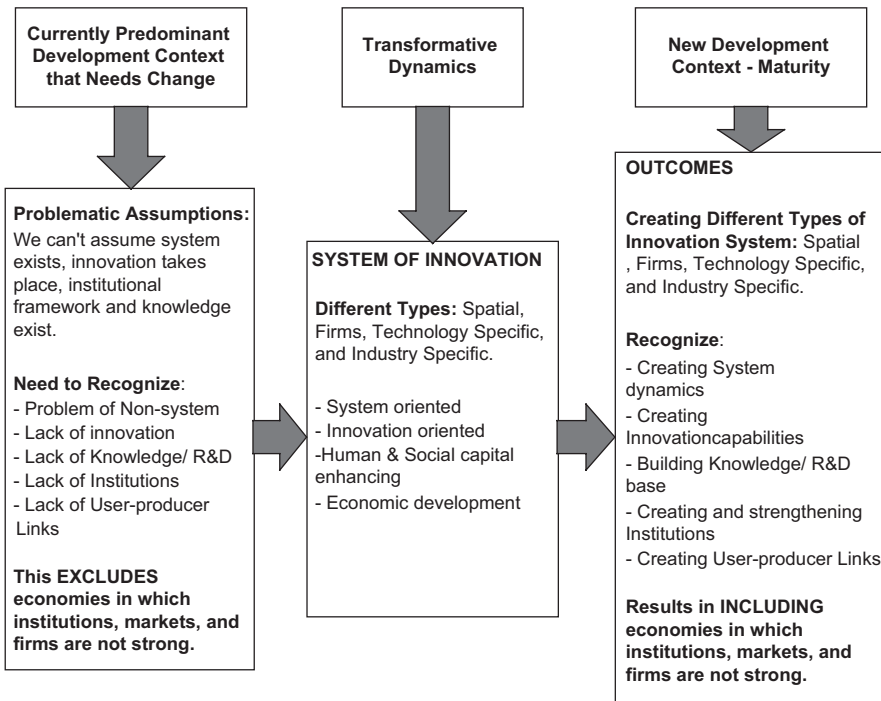


Fig. 3 Locating development economics in the unified system of innovation

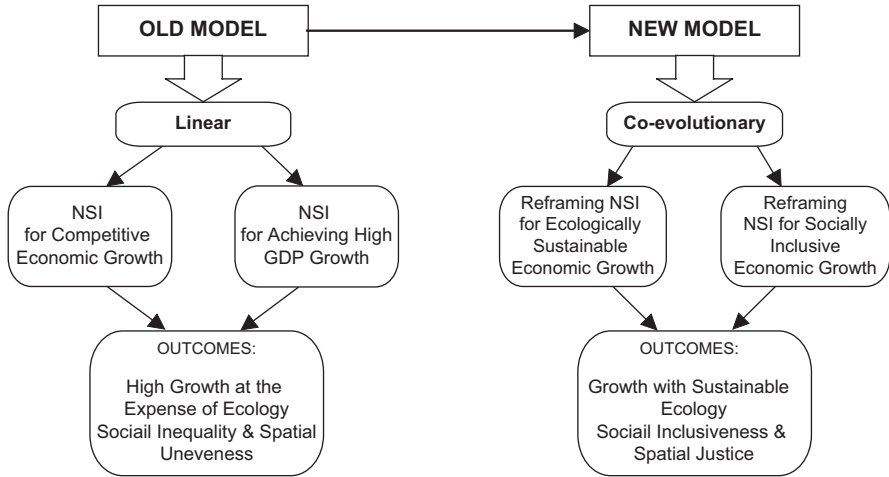


Fig. 4 Rethinking innovation system approach for ecologically/socially sustainable development and growth

and extended to include the problems and challenges of development and underdevelopment.

There is always the risk of misuse and abuse of a framework when it is extended to new terrain and endeavors. In order to avoid such a mishap the review and exploration of how the system of innovation has evolved and been used has been undertaken and what remains to anchor in research and profound knowledge production is the application of what we propose here as the Innovation and Development Systems by taking as distinct categories and in unified way the various categories as focusing devices such as firms, spaces, technologies and innovations.

The innovation and development system has its own core and peripheral components that enter at different levels bringing up as challenges distinguishing the variables that need inclusion from those that do not.

An ontological appreciation of the challenges of development necessitates that the conceptual focusing device on systems of innovation is extended to an innovation and development system to open research on issues and problems that development economics on its own or system of innovation on its own could not fully explain and advance. The innovation and development system provides an ontological anchor directly to address the development challenge of many economies with low income by unifying knowledge, learning and capability building in such a way contributions to address the problems of development and underdevelopment will be continuously enriched. We propose that it is not only IS (innovation system), but a refined development driven approach that provides a useful analytical framework for policy learning and research by addressing directly the challenges of development and underdevelopment in many low income and pre- transition and transition economies in the developing world.

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Innovation and Regional Integration in Africa: Exploring Theory and Praxis for Socio-Economic Development



Samuel Ojo Oloruntoba

Introduction

The search for a viable path to socio-economic development has underpinned the various efforts geared towards regional integration in Africa. Indeed, since the early 1960s through to the dawn of the twenty first century, political and bureaucratic elites in Africa such as Kwame Nkrumah of Ghana, Nnamdi Azikwe, Obafemi Awolowo, Adebayo Adedeji of Nigeria, Thabo Mbeki of South Africa, among others have identified and championed the imperative of regional approach to restructuring the political economy of Africa (see Ndlovu-Gatsheni 2013; Adedeji 2012; Nkrumah 1963). The logic of their arguments stem from the weak capacity of the postcolonial state in Africa and their location in the global political economy, that is disproportionately designed against them. In order to realise the ambition of a united and integrated Africa, various programmes and strategies have been designed over the past four decades, both at the regional and continental levels. Starting from the formation of the Economic Community of West African States in 1975, through the East Africa Community of 1977 to the Southern African Development Community in 1992, many regional economic organisations have been formed on the continent to facilitate closer interactions and foster higher volumes of trade and investment among African countries. At the continental level, the Lagos Plan of Action and the Final Act of Lagos of 1980 had at its core, socio-economic development through self-reliance, industrialisation and regional integration (Mkandawire 2016; Adedeji 2012).

The Lagos Plan of Action was a precursor to the Abuja Treaty of 1991, which proposed the establishment of the African Economic Community. Relatedly, the New Economic Partnership for African Development (NEPAD), which was launched in 2001 and the Constitutive Act of the African Union of 2002 also had regional integration as

S. O. Oloruntoba (✉)

Thabo Mbeki African Leadership Institute, University of South Africa, Pretoria, South Africa
e-mail: oloruso@unisa.ac.za

one of its major planks on which socio-economic transformation and the renaissance of Africa should be anchored. For instance, Article 13(i) of the Constitutive Act provides *inter alia* that the Executive Council of the AU shall coordinate and make decisions on policies in the areas of science and technology that are of common interest to the member states (Landsberg 2016; Mugabe 2011). Theoretically, regional integration has been explicated through various approaches, which include market integration, development integration, intergovernmentalism, functionalism and neofunctionalism (Haas 1964). Newer theories of regionalism and regional integration includes new regionalism approach, networked political economy, private authority and regional identity (Soderbaum 2016, 2004; Iheduru 2012). There is an increasing recognition of the link between regional integration and innovation, especially in the context of global value chains, science and technology as well as cross-cultural flows and social interactions at macro and micro levels (see UNECA 2016). However, gaps exist in the development of appropriate theory and how this can feed into the formulation and implementation of appropriate policies that can foster socio-economic development. These gaps account for the relatively lower position that Africa occupies in global competitiveness index today. Clearly, the continent lags behind such regional economic blocs as the Association of Southeast Asian Nations in fostering innovation and competitiveness. This region as well as countries such as India and Japan has increased competitiveness and productivity through regional supply and value chains (UNECA 2016). This is the subject of this chapter. In section two, I explicate on the conceptual and theoretical underpinnings of innovation and regional integration. Section three contains the historical and contemporary justifications for innovation and regional integration in Africa, within the context of the location of the continent in the international division of labour and the search for autonomous development paradigm. In section four, the various programmes and strategies geared toward innovation and regional integration in Africa were presented with due critique of the limitations that may undermine their practicalities. Section five concludes with recommendations on how these limitations can be mitigated and how to maximise regional integration and innovation for socio-economic transformation of the continent.

Concepts and Theories of Regional Integration and Innovation

The interconnectedness that globalisation has fostered among countries has reinforced the increasing importance of the relationship between innovation and regional integration. Innovation itself relates to the discovery, development and commercialisation of new products and services in such ways that can add value to companies, countries and societies. It promotes interactive activities between and among institutions in order to generate and use new products, processes and organizational practices. Innovation is an old concept that underpins the foundation of industrialisation and economic transformation of the developed countries such as the United States of America, Germany and Britain. It also defines the massive transformation that has taken place in East Asian Tiger countries such as South Korea, Hong Kong, Singapore

and to a great extent, Japan and China. Innovation has been generally conceptualised to mean the ‘variegated processes by which man’s technologies evolve over time’ (Winter and Nelson 2009:9). National system of innovation (NSI) is encrusted under what the German-American, Frederick List calls the National Political Economy of Production. Innovation is essentially the use of new knowledge to add value to production and services in ways that ensure that cost efficiency and profitability. Freeman (1987 cited in Muchie and Baskaran 2011:ix) defines National Systems of Innovation as ‘the network of institutions in the public and private sectors whose activities and interactions initiate, import, modify and diffuse new technologies’. One of the scholars who have established an inextricable link between innovation and development is Joseph Schumpeter. According to Schumpeter (1912 cited in Vertova 2014:3), innovation consists of any of the following: (i) introduction of a new good; (ii) introduction of a new method of production; (iii) opening a new market; (iv) conquest of a new source of supply of raw materials or half-manufactured goods; and (v) implementation of a new form of organisation. A key determinant of innovation is generation of new knowledge in anticipation of value added benefits. According to Vertova (2014:3), there are two kinds of knowledge that can thus be generated as a precondition for innovation. These are: “public” one, which takes the form of information that are easily codified in patents, blueprints, textbooks, etc.; and a second “tacit” one, embodied in routines, skills, competencies, and specific practices. Lundvall (1992) conceives national systems of innovation as the elements and relationships which interact in the production, diffusion and use of new, and economically useful, knowledge and are either located within or rooted inside the borders of a nation state. Using Denmark as his case study, his works on innovation focuses on the important social interactions between suppliers and customers and their role in encouraging innovation.

Mugabe (2011) identifies various institutions that are relevant to building and sustaining national systems of innovation. He argues that ‘the main institutional actors in the national system of innovation include universities, public R&D [research and development] institutes, private enterprises, financial institutions such as commercial banks, technology support agencies, policy-making bodies and the government in general. Consequently, there are complex web of interactions among institutions that can facilitate the utility of innovation as a necessary component of socio-economic development. Muchie and Baskaran (2011:xi) notes that in relations to socio-economic development, there have been various approaches to innovation. These include

building systems of innovation for smart economic growth, systems of innovation for inclusive growth, systems of innovation for justice fairness and equitable distribution of resources to enhance the welfare of people, starting from the least advantaged; systems of innovation for sustainable development; systems of innovation that overcome irrational fragmentations and help construct project identity; systems of innovation that can combine modern scientific knowledge with indigenous local knowledge; systems of innovation capability for knowledge exchange rather than for knowledge transfer from those with strong systems of innovation to those with very weak systems of innovation and so on.

Given this Understanding the linkages among the institutional actors involved in innovation activities or processes is crucial to improving a country’s technological and economic performance (Mugabe 2011).

The complexity and the multi-dimensional approach to innovation predispose the concept to various theoretical interpretations. The limitations of the 'prevailing theories of innovation to provide much guidance regarding the variables that are plausible to change, or to predict with much confidence the effects of significant changes' necessitates exploration of new theories (Winter and Nelson 2009:9–10). The dominant theory of innovation has been advanced by Economists who, establish a relationship between innovation and productivity. According to Winter and Nelson (2009:13), the analysis on production theory was mainly concerned with explaining cross sectoral differences in growth of total factor productivity, rather than output per worker. They argue that 'the primary conclusion was that research and development intensity of an industry (measured in several different ways), was a significant factor explaining differences in total factor productivity growth across manufacturing industries ... both in simple and multiple regressions'. What emerge from the above theoretical explanations of innovation is its focus on firm level analysis as well as profitability that emerge from increased factor productivity. Beyond the micro approach to innovation is its macro dimension, in which innovation from one region can have a spill over effect on other regions. In the context of the increasing multiplicities of regional trade agreements and mega trade agreements, innovation in one region can foster closer interaction with other regions through investments and production (value chains) and knowledge mobility.

According to Maskus (2016:1), 'regional trade agreements can have powerful impacts on technology transfer (TT), primarily through their effects on trade in high technology, goods and services, foreign direct investment (FDI), and licensing all of which are key channels of information diffusion'. Innovation contributes to technology transfer at regional levels. UNECA (2016) identifies different types of innovations, which include the following: product or service, process, organisation, social and marketing. These various approaches to innovation are generally geared toward improvement in existing products or services and adding something new that can add value to an existing business and organisation.

Regional integration and regionalism have been interrogated from various theoretical perspectives. The differences in the theoretical approaches that have been developed to explain the concepts are borne out of the divergences in the histories and focus of regionalism itself. Some of the theories of regionalism or regional integration include; neorealism, functionalism, neofunctionalism, institutionalism, market and trade integration, structuralism, development integration and new regionalism (Schulz et al. 2004:2).

Early theories of regionalism were framed in the context of post-Second World War international order, in which the search for peace and security was critical for the stability of the global order. For instance, neorealism, in its preoccupation with power and how shapes the behaviors of the state,' constitutes the most dominant and influential approach for understanding the formation of regions in the field of International Relations' (Schulz et al. 2004:7). It builds on the realist approach, which defines inter-state relations from the perspective of power relations and how to balance the differences in power among states through alliances. Consequently, the main concern of neorealism is security and how it can be maintained within the context of competing interests among states. It was in this context that building regional alliances became imperative for maintaining peace and security at regional

and international levels. Functionalism and neo-functionalism theories were also based on the logic of regional cooperation as a counterpoise to any threat to peace and security. Scholars of these theoretical bent recognises the imperative of building regional organisations and institutions, which can facilitate trade and other forms of economic cooperation. They argue that the presence of more interactions among states limit the possibility of wars and hostilities (Mitrany 1976). As Borzel (2016:45) argues, rationalist functionalism is based on state actors. Although it assumes international anarchy like the neoliberal institutionalism, it 'emphasise complex interdependence among states and their shared interests in dealing with the problems that arise from it by setting up international institutions'.

Market and trade integration approaches to regional integration is essentially based on the example of the European Union (formerly European Economic Community). As Gibbs (2009) explains, this theory is primarily concerned with the creation of market access among regionalising states, through a process of gradual removal of barriers to trade in a continuum that eventually result to constructing a political union. The follows the Viner (1950) stages of economic integration, which was later advanced by Ballasa (1962). Draper (2013) explicates more on market integration by locating the process and plans within the structure of the political economies of the member states of the European Union, in which relatively developed institutions, strong capacity of the state and relative symmetry in the economic capacities of the state make complementarity and agglomeration possible.

The theoretical framework of development cooperation is based on the dependencia theories of the 1960s, in which it was thought that the formation of cooperative agreements between countries in the global south will facilitate economic development for such regions. In what is generally referred to as developmental regionalism, this approach to regional integration goes beyond the removal of market access to building infrastructures and constructing regional value chains (Gibbs 2009). Although the near consensus among scholars is that attempts at forming regional integration in Africa has been modelled after the European Union, there is a marked difference in the history of state formation, quality of institutions, depth of political economies and priorities of the states in the two regions. Draper (2013) argues that the above named differences in experiences between Europe and Africa limit the applicability of European integration approach in Africa. What emerged from the above is the link between the liberal international economic order of the post-Second World War period and the proliferation regionalism and regionalisation. Even though a regime of multilateralism would appear to be the dominant practice of this period, there have resurgence of regionalism across the world. The breakdown of the Doha Development Rounds of negotiations under the auspices of the World Trade Organisation has further increased the tempo of regionalism, as evidenced by the formation of regional and preference trade agreements both in the global north and south.

As the dynamics of regionalism continue to change due to the multiplicity of actors and the focus of regional integration efforts, new theories have emerged to explain its trajectories. Some of these include the networked political economy, private authority and regional identity as legitimate agents and actors in global governance (Iheduru 2012; Lake 2010). Private authority in the context of regionalism is often referred to as "governance," which means, the exercise of authority by an

actor over some limited community or issues that often involves multiple authorities (states, civil society, INGOs, etc.), horizontal networks, and voluntary rules. As Oloruntoba (2016c: 5) argues, it would appear that where foreign multinational companies and even political elites have failed to drive integration in West Africa, there is a new dynamics of integration, which involve indigenous multinational companies such as Banks, civil society organisations and cross border networks. Iheduru poignantly puts this in empirical and theoretical perspectives, thus:

While aspects of the old forms and structures of regional interactions still remain important in West Africa, a “new regionalism” and network of power relationships co-constructed by myriad multiple-actor, cross-border coalitions of states, intergovernmental organizations (INGOs), and civil society have begun to emerge. Significantly, the emerging architecture of regional political and economic interactions in the region includes several indigenous large or conglomerate financial institutions, multinational cross-border transport and telecommunications industry operators, as well as business coalitions and advocacy networks representing a variety of economic sectors, firm sizes, and genders that developed over the past two decades

This turn in regional integration falls under what scholars call new regionalism, which goes beyond state-centric approach that has been the dominant practice over the past half of a century. The state-centric approach to regionalism focuses on the state and its actors in negotiating and advancing regional integration arrangements. Based on the Eurocentric approach to regionalism, the focus is usually creation of more trade linkages among regionalising states as well as the promotion of peace and security. The new regionalism approach encompasses non-state actors in the processes of regionalisation in ways that ensure that regional integration is not limited to trade (Soderbaum 2016, 2004). Apart from the technical aspects of innovation, which is examined elsewhere in this volume, the multi-stakeholder approach to regional integration, in which non-state actors are involved through establishment of companies, constitutes a form of innovation. This takes us to the next part of this chapter: innovation and regional integration.

Justifications for Innovation and Regional Integration in Africa

The need to establish a link between innovation and regional integration in Africa is informed by various factors such as the low level of socio-economic development in Africa, importance of innovation to economic development, the differences in the levels of innovation and development across the continent, the common identity of Africans as the most marginalised region in the world and the possibility of knowledge sharing and development of regional value chains through regional integration. I elaborate on these factors below. At the level of socio-economic development, Africa remains the most marginalised region of the world, if measured in terms of per-capital income, contribution to global value chains, investment, trade and technology flows. For instance, the contribution of Africa to global merchandise trade is less than 3% (WTO 2016). The result of this is that most of the countries that occupy low human

development category in the United Nations Human Development Index are found in Africa (2016; World Bank 2016; Oloruntoba 2016a, b, c). The level of underdevelopment in Africa has been attributed to many factors, not least are the weak capacity of the state to accumulate capital, lack of a cohesive and autonomous developmental ruling elite, weak institutions, over-integration into the global economy in an asymmetry manner, prevalence of corruption both in the public and private sectors (Edigheji 2010; Shivji 1980; Taylor 2014; Onimode 1988). Other scholars establish a link between the contemporary political economy of Africa with the colonial structure of the economy (Rodney 1981; Ake 1981). Others such as Mamdani (1996) establish a link between the current experiences of underdevelopment with the nature and quality of institutions that the colonialists left for the former colonies. Despite the recent euphoria of an African rising, empirical evidences show that the growth were neither reflective of any fundamental transformation in the economies of the various countries on the continent, neither have they translated to significant improvement in the living standards of the majority of the people. What has emerged is growth without development in an economic structure that contributes to the higher rate of accumulation of the tiny minority made up of the members of the transnational capitalist class (Robinson 2004; Oloruntoba 2014a, 2016b). The origins of the state in Africa and their dependent locations in the global capitalist system has reinforced the continued inability to transform from aid dependent and raw material exporting economies into viable, self-reliant and development oriented political authorities. Despite the potentials that intra-Africa trade and investment as well as knowledge sharing hold for the overall socio-economic development of African countries, these have been held back through bondage of boundaries, so powerfully expressed by the maintenance of the artificial and arbitrary borders imposed by the imperialists at the Berlin Conference of 1884/1885 (Ndlovu-Gatsheni and Mhlanga 2013; Ki-Zerbo 2005). Beyond the constraints of artificial boundaries is the more complicated challenge of the crisis of identity in which Africans continue to differentiate themselves on account of nationality, rather than seeing themselves as one.

Secondly, innovation contributes significantly to economic development. Leading industrial economies of today invested heavily on building innovation capabilities. In this respect NSI were established. NSI leads to high level of productivity both in labour and industrial outputs. This also boost entrepreneurship through addition of new products and services across the value chains. According to UNECA (2016: ix), innovation capacities are vital for diversifying and differentiating the production and trade portfolio, providing a chance to “leap-frog”—technological progress and factor efficiencies may well account for half the economic growth in dynamic economies. The UNECA report also notes that

by knitting together networks of institutions, people and markets—the essentials setting innovation in motion—even a loose connection between two or more nations is bound to facilitate innovation and related creative activities. The cross-pollination of ideas and experiences greatly benefits innovators, who can use their enhanced knowledge to adapt ideas and apply them to push beyond the current frontiers of innovation—contributing to competitiveness within the bloc (UNECA 2016:1)

Innovation and Regional Integration provides direct and indirect economic benefits to the integrating states. UNECA (2016:1) further exemplifies this point thus:

The wider consumer base provided by the regional economy translates into more demand and ultimately greater returns on any investment in innovation. In addition to facilitating access to new markets and tying them together, regional integration can also have more profound effects on consumer preferences and behaviour. Larger consumer group sizes particularly benefit niche innovators. Deep regional integration between states also enables innovators to cluster more effectively, as seen from the tremendous growth of the electronics industry in the countries of the Association of Southeast Asian Nations (ASEAN).

The multi-dimensional nature of innovation makes it particularly relevant for development. Thus, beyond innovation at the firm level, NSI is relevant in financial engineering, education, health, institutions and other aspects of the public sector. Historically, the State has played very important role in sponsoring research that leads to breakthrough in innovation, especially in developed countries. In countries such as the United States, Japan and Germany, the State bear the risks for innovation, without consideration for profit. However, concerns have been raised that, some companies free-ride on the State to make profits, without consideration for delivery social goods. However, the hegemony of market ideas over the past 3 years has led to a situation in which State-sponsored research is no longer regarded as a public good. Rather, the search for profit has been the predominant motive for innovation (Vertova 2014). In the case of Africa, the weak capacity of the State under the tyranny of market ideas have severely limited its role in fostering innovation. Building State capacity in Africa could help to foster developmental innovation. Due to the micro nature of the many of the States in Africa, regional integration approach to innovation is salient. The bigger economies on the continent such as Nigeria, South Africa, Mauritius and Kenya can help to build a regional systems of innovation both in the public and private sectors. These can be shared across the continent, under the supervisory eyes of the African Union. Historical examples of industrialised countries show that research and innovation were public goods, which had long time effect on industrialisation, manufacturing and commercial viability.

Thirdly, coloniality sensibility and mentality as well as lack of understanding of the common identity of Africans have kept them apart from acting in consonance with the much cherished communal nature of African society (see Oloruntoba 2017), through which the brotherliness of all humanity is accepted and celebrated. To a great extent, Africans accept, recognise and even venerate people from other regions, especially those of other races. A typical instance of this is the ease with which Europeans, Chinese and Americans have easy access to investment opportunities and travel access to African countries, without much ado. On the other hand, Africans find it hard to travel within other African countries. Over the past four decades, 40 years incidences of xenophobia or what scholars have termed Afrophobia have become rampant (Prah 2010, 2006). This crisis of identity has affected sharing of knowledge, resources and talents. To be sure, African countries joined hands with one another to fight against political colonialism. However, the combination of internal and external factors, much of which pertain to narrow

nationalism, the politics of difference, short-sightedness of political and intellectual elites, poverty of imagination and continued influence of former colonial masters in the internal affairs of African countries, the Pan-African project has receded and has not been able to foster economic decolonisation (Ki-Zerbo 2005; Adedeji 2012; Olorunto 2016a, b, c). Thus, a reconstruction of Pan African identity and consciousness is key and fundamental to the transformation of the economy of the continent, through innovation and regional integration.

Having a Pan-African conscious approach to development could translate into sharing of expertise and resources and design of a continental and sub-regional programmes that can foster innovation. In 2014, The African Union adopted a 10-year Science, Technology and Innovation Strategy for Africa (STISA-2024). Martial De-Paul Ikounga, the African Union Commissioner for Human Resources, Science and Technology, notes in respect of STISA-2014 that

the strategy is part of the long term people centred AU Agenda 2063, which is underpinned by science, technology and innovation as multi-function tools and enablers for achieving continental development...the strategy further fosters social transformation and economic competitiveness through human capital development, innovation, value addition, industrialisation and entrepreneurship (Ikounga 2014:8)

The AU recognises the importance of a multi-stakeholders engagement in order to make this initiative work. Consequently, the Commissioner states that AU must mobilise and widen the involvement of relevant segments of the population, private sector, civil society, parliamentarians and the Diaspora to participate in Africa's science and technology programme. This point is very important because most of the previous agreements and treaties that have been agreed at the continental level have not been implemented. I elaborate on this strategy in the next section chapter.

Innovation and Regional Integration in Africa: Programmes of Actions and their Challenges

There are various programmes of action at national and continental levels geared toward the promotion of innovation and linking same to development. At the continental level, the African Union Science, Technology and Innovation Strategy for Africa (STISA-2024) is the umbrella body for promoting innovation and development in Africa. Framed under the AU Agenda 2063, STISA was designed to respond to the demand for science, technology and innovation to impact across critical sectors such as agriculture, energy, environment, health, infrastructure development, mining, security and water among others (African Union Commission 2014). It has six priority areas which are critical to the realisation of the Vision of African Union: These include: Eradication of Hunger and Achieving Food Security; Prevention and Control of Diseases; Communication (Physical and Intellectual Mobility); Protection of Our Space; Live Together-Build the Society; and Wealth Creation. These priority areas are anchored on four pillars, which include: building and/or upgrading research

infrastructures; enhancing professional and technical competences; providing and enabling environment for STI development in the African continent (African Union Commission 2014:10). In order to ensure effective implementation, the STISA has been designed in such a way that it will be implemented at three levels, national, regional and continental levels. These three levels must be synchronised to achieve higher milestones in innovation and development in Africa. Despite the relative high level of seriousness and pragmatism that African leaders appear to be pursuing the agenda towards increasing the level of competitiveness, several challenges remain to be confronted. One of such challenges is the Intellectual Property Rights Agreements under the World Trade Organisation. This agreement appears to have locked in African countries into low level of innovation as the policy space available to the State to drive the process is severely constrained. According to Wade (2003:621),

of the three big agreements coming out of the Uruguay Round-on Investment measures (TRIMS), trade in services (GATS), and intellectual property rights (TRIPS), the first two limit the authority of developing country governments to constrain the choices of companies operating in their territory, while the third requires the governments to enforce rigorous property rights of foreign (generally Western) firms. Together, the agreements make comprehensively illegal, many of the industrial policy instruments used in the successful East Asian developers to lock in the position of Western countries at the top of the world hierarchy of wealth.

Although African countries have been making demands for a change in the Intellectual Property Rights regime under the WTO, several areas on which innovation can be applied based on the peculiarity of the continent as late comer to industrialisation have not been released from the control of the TRIPS agreement. Despite the flexibilities in the TRIPS, there are other domestic factors that limit the possibility of exploring such for boosting innovation in Africa. Another challenge with building capabilities for innovation is the low quality of African universities. Even though access has increased over the last three decades, quality has reduced. Reduction in government funding, brain drain, lack of adequate attention to development of Science and Technology education, dependence on external agencies for technical support and lack of synergy between local realities and the content of curricula have all contributed to the low level that Africa continue to occupy in the Global Innovation Index (see Oloruntoba 2014a, b).

Conclusion: Maximising Innovation and Regional Integration for Development in Africa

This chapter has examined the link between innovation and regional integration in Africa. I have argued that when innovation and regional integration are effectively linked, there is possibility of positive spill-overs, that can facilitate socio-economic development. Due to several actors, not least the political economic history of Africa, the contradictions of visionless elites who are entrapped under coloniality, the regime of exclusion under the TRIPS, African economies have continued to be dominated by export of commodities. Apart from Mauritius which occupies the 40th position in the Global Innovation Index and 44th position in the Global

Competitiveness Index, most African countries have been at lowest end of these measures of global innovation capabilities. As UNECA (2016:5) notes in its report on assessing regional integration in Africa:

African countries have been active at the World Trade Organization and World Intellectual Property Organization in Geneva in pursuing initiatives on intellectual property rule-making, and the Doha Declaration on the TRIPS Agreement and Public Health marks a rare example of their success. Conversely, their moves on global intellectual property rules for genetic resources, traditional knowledge and folklore, and geographical indications, which can help to counter bio-piracy, have yet to bear fruit.

The result has been that the massive potentials that are inherent in innovation has in such areas as production, manufacturing, services and so on have not been fully utilised. African leaders are very much aware of these challenges and have developed strategies that are geared toward addressing them. At the continental level, the African Union has put in place a Science, Technology and Innovation Strategy under the Agenda 2063. The strategy is aimed at mainstreaming innovation to development at national, regional and continental levels. According to UNECA (2016) Innovation in various forms, raises growth through at least four channels: technological progress, investments in knowledge-based capital, multi-factor productivity growth and creative destruction. Given the various advantages and potentials that are accruable to African economies through innovation, it is imperative that the current momentum towards innovation and regional integration should be sustained. Unlike in the past where agreements were signed but never implemented, both state and non-state actors must ensure agreements, protocols and treaties on these issues are fully implemented. Within the context of Pan-Africanism, countries with higher levels of innovation capabilities are invited to share resources and experiences with countries without such capabilities. I have shown that there are great benefits that innovation and regional integration can bring to the integrating countries. Consequently, it is important that the various negotiations toward a Tripartite Free Trade Area as well as the Continental Free Trade Area should incorporate elements of innovation and how intellectual property rights can be shared and managed for the optimal benefits of African countries. These agreements have either been concluded or being negotiated among African countries to foster greater trade volumes among African countries. The proposed Pan-African Intellectual Property Rights under the auspices of the African Union is a step in the right direction. When operational, it will assist in helping African countries to negotiate with external partners on the best regime of intellectual property rights for the continent. An intellectual and political disaggregation of the politics of difference at physical and psychological levels could bolster the possibility for achieving development in Africa through innovation and regional integration.

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Innovating the Political Economy of Pan Africanism: Imagination and Renaissance



Abu Girma Moges and Mammo Muchie

Introduction

Africa emerged from the ordeals of colonialism with deeply traumatized population, widespread poverty and backwardness, weak economic and institutional infrastructure, dual economic structure within national economies, arbitrarily drawn and fragmented political boundaries, and vulnerability to persistent tension and instability. The 1960s were considered commonly as the decade of political independence of the continent even though the struggle against colonialism and apartheid somewhat continued in different corners of the continent for much longer period. The initial conditions of liberation and the legacy of colonialism throughout Africa left little room for optimism and magnified the daunting challenges that the new African nation states confronted and had to address within a fairly short period of time.

Economic and political renaissance of the continent demand ambitious and bold institutional reforms that could realize the huge potential of Africans to lead a prosperous and dignified life. The African leaders realized quite early that the nominal political independence of the continent should be backed by genuine economic independence to bring about sustainable economic and social development of Africa (Nkrumah 1963). The central challenge of African societies and nations was how to initiate and sustain economic growth and development that would eventually ensure their political and social transformation. Should they seek a continental approach, a regional effort, or national development agenda which will support a meaningful and sustainable African union and renaissance? What would be the most plausible path

A. G. Moges

Faculty of Humanities and Social Sciences, University of Tsukuba, Tsukuba, Japan

Tshwane University of Technology, Pretoria, South Africa

M. Muchie (✉)

Tshwane University of Technology, Pretoria, South Africa

to manage the contour of violence and insecurity that was posed not only by the European colonizers and their local sympathizers but also by the historical legacy of ethnic and bilateral conflicts? Would the new leadership and institutional arrangements of the liberation movement be capable of handling the post-independence challenges of the continent or should it be approached from a new perspective?

The economic foundations of the colonial regimes were based on extractive political and economic institutions that minimized horizontal cooperation and integrated production network that resulted in vertical dependency of economic activities to the colonial economic structure. The new leadership had the urgent task of establishing inclusive institutions for sustainable economic development. Political independence held promises and potential possibilities for economic, social, and cultural development of the continent (Nkrumah 1963; Rostow 1960). The 1960s was a unique period in the political history of Africa in that a large number of countries achieved their political independence from European colonial rule. This political phenomenon opened the possibilities and potentials for economic development provided that new institutional arrangements more suitable for the newly independent nations were to take shape in the context of emerging new global political economy.

The year 1963 marked one of the most remarkable efforts of the African countries in setting up a continental institution whose central objective was to ensure the total political liberation of the continent. The Organization of African Unity (OAU) was established and started to play important role in providing both material and political support for the liberation movements against colonial rules in different corners of the continent. While the OAU was instrumental in maintaining sovereignty of the newly independent nation states, it kept itself away from addressing pressing challenges within African states that frustrated the capacity of nations to achieve sustainable economic development and political stability. African states jealously guarded their sovereignty and the OAU by design was incapable of addressing problems that had consequences across borders and at continental level. The post-colonial Africa was dotted with conflicts, economic stagnation, and poverty and Africa engaged in various development effort without reforming its extractive economic and political institutions.

Does pan-Africanism make economic and political sense? Or is it a political rhetoric with marginal economic or even political merit? If it does, what are the theoretical and policy rationale and the plausible strategies that could provide feasible pathways for the future of African political, social and economic landscape? Despite the considerable potentials of pan-Africanism in promoting sustainable economic development, the failure of leadership and determination to reform the extractive political and economic institutions is bound to hamper the development aspirations of African economies. What does the power of imagination and renaissance of Africa has to offer for a renewed effort to set the trajectory for the future development path of the continent? Who are the main constituency of the United Africa and what does it take for African optimists to realize their imagination of establishing a united, strong, independent, and peaceful Africa suitable for development and prosperity?

This chapter develops a political economy argument whose central thesis is that while pan-Africanism has considerable potential to promote economic and political affinity and mutual development, the movement confronts a deep rooted vested interest which seeks to protect the extractive institutions that doomed sustainable and inclusive development process on the continent. In this context, we argue that gradual but steady promotion of intra-African trade, production, and resources mobility coupled with economic, institutional, and political policy synchronization could make the pan-Africanism movement a potent force to improve the welfare of Africans. Most of these initiatives are predicated, however, by the existence of a functioning and inclusive political and economic institutional benchmark across countries on the basis of which pan-African economic space operate. It takes radical institutional reforms of revolutionary proportions across Africa to realize these objectives.

The rest of the paper is organized as follows. Section “[Literature Review](#)” reviews the literature on the economic and political views on the pan-Africanism movement. Section “[Development and Political Affinities](#)” addresses the characteristics and tendencies of African countries in terms of development and political affinities towards establishing a unified and integrated African political and economic space. Section “[African Union: Policy Coordination and Renaissance](#)” extends the discussion with critical analysis of the potential strategies and their constraints in realizing the movement. Section “[Concluding Remarks](#)” draws concluding remarks.

Literature Review

Pan Africanism as a concept broadly refers to what Kodjoe described as the acceptance of oneness of all African people and the commitment to the betterment of all people of African descent (Kodjoe 1986). This, of course, could broadly mean all of humanity given the fact that our ancestors all came from the African continent. In a way, we are all Africans. A more contemporary interpretation of the concept confines itself to two sets of people that currently reside in Africa and African descendants who reside outside of Africa or the African Diaspora (Fosu 1999; Walters 1993). Africans share diverse identities and shared values on an extensive level and within diversity that the concept of a modern notion of African nation is effectively invoked to anchor the future development of the continent (Muchie 2000). Pan-Africanism should be based on the seedling bed of the contemporary African sphere that aspires to consolidate the solidarity and shared values and identities reaching not only those residing in Africa but also the community of African diaspora residing all over the world.

The concept of Pan-Africanism defined as the domain that consists of Africans residing in Africa and the African Diaspora suggests maximizing affinity and the welfare of all requires considerable mobilization effort and set of institutions that facilitate the participation in and benefit from the process. The dispersion of Africans

from Africa took broadly two waves the first of which was undertaken through slave trade and the more recent one is more of self-motivated migration to the rest of the world. The current estimate of the African population is about 1.03 billion (United Nations 2013). Moreover, the African Diaspora is estimated to be about 170 million people residing all over the world but with high concentration in the Americas. Most of the Diaspora are descendants of slaves from Africa who were victims of slave trade and had lost most of their contacts with their African roots and recent migrants.

The African diaspora has continued to grow with recent migrations reflecting both push and pull factors of both economic and political nature (Walters 1993). This is accompanied by recent expansion of migration within Africa which roughly constitute recent destination of the African diaspora who live away from their place of origin. The challenge is what can be done to effectively use the number, skill, technical knowhow, capital, and entrepreneurship of all these potential resources to promote sustainable and steady economic development of Africans. In the same context, what economic and socio-political forces motivate the African diaspora to identify itself with their country of origin? Could this relationship of identity and the process in which the African diaspora came to its current situation be relevant for the economic development potentials of the continent? These are some of the relevant topics of interest in the economic analysis of pan-Africanism.

The call for Pan-Africanism was, at least initially, motivated and driven by political imperatives which attempted to use the collective and united struggle of African people everywhere to help the abolition of slavery in the Americas and the liberation of Africa from European colonialism. Political liberation has traditionally been the more urgent and shared objective of Pan-Africanism.

The experiences of post-colonial Africa have mixed features when it comes to the issue of how the consolidation of the new nation state status stood in tension with the objectives of forming supra-national identity and unity. Pan-African nationalism has to contend with the newly acquired nationalist sentiments and the old ethnic and tribal loyalty that predominated much of the institutions of the continent. Much of the discussion about Pan-Africanism has focused on the continental and regional initiatives. Leaders of the liberation movement did not manage to replace the extractive political institutions of the colonial era with a more inclusive institution of pluralistic and democratic systems and the rule of law. Even those with aspirations to embrace the democratic rule soon fell to the temptations and appeals of continuing the coercive institutions of authoritarian and dictatorial rule. To support such an approach, most pursued economic policies that promote the interest of the few elites at the expense of the masses leading to stagnation and widespread poverty.

The macro perspective of pan-African movement was dominated by rhetorical statements by political leaders whose practical constraint at the national level would hardly allow them to delegate power to supra-national institutions. As a result or perhaps despite the rhetoric, leaders of the newly independent nation states across the continent developed the infrastructure for centralization and authoritarianism. The ideals of the rule of law and the emancipation of Africans from the legacy of coercion were eventually shelved and a new brand of autocratic and dictatorial

forces took shape in one form or another. Those who survived in the political marginalisation, with a few exceptions, were strong men with brutal legacies of repression of their own people.

The form of political leadership and the political institutions by which individuals and parties come to power shape the way decision are made both at national and continental levels. The continental and regional organizations increasingly became clubs of dictators and autocratic rulers with very limited, if any, involvement of the public in the process. This has affected the capacity of these organizations to engage the broad masses and to cultivate shared goals and identity across the continent.

Whereas the anti-colonial struggle was dominated by revolutionary currents and support from anti-European colonial and socialist movements, the liberation movement did not have the coherence and synchronization to share the system of newly emerging nation states (Padmore 1972; Young 1982). As a result, the new nations were typical in terms of peculiar national features and domestic forces that continue to preoccupy the new leadership after liberation. This trend was also accompanied by the realities of the cold war creating the incentive to align with and experiment with socialism or operating with the non-alignment movement. These movements and experiments could not undo the legacy of extractive and coercive institutions that dominated the African continent during the colonial rule. Instead, more coercive and brutal institutions emerged which were orchestrated by the local elites with help from their foreign patrons.

The economic structure of the newly liberated countries were not only backward but also featured dual structures in which the majority of the population earned its livelihood from subsistence agriculture in rural areas whereas pockets of urban based industrial and mining industries operate with relatively small contribution in output and employment. These economies faced the challenges of how to industrialize and create employment opportunities for the masses by channeling labor power from low productive rural based agricultural sector to higher productive industrial and services sector in urban areas. The challenges of industrialization and the mobilization of the necessary investment resources from both domestic and foreign sources was the main policy challenge of the day.

This approach to economic development emphasized the role of the state in the development process and central planning to bring about concerted effort to economic resource mobilization and allocation. In the process, the private sector and market forces were marginalized and discouraged, paving the way for the government to control the commanding heights of the economy and crowding out the private sector. The African economies were poor and backward at the dawn of independence and post-colonial economic performance has been dismal where stagnation and poverty dominated the continent.

There have been competing theories with regard to explaining the poor growth performance of the African economies (Easterly and Levine 1997; Landes 1999; Venables 2010; Acemoglu and Robinson 2013; Beinhocker 2007). Most, if not all, agree that economic growth performance is highly dependent on economic policies and institutions in which economic agents undertake their decisions and respond to overall incentive structures. Sustainable economic growth and development requires

countries putting their policies and institutions right and responsive. The central theme of the neoclassical economic theory is that individual decision makers to a large extent would promote collective social welfare by optimizing their choices under their respective resource constraints. In the long-term, the economy eventually moves to its stable potential steady state. The role of the private sector is crucial in the process whereas the government sector could play only a supplemental role in basic but critical areas of infrastructure development, external relations and national defense, stable macroeconomic environment, the rule of law and the protection of property rights, and manageable system of taxation. The experiences of newly industrialized countries suggest that the government sector can indeed play crucial role in industrialization process by addressing the challenges of market failure and weak private sector development. The relative role of the private-public sector in economic affairs is dynamic and should be viewed as ever evolving process where both sectors operate to address critical hurdles in the development process.

Market failures are pervasive in developing countries. So are government failures. The art of economic policy-making demands balancing the two forces in a pragmatic and realistic way. The private sector in Africa has been repressed and stunted to such an extent that it operates far below its potential in subsistence and informal sectors. Despite reform measures to liberalize their economies and allow market forces to play more active role in the allocation of resources and the private sector to play a leading role in their development effort, most African economies operate in an environment in which non-market forces are dominant and the state assumes a commanding role in their economies. Liberalization reform measures have improved the role of the market and the private sector in an increasingly large number of African countries and yet there is much more to be desired before these forces are given the roles that commensurate with their potentials.

African economies are fragmented and least integrated relative to other regions depriving these economies the benefits of production network and participation in the global value chains. However, these features have to be critically examined from the perspectives of deeply rooted economic and political realities of the continent that is not compatible with pan-African economic and political integration. By implication, current efforts toward political and economic unity of the continent, despite its huge potentials, remains unattainable unless the underlying forces are addressed. Initiatives for economic and political integration under the auspices of pan-Africanism in post-colonial Africa, and the necessary reform measures that should be undertaken at national and regional levels to realize these goals, have not been rewarding enough to necessitate radical institutional reforms. Nationalist sentiments still prevail to hamper sustained effort to build continental institutions for sustainable development. Governments that came to political power through all forms of non-democratic ways are reluctant to submit to the consent and aspirations of their subjects and upholding to the principles of democratic institutions. Achieving the minimum requirements of democratic institutions such as the rule of law, the consent of the electorate, the check-and-balance in the exercise of political power, and transparency in public policy making are elements that would have allowed

more engagement of African in the political affairs of their life and projection of continental pan-African movements and realization.

The extractive institutions that were set in pre-colonial Africa and consolidated during the colonial era have remained in place and the elite makes effective use of them for enriching itself at the expense of the majority of Africans. Whereas the cost of the conventional system is huge in terms of lost opportunities and standard of living for the masses, the cost is spread across powerless and voiceless families who are caught in the vicious cycle of repression, lack of opportunity, and poverty. However, this system rewards the few extremely well and the intensity of support and protection is high and grows over time with what is at stake. This process consolidates itself with all available instruments of repression and the stake increases with the passage of time. It takes nothing short of radical change of revolutionary proportions to establish a functional institutional framework and do away with extractive economic and political institutions.

Development and Political Affinities

The theoretical perspective of the previous section strongly suggests that the economic rationale of Pan-Africanism, though continental in framework, need to be built on the micro foundations of decentralized local clusters and networks. It is imperative that the overall objective of continental Pan-Africanism takes the indirect and micro based foundations of production network, horizontal and vertical linkage and mobility, shared and common basic rules and institutions, and gradual harmonization of policies whose effectiveness are tested at local levels. The route to pan-Africanism therefore takes the path of decentralization from its current situation of nation state basis which would eventually move to supra-national framework and continental domain.

Africa is characterized by complex diversity, ethnic and linguistic fragmentation, and geographical variations (Easterly and Levine 1997; Venables 2010). Moreover, the legacy of slavery and slave trade across African communities has been such that there is a deep rooted suspicion and mistrust across communities. Slavery and slave trade were coercive and brutal systems of extractive institutions. Slavery operated on the basis of violence and deprivation of the weak in society who fall victim to the brutal and the powerful. Slave trade was possible only in a system of slavery and it was undertaken with active participation of the local elite who traded slaves for repressive instruments and weapons to consolidate the relative power violence of the elite. Creating political, cultural, and institutional affinity across African countries by necessity involves remodeling, reforming, completely changing, and replacing with new policies and inclusive economic and political institutions. This is a slow and challenging objective but there is no short cut to achieve a sustainable basis for continental current that serves to economic and social development of Africa.

Whereas extractive economic and political institutions may not necessarily prevent episodes of economic growth, such an approach could not generate sustainable and shared economic growth and development. After all, the elite has vested interest to grow the economy so long as they are in a position to extract more and enrich itself and sustain the system. However, by depriving property rights and security, the system prevents creative innovation and progress in structural transformation processes of their economy.

As the experiences of developing countries with extractive institutions and relatively huge inflow of foreign investment resources indicate, sustainable economic growth and development could hardly be achieved by the inflow of investment resources from abroad. The effectiveness, sustainability and reliability of foreign aid and capital flow for initiating and sustaining economic growth and structural transformation of African economies has been the weak link the development experience of African countries (Easterly 2006; Easterly and Levine 1997).

Creating cooperation among individuals within nations or across national boundaries requires shared affinity and identity which nationalism came to serve in various ways. Strong nationalism had caused various problems and was considered as one of the underlying causes of the conflicts and violence within and across countries. However, nationalism in terms of its sense of oneness and belongingness serves important purpose for the community of people to pursue shared objectives and aspirations for the common good beyond the individual (Collier 2013). Apparently, the weakness of nationalism and reliance on tribal identity is considered one of the challenges that most African nation states face in creating an integrated and coherence system of governance without which national development efforts could be frustrated. However, the hurdles for economic and socio-political development are not dominantly caused, even if they might have some contribution, by ethno-linguistic fragmentation but rather by the prevalence of extractive economic and political institutions that formed a system of exploitative relation which serves the few at the expense of the majority (Acemoglu and Robinson 2013). This robs society the opportunity to initiate and sustain inclusive economic system that rewards innovation and effort and promotes the accumulation of physical and human capital as well as innovation in the system.

In the context of pan-Africanism, the ultimate motivating and uniting force would be the emergence of a vibrant pan-African nationalism that would make possible member countries and communities to cultivate shared developmental, social, and political affinities across the continent (Nantanmbu 1998; Walters 1993; Muchie 2000). African nationalism could emerge only if the ethnic and tribal loyalty gives way to a new consciousness among the African communities and this remains the daunting task facing pan-African movements. Africans indeed have the essential attributes and affinities that bind them as a solid nation with shared legacies, histories, and roots that remain to be developed across the continent. The new consciousness could express itself in the eventual freedom of Africans to move across countries and boundaries without losing their linkage with their community of origin and exploring the opportunities that the continental economic and socio-political environment provides.

Table 1 Africa: basic economic and demographic indicators

Description	1960	1990	2000	2011	20	2060 ^a
1. Demographic indicators						
Population (Total) (millions)	283	627	803	1034		2797
Population ages 0–14 (% of total)	42.9	44.5	42.4	40.14		29.7
Population ages 15–64 (% of total)	54.0	52.4	54.3	56.32		63.2
Elderly Africans ages 65+ (% of the total)	3.0	3.1	3.3	3.55		7.1
Urban population (% of total)	18.7	32.0	34.5	39.7		55.9 ^b
2. Economic indicators						
GDP Total, PPP, (constant 2005 international dollar), (billions)	139.4	449.1	584.9	953.9		
GDP per capita, PPP, (constant 2005 international dollar)	493	717	729	922		
Labor force (total) (millions)	Na	225.3	299.7	404.9		

Source: World Bank (2014). World Development Indicators Database; United Nations (2013)

Note: ^aPopulation projection data for 2060 are based on median variant projection of world population prospects for 2012 revision

^bProjection for urbanization refers to the year 2050

Economic activity and international trade in general and intra-African trade in particular play important role in establishing the process of integrated pan-African economic space. The African continent has recently exhibited significant growth rate in merchandise trade. The value of trade increased from about \$298 billion in 1995 to \$349 billion in 2000 and further expanded to \$1460 billion in 2013 (UNCTAD 2014). Africa exported to the rest of the world about \$700 billion worth of goods and services whereas the continental economies collectively imported about \$760 billion worth of goods and services by 2013. The continental economies exhibited significant growth in trade than the rest of the world both exporting to the world and serving as market for a whole range of imports from the rest of the world. The total value of African international trade exhibited an average growth rate of 8.8% during 1995 to 2013 setting a healthy trend among African economies towards openness to international trade. This is particularly important as the prime drivers of the growth in international trade both in terms of export destination and origin of imports are emerging market economies such as China and India opening up new opportunities and economic cooperation among developing countries. However, the share of African trade in global trade remains very low as it remains at about 3% in world trade indicating a significant potential for further growth in the future Table 1.

There is also an important expansion in trade activities among African economies. Total intra-African trade increased from \$28 billion in 1995 to \$31.6 billion in 2000 and to \$147.5 billion in 2012 representing a remarkable average growth rate of 9.8% during the period under consideration and a corresponding average of 12.9% from 2000 to 2012. International trade within the continent, as Fig. 1 illustrates, has expanded with the orientation of most economies towards exports both to other African markets as well as to the rest of the world. Economies that have some

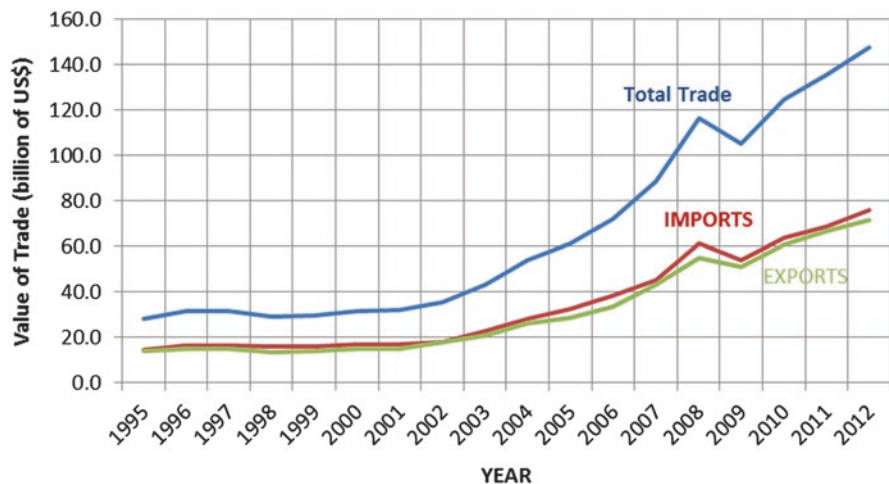


Fig. 1 Intra-African trade flows. (Source: UNCTAD (2014))

manufacturing and processing capabilities have benefited from the recent trend that opened opportunities for new market or expansion of existing market outlets.

It is also notable that trade activities within the continent remains relatively small and most of the international trading partners of the economies in the continent are elsewhere in the rest of the world. This trade structure is partly the reflection of the nature and characteristics of the commodity composition of economies in the continent and the lack of forward and backward linkages and infrastructure that could promote production network and value-added chain. A larger share of expansion in the value and volume of trade happened with the rest of the world than within the continent itself. This relatively weak intra-African trade could expand further with the expansion of more efficient and cost effective transportation network across the continent and the processing and manufacturing capabilities of local enterprises in the continent. This will open more expansion in the size of the market not only for final products but for raw material and intermediate inputs in the production process and expansion of the value-added chain.

Intra-African trade is growing and yet, as Table 2 summarizes, the share of trade activities that is flowing within the continental economic and market space remains relatively small and the dominant market and source of imports for African economies are outside the continent. It takes sustained structural transformation of the production and technological capability of African businesses to change the content and diversity of the production activities that would enable trade and hence investment to focus on the local economies and sustain their growth. The economic and trade regimes of developing countries are typical in their reliance on export of primary products and the import of manufactured products and services from the rest of the world and this is fully reflected in the collective continental trade flows of Africa. There are some regional and national variations within the African continent and yet the overwhelming picture reflects the trade regime and overreliance on a few

Table 2 Africa: Intra-African trade flows (percentage of total exports or imports)

	Export trade		Import trade	
	2001–2006	2007–2011	2001–2006	2007–2011
Africa	9.8	10.9	13.5	12.7
Eastern Africa	14.1	13.9	9.3	7.1
Middle Africa	1.0	1.3	2.5	3.1
Northern Africa	2.9	3.9	3.7	3.8
Southern Africa	2.1	2.1	10.7	7.9
Western Africa	10.0	9.0	12.5	10.2
Developing America	17.6	20.6	19.0	21.1
Developing Asia	45.1	50.1	49.3	53.0
Developing Oceania	3.0	3.3	2.3	2.7
Europe	71.4	70.0	67.0	64.4

Source: UNCTAD (2013a)

Note: Intra-regional trade indicates the flow of imports and exports by their origin and destination within the respective regional economies

primary export commodities destined for markets outside the continent. In comparison, developing Asia and America perform relatively better in orienting their international trade activities more on their regional economic space.

The weakness of intra-Africa trade flows is closely related to the fragmentation of the African economies and the high cost of tariff and non-tariff barriers to trade across borders (World Bank 2012). The high cost of transportation and trade barriers discourage African economic agents to engage less in mutually beneficial exchange activities. This is particularly important in commodities, staple food items, and intermediate inputs that have a rising demand across African countries. It is also important to note that the structure of these economies and the trade relationship that correspond to them is such that it does not facilitate trade flows within a rather similar and rival economic activities linked with export destinations outside the continental economy.

Foreign direct investment has served as important mechanism in creating economic integration across national economies and forming value chains that have been instrumental in improving productivity and serving as vehicle for introduction of new technology. The African continent has for long failed to attract foreign direct investment both in terms of volume as well as quality of technological innovation to better exploit the potentials of the continental economies. The share of Africa in the global FDI inflow remains depressing low at about 4% of world FDI flows or about \$57 billion as of 2013 (UNCTAD 2014b). This has not shown tangible improvement over the years and the local capacity to generate investment resources through domestic saving and channeling to investment purposes remains weak. The African region hence largely remains starved of investment resources for sustainable economic development.

There are some encouraging trends in recent years that indicate rising FDI inflows from other developing countries of Asia into African economies and better performance in intra-Africa FDI flows. Investment by South African, Kenyan,

Angola, Egyptian, and Nigerian companies in other African economies has created wider opportunities and deeper economic integration across countries within the continent and given the current state of cross border investment initiatives much more could be achieved once this processes get momentum. The healthy growth rate of African economies over the last decade and the rapid population growth have been factors in the rapid growth of the size of the African market attracting further investment and innovation by continental as well as other potential foreign investors. The tendency of intra-African investment projects to focus on manufacturing and services, unlike the focus of other FDI inflows to natural resource extractive projects, has created better linkages and employment opportunities in African host countries (UNCTAD 2014b). The volume and share of intra-African investment flow is not yet large enough to make its impact on the value chain of African economies and yet its features and composition attests to the fact that effective economic integration could be supported by deeper and sustained investment initiatives within and across African economies.

The issue of population mobility within countries and across political boundaries has been a topic of recurrent discussion with implications on the migrants, the host communities, and those communities left behind. The advancement of transportation and communication technology has made both the pull and push factors accessible to individuals to make their decision with regard to their place of residence and work. Conventionally, migration from rural to urban areas and employment in emerging industrial and services sector was a typical reflection of economic and social transformation in developing countries. This process of mobility of labor force from agriculture to the modern sector necessitated adjustment in life style and educational training that facilitated the transition. African societies have predominantly been agrarian and rural and yet there has been rapid urbanization in recent decades and the process of urbanization is bound to continue for the foreseeable future. As Table 1 indicates, nearly 40% of the African population resides in urban areas whereas the majority still lives and works in rural areas. This is a remarkable growth of urbanization from the situation at the dawn of independence in 1960 where less than 20% of the population in the continent was living in urban areas. Current projections suggest that by the middle of the current century, more than half of the African population is expected to live in urban areas suggesting significant mobility of population from rural to urban areas.

There is also an emerging trend in population mobility across national boundaries with an overall tendency of net migration of people from less developed to more developed regions of the world. This situation has set a new trend and it is driven by both opportunities that advanced countries offer to people in less developed countries and the push factors that necessitated families and individuals to migrate away from their country of origin.

International migration has accelerated over decades with a typical feature of people migrating from less developed regions to more developed regions. Accordingly, as Table 3 summarily depicts, there is a net outmigration from Africa to the richer countries of the world. This is part of a global trend and the host countries generally have a more prosperous economies and standard of living which

Table 3 Africa: net population migration trend (thousands)

Year	Africa	Sub-Saharan Africa	More developed regions	Less developed regions
1960–1965	–950	–237	2287	–2287
1990–1995	–1015	–450	11,558	–11,558
1995–2000	–3417	–1137	13,923	–13,923
2000–2005	–2099	–429	17,142	–17,412
2005–2010	–1779	–184	17,412	–17,412
2010–2015 ^a	–2481	–741	13,170	–13,170
2045–2050 ^a	–2492	–1763	11,596	–11,596
2060–2065 ^a	–1740	–1230	8145	–8145

Source: United Nations. 2014. World Population Prospects: The 2012 Revision

Note: ^aProjection based on median variant estimation on fertility rate

serve to attract more people to consider migration for economic reasons. The future policy choices of host countries in terms of attracting and welcoming immigrants will exert significant influence for the foreseeable future (Collier 2013; Kelly 2004). The divergence of income between the developed regions and the less developed regions made it more appealing for people in poor countries to migrate and increase their opportunities. Whereas migration is driven mainly by economic reasons, its implications stretch to social and political spheres both in the host countries and countries of origin.

African Union: Policy Coordination and Renaissance

The driving force behind the pan-African movement was political aspiration that sought to unite Africans against colonialism and racism. The projects of the Organization of African Unity (OAU) and now the African Union (AU) closely follow this political philosophy and how to mobilize Africans for their political and economic independence and collective welfare. The ultimate goal has remained to promote political unity across the continent and establishing a United States of Africa. The contemporary version of the aspiration for pan-Africanism and unity comes from the urgent priorities for economic and social development, areas where the African continent lags far behind most other regions.

The African Union and its effective operation could be instrumental in enabling the continent better manage the challenges of a rapidly changing world. This also enables Africa not to be left behind in the recent global trend towards international economic integration extending from the European Union, North American Free Trade Area (NAFTA), and the Association of South East Asian Nations (ASEAN). The third perspective is related to forming a coalition of resistance among African countries to minimize unwarranted pressure from abroad in dealing with African governments. This pressure comes not only from the West but also from emerging powers such as China and India that tend to exploit the weakness of African

countries. A united Africa can speak with one voice and synchronize its agenda on a number of regional and global issues.

The manner and speed of establishing a political union of the continent has remained a contentious issue. The first articulation of the idea was formed in 1960 in a pan-African conference in Cairo, Egypt, in which both radical and gradual approaches were argued in favor or against the immediate formation of a United States of Africa. The radical views were promoted by leaders like Nkrumah of Ghana whereas the gradualists were championed by Nyerere of Tanzania. Both sides made their passionate arguments and yet the experience of the past half century suggests that the formation of a political union has been a daunting task. It is also imperative to note that both sides have important regional power supporters making the continental agenda to be nothing but a gradual movement without strong momentum. This was followed by a somewhat compromised agreement with the formation of the Organization of African Unity (OAU) in 1963. The recent reincarnation of the aspiration of pan-Africanism and forming the United States of Africa has quite similar division of opinions and priorities as well under the auspices of the African Union (AU), which was established in 2002.

Whereas immediate formation of a federal structure of government has some proponents, the regional powers such as South Africa, Nigeria, and Egypt have consistently supported a gradual approach to unity. The main players contend that Africa has to address its immediate challenges such as weak governance, democratic institutions, poverty, and marginalization of the African economies in global trade, investment, and innovation processes. The change in priorities of the African integration project suggests the route for pan-Africanism necessarily takes regional economic integration processes that would eventually lead to a unified economic, political, and social space.

In the absence of a definite agenda and program of action to forming immediate political union, intermediate actions that range from regional integration and economic community have taken the main feature of measures within the continent. Whereas regional integration projects and their effective operation could serve as a stepping stone towards African economic community and eventually to African Union, most of them largely failed to achieve even their original often modest objectives of promoting economic cooperation and development.

It is imperative to emphasize, however, that the regional economic integration approach could hardly be successful until and unless African countries are seriously implementing the measures to do away with extractive economic institutions that are supported by extractive political institutions. A progressive continental institution could not be built by the sum of extractive national institutions that dominate the continental political economy landscape. It takes learning and adapting the experiences of successful inclusive institutions from Africa and elsewhere, such as Botswana, to make the transition from economic and political stagnation to sustainable economic growth and democratic political system.

There are renewed efforts in recent years to accelerate regional integration across the continent in a bid to prepare the environment for the eventual emergence of the

African Economic Community. The policy coordination effort to harmonize the priorities and objectives of the regional economic communities and expanding the scope and domain of existing regional institutions into a continental sphere is getting support from continental institutions. This is backed up with an increasing flow of intra-Africa investment which is growing at modest rate from its previous very low level. Once this process takes momentum and the continental value chain of local enterprises increases, the depth and linkage of the African production units would have more opportunities to expand sustained growth in output, investment, factor mobility, market expansion, and employment opportunities. There are still considerable hurdles towards realizing these potentials as national economies are very slow to opening up their economic domains for the continental players to operate at full potentials (UCTAD 2014b; World Bank 2012).

However, even if deeper trade and investment integration across the continental economic space provides opportunities for improved productivity and growth in the enlarged economic space, in the absence of inclusive economic and political institutions that engage and reward the majority of Africans reform efforts might end up further empowering a few elites across the continent to spread their exploitative network across the continent. It is therefore important to emphasize that pan-Africanism in the economic and socio-political sphere requires setting the necessary conditions for inclusive economic and political institutions at national and sub-national levels. The path towards pan-Africanism could therefore be built on the foundations of inclusive institutional benchmarks across member countries that need monitoring and evaluation to identify ways to make them applicable and acceptable all over Africa.

Concluding Remarks

The political economy of pan-Africanism movement is faced with strategic challenges and its prospects depends on the policy choices that Africans make at national and continental level to operationalize the imaginations and renaissance spirit of the current generation into practical outcomes. The current strategy has focused three levels: First the different countries are trying to strengthening existing states. They also go for regional integration and finally through these processes achieve the Africa we want agenda in 2063. When to realize an African economic community that will serve as the basis for pan-African political and social development is waiting to be realised. It is still a challenge whether this approach which does not involve the people of Africa directly in the African unity and renaissance project will succeed. There is no clarity how to involve the people yet. Realizing the economic potentials of pan-African domain requires building inclusive economic and political institutions and their supportive system of laws and norms that would serve as engine for building an integrated and sustainable African economy growth process.

The current series of extractive economic and political institutions are the central bottlenecks for growth, investment, market size, infrastructural, human capital formation, property rights, human security, and improvement in productivity and standard of living of the African population. It is imperative for African countries to pursue reforms that address these challenges in time before pursuing decentralization and supra-national initiatives and institutions. Pan-Africanism does make economic sense provided that it is based on new political and economic institutions that motivate and rewards all Africans. The immediate task is to cultivate a shared and commonly implementable framework of policy reform that enable African communities replace extractive institutions by decentralized, participatory, and inclusive institutions that would support sustainable and continental economic development.

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Innovating Policy and Systems of Innovation for Regional Integration



Christopher C. Nshimbi

Introduction

The concept national system of innovation (NSI) is popular in innovation parlance. In general, the definition of NSI locates the interactions that occur between the various elements promoting the production and use of knowledge in the confines of the nation-state. This is besides the fact that systems of national innovation, NSI policy, and policy for NSI are by default formal. They focus on the firm, formal organizations and the formal environment of the domestic economy. This chapter breaks from convention and attempts to innovate around innovation policy, systems of innovation and regionalism.

Innovation

National System of Innovation

According to Freeman (1995), the concept was first used by Bengt-Ake Lundvall. Freeman however traces the idea behind the concept to Friedrich List's 1841 characterization of a 'National System of Political Economy'. According to Freeman, List was cognizant of factors that were fundamental to the modern industrial economy. Some of them included education and training, the need for industry to be linked to formal institutions of education and science, the interdependence between investment that is tangible and intangible, and the interdependence between foreign technology and the development of domestic technology. Policies concerning innovation thus had as their intent, the acquisition and application of new technology, for

C. C. Nshimbi (✉)

Centre for the Study of Governance Innovation, University of Pretoria, Pretoria, South Africa

a country to catch up to the level of those enjoying higher levels of industrialization and economic development.

Despite its complexity and multidimensional elements, no single definition of NSI exists. Galli and Teubal (1997, 345) define it as “the set of organisations, institutions, and linkages for the generation, diffusion, and application of scientific and technological knowledge, operating in a specific country.” The context in which the factors cited in this definition occur—a specific country—is noteworthy insofar as concerns the argument of this chapter. The definition makes the state the unit of analysis. It places the role of formulating, implementing, coordinating and, generally, the overall responsibility for technology and innovation policy as well as the economics of technical change on the state.

The way in which this state centric and dominated understanding of NSI confines the notion within nation-state borders is more pronounced in Niosi et al.’s (1993, 212) “workable” conceptualization of NSI as “the system of interacting private and public firms (either large or small), universities, and government agencies aiming at the production of science and technology within national borders.” Niosi et al. not only emphasize the state’s dominance, but also highlight the firm as the determinant of overall efficiency and success of NSI.

The standard indicators of the ability to innovate, technological policies and the performance of technological policies based on the above definitions include inputs and outputs of research and development (R&D), numbers of research personnel, numbers of patents created, etc. Such indicators, however, are limited in their ability to explain productivity, growth, development and, especially, the dynamics of interactions among various actors in processes of innovation.

Lundvall’s (1992) definition of NSI is favored in this chapter. It resonates with the theme of the chapter and some issues that speak to the argument and discussion herein. Lundvall defines NSI as “that system which is constituted by elements and relationships which interact in the production, diffusion and use of new and economically useful knowledge...and are either located within or rooted inside the borders of a nation state” (1992, 12). The interacting relationships in Lundvall’s definition hint at the realities of the contemporary global political economy, where processes of innovation are not confined to nation-state boundaries.

Despite their definition (cited earlier) of NSI as a system occurring in a specific country, Galli and Teubal (1997, 342) provide a list of trends that are profoundly changing the innovation systems of countries. These include globalization, liberalization, dematerialization and technological revolution. According to Galli and Teubal, these trends are accompanied by dominant international linkages in science, innovation and diffusion processes which increasingly make NSIs ever more open systems. In this way, globalization, among other emerging phenomena in the global political economy, has seen the spread of technological alliances between and across firms. This will be discussed further later in this chapter, in relation to regional integration.

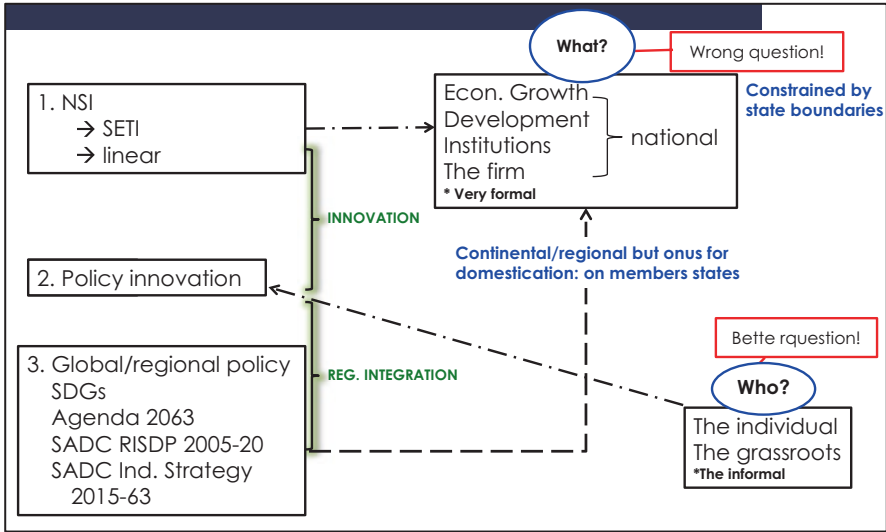


Fig. 1 Innovation, Regional economic integration, Development. (Source: Illustrated by the author, 2017)

Policy and Policy Innovation

For now, the foregoing shows that by definition, NSI generally confines and locates the interactions which occur between the various elements that promote the production and use of knowledge within the nation-state (see Fig. 1). This is besides systems of national innovation, NSI policy, and policy for NSI being formal by default. They focus on the firm, formal organizations and the formal domestic environment. In this respect, and as this chapter attempts to show, two aspects of the conventional approach to innovation are worth highlighting. First, the assumption that conventionally, the evolution of innovation is linear. Second, that countries which successfully built economic strength did so fully dependent on their science, engineering, technology and innovation (SETI) capabilities.

As depicted in Fig. 1, this chapter posits that the combination of NSI (primarily consisting of linearly evolving innovation and SETI) and NSI policy and related issues constitutes innovation. For its purposes, the chapter thus considers policy to be a statement of intent or course of action taken by an actor such as government, business or individuals towards attaining specific goals.

Regional Integration

Global/Regional Policy

In addition to the foregoing, this chapter also ventures outside the confines of nation-state and government, taking particular interest in policies devised by and which bring together at least two nation-states, to achieve common goals (Fig. 1). Globally, for example, the Sustainable Development Goals (SDGs) include 17 statements of intent or goals (and 169 targets within those goals) formulated by the global community of states in their commitment to transforming the world into a better place, especially (for) people on the ground by 2030.

In Africa, the African Union (AU) drew Agenda 2063 in 2015, among its many legislations and policies. The agenda was designed to drive Africa's transformation and development up to 2063. The continental roadmap for development represents AU member states' commitment to "build[ing] an integrated, prosperous and peaceful Africa, an Africa driven and managed by its own citizens and representing a dynamic force in the international arena" (African Union Commission 2015, 1).

Various regional blocs in Africa have crafted legislations and policies to foster cooperation for development between proximate countries belonging to the regional blocs. The Southern African Development Community (SADC), for instance, seeks to integrate and develop the countries of Southern Africa through formalized regional institutions, as generally stated in the Declaration and Treaty of the SADC (1992). Based on this, SADC countries launched the SADC Regional Indicative Strategic Development Plan (RISDP) 2005–2020 in 2015. This comprehensive 15-year roadmap envisages the integration of the 16 SADC member states through the successive stages of integration conceived in the neoclassical model of regional integration.

The model, informed by inter alia Bela Balassa's (1961) Theory of Economic Integration and Jacob Viner's (1950) Customs Union Issue, posits that the integration of the countries of any given geographical area proceeds through four key successive stages. The stages include a Free Trade Area (FTA), Customs Union (CU), Common Market and, ultimately, Economic and Monetary Union (EMU). We will return to these stages in the discussion of systems of innovation for regional integration.

Driven by the RISDP, other regional instruments as well as those of the respective member states, the SADC Industrialization Strategy and Roadmap (ISR), too, seeks closer cooperation between SADC countries. The ISR is primarily orientated towards the need to structurally transform the SADC region through industrialization, modernization, upgrading and closer regional integration (SADC 2015, 1). The ISR is itself driven by the SADC Industrial Development Policy Framework (IDPF), which envisions an integrated SADC regional economy that is industrially diversified, innovative and globally competitive, and contributes to the creation of employment and sustainable growth (IDPF 2014b, 11). As a regional policy framework, the IDPF is designed in a way that enables it to leverage and build on

opportunities that are mutually beneficial to SADC member states while addressing the common industrialization challenge in the region through the development of activities or strategies that are coordinated at SADC level (SADC 2014a).

The regional instruments highlighted above (as well as numerous others) underscore regional cooperation and the value placed on such cooperation by the countries of Southern Africa (Fig. 1). Regional integration in this chapter is taken to constitute the combination of such instruments or legislations, policies, activities, strategies and initiatives designed to foster inter-state collaboration between the countries of a region (such as Southern Africa), and the policies around these issues.

Generally, the motivation for NSI and regional integration and the corresponding policies as sketched out above relate to the question, what should countries do to achieve development? (See Fig. 1). Accordingly, policy makers and developers of NSI and regional policies/initiatives say the said initiatives are devised to achieve development and economic growth. The initiatives also seek to enhance the efficiency of institutions and firms for purposes of realizing the development and growth objectives. This should be accomplished through, among other things, increased industrial output and employment creation, etc. The legislations drawn at continental and regional levels towards these ends may indeed be continental and regional. However, the onus to domesticate the policies/initiatives into implementable national legislations, policies, activities and programs as well as their actual implementation rests on respective member states, as illustrated in Fig. 1. This, again, brings the question about the ends of NSI and regional integration (i.e. economic growth, development, establishment and/or enforcement of institutions, and the efficient operation of firms) and the drivers thereof squarely into the national context. A context constrained by nation-state boundaries.

Because of this, the what question concerning motivations for NSI and regional integration is rather the wrong question to ask on such matters. This is because formulating the question in this way directs attention away from the intended beneficiaries of the cited initiatives and policies. Reiteratively, the challenge with these conventional approaches is that NSI and policy are formalized; focusing on firms, organizations, institutions and (all of which are taken to be) national.

A question that would help issues of innovation and regional integration for development better should rather focus on who? Such a formulation would call attention to the important subject or target of all legislations, policies, programs and activities in which various elite actors in Africa and its respective regions engage for purposes of accomplishing development (see Fig. 1). It would shine the spotlight on the individual and, particularly, the one at, and, the grassroots. It would locate human agency in the entire process of innovation for development. The view would also draw attention to a critical but largely ignored sector that characterizes most economies in Africa—the informal economy.

Formulating policy that specifically caters to the needs of actors in as well as the informal economy calls for policy innovation, as this would be generally unconventional. This is also besides the purported illegality and obscurity of the informal sector and actors in many countries and regions of Africa (United Nations Economic Commission for Africa 2017). Added to this, policy innovation in the area of NSI

would also require formulating NSI policy that extends beyond the state-centric approach to NSI. It is for this reason that this chapter breaks from convention and attempts to innovate around innovation policy, systems of innovation and regionalism. It does this by attempting to respond to some questions aimed at stimulating debate on innovative systems of innovation and innovative innovation policy. Thus, how do you extend systems of innovation to the regional level without neglecting the grassroots/informality found (with)in the national?

This question is asked because NSI is implicitly defined by national/state boundaries. The state is by default the unit of analysis in measurements or matters of NSI. Yet, various sectors and actors in and outside formal industry and policy circles who affect and are affected by NSI and NSI policies cross and engage each other across nation-state borders. A variety of such research and business networks exist in Africa.

Systems of Innovation for Regional Integration

Innovative systems of innovation and innovative innovation policy call for (national and regional) policy that is innovative, incorporating informality and cross-border (aspects of) socioeconomic interaction. This, according to this chapter, is what would constitute innovation (Fig. 1). This section addresses this assertion by attempting to respond to the question, what should (a system of) innovation that leads to wellbeing in an African regional context look like? A simple model (Fig. 2) is thus proposed that expands the foregoing discussion, which was also illustrated in Fig. 1.

Firstly, conventional or traditional approaches to innovation and regional integration are reviewed in succession (Fig. 2). The limitations of these approaches in meeting challenges and the necessity of innovation for development in the context of African regionalism or situations concerning at least two geographically proximate countries on one hand, and the realities of contemporary alternative transboundary interactions especially among people and entities at the grassroots operating beyond the state's gaze (Turner 2013; Nshimbi 2015) on the other hand, are highlighted. From these, the alternative innovations are shown to be more adaptable and innovative to meet the need for wellbeing. Specifically, alternative regionalism is shown to be more accommodating and in congruence with innovative systems of innovation and innovative innovation policy that could lead to wellbeing or development in Africa (Fig. 2).

Conventional or traditional approaches to systems of innovation can be likened to conventional forms of regional integration insofar as both notions can be characterized as linear. They are theorized to follow somewhat universal evolutionary paths which must be adopted by nation-states aspiring to attain to comparable levels of development and integration as the advanced.

Though open to several interpretations, depending on, among others, ideological preference and focus, systems of innovation as an approach is conceptually founded

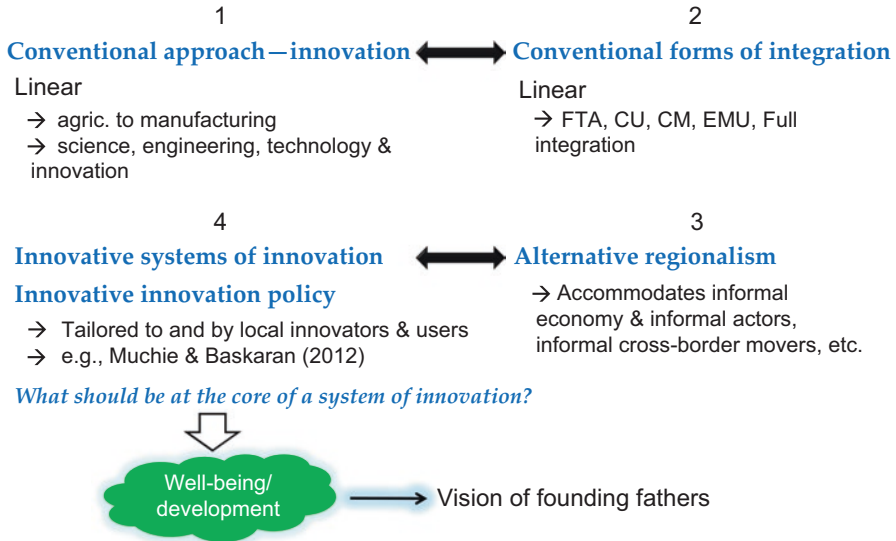


Fig. 2 Systems of innovation for regional integration. (Source: Illustrated by the author, 2017)

on definitions of institutions and innovations. In this sense, innovations constitute technological innovations while institutions are defined as formal organizations that generate and diffuse knowledge that is economically useful. More broadly though, institutions are formal and not restricted to technology-related organizations. They also include informal interactions within the formal institutional structures. Innovations are broadened to include changes in the organization of economic activities, ultimately attaining to better outcomes. Such a conceptualization of systems of innovation is reflective of a nation-state’s general political economy reminiscent of List’s national system of political economy.

Conventional Approaches to Innovation

Within the context of building systems of innovation for development, conventional or traditional approaches set forth some normative assumptions about economically strong countries. There is, for example, the traditional linear route to economic strength which asserts that progression should occur from agriculture to manufacturing (Fig. 2). Technical change occurs in a linear fashion, based on basic science research. Researchers in scientific establishments produce information and knowledge which is diffused to end-users, and the widespread use of which leads to economic growth (Rosenberg 1982). The model, which was historically developed to understand science and technology and the way in which they relate to the economy, thus posits that innovation begins with basic research, to which is added applied

research and development, and the end of which is the widespread production and diffusion of knowledge and information (Godin 2005).

The co-evolution approach, a variation of the linear, posits the co-evolution of sectors towards the establishment of sound systems of innovation and development. Thus, agriculture co-evolves with manufacturing; the rural economic sector with the urban; the community with industry; and the university with government. The linear model of innovation is criticized for its inability to adequately explain what happens in the linear progression from one stage to another, and ignoring feedbacks that might occur between successive stages.

The literature on the economics of innovation further posits that the economic strength of advanced countries is based on their SETI capabilities. By relying on these capabilities, such countries were able to get an edge in the innovation sphere and attained economic leadership in the global political economy.

Of late, NSI is employed in the analysis of innovation systems. Added to the definitions given earlier, the World Bank's definition of an innovation system extends the understanding beyond the two key elements. It also highlights actors and issues that are pertinent to the discussion of this chapter. An innovation system is, accordingly, "a network of organizations, enterprises, and individuals focused on bringing new products, new processes, and new forms of organization into social and economic use, together with the institutions and policies that affect their behavior and performance" (World Bank 2007, xiv). As indicated earlier, organizations and institutions constitute two key elements in understanding innovation systems. Again, the organizations are, however, formal. Examples include firms or companies, universities and R&D organizations. Innovation and related activities, indeed, occur in these organizations. Institutions are the soft structures of/within the organizations. They constitute the routines, habits, practices, rules and regulations that define the relationships and interactions between actors, groups and organizations within the formal structures of the organizations. We will return to the pertinent actors and issues highlighted in the World Bank definition shortly, under the discussion of innovative systems of innovation.

Conventional Regional Integration

Regionalism is touted among strategies that African countries should adopt in order to develop capacities and competences to effectively compete and integrate into the global political economy. The European integration project founded on the European Coal and Steel Company (ECSC) seems to be the de facto model against which the success (or failure) of regional integration schemes and processes elsewhere in the world, and especially in Africa, are assessed. Additionally, neoclassical/neoliberal economics and trade theory, as indicated earlier in the work of Viner (1950) and Balassa (1961), significantly influence the understanding of regional integration.

This chapter posits that these conceptions depict regionalism as a linear process (Fig. 2). To elaborate on the stages presented earlier through which regional

integration progresses, countries regionalize in order to open up or liberalize trade as well as integrate markets within the regional bloc that they establish. Therefore, in the first or FTA stage, the integrating countries remove trade restrictions between them. To accomplish this, they abolish tariff and non-tariff barriers to trade between them, and thus internally liberalize trade. However, each of the participating countries continues to determine the tariffs and quotas it maintains with countries that are not participating in the integration scheme. In the second stage, the independent determination of external tariffs to hold with countries which are not part of the regional bloc gives way to a common external tariff (CET) towards those countries, as determined by the group of integrating countries. The adoption of a CET towards nonparticipating countries effectively establishes a customs union of the participants in which the liberalized internal trade is protected. From the customs union, the regional bloc proceeds to establish a common market in which the respective member countries remove all restrictions to the internal movement of labor, capital, goods and services. In this stage, the countries realize full liberalization in the movement of these factors, as all restrictions within the bloc are completely eliminated. With this, the regional bloc proceeds to the fourth stage to establish an economic and monetary union (EMU). In the EMU, the bloc establishes supranational institutions and authorities to govern and coordinate the economic policies of the group of participating countries. Integration at this stage requires a common economic policy of the participants, governed by the supranational institution. The stage is characterized by a unified fiscal system, a single monetary system, and a central bank. This stage is, however, difficult to fully achieve. This is because some participating countries are reluctant to surrender sovereign control over domestic policy and institutions to the regional or supranational body.

Alternative Regionalism

The regionalism discussed in the foregoing is generally conceived as the ideal behind the establishment of alliances between the proximate countries of a given geographical region (Nshimbi 2017). In this conception, regional integration is depicted as a state-led, inter-state project where the integrating countries establish formal alliances to promote development through cooperation facilitated by the integration. This understanding of integration, however, does not in general address, but ignores the realities of life at the grassroots. And, it rarely contributes to the disadvantaged and poor, who instead resort to creating informal or alternative regionalism for survival (Hettne 2004).

Thus, alternative regionalism proposes a broader definition of regionalism than the narrow state-centric ideal. Accordingly, alternative regionalism constitutes a “range of formal/informal mid-level ‘triangular’ relations among not only states but also non-state actors, notably civil societies and private companies” and ordinary people at the grassroots (Söderbaum 2003, 1). It includes a range of activities of and informal non-state and private actors including ethnic entrepreneurs, informal

cross-border and small scale traders, ordinary people, civil societies and transnational corporations (TNCs), among others (Nshimbi 2015) (Fig. 2). These actors drive regionalism from below, being primarily motivated by the need for survival. Besides the urban centers in various Southern Africa countries, the informal actors also contribute to regionalism through their vibrant involvement in transnational or cross-border trade and socioeconomic activities.

In this regard, the porous or open nature of the borders that characterise most Southern African countries make it convenient for actors who engage in informal cross-border trade and cultural activities and, thus, enhance regionalism. This is especially the case for people who live in borderlands communities. They can freely move and ply their trade across nation-state borders, irrespective of formal and restrictive state regulations (Nshimbi 2017a).

It is worth noting that alternative regionalism does not minimise or disregard the relevance of the state or its role, power and authority. Rather, it highlights processes involving different and various kinds of actors and the roles they play in the integrative process. In this way, alternative regionalism also highlights and brings together the static and dynamic nature of regionalization.

Informal or alternative regionalism is of late receiving increasing attention, as researchers (and policymakers in some African countries) acknowledge the reality of the activities of a range of non-state and cross-border actors who operate within and outside the institutional frameworks provided by state-led regionalism (Soderbaum 2004; United Nations Economic Commission for Africa 2017). Studies have been conducted to demonstrate the region-wide operations of networks of informal cross-border trade, civil society and religious organizations, among others, below the state level and outside the frameworks of state-led regionalism (Ohmae 1996; Scholte 1996; Inocent Moyo 2016).

However, none have investigated prospects of extending systems of innovation beyond nation-state boundaries to a broader regional group of nation-states with the aim of promoting wellbeing and the concerns of grassroots/informal actors in mind. The next section ponders on the discussion so far and, in view of the various sectors and actors in and outside formal industry and policy circles that cross and engage each other across nation-state borders, proposes innovative systems of innovation that could lead to innovative innovation policy.

Innovative Systems of Innovation and Innovative Innovation Policy

The combination of alternative regionalism and innovative systems of innovation in the foregoing discussion (and depicted in Fig. 2) calls for innovative innovation policy at national and regional levels that incorporates informality and cross-border (aspects of) socioeconomic interactions. This chapter posits that, this is what would constitute innovation. The kind of innovation that locates and emphasizes human

agency as central to the entire process, over and above restricting and confining such agency within state boundaries. It would be tailored to and by local innovators and users. This proposed innovative system of innovation is not totally unfounded either. Rather, it speaks to the existence and activities of actors in the informal economy and the innovations that occur there. Those innovations also filter into the formal, as discussed below.

Muchie and Baskaran (2012, xi) actually list several novel approaches to development that do not strictly follow the linear approaches to innovation discussed earlier. Examples that make Muchie and Baskaran's list include systems of innovation for smart economic growth; inclusive growth; justice, fairness and equitable distribution of resources; poverty reduction; and sustainable development (Muchie and Baskaran 2012, xi). These approaches represent a step towards innovative innovation policy that differs from conventional approaches.

Muchie and Baskaran (2012: xi) further ask, "what would work better, promoting system of innovation based on broad-based innovation or system of innovation with high technology content, or combining them together to create new synergies and syntheses?" Combining the two can (in the context of the theme of this chapter) greatly impact the economies of a region like the SADC.

However, the broad-based innovation part of this combination needs particular attention, to ensure the inclusion of informality and corresponding innovations. The way in which the European Commission (EC) characterizes broad-based innovation shows the importance of paying attention to informality in systems of innovation. Broad-based innovation according to the EC should involve "all actors and all regions in the innovation cycle; not only major companies but also SMEs in all sectors, including the public sector, the social economy and citizens themselves (social innovation); not only a few high-tech areas, but all regions [...] and every Member State, each focusing on its own strengths with [...the region...], Member States and regions acting in partnership" (CEC 2010, 8). This characterization resonates with a definition of innovation that is relevant and applicable to this section; i.e. vis-à-vis the informal economy and its contribution to regional integration and wellbeing. Thus according to the Organisation for Economic Co-operation and Development (OECD), innovation is "the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organizational method in business practices, workplace organisation or external relations" (OECD and Eurostat 2005, 46). The foregoing characterizations of innovation have implications for efforts or the need to broaden the scope of activities that concern innovation and innovation policy that consider informality and the activities of people in the informal economy. For one, the characterizations clearly extend conceptualizations of innovation from the narrow focus on traditional linear and product based models focused on science and engineering, to approaches that are systemic. The systemic approaches are inclusive of service and low-tech industries (including enterprises in small and medium scale industries and informal undertakings) and forms of innovation that extend beyond product and process, to include forms such as marketing methods. Similarly, the policy space becomes inclusive of all policy sectors, and not just the traditional science and innovation. This creates room for a

region such as the SADC to unleash the potential and benefit from the contribution of the informal economy to integration and development.

That the informal economy contributes to development, livelihoods and wellbeing in Africa has been clearly demonstrated by research and the work of development oriented non-governmental organizations (NGOs). Moreover, innovation does occur in the informal economy too as demonstrated below. Because of this, the regional and national policies of respective member states of the SADC should promote inclusive innovative systems of innovation and innovative innovation policy, as the next subsections attempts to show.

Informality and Development

Studies of informality in Africa and other parts of the developing world clearly show that there is more to it than the simple argument that people involuntarily engage in informal socioeconomic activities because they are driven by poverty. The informal economy is indeed a source of livelihoods, employment and means of survival in Africa (Hart 1973; International Labour Organization 1972; Moyo et al. 2016; Nshimbi 2017a). Informal economic activities cater to the employment needs of especially females and youths and, indeed, some people in formal employment who earn low wages.

Further, informal employment not only serves as an employer of last resort which provides subsistence income. It is also a queuing device for formal salaried employment (Bernabè 2008, 2). In this way, workers tend to move into formal salaried employment from the informal sector.

The informal economy also promotes social cohesion, as actors in the sector rely on social capital to tackle common challenges and satisfy common needs. As an example, female informal cross-border traders in Zambia, Malawi and Mozambique whose informal trading activities are supported by a Common Market for Eastern and Southern Africa (COMESA) initiative--the Simplified Trade Regime (STR)--tell of the way in which they pool financial resources in self-help groups to purchase merchandise, which they then share according to amounts each one contributed to the pool (Nshimbi 2015). They do this to fill the gap arising from the lack of financial and investment support from formal lending institutions.

Though operating in precarious conditions, actors in the informal sector are able to make ends meet with such innovations, which fit into the broad-based innovation characterized above and discussed briefly (*vis-à-vis* informality) in the next section. Studies have actually shown that the wages of some actors in the informal economy are competitive with those of counterparts in the formal sector. Thus, it has been established that informal cross-border traders in Southern Africa gain employment and sustain livelihoods out of cross-border trade, which pushes them out of extreme poverty (Nshimbi 2017b). Similar studies focusing on urban areas in developing countries found the self-employed to have competitive incomes with wage earners in the formal sector (Yamada 2013). Based on such research findings, Yamada

(2013, 289–290) thus posits that people in developing countries are voluntarily or self-employed by choice in the urban informal sector and receive higher incomes from self-employment in that sector.

Innovation in the Informal Economy

The definition of innovation as a broad-based system that includes knowledge, the implementation of significantly improved products, new organizational methods, or new marketing methods in business practices, etc. (OECD and Eurostat 2005), helps illustrate some of the innovation inherent in the activities and behavior of actors in the informal economy. For instance, in his study of black immigrant traders in the South African City of Johannesburg, Moyo (2014, 257) calls these informal actors “enterprising” when they engage in new marketing methods and business practices. Moyo demonstrates how the immigrant traders exploit and fill up niche markets to satisfy the demand (among immigrant consumers) for products such as African traditional attire, which originate from other parts of Africa and are not readily available in South Africa. According to Moyo (2014, 258), the immigrant entrepreneurs noticed the presence of many immigrants from other African countries in inner city Johannesburg and, therefore, reasoned that these foreign nationals had a general need for traditional clothes that suited their national or ethnic tastes.

Moyo further illustrates the informal traders’ “enterprising” behavior evident in DRC (Democratic Republic of the Congo) and Zimbabwean immigrant traders who, upon visiting supermarket chain stores—e.g., Shoprite, Woolworths and Spar—established that the prices of vegetables were high. The immigrant traders thus went into the market, bought vegetables in bulk and packaged and directly sold them in smaller quantities to consumers, most of whom were South African. “It is arguable that it is an entrepreneurial [or innovative] quality on the part of Black African immigrant entrepreneurs to recognize that there were goods that needed to be sold in smaller quantities at less cost, directly to the public” (Moyo 2014, 257).

Further afield from inner city Johannesburg, informal traders constitute entrepreneurial networks that establish them as cross-border traders who crisscross the SADC region and beyond (Nshimbi 2015). Actually, many informal immigrant traders of the type being discussed here not only trade within inner city Johannesburg. They also use the city as a source of merchandise for export and to sell in the other shops they own in home and other countries in the SADC region (Nshimbi and Moyo 2018 forthcoming). Nshimbi and Moyo thus tell of traders such as a Zimbabwean who owned a shop in Johannesburg and in Bulawayo, Zimbabwe. Additionally, this informal trader also travelled to Zambia and Malawi to sell their merchandise in those countries. The informal cross-border traders who engage in such activities comprise a core element of the Southern African sub- and regional integration project and have been said to promote integration from below (Nshimbi 2017b). Thus, the informal economy constitutes a nonconventional and innovative means of regional integration from below, as discussed in the next section.

Integration, Innovation and Informality in Africa

The foregoing discussion gives the impression that Africa and its key regional blocs do not have any concrete or coherent policies, plans, positions or approaches to innovation. On the contrary, science, technology and innovation (STI) are considered key drivers of and crucial to sustainable socioeconomic development in Africa. They are considered able to lead to wealth creation and better standards of living. Africa and its regions have thus crafted clear STI visions, goals, objectives and plans. These are outlined in key continental and regional instruments. Essentially, the instruments stipulate that as drivers of development, science, technology and innovation help in alleviating poverty and contribute to the creation of employment while providing the scientific and technological solutions to the challenges facing regional integration (see, e.g., SADC 2001).

Africa and its key regions does not, therefore, shy away from continental and interstate engagements and policy on innovation. NEPAD (the New Partnership for Africa's Development)—otherwise the African Union's (AU) the technical arm—is, for instance, pushing for a sound Africa-wide system of innovation. At the behest of the African Ministerial Conference on Science and Technology (AMCOST), NEPAD uses its African Science, Technology and Innovation Indicators (ASTII), adopted by AMCOST in 2005, to enhance the capacity of African countries to develop and use STI indicators in policy and development planning (New Partnership for Africa's Development 2017). This should help enhance the quality of STI policies in Africa at national, regional and continental levels. According to NEPAD, the ASTII primarily focuses on the harmonization of industrialization policies at country and regional level, to ensure that synergies exist with continental policy.

Africa has indeed historically developed plans that categorically touch on STI and stipulate its role in or the way in which it should be exploited for development. Citable examples in this respect include the 1980 Lagos Plan of Action, the Constitutive Act of the African Union of 2000 (which entered into force in 2001), the Cairo Declaration and Cairo Plan of Action of 2000, Africa's Science and Technology Consolidated Plan of Action of 2005, the Science, Technology and Innovation Strategy for Africa 2024, and the AU Agenda 2063, among others. Such instruments clearly show that African leaders consider STI and policies important, based on the declarations and commitments made therein to the subject.

In line with continental aspirations and objectives, African regional economic communities (RECs) recognize the importance of innovation too. As discussed earlier, innovation insofar as concerns regional integration in Africa is best conceived as largely formal: involving the linear progression where the firm is key, along with the need to exploit economies of scale. The innovative and competitive firm stands to benefit the most from this. Studies conducted in Southern Africa have at least shown how firms that were not innovative and competitive enough collapsed after the liberalization of markets implemented under the auspices of, among others, global financial institutions such as the World Bank and International Monetary Fund (Nshimbi 2005).

Still, the eight respective RECs recognized by the AU likewise consider innovation on their development agenda as can be seen in attempts to formulate and in their STI policies. In the interest of space and given the scope of this chapter, two examples of these RECs including the Economic Community of West African States (ECOWAS) and the SADC are briefly considered here.

The ECOWAS Revised Treaty (ECOWAS Commission 1993) has a whole Chapter (V) that speaks to the promotion of cooperation in industry, science and technology, and energy among member states. It also has a full Article (V.27) dedicated to science and technology. In the treaty, member states pledge and commit to strengthening national capabilities in science and technology along with the regional harmonization and coordination of national science and technology, and related policies. These regional provisions for science and technology are distilled into the ECOWAS Policy on Science and Technology (ECOPOST), adopted by the Second Conference of ECOWAS Ministers for Science and Technology in 2012. The policy provides a framework that member states can use to establish or improve national STI policies and action plans. The policy is accompanied by action plans and comes with, among other things, a monitoring and evaluation mechanism for policy implementation. It also calls for the creation of a directorate for science, technology and innovation in member states.

In the SADC region, member states through the Declaration and Treaty of the SADC (Southern African Development Community 1992) commit to the promotion of science and technology too and identifies it as an area of regional cooperation. The 2008 SADC Protocol on Science, Technology and Innovation seeks to enhance cooperation, promote the regional transfer and mastery of science and technology and the development and harmonization of science, technology and innovation among member states (Southern African Development Community 2008). Additionally, the region has established the SADC Science, Technology and Innovation Desk in the Social and Human Development Unit at the SADC Secretariat. This signifies a move towards strengthening the institutional capabilities of the region in STI.

Without minimizing the importance of the legislative, policy and institutional initiatives for STI in Africa and its RECs discussed in this section, the measures clearly have no room for or the promotion of innovation in relation to informality and the informal economy. Actors in that sector are left to fend for themselves, despite the size and importance of the sector to the sustenance of livelihoods, employment creation, potential and contribution to innovation and development, etc.

Moreover, the reality at both continental and regional level is that of a formal system of innovation fraught with challenges. Atop the list of these challenges is the lack of or low levels of funding for R&D. This is coupled with the shortage of human resources in the areas of science and technology. And, as discussed throughout this chapter, these instruments are state-centric and confine innovation within nation-state boundaries, despite their continental and regional connotations. They expressly seek and focus on the development and strengthening of national systems of innovation. In this way, they promote the territoriality of innovation by placing emphasis on the territoriality of borders and confining innovation to the spaces

within nation-state borders. Thus, the continental and regional approaches to innovation could in a nutshell be characterized as largely state-centric. That the onus to domesticate continental and regional instruments on innovation is on each member state (Fig. 1), also reinforces the state-centric approach to innovation. This is equally evident in the fact that these instruments urge member states to incorporate the provisions contained therein into respective member states' national development plans, policies and legislations, etc. However, this chapter posits that the human element is central to the determination of the survival, competitiveness and progress of society. Efforts to achieve wellbeing and development that place the African—especially the unrecognized actor in the informal economy—at the core of a system of innovation constitute a significant part of the vision of Africa held by its founding fathers. This is evident in continental blueprints such as the Lagos Plan of Action, which asserts that “Africa’s greatest asset is its human resources” (OAU 1981, 28). It is humans that create wealth.

Conclusion

This chapter attempted to break away from convention in an effort to innovate around innovation policy, systems of innovation and regionalism. It did this by responding to several questions regarding systems of innovation in the regional context, characterized by mechanisms in which at least two geographically proximate countries purposefully cooperate, being guided by the ideal of forming regional alliances. Among such questions was one that sought to look into ways in which systems of innovation could be extended from the state to the regional level, without neglecting the informal or grassroots actors located (with)in the national environment. Also asked was, what should (a system of) innovation that leads to wellbeing in an African regional context look like?

As relates to innovation and development, the major problem concerning innovation and regionalism in most of Africa was thus established to be the fact that policymakers not only view the existence of the informal economy as a problem and refuse to acknowledge it, but the failure to realize the critical role played by actors therein to regionalism and livelihoods (Nshimbi 2016; Soderbaum 2004). Consequently, the authorities fail to unlock the creative potential and entrepreneurship of the informal sector.

It is not just the policymakers in Africa. The Oslo Manual, which is “devoted to the measurement and interpretation of data relating to science, technology and innovation”, acknowledges that the economies of developing countries significantly depend on practices in the informal economy and argues that informality “is not a favourable context for innovation” (OECD and Eurostat 2005, 4, 137). However, it does not proffer any policy or prescriptions on how the “great creativity invested in solving problems in the informal economy” (OECD and Eurostat 2005, 137) can be systematically applied to foster development from those innovations. Informality is just wished away or could, at best, be said to be lumped with clandestine activities

such as trade in stolen goods, drug manufacturing and trafficking and smuggling; all of which are considered illegal (Schneider and Enste 2002; Lesser and Moisé-Leeman 2009). Such a view is informed by the general understanding of informality in advanced economies. That workers and firms chose to remain unregistered or work in the informal sector in order to avoid strict regulation and high taxes (Bernabè 2008, 2). It is imperative for policy makers in Africa to change their perception of the informal economy, the actors therein and the role of the sector in development and the promotion of wellbeing. The need to craft (progressive) policies for this sector and the policies to be consequently drawn greatly depend on these perceptions. It is high time African policy makers revisited and revised the pre- and colonial traditional view that the informal sector is backward (Geertz 1963; Nshimbi 2018 forthcoming). Only then can wasted efforts to stifle the sector and ostracize the actors therein be put to better use. Only then can governments, regions and Africa establish prospects for inclusive innovative innovation policy and thriving regional and continental systems of innovation.

Concerning formal systems of innovation and regional integration, the concluding recommendation is made that, Africa needs a regional approach to systems of innovation. For starters, this could be built on the eight RECs recognized by the AU. A regional system such as, say, an ECOWAS system of innovation would help reduce the possibility of the development and evolution of innovation that is skewed towards the most advanced regional economy—in this case Nigeria. This would enable the region to work out ways of balancing out a potential zero-sum game that might result from a region's professionals and skilled human resources from the less developed economies migrating to the developed economies (assumed to have better systems of innovation) in the region.

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Transnational Simultaneity: An Emerging African Perspective of Cross-Border Lifestyle



Adebusuyi Isaac Adeniran

Background and Statement of Study's Problem

Within the West African sub-region, notable communities of shuttle traders and occupational migrant groups, of the same and varying ethnic origin, exist. Amongst such groups are the Ejigbo-Yoruba (Nigerian) migrants who, for instance, have had a long-distance experience of trans-border relations with the Ivorian society. Trans-border interactions, for purposes of trade and work have become the most widespread pattern of mobility, especially since the colonial and immediate post-colonial era. Meanwhile, such have not been dominated by the male folk as mobility used to be in parts of West Africa, particularly during the pre-colonial period; often factored by inter-ethnic strife and wars. The colonial and post-colonial migration of labour have equally put on the move a considerable number of women who are seeking for opportunities that could enable improvements in their existence, for instance through rewarding employments or through enabling business ventures. Essentially, related cross-border engagements of the womenfolk have reflected the newly 'acquired freedom of movement', hitherto improbable within the pre-colonial setting (Adeniran 2012: 78–80; Afolayan 2004; Asiwaju, 1992).

While the impact of cross-border migrants on trade and related socio-economic endeavours often improves as soon as they become potently entrenched into the host economy, their role as trade facilitators for exports and imports to and from their home country could only be most effective if they remain in regular contact with the home country and are aware of developments, which could influence trade there (Manning 2005; Bauder 2006). In the meantime, the problem of economic immobility, which the immigrants usually predicate their relocation upon, ab initio, often resurfaces on the social plane when vagaries of transnationalism present limits

A. I. Adeniran (✉)

Department of Sociology and Anthropology, Obafemi Awolowo University, Ife, Nigeria
e-mail: adebusuyi@oauife.edu.ng

to them by way of undue foreclosure of their emancipatory propensities. As such, any emanating attempt at identity repositioning by the immigrants within the host society is bound to impact on their usual day-to-day experiences.

It is, perhaps, with the realisation of this, that the Economic Community of West African States (ECOWAS) has found it expedient to transform its earlier intent of 'ECOWAS of States' to 'ECOWAS of People'. Within the prism of this new expectation, it would be probable to assess what is actually happening to the people directly rather than through the state.

Aim and Objectives of Research

The primary aim of this study is to present the practice of transnational simultaneity as an emergent African pattern of cross-border lifestyle. Other objectives include:

- (i) To explore the evolutionary trend of cross-border interaction in West Africa;
- (ii) To examine the process of identity construction by Nigerian immigrants in Cote d'Ivoire;
- (iii) To explain the specific impacts of simultaneous attachment to two nations by Nigerian immigrants in Cote d'Ivoire;
- (iv) To analyse the practice of transnational simultaneity as a framework for attaining the goal of a borderless West African sub-region.

Theoretical and Methodological Consideration for the Study

The study's specificities are ingrained in the dictates of Charles Tilly's *urban sociological postulate* in which the nature and pattern of migration to urban centres are interpreted by connoting related processes as evolving social networks.

Contrary to the assumptions of minimizing distances and multiplying opportunities repeatedly, individuals are keen on establishing regular migration between two widely separated locations, and then concentrate their migratory practices within such bipolar configuration. Chain migration in this respect is, of course, the arrangements in which social ties persist between people of a particular origin of migration and a particular destination of migration, with people at the point of destination sending back information about new opportunities, recruiting new migrants and helping them to relocate. This form of cross-border interaction reflects the nature of prevalent practice by Ejigbo-Yoruba (Nigerian) migrants along the Nigerian-Ivorian migratory corridor.

In spite of subsisting colonial, cultural and geographical impediments between Nigeria and Cote d'Ivoire, the Ejigbo-Yoruba migrants have been able to sustain existing chain of migration between the two countries over time and space, though a supposed sister nation of Ghana, and two other West African countries – Togo and Benin Republic – have to be crossed over (see Fig. 1).

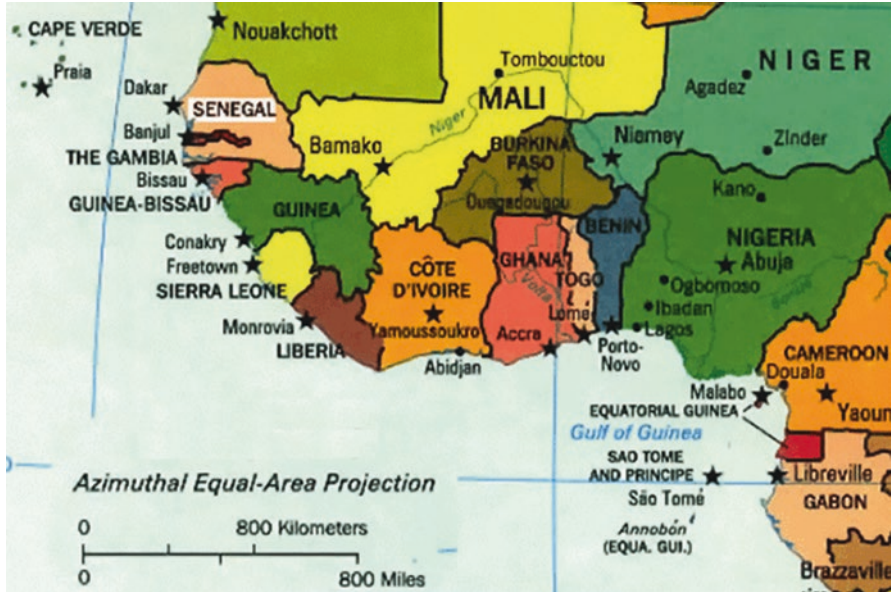


Fig. 1 Map of West Africa showing the migratory poles and the transit points. (Source: <http://un.org/Depts/Cartographic/map/profile/westafrica.pdf>, accessed on 06/08/2011)

Being essentially a reflexive exploratory study, relevant qualitative data collection techniques (non-participant observation, in-depth interviews (IDIs), focus group discussions (FGDs) and case study) were utilised in generating primary data for the study from the two study locations of Ejigbo, Nigeria and Abidjan, Cote d’Ivoire. This was done in order to provide the study with useful first-hand information on the nature of cross-border networking and mode of constructing ‘self’ within the transnational social space. Content analysis and ethnographic summaries were engaged in the process of data coding and analysis.

In Abidjan, only Ejigbo-Yoruba immigrants who have stayed for a minimum of 5 years in Cote d’Ivoire were engaged in the study, and in Ejigbo, only Ejigbo-Yoruba returnees of a minimum of 5 years stay in Nigeria were involved in the study. A pilot study preceded each of the main surveys in the two study locations in order to pre-test the potentiality of the research instruments and indeed, to get accustomed to the study’s locations.

Historical Reflections on Cross-Border Interactions in West Africa

The arrival of European colonialism at the twilight of the nineteenth century did redefine the frameworks for cross-cultural and cross-border relations in parts of West African sub-region. Hitherto, various societies had existed as kingdoms and as

empires without any clearly defined borderlands. Nevertheless, nomadic herding and trading across the Sahara had caused significant human mobility and migration across parts of pre-colonial West Africa. As such, incidences of unregulated movements of individuals had been necessitated.

The policies and workings of the colonial administration in West Africa did result in geo-political delineation of borders, largely along the Francophone-Anglophone divide. The political economy of the colonial administration did encourage unbridled internal migration within the emergent nation-states. A justification in this respect was the colonial manpower need in mineral extraction, agricultural production and public administration. Meanwhile, cross-border interactions, especially along the Francophone-Anglophone dichotomy, were unduly discouraged. Yet, though ironically, such colonial creation could not stop the people from sustaining their pre-colonial socio-cultural and economic interactive frameworks post-colonial rule. The earlier established, pre-colonial modes of cross-border interaction had outwitted such contemporary tendencies (Adeniran 2009: 3676).

Despite exigent set back in cross-border interactions amongst the people of West Africa, as facilitated by extant colonial interest, a lasting development is the fact that boundaries between the peoples of the same or different culture (ethnic group) in different countries were routinely adjudged by these same people as being artificial. Thus, many migrants who came from areas immediately to the other side of the border or across borders usually consider such movement as one taking place within the same socio-cultural space rather than between two different nations (Okobiah 1989).

The Process of Migrants' Networking

Chains relations have tended to predetermine the pattern of assistance obtainable within the network interactions. The achievements of earlier migrants and the entrance of Ejigbo-Yoruba indigenes into cross-border transport business, and their extant willingness to transport people and goods on credit between the two points have all helped the growth and sustenance of the familial pattern of the network:

... the lifestyle of Abidjan people (Ejigbo-Yoruba immigrants) encouraged me to go initially ... no home-based individual could spend the way they used to do then (IDI, male, returnee, 78 years, Ejigbo, August 18, 2010)

When people at home saw the progress that some of the migrants were making they were naturally encouraged to become part of the network process. For instance, the building below (see Fig. 2) happened to be one of its first types in the entire Ejigbo community in Nigeria. It was constructed by an Ejigbo-Yoruba immigrant in Cote d'Ivoire. It did serve as a source of encouragement for the indigenes to dream of Cote d'Ivoire, especially in the 1950s. Impliedly, it enabled the growth of the migratory network along the Nigerian-Ivorian corridor. It is interesting to under-



Fig. 2 One of first set of projects by the migrants in Ejigbo, Nigeria. (Source: Fieldwork, 2010)

stand that most personal or communal projects became a reality through the cooperation between the immigrants and their relatives back home; for instance, the establishment of The French Language Centre in 1969 in Ejigbo, which serves a social network framework for potential migrants to Cote d’Ivoire. While the immigrants provided the fund, their relatives monitored the projects.

Aside from building on existing level of trust, some of the relatives back home were either helped to set up businesses or to migrate to Cote d’Ivoire in order to begin a new life. One of the major summations of the ‘transnational social field’ becomes tenable here: that the pre-migratory social relations pattern between the migrants and their relatives at home are sustained for the growth of the network in particular, and the development of individuals at large (Observation, Ejigbo, June 2, 2010; IDI, female, returnee, 72 years, Ejigbo, August 8, 2010).

According to a ‘male case profile’, what has been spurring him to assist individuals of Ejigbo-Yoruba descent to migrate and settle down in Cote d’Ivoire is that at a particular point in his existence, he had benefitted from the existing network structure; that is, between Ejigbo, Nigeria and Abidjan, Cote d’Ivoire. He claimed that when he was tired of Nigeria after his secondary education, he had to beg a driving crew that brought him to Cote d’Ivoire free of charges:

... this is why I cannot reject anyone that desires to come here (Cote d’Ivoire) through me ... many friends, many family members have come here through me. (Case profile, male, 55 years, cross-border transporter, Abidjan, June 20, 2010)

This network functionary affirms that it has been his ‘personal principle’ to assist individuals to migrate to Cote d’Ivoire from Nigeria, even when it is not convenient. By implication, this gesture has been facilitating the growth and sustenance of prevalent ‘familial pattern’ of the network’s functioning.

The Pattern of Migrants’ Identity Construction

As a matter of routine, an average Ejigbo-Yoruba migrant in Cote d’Ivoire kept alive two distinct identities within the adopted social space. That is, a ‘Nigerian identity’, which is the original Ejigbo-Yoruba cleavage and an ‘Ivorian identity’, which is a disposition that is essentially of the Ivorian social space. While the ‘Nigerian identity’ depicts traits and attributes that are basically Nigerian (that is, of Ejigbo-Yoruba), the Ivorian identity entails traits and peculiarities that are essentially of Ivorian (that is, of cosmopolitan Abidjan). Such identity cleavage has, however, undoubtedly emanated from the larger network functioning.

Prevalent situation (and the interest at stake) usually determines the mode of related identity deployment in the process of interaction. While the need for a productive socio-economic integration into the host society has been the impetus for related identification with the Ivorian culture, the need for a convenient re-integration into the Nigerian society thereafter has been the underlying factor for continued attachment to Nigerian peculiarities. The following IDI submission has been quite appropriate in driving home this affirmation:

... during selling and other business transactions, I do as if I am part of Ivorian society ... among ourselves and whenever I visit Nigeria I relate like a typical Nigerian. (IDI, female, trader, 52 years, Semisel-Abidjan, June 21, 2010)

Though, most of the Ejigbo-Yoruba in Cote d’Ivoire believe in Nigeria, they seemed to have been compelled to live and identify with specificities that are of the Ivorian society for obvious socio-economic consideration. One could observe that hardly would you find any matured Ejigbo-Yoruba indigene in Cote d’Ivoire without a building or a business project, either completed or ongoing, in Nigeria. In fact, participation in such projects is seen as an evidence that one has not been ‘lost’ completely to the Ivorian society, and indeed, it serves as a means of re-oiling the wheel of pre-migratory social relations with relatives back home (Observations, Ejigbo May 4–9, 2010; Abidjan, June 20–July 2, 2010).

Besides, most of the Ejigbo-Yoruba immigrants would have ordinarily preferred to exist in Nigeria if relevant opportunities at the level of socio-economic participation had been available. In spite of attaining considerable measure of their transnational goals, most of the Ejigbo-Yoruba immigrants, still felt attached to Nigeria. This view has been buttressed further by the submission of the following male FGD participant:

... I love Nigeria ... I equally love Cote d’Ivoire ... see what God has given me in this country ... I have learnt to be like the people over the years. (FGD, male, entrepreneur, 56 years, Treichville-Abidjan, July 1, 2010)

Really, all I could see around him were riches and accomplishment. Though, this male FGD participant is not educated, he functions as a 'big time' contractor to the Ivorian national government; a feat that would have been rarely feasible in Nigeria considering his family and educational background. For realising his socio-economic goals in Cote d'Ivoire, he is at 'home' with the Ivorian social space. Simultaneously, he is not prepared to neglect his 'original' attachment to Nigeria, which is largely denominated by subsisting kinship interconnectedness. In this light, the notion of 'methodological nationalism' that recognises the potency of the limits of national borders in determining patterns of socio-economic interaction within a given 'social space' would become obliterated and pave way for the emergence of a 'transnational social space' in which 'national borders' would no longer serve as impediments to interactions or functioning beyond geo-political boundaries.

Various observations made at a burial party for the father of a male Ejigbo-Yoruba immigrant (who had been buried in Nigeria) in Macory-Abidjan did reveal that ceremonies among the people here do take after the usual styles and procedures in Nigeria. When I inquired of the reason for this, I was informed that they did not want to forget home (Nigeria). In fact, the arrangement of the street (not the party) was as if it was in Nigeria. (Observations/Interactions, Macory-Abidjan, June 22, 2010).

I was to overhear a middle age woman cracking a joke at the gathering:

... leave my brother alone; unfortunately for him he has his passport on his cheeks.

Literally, the submission above laid credence to prevalent 'identity dualism' that most of the Ejigbo-Yoruba tend to imbibe in the transnational process. The middle age woman was jokingly affirming the 'Nigerianess' in his 'brother' as indicated by the tribal marks on his face, though he was flagrantly tending to claim to be 'more Ivorian than the indigenes' while interacting within the public space. Such Ivorian cleavages were glaring in his dressing pattern, gesticulations, discussions (nearly all he was saying were Ivorian issues and concerns) (Observations/Interactions, Macory-Abidjan, June 22, 2010).

In most instances, economic interests of individuals have been the precursors of such intent and practice amongst the immigrants. Situational contextualization of 'self' is seen to be contingent upon 'extant interests' at stake and the 'social space' within which related disposition is unfolding (FGD, female, 40 years+, Abidjan, June 26, 2010).

Transnational Simultaneity: An Emergent Framework for a Borderless ECOWAS Sub-Region

The process of simultaneous identification with two societies by the Ejigbo-Yoruba migrants within the Nigerian-Ivorian corridor seems to be presenting a positive framework for the realisation of the much desired socio-economic integration of the

West African sub-region. Amongst the relatively older returnee-indigenes of Ejigbo community in Nigeria (that is, from 70 years and above), their retirement or relocation from Cote d'Ivoire has not prevented them from going back to the country intermittently, especially by road despite the tediousness and exhaustive nature of such trips. Why? One, their existence is still largely tied to Cote d'Ivoire. They do go there to collect rents on their houses, shops and other business ventures (often managed by their Ivorian spouses or children or relatives whom they took there ab initio). Some even go there to collect their retirement benefits and/or pensions from the Ivorian government (Observations, Ejigbo, May 19, 2010; Abidjan, June 21–July 2, 2010).

Two, to visit their Ivorian friends whom they must have met in the course of their sojourn in Cote d'Ivoire especially those, who, one way or the other, facilitated the path of their existence while there, for instance, in the process of acquiring Ivorian right of stay or citizenship; getting jobs and/or contracts, securing lands and/or property, marrying indigenes and of course, in acquiring local spiritual power (Observations, Ejigbo, June 19, 2010; Abidjan, June 21–July 2, 2010).

... I am on my way to collect rent on my house and shops in Abobo-Abidjan (Cote d'Ivoire); to do my monthly pension verification and to visit my old friend at Bouake to renew my 'gbetugbetu' (traditional spiritual power) which he gave me while we were working together. (IDI, male, returnee, 86 years, Ejigbo, June 18, 2010)

Inferring from the text of the IDI above, it is conspicuous that the respondent, as applicable to some other returnees, still has arrays of reasons for sustaining his relationship with the Ivorian society; from economic consideration to family consideration and, interestingly, spiritual consideration. One end product of all these patterns of relationship is the enhancement of bond of integration across the region, though in a rather inverse pattern.

Naming of monuments and streets in some parts of Ejigbo, Nigeria and Abidjan, Cote d'Ivoire equally attests to the claim of regional integrative propensity, courtesy of the ongoing transnational processes along the Nigerian-Ivorian corridor. 'Oba Abidjan Street' (see Fig. 3) is a major street in Ejigbo town in Nigeria. Not only that it comprises of mainly properties of Cote d'Ivoire-based indigenes, the most revered and respected Oba-Yoruba (Yoruba King) in Cote d'Ivoire – late Chief Emmanuel Alabi – has his house and burial site on this street. This street radiates 'high-class setting'; and savours the subsisting interconnectedness and identification of Ejigbo-Yoruba with the Ivorian society. Notably, obtainable way of life in Cote d'Ivoire is replicated on this street. Such include the retail of solely imported goods from Cote d'Ivoire. In Cote d'Ivoire, one of the major streets in Downtown Abidjan – Temidire – has been named in honour of the Ejigbo-Yoruba migrant group. Actually, the name is a Yoruba word. Equally, obtainable way of life in Nigeria is replicated on this street; including the sale of solely imported goods from Nigeria.

The nature of the Ejigbo-Yoruba's interactions with the Ivorian society has potently made both Ejigbo and Abidjan communities to become somewhat interdependent over the years. At the level of transaction the '*Franc CFA*' has been



Fig. 3 One of the major streets in Ejigbo, Nigeria. (Source: Fieldwork, Ejigbo 2010)

a popular ‘legal tender’ in Ejigbo, Nigeria and of course, exchanged with the ‘*Nigerian Naira*’ in most households in the town. Reciprocally, this is the situation with the ‘*Nigerian Naira*’ against the ‘*Franc CFA*’ in most Yoruba households in Abidjan, Cote d’Ivoire often populated by the Ejigbo-Yoruba. Essentially, as many Ivorian commodities are sold in Ejigbo so also identifiable local Nigerian commodities/items are retailed in Abidjan. Though, as a group they tend to replicate most of the things done back in Nigeria in Abidjan, there still exists a remarkable departure from the ideal. The Ivorian society has actually impacted on them. As a consequence, a new outlook; definitely not wholly Ivorian or wholly Nigerian (possibly, ECOWAS) has emerged amidst them. The speaking pattern of the people has been largely distorted; whenever they speak Yoruba, colloquial Abidjan French usually reflects and vice versa (Observations, Ejigbo, June 19, 2010; Abidjan, June 21–July 2, 2010).

Concluding Comments

Since the Ejigbo-Yoruba immigrants are usually desirous of attaining formidable socio-economic acceptance within the host society (that is, Cote d’Ivoire), and also to be in kinship touch with the home country (that is, Nigeria), this study affirms that the resultant implication of such interactive pattern is the production of a people who are engaged in a kind of ‘transnational subsistence dualism’ (that is, ‘transnational simultaneity’) in which integration for socio-economic gains within the host society and re-integration into the home country thereafter have been the main impetus for the prevalent dualist disposition. As they tend to identify with the host’s institutional peculiarities, so also they tend to identify with their home

cultural affinity. As such, the projectable identity of individuals at a specific point in time would be factored by the subsisting social space within which related interactions are taking place and the extant interests at stake. Essentially therefore, an epistemological framework for understanding the way a transnational migrants' community constructs its identity in relation to 'home' and 'host' communities has been presented by this study.

Recommendations

- (i) A greater attention should be given to contextualising the preference of Ejigbo-Yoruba for migrating to Cote d'Ivoire despite prevalent colonial and contemporary impediments like language and related cultural specificities. Perhaps such pattern of mobility could be utilised in explaining the possibility of a borderless West African sub-region;
- (ii) The network identity, which seeks to integrate network migrants into the socio-economic workings of the host community and at the same time facilitating the sustenance of the pre-migratory relations with the home front should be made sustainable;
- (iii) Besides fostering regional integration, ongoing simultaneous attachment to Cote d'Ivoire and Nigeria by the Ejigbo-Yoruba migrants should be utilised in enabling inter-community development in West Africa;
- (iv) The practice of 'transnational simultaneity' by the Ejigbo-Yoruba should be engaged as a veritable platform for realising the goal of a borderless West African sub-region.

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Adebusuyi Isaac Adeniran is a lecturer/researcher at the Department of Sociology and Anthropology, Obafemi Awolowo University, Nigeria and a visiting scholar at The Harriet Tubman Institute, York University, Canada. He has published widely in notable local and international journals, periodicals, books, and encyclopedias. He is a recipient of cogent scholarship, fellowship and research grant awards. His research fields include: border studies, regional/identity integration, international development and political sociology.

Knowledge Valorisation for Inclusive Innovation and Integrated African Development



Saidi Trust

Introduction

The efforts of African countries towards building endogenous Science, Technology and Innovation (STI) systems for the service of their population continue, but with limited success (Sanginga 2009; Juma 2005; Adeboye 1998; Vitta 1990). The last decade has witnessed a rapid increase in the number of universities in Africa, particularly those oriented towards STI, due to the recognition of the important role they play in the innovation system (Sooryamoorthy 2015; Cloete et al. 2011). It is without doubt that universities occupy a central role in creating and disseminating knowledge. Research is one of the core responsibilities of universities, which is meant to generate solutions to the challenges that affect society (Sawyer 2004). To ensure that scientific research contributes to the body of knowledge in the emerging global knowledge society, scientists in the academia are expected to publish their results. This is very important as it facilitates knowledge to traverse out of the confinement of laboratories.

To promote publications, there are various incentives attached such as promotion and tenureship (Van Dalen and Henkens 2012). This exerts a lot of pressure to publish in order to gain financial incentives and secure employment. Just like other continents, Africa has registered a sharp increase in the number of publications (Tijssen 2015). This is no mean achievement, considering that it is a good indicator that a research culture has become engrained in the academic institutions. For example, from 1996 to 2012, the number of research papers published in scientific journals with at least one African author more than quadrupled from about 12,500 to over 52,000. During the same period, the share of the world's articles with African

S. Trust (✉)

Division of Biomedical Engineering, Department of Human Biology,
University of Cape Town, Cape Town, South Africa
e-mail: trust.saidi@uct.ac.za

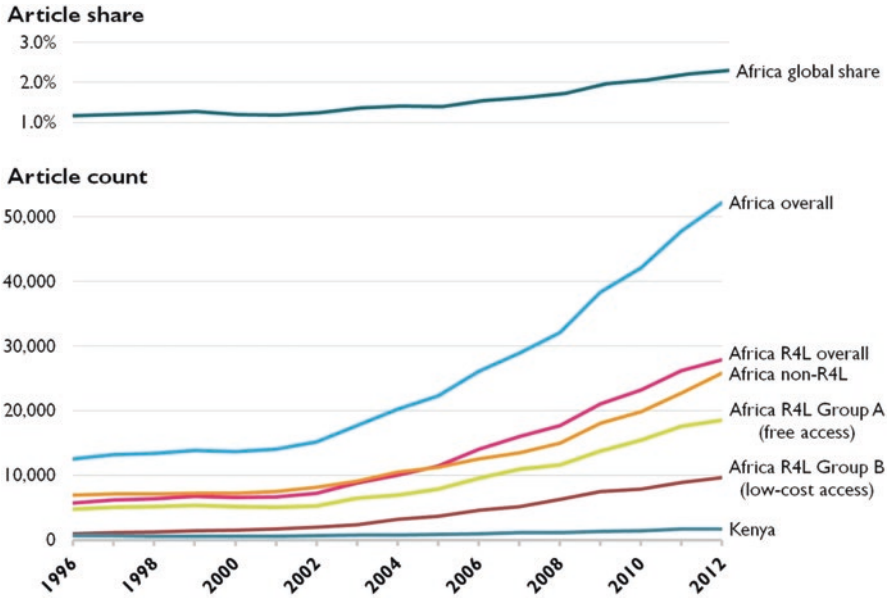


Fig. 1 Increase in the number of publications in Africa (Schemm 2013)

authors almost doubled from 1.2% to around 2.3% (Schemm 2013). Looking at Africa’s overall research outputs as a share of total publications globally, it is remarkable that the continent has made remarkable progress on the world stage (Blom et al. 2016). This is a very great achievement in the prospects for Africa to develop as research and innovation activities can converge and become strategically interlinked to improve human well-being. The phenomenal increase in the number of publications in Africa is shown in Fig. 1:

Despite the increase in the number of publications in Africa, it seems that the results have not culminated into significant impacts in terms of solving the day to day challenges that affect the inhabitants of the continent. Large volumes of publications have been generated, but their impacts in providing solutions to the problems affecting humanity are very limited (Sanginga 2009). For example, the continent is still far from solving challenges in the health, agricultural and energy sector. Even though Africa sits on approximately 60 percent of global yet-to-be cultivated arable land, the continent continues to experience hunger as families struggle to feed their children and dependants (Sachs 2012). Of late, the continent has been registering poor agricultural harvests, which has forced countries such as Zimbabwe to become net importers instead of exporters of food (Rakotoarisoa et al. 2011; Del Ninno et al. 2007). The importation of staple food which should be produced locally has the effect of consuming the meagre foreign currency reserves, resulting in unfavourable balance of trade. Many African countries such as Democratic Republic of Congo, Zambia and Mozambique boast of huge mineral resource endowments, yet they continue to register high poverty rates (Campbell

2009; Deaton 1999). Although some of the causes of poverty are linked to mismanagement of resources, it can be argued that little effort has been made towards coming up with mechanisms for adding value to primary commodities.

The World Bank indicated that sub-Saharan African countries have the largest share of people living below one dollar a day (World Bank 2012). While other countries in Asia and Latin America are slowly pulling themselves out of poverty, African countries are regressing into lower levels of deprivation. For example, the health sector in Africa is confronted by a heavy burden of communicable and non-communicable diseases (Kirigia and Barry 2008) as well as neglected tropical diseases which adversely affect the poor (Hotez and Kamath 2009). Furthermore, a high proportion of the inhabitants do not have access to clean sources of water (UNICEF 2012), while the provision of reliable energy has remained a pipe dream (Brew-Hammond 2010). The challenge of eradicating poverty remains uncertain as there is hardly any country in sub-Saharan Africa which achieved the Millennium Development Goals. With the focus shifting towards the Sustainable Development goals, it is not an understatement to argue that the continent may follow the same trajectory unless strategic measures are put in place to promote inclusive innovation. One of the measures may require revisiting how research is conducted as STI is the key driver of human development.

The central question of this chapter is: How can Science, Technology and Innovation be appropriated and made relevant for the development of Africa? It is motivated by the central theme of the book 'Innovative research for an integrated African development', which explores the link between innovation, regional integration and development in Africa as a function of not only the structural transformation of economies, but the advancement of scientific and innovation capacities. In responding to the question, this chapter makes a case for Africa's sovereignty by arguing for a socialisation and democratic governance of STI as a pre-requisite towards sustainable development of the continent. This comes at a crucial moment when there is growing call for transforming the education system in Africa, particularly in South Africa where the discourse on decolonisation of science education is considered to be part of an integral part of the transformation process which involves both an epistemological and intellectual paradigm shift.

Role of Science, Technology and Innovation Towards Development

At the heart of the debate about the development of Africa is the question of how STI can be exploited to improve human livelihoods. It is indisputable that STI can improve human livelihoods through poverty alleviation and economic growth (Juma 2005; Watson et al. 2003). The role of STI as a touchstone for development is beyond doubt. The question is no longer about whether STI can contribute towards development or not. Instead, it is about how STI can be exploited to improve the

standard of living of different societies, as most scientific and technological developments exist through human beings in action in particular contexts.

Science, Technology and Innovation is associated in all means with modernity as an essential tool for rapid development (Brito 2014). This is because technological and scientific revolutions underpin economic advances, particularly improvements in health systems, education and infrastructure. The developments in STI hold the potential to improve human livelihoods and enhance economic development (Aghion et al. 2009). Globally, the influence of STI on people's lives is growing and this is not an exception to Africa. According to the World Bank (2012), seven of the ten largest economies of the world by 2020 would be China, Japan, India, Thailand, Indonesia, South Korea, and Taiwan. A few decades ago, these countries were known to be poor with some in the middle income bracket. However, with the introduction of STI in an effective and strategic manner, these countries have made rapid advancement across the globe. Thus, the role of STI in improving human livelihoods across the globe cannot be overemphasised.

Countries across the world are actively engaged in research aimed at fostering scientific and technological development. The issue is no longer about mere publications but the impact on society. What separates the different countries is the impact that the research has on transforming human livelihoods. Some of the researches are of academic interest, while others generate innovative solutions to global challenges. A nation's development and prosperity is not determined by the quantity of its research outputs only, but also quality in terms of societal relevance. Without proper implementation of STI, the efforts to conduct research can generate large volumes of publications with minimum impact on humanity. This is a challenge, especially in the context of Africa as resources are being channelled towards research and development with the expectations that it will bring a turnaround to the economy. Various initiatives have been made with the aim of harnessing STI for the development of Africa.

Initiatives Towards Promoting Research STI for the Development of Africa

Many African countries recognise the critical importance of research, hence the emphasis towards increasing budgetary allocations for research and development. Based on the recognition of the role of research towards human development, African governments are committing themselves to invest at least 1% of their Gross Domestic Product (GDP). The call for increased investment in research and development has been done through various platforms namely Monrovia Declaration of 1979, the Lagos Plan of Action (LPA) for the Economic Development of Africa (1980–2000), the Eighth Ordinary Session of the Executive Council of the AU (2006) and the Ninth Executive Council (2007) (Akonor 2009; OAU 1982). The call for increased funding in research is a result of the fact that many African countries

are lagging behind in terms of investing sufficient financial resources. While investment in research and development as a percentage of GDP is an important measure of any country's move towards a more knowledge-based economy, it does not indicate the quality, relevance and impact of the outputs.

Apart from calls for increased investments in research, African countries have been working towards developing and/ or revising the STI policies. As early as the 1970s, African countries have been assisted by UNESCO and UNECA through the CASTAFRICA to create STI policies and management institutions (Jugessur 1990). Over the past years, Africa has witnessed the establishment of National Research Councils with several countries having a stand-alone Ministry of Science and Technology. Furthermore, research in STI has been integrated across various departments and ministries due to its cross cutting nature. The African Union declaration marking 2007 as the 'Year of Scientific Innovation for Africa' stimulated several developments in the area of STI and this included the establishment of centres of excellence at country and regional levels and the revitalising of African universities (Irikefe et al. 2011). In 2014, the African Union adopted a new strategy, the 'Science, Technology and Innovation Strategy for Africa 2024 (STISA- 2024)' to provide an enabling environment for STI as an engine for development with the aim of meeting both economic and societal challenges in the broader context (Ambali 2013). In an attempt to bring researchers together, countries such as South Africa, Kenya and Zimbabwe have established academies of science. These are all efforts meant to bring positive impacts on research for the development of the continent. Such efforts provide a strategic and systematic way of channeling research efforts towards desirable outcomes.

Despite all the commendable efforts to promote STI in Africa, the impact in addressing the challenges affecting the continent has been minimal. However, it should be appreciated that the various initiatives have laid a solid foundation for STI development. The focus has been mainly on the conditions necessary to promote STI development with less attention being on how the research should be done. It is at this juncture that the focus should shift from what Kilduff et al. (2011) describe as blue-sky research towards research with impact on human development. Thus, the question on the impact of research is fundamental towards aligning all the efforts that have been made in facilitating inclusive innovation. As the number of papers are increasing, which has made Africa visible on the global area, the challenges facing the continent continues to grow. This implies that there is a missing link between the quantity and quality of the research, particularly in terms of the impact on society. The conditions at research institutions, particularly the issue of publish and perish promotes pre-emptive publication, which compel researchers to hurriedly publish results before engaging in critical research with potential to impact human welfare. The institutional conditions and professional norms exert a strong normative control over the way research is conducted and reported.

Effect of Publish or Perish Mantra

Despite the huge increase in the number of publications during the three last decades, there is a serious shortage of high-impact research capable of transforming the livelihoods of Africans. According to Alvesson and Sandberg (2013), who studied the declining impact of research for development, the primary reason behind this paradoxical situation is the near total dominance of incremental gap-spotting research which rarely leads to influential theories and outcomes. As such, much of the research is driven by interacting key drivers, namely institutional conditions and various assessment formulas for evaluating academic research performance. There is a tendency to encourage research on topics that fit neatly within today's popular theories and allow the development and tweaking of those theories (Oswick et al. 2011; Starbuck 2009). This has the effect of stifling innovative research which is influential towards human development. For example, in the examination of knowledge production within the social sciences, Starbuck (2006) notes that there are negligible gains in usable knowledge as much effort goes into generating research findings of academic interest, but with no potential of producing discoveries that can be useful in solving day to day challenges affecting humanity. Bartunek et al. (2006) and Weick (2001) call for rigorously executed research, which produces significant impacts on society by challenging assumptions that are often taken for granted.

There is an inclination towards contemporary research which tends to be anchored on tradition and eschewed innovation as researchers confine their work to answering established questions. This approach often give rise to publications which are needed for career advancement in academia, but the impact on society is limited (Lawrence 2008; Bouchikhi and Kimberly 2001). On the other hand, researchers who decide to take the less popular route of asking more original and practical questions are more likely to stumble on the road to publication, which can make them appear unproductive to their colleagues. Too much emphasis is placed on the academic contribution and little attention is given to the valorisation of knowledge created. The pressure to publish can result in scientific research in domains where real world applications are not immediately apparent and this give rise to pre-emptive publication (Adler and Harzing 2009). As a result, researchers face a natural tension and trade-off when deciding whether to build on accumulated knowledge in a field or pursue a bold new idea that challenges established thinking and produce results with an impact on society.

There are negative consequences of the academic culture promoted by the pressure to publish-or-perish. For example, Alvesson and Sandberg (2013) argue that there is critical shortage of imaginative and innovative research despite a sharp increase of academic publications. The academic assessment system based on quantitative measurement is cited as one of the factors that push researchers away from genuinely fostering original knowledge (Adler and Harzing 2009). The pressure to publish results in a growing homogeneity in research, in which researchers tend to report research results in line with dominant paradigms, so as to maximise the

acceptance rate of papers (Lawrence 2008; Bouchikhi and Kimberly 2001). In line with this, Fanelli (2011) argues that papers are more likely to be accepted by journals if they report positive results that support an experimental hypothesis and this tends to promote bias against negative results. The disappearance of negative results is not healthy as they are necessary to avoid repeating the same pitfalls (Dwan et al. 2013). The negative results are most likely left unpublished or somehow turned into positive results through selective reporting, post-hoc re-interpretation and alteration of methods and analysis so that they can be published (Fanelli 2011). One of the most worrying distortions that scientific knowledge is experiencing is the loss of negative data. This emanates from the fact that results that do not confirm expectations because they yield an effect that is either not statistically significant or just contradicts a hypothesis are crucial for scientific progress as research and development is driven by a collective self-correcting process (Gerber and Malhotra 2008; Dwan et al. 2013). To fast track an article into publication, it is often easier to take a route that supports positive results. However, a system that disfavors negative results does not only distorts the integrity of scientific research, but also discourages high impact projects and can pressure scientists to fabricate and falsify their data (Fanelli 2011).

A Paradigm Shift Towards Knowledge Valorisation

It is important that Africa focus on knowledge valorisation to ensure the practical utilisation of scientific knowledge. This will help in developing products and applying scientific knowledge to various processes of human development. This chapter proposes the following measures for promoting knowledge valorisation for inclusive innovation and integrated development of Africa.

There is need to attach value to scientific research which has an impact on society. Overemphasis on publications tends to reduce the objectivity of the arguments developed in journal articles and books and this has the adverse effect of damaging the practice of science. Thus, there should be a shift towards goal-oriented research that fits the strategic intent of promoting inclusive innovation in Africa. This requires researchers to put concerted effort towards research that directly solve challenges affecting humanity. It may entail changing the hiring system to allow researchers to work under a diversity of employment contracts and attachments. Ideally, the hiring and compensation should be oriented towards the ability to imagine, execute, generate and use the outcomes of research to develop innovative solutions to societal challenges.

Research institutions such as universities should not be isolated from the problems affecting the surrounding communities. Instead, there is need for universities to derive their research from society and move away from being 'ivory towers'. While it is important for research institutions in Africa to be connected to research centres in the developed world, that should not be done at the expense of the local needs of industry, agriculture and education in their own countries. Emphasis should

be shifted from paper production to the creation and production of scientific knowledge and technological products that benefit the citizens.

The process of publishing should be treated as a means for facilitating the development, quality assurance and communication of new knowledge and not as an end in itself. The publication of journal articles and books is an excellent means of sharing research results. However, the pre-occupation of researchers with publications can obscure a more significant role of producing innovative and influential ideas and theories that can make a significant difference to human development. Thus, it is imperative to encourage research with potential to bring positive outcomes on society. This requires a substantial rethinking and reworking of institutional conditions and professional norms.

As individual scientists, research institutions, countries and international organisations are increasingly evaluated based on the numbers of papers they publish and citations they receive, there is need to revisit the assessment criterion. It is important to put contingent measures that discourage undue proliferation of publications as this leads to impoverishment of research creativity by favouring normal science and predictable outcomes at the expense of pioneering and high impact results. Ideally, there is need to create an environment that encourages researchers to spend less time scheming to get their papers into journals and more time towards conducting research that generate solutions to the challenges affecting humanity. It is recommended that universities should encourage high impact research by decoupling job security from productivity of research papers. This may require a substantial reorientation of research policies to focus on key issues of economic growth, including those associated with the use of new and established scientific and technological knowledge.

The pressure to publish, if not properly managed can force junior researchers to play a numbers game to earn tenure. There is need for research-oriented institutions to come up with strategies that manage the unhealthy aspects of 'publish or perish' practices and promote cutting-edge research for the advancement of STI. For example, innovative research can be enhanced by using funding schemes that make it less risky for researchers to pitch novel ideas and explore uncharted waters.

Conclusion

Publishing research results plays a significant role in the dissemination of knowledge. It is one of the primary ways in which academic institutions influence the development of STI by making research outputs available to the wider scientific community. The use of publications as an assessment tool is good but the problem lies on the emphasis of quantity at the expense of quality. The former offers incentives for higher output and productivity rather than the value attached to the research. Focusing on the number of publications as a main indicator of academic research performance is marred with challenges, as it can encourage incremental gap-spotting. Thus, there is need to manage the numbers game that emanate from

the pressure to publish in order to develop a culture of research that is driven by zeal to find solutions to the problems affecting mankind. Attention should be on the importance of making personal contributions to the body of knowledge and not simply the application of standard research techniques to conventional research questions.

It is important to encourage researchers to make contributions to society by promoting original thinking and problem solving. This is more likely to yield positive research outcomes that can improve many aspects of social and economic development in Africa -from pest-resistant crops to less wasteful food processing; from prenatal care and child health to the prevention and treatment of diseases; from reduction of environmental contaminants to purification of water and from more reliable electricity to more efficient and affordable communication and transportation systems. The foundation for conducting research in Africa has been laid and what is required is a shift towards adding value to STI. The thrust should be on the valorisation of research to create workable mechanisms aimed at meeting the societal goals of reducing poverty in Africa through inclusive innovation. This requires a wide range of normative choices towards research, which include redefining the role of academic institutions and individual researchers in the development of STI.

There is no recipe for promoting research and development in Africa, but there are suggestions that can be put forward. One of the suggestions involves going back to the drawing board and asking about what informs knowledge production in different regions of Africa. Such a question invokes various issues such as the indigenous knowledge systems, which are an important tapestry of research and development. Using indigenous knowledge systems as a launch pad, there is need to critically question conventional forms of STI knowledge generation, circulation, monitoring and evaluation as a step towards developing a more inclusive approach to innovation and regional integration. It is crucial for STI to recognise and harness the plurality of knowledge systems and traditional knowledge communities in Africa. There is need to revisit the nature and type of incentives, the institutionalisation of STI and the global STI structure that reinforces the colonial stereotypes and alienate Africa's STI from its communities and problems. This is a challenging task considering the polarisation of the geopolitics of STI in Africa, the globalisation and internationalisation of STI and the funding and knowledge support structures in which agenda setting is done. However, there is room to influence transformational changes in how STI is socially defined and constructed, prioritised and funded, communicated, monitored and evaluated through the adoption of proactive policies that fully embed African STI in societies. For example, indigenous knowledge systems can inform STI policy if treated as formidable repositories of scientific information for addressing Africa's development challenges instead of dismissing them as inferior, unscientific and uncodified. This can be achieved if scientists from Africa are at the forefront of developing new forms of STI that address the region's agenda and development challenges with the aim of finding sustainable solutions.

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Part II
Regional Institutions and Innovation in
Africa

Regional Integration Prospects, Challenges and Opportunities in Africa: A Case of the Tripartite Free Trade Area



Moorosi Leshoele

Introduction

There is an old adage that says ‘kopano ke matla’, from Sesotho language, which means unity is strength. This idiom best captures the significance of uniting for a particular desired end in whatever facet of life. Regional integration for this paper is one such facet that will be explored through the lenses of the Tripartite Free Trade Area (TFTA). Regional integration is defined, for the purposes of this paper, as a concept which signify political, economic, and cultural high level cooperation between independent states and their people, for mutually beneficial ends. TFTA is a regional bloc or organisation that was formed in 2015 comprising three smaller Regional Economic Communities (RECs) – Southern African Development Community (SADC), East African Community (EAC), and Common Market for Eastern and Southern Africa (COMESA) merged into one. Amongst other purposes for the formation of TFTA is for it to pave way and provide a blueprint for the Continental Free Trade Area, which was earmarked for 2017. It also seeks to enlarge its markets, and increase its bargaining power when negotiating business deals with other regions and super powers.

Efforts to integrate Africa politically and economically have been numerous, and outcomes of such efforts have been mixed. Even before the dawn of decolonisation and independence in the 1960s, Pan African movements across the world were already engaged in the discourse of the significance of the reunification of Africa. The term ‘reunification’ is used here because Africa used to be a united region that’s was borderless, until 1884 when a gang of European expansionists and invaders decided to partition it and share it amongst themselves in Berlin, Germany. The

M. Leshoele (✉)

Department of Development Studies, University of South Africa, Pretoria, South Africa

Thabo Mbeki African Leadership Institute, University of South Africa, Pretoria, South Africa

notorious so-called 'back to Africa' movement which was popularised by the great Marcus Mosiah Garvey from Jamaica through his Universal Negro Improvement Association (UNIA) movement is a case in point of attempts to ensure a united Africa with its diaspora.

Following Ghana's independence in 1957, Kwame Nkrumah was a staunch advocate and arguably, pioneer of regional integration of Africa into one strong powerbase for all African people scattered all over the world. This, Nkrumah argued would only be achieved if Africa were to scrap all the colonial superficial borders in Africa and forming a United States of Africa that would speak with one voice in international relations. These efforts culminated in the formation of the Organisation of African Unity (OAU) in 1963, which was later renamed African Union in 2001, signalling a growing appetite to further integrate Africa. Taking the baton from Nkrumah after being toppled in a Western backed military coup of 1966, Muammar Gaddafi of Libya became one of the foremost advocates of African Unity until he was also assassinated by NATO forces in 2011, who used locals as a smokescreen to propagate their propaganda that he was killed by a mob of his own citizens.

All the organisations and leaders which played a prominent role in their formation points to the fact that regional integration in Africa is not a new phenomenon, but for over 50 years of many attempts, it still has not been fully realised. The latest edition of these attempts to unify African countries is the Tripartite Free Trade Area which was established in 2015, bringing together 26 African countries, making it the largest Regional Economic bloc in Africa that seeks to increase intra-Africa trade and economies. This 26 member states which effectively is approximately 50% of African countries implies that half the continent will be working towards ensuring a single market and removing all trade barriers between them. This 26 member states free trade area boasts about 632 million people (TFTA Summit 2015), which is 57% of Africa's population (1.1 billion people). Like its predecessors, it faces many challenges and there are also opportunities for it to offer a possibility for the ultimate political and economic unification of Africa as a whole.

This chapter seeks to explore these challenges and potential opportunities that TFTA have and how it can, with the benefit of hindsight and history, learn from the shortcomings of its predecessors so that it may avoid making the same mistakes. The first section deals with opportunities that TFTA presents for regional integration in Africa. The second section covers challenges and obstacles that face TFTA which may dwarf and slow integration of Africa. The third section delves into migration prospects and movement of people within and between TFTA member states. A critique of the founding documents of the TFTA is made as free movement of people is hardly mentioned and given enough attention. The fourth section explores the role of South Africa in boosting intra-Africa and intra-TFTA member states trade. The last section concludes the paper with recommendations for policy makers.

Opportunities Presented by TFTA

Cultural fertilisation and tolerance between Africans from member states of this free trade area is one of the most important potential gains that may be presented by this Regional Economic Community. It is only natural that with the movement of goods and services within this free trade area, that citizens of these countries will interact more and learn about one another's cultures and ways of living. Implicitly, this increased interaction between Africans from Northern part of Africa member states and their Southern member states, will result in more interpersonal understanding and tolerance, which will in turn ensure that trade increases as one of the unwritten rules of business. This is important as people tend to trade more with those that they can trust with their investments. Furthermore, sporadic incidents of the so-called xenophobic attacks in South Africa would likely be significantly reduced because more South Africans would have had an opportunity to travel and trade with their fellow African brothers in their countries.

Perhaps before I delve deeper into some of the projected benefits that the Tripartite Free Trade Area may present to Africans and to regional integration of the continent, I should highlight the core objectives of this regional initiative. Three primary pillars of TFTA as set out by SADC-EAC-COMESA Summit of 2015 are; market integration, infrastructural development, and industrial development. Each of these core pillars will be discussed in detail in the sections that follow. Arguably the most important and urgent pillar and intervention that member states will pursue first and benefit from is the first pillar – market integration. Doing business in Africa especially between Africa countries has been a challenge for many decades. Therefore, barriers to trade, if urgent addressed by the TFTA will have enormous benefits to intra-African trade and regional integration. Key among these barriers which the TFTA has outlined are; “tariff liberalization, rules of origin, customs procedures and simplification of customs documentation, transit procedures, non-tariff barriers, trade remedies and other technical barriers to trade and dispute resolution” (Aniche 2014, 130).

The larger market (USD\$ 1.3 trillion total GDP) that TFTA has (TFTA Summit 2015) will help it possess a greater bargaining power when negotiating with superpowers such as the US, UK, and China. Like OPEC (Organisation of Petroleum Exporting Countries), TFTA member states can use their unified economic community and ultimately their economic union, to determine the price of their commodities while trading with non-member states. The fact that South Africa has the largest deposits of platinum in the world, DRC has the largest deposits of cobalt in the world, and Botswana is one of the largest diamond producers yet they do not have a direct say in setting the prices of these commodities is unacceptable. The only way to change this abnormality is if African countries unite and become unanimous and unwavering in seeking fair terms of trade with their counterparts and former colonisers in Euro-America. Therefore, TFTA presents this opportunity for bargaining power when doing business with superpowers, the same way OPEC used it in the 1970s during the oil crisis.

Considering the crop of leaders and bureaucrats that Africa has, it may be a long time before such a bold stance is taken because most of our leaders are mere puppets on a string when it comes to their engagements and relations with the global empire. It would take a new breed of leader that are fearful and resolute as Sankara to call for prices of African minerals to be determined by African countries themselves. However, the somewhat similar attempt failed when tried by Thomas Sankara who called for all African countries to act in unison in repudiating colonial debt.

Potential developmental benefits of TFTA cannot be overstated, provided all member states commit and adhere to the founding principles of this body. Aniche (2014, 131) reiterates this point by arguing that “the T-FTA could rival any other regional economic community, the European Union (EU) included, if it actualizes its potentials and becomes a truly integrated economic bloc”. Realistically speaking, this claim by Aniche may be a bit farfetched considering the political climate that still reigns in a handful of member states of TFTA. Wars and poor infrastructure that plagues countries like DRC, Burundi, Libya, and Rwanda still poses a major challenge for this economic bloc. However, these challenges are not insurmountable, and in fact, with more economic cooperation which TFTA seeks to foster, some of these challenges are likely to be tackled. For instance, infrastructure challenges which are essentially facing almost all African countries, are among the three pillars that TFTA seeks to address through this regional integration economic bloc.

Harmonisation of economic policies will be fast-tracked through the implementation of this economic bloc’s objectives because multiple membership challenges to other REC would be avoided. The Eastern and Southern parts of Africa will have the same or harmonious tax regimes, for instance, for TFTA member states.

Expansion of the arts and African language development is yet another significant opportunity that may be presented by TFTA member states doing more business with one another without trade barriers. There are many resilient economies especially along the borders of African countries, where citizens of the nearby countries would cross the borders and sell their products in the neighbouring country and vice versa. For instance, there are many Zimbabweans who trade along the border of Zimbabwe and South Africa in Beitbridge and the same happens at many borders between Lesotho and South Africa. Therefore, there are many benefits that would accrue once trade barriers are removed and goods and people can move with more ease at border posts. Zimbabwean Shona speakers who trade in South Africa at the border town will feel more comfortable interacting with their South African Tshivenda speakers for instance, and this way both these languages and cultures would immensely benefit from such cultural fertilization through language.

The importance of cross border languages and their significance in being catalysts to regional and continental integration is concisely dissected and explained by Ndlovu (2013) in his article titled Cross-border languages in Southern African economic and political integration. In this article, the author contends that ‘mainstreaming the significance of language in the mediation of power’ is of utmost importance if developmental projects in Africa are to succeed as they hardly factor the aspect of indigenous languages underdevelopment (Chumbow 2008) as cited in Ndlovu (2013, 20).

In addition, the fact that languages of former colonisers like English, French and Portuguese still have hegemony and are prioritised more than indigenous cross border languages in official government documentation at borders adds salt to the wound (Alexander 1999). Cross border traders who are often lay persons without formal education find it hard to complete such forms written in these languages, thereby impeding free movement of these traders and their goods. In spite of all these obstacles, Walsh (2006) and Mansour (2007) found that from 2004;

Cross-border trade accounted for an average of about 25% of total tax revenue in sub-Saharan Africa. In 2006, the share of customs revenues as part of total government revenue for SADC member states stood at almost 50% for Lesotho and Swaziland; 11–16% for Botswana, Zambia and Zimbabwe; and 22–34% for Malawi, Mauritius, Mozambique, Namibia and Tanzania (cited in Ndlhovu 2013, 27).

The outlier was found to be South Africa which, according to Lesser and Moise'-Leeman (2009), had the lowest customs revenue in the same period as these Sub-Saharan countries. The reason for this could simply be that South Africa, as the largest economy in Africa at the time, was a net exporter to most African countries, while they were net importers from South Africa, hence they got more tax revenue from the importation of South African products.

More mega Infrastructure projects like the earmarked North-South Corridor Road and Rail projects, Great Inga Dam in the DRC, may be spurred by TFTA member states. This North-South Corridor is envisaged to stretch from "Dar es Salaam in Tanzania, across the Republic of Congo, Zambia, Malawi, Botswana, Zimbabwe and Mozambique to South Africa" (NEPAD Business Foundation 2016). Such large-scale projects could also be fully financed by these countries themselves without having to plead for loans from institutions like the IMF and the World Bank. Without this much needed infrastructure to link this economic bloc's member states, most of its plans will just be wishful thinking because all of them ultimately dependent on availability of infrastructure. This will make the cost of doing business between TFTA member states cheaper. NEPAD, AU, AfDB (2011, 6) conducted a study on the state of Africa's infrastructure called Programme for Infrastructure Development in Africa (PIDA) and reported that;

The road access rate is only 34%, compared with 50% in other parts of the developing world, and transport costs are higher by up to 100%. Only 30% of the population has access to electricity, compared to 70–90% in other parts of the developing world. Water resources are underused. Current levels of water withdrawal are low, with only 4% of water resources developed for water supply, irrigation and hydro-power use, and with only about 18% of the continent's irrigation potential being exploited. The Internet penetration rate is only about 6%, compared to an average of 40% elsewhere in the developing world.

Based on these findings above, the importance of infrastructure in Africa regional integration and economic development cannot be overemphasized. For Africa to be internationally competitive and to be able to have export led economies, we must ensure that we drastically reduce our transport costs, which were 100% higher in 2011 compared to other developing countries. TFTA can play a major role in this regard. Green and Seidman (1998) cited in McCarthy (2010) in their seminal book

on post-colonial regional integration caution us that overemphasis on economic integration while underemphasizing the equal significance of political integration is unrealistic.

Challenges and Obstacles that Face TFTA

Diversification Conundrum

Most African countries and TFTA member states produce almost the same thing – production of raw materials and agricultural products and shipping them off to western countries at much lower prices. They then buy back manufactured goods from their very own commodities at much higher prices than they sold them for. Worst of all is that, as mentioned in the preceding sections, African countries which produce crude oil and mineral resources like gold, diamonds, platinum etc., do not determine the prices of these resources. The pertinent question in light of this challenge then becomes, how can TFTA member states use this economic bloc and the bigger market they have, to ensure beneficiation of their mineral resources and agricultural products? Secondly, how can this economic bloc increase inter member states trade in light of the challenge that most of these countries are dependent on raw materials which are often the same?

To answer the first question, one of the basic things that must happen is that there must be enough political will to formulate and enforce radical economic policies that would ensure that all foreign companies that extract resources (in the mining sector for instance), dedicate a significant portion of their budgets to skills transfer to the locals, failing which, some of these key strategic sectors in African countries economies must be nationalized with the aim of securing enough financial resources to take as many Africans to specialized higher education institutions abroad to acquire the necessary skills to add value in to our raw materials before we can sell them. The second question also boils down to political commitment amongst TFTA member states. One pragmatic way of increasing intra Africa trade would be enforcing preferential tax regimes when trading with TFTA member states (or abolishing tax altogether) and increasing tax for buying goods and services that come outside the African continent. African countries, especially TFTA member states, must hold each other accountable to make sure that their tax regimes are compatible while trading with non-African countries. This proposal may, to some seem draconian and antagonistic to the neoliberal free market dogma. Indeed, if Africa is to emerge out of the ‘orphan’ and black sheep status with its trade relations with western countries and the rest of the world, it must take bold and radical steps. Otherwise any other efforts will be merely scratching the surface and deepening our dependency syndrome on Euro-American empires.

Social and Cultural Barriers

Africa's colonial experience will without doubt make regional and continental integration very difficult. The fact that almost all African countries were colonised (with the exception of Ethiopia), led to a partitioning and classification of Africa along who the colonial master was. Anglophone, Francophone and Lusophone are the three main colonial classifications of African countries. For Africa to integrate beyond this arbitrary partitioning is quite a challenge because language differences and attachment that Africans now have with the colonial masters languages like English and French for instance. Furthermore, the fact that most Francophone countries still have their currencies backed against the currency of France and their reserve banks are in France, implies that fiscal and monetary policy harmonization in Africa is still a farfetched dream. This process is done through a system known as the Franc Zone (Martin 1986).

There are vast cultural disparities especially between Sub-Saharan countries and those in the North (Arab countries). Beside the language differences which are explored at length in this chapter, religious practices also play a big role in posing a real threat and challenge to Africa's integration even within the Tripartite Free Trade Area itself. Figure 1 below gives a visual depiction of TFTA member states and the Arab states (e.g., Egypt and Djibouti) within this economic bloc. As history has shown us, many wars in the world have been over some form of religious differences, and the classical example would be the centuries old war between North and South Sudan that led to Sudan being divided into two independent countries – Sudan and South Sudan in the year 2011. It remains to be seen how TFTA member states will curb such potential wars that may occur due to socio-cultural and religious differences within and between its member states.

Economic Dependency Syndrome

It is common knowledge that Africa does not trade with itself more than it trades with European and American countries. The latest and largest African trading partner is said to be China (The Economist 2013) and most African are adopting the so-called look 'East Approach'. Despite the fact that their economies are still intrinsically linked with those of their former colonisers, African countries are now trading more with other emerging superpowers like China. This is commendable, even though it is not sufficient as there is still little intra African trade happening.

African countries who are still 'suffering' from what I would call Economic Dependency Syndrome (EDS) are still many. They range from countries that still implement Structural Adjustment Programmes as prescribed by the IMF and World Bank in the late 1980s and early 1990s, aid dependent countries whose national budgets are still largely financed by their former colonial masters etc. Once more, many Francophone countries are still taking orders from France on how they should

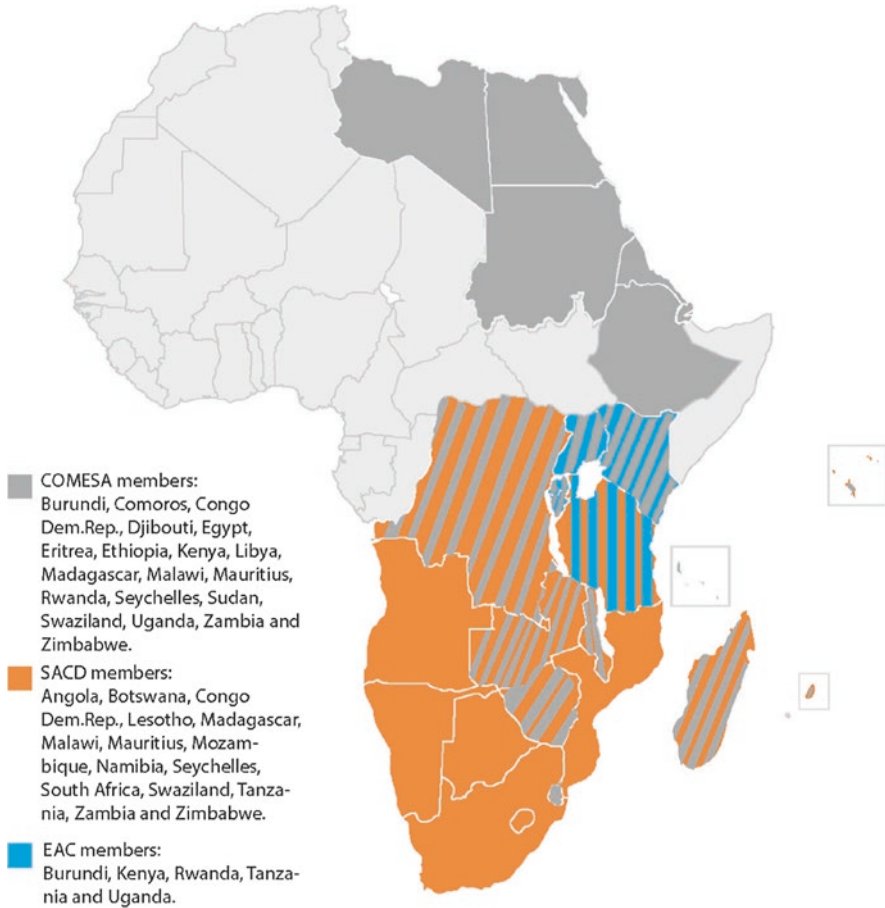


Fig. 1 Visual Image of member states of TFTA. (Source: Zamfir (2015))

structure and spend their public funds in line with the neoliberal vested interests of France. The Franc Zone, as alluded in the preceding section, is one such tool used to make Francophone countries' economies to be dependent on France's interests. Guy Martin also reiterates this dependency syndrome curse that still bedevils Africa:

While the monetary cooperation agreements do provide for the possible modification of the CFA F/FF exchange rate, the French government has clearly cautioned the African states on the serious economic and political consequences of severing the monetary 'umbilical cord' which links them to France (Martin 1986, 215).

Prevalence of Conflict in Africa

Since colonial invasion of Africa, conflict has been the order of the day. Without peace and security, ease of doing business in Africa will continue to be low and the transaction costs will also keep sky rocketing. Therefore conflict is a real threat to increased trade between TFTA member states. Kimenyi and Kuhlmann (2012, 12) also argued that,

Deeper regional integration, and the economic opportunity it can bring, could have the additional benefit of reducing conflict within the continent. The deeper relationships and higher level of economic inter-dependency between the member countries could make outbreaks of conflict less likely, and integrated regions are more inclined to establish mechanisms for conflict resolution. In some cases, regional integration entails political integration, which significantly lowers the probability of conflict.

The issue of conflict resolution is indeed an important one. However, an even deeper question which is rarely addressed in regional integration literature is this. For economic blocs such as TFTA to achieve its goals, should economic integration precede political integration or the inverse should prevail? What begs this question is the fact that often times most RECs tend to put more emphasis on consolidation of economic institutions while saying very little about the political dynamics and governance that in actual fact is the main driving force in terms of policy alignment etc. It is therefore the contention of this paper that both political and economic aspects should be equally prioritised by the Tripartite Free Trade Area. That is, progressive thought leaders who are conscious of the fact that without a Pan-Africanist outlook and effort, no one country can emerge victorious in the unbalanced terms of trade with the West, that Africa as a whole finds its self in. Yash Tandon (2015) argues in his recent book *Trade is War*, that in fact the nature of trade between Africa and the West is tantamount to war, because of its asymmetrical and unequal level playing field nature.

Migration and Regional Integration Interface

What one might describe as free movement of people paralysis in Africa, is one of the lacuna that the 45 articles and 10 annexes that make up the TFTA agreement have only mooted to but did not give significant attention (Luke and Mabuza 2015). It is only within certain RECs like SADC, ECOWAS etc. that VISAs on arrival are given to citizen of these regional organisations. These VISA's however, are given for a fixed period of 30 days. When SADC citizens travel to other parts of the continent like ECOWAS, they then have to apply for VISAs which often take long to acquire, deterring ordinary people who may want to tour to other parts of the continent. For business people, consequences of such VISA regulations and the time it takes to access, are dire and this directly affects and retards the much needed intra-Africa

trade. Therefore, besides our colonial heritage which, amongst other things, meant that roads and other infrastructure was developed so as to extract mineral wealth from Africa and shipping it to Euro-America, we also have ourselves to blame. African countries policy decisions around immigration laws are themselves stifling and retarding meaningful and increased intra-African trade.

Easing movement of goods and people at border posts in Africa by Relaxing immigration rules may be the first step. Free Trade Agreements, preferential tax-immune goods should be encouraged and lower tax for all other goods (if any at all) can help boost intra-African trade. These again can increase intra-Africa tourism, provided mobility of Africans in the continent is prioritised through free and efficient administration of VISA applications. This will have benefits far beyond the economy. With more intra-Africa touring, Africans can be exposed to other cultures and develop mutual understanding and respect for fellow Africans. This will again minimise the stereotypes Africans have about one another.

Not only would these Regional Economic Communities (COMESA-EAC-SADC) benefit from economic integration, but it would also benefit from 'people integration' as a result of increased migration prospects driven by ease of doing business in the region. A crucial question that then arises is; what socio-political and cultural benefits may accrue out of the comprehensive implementation of the TFTA? This is a pertinent question which, I would argue, was not sufficiently and adequately addressed by the 45 articles and 10 annexes alluded above.

Kimenyi and Kuhlmann (2012, 18) aptly argued that;

Probably the most daunting challenge to regional integration in Africa is the issue of free movement of people, or "movement of natural persons" in trade policy terms. For regional integration to deliver its expected benefits, it is crucial that people be able to move across national boundaries -with minimal hindrance and requirements.

Indeed free movement of natural persons should have, in my view, been one of the key priorities of the TFTA. In addition to the current three pillars (market integration, Infrastructure development, and industrial development) that inform objectives of this regional economy community, 'free movement of people' should have been the fourth pillar to complete the picture. Without this fourth pillar, which would arguably be the most important because even in light of enormous technological advancements in the world, trade still requires a human face and human interactions. Secondly, Africa as a whole is a net exporter of raw materials and a net importer of finished products and technology, therefore, Africans still need to physically travel to other regions within the continent for them to sell their goods and services. It is for these reasons that free and easier movement of people within TFTA member states should have been prioritised for the success of this noble REC that was long overdue.

In an attempt to answer the question that I posed above, socio-political benefits that may be gained if the TFTA becomes a resounding success is that it would have provided a working model and blueprint for implementation of African Economic Community (AEC), which would in turn speed up the process of ensuring a rebirth of the United States of Africa, at a political level. Cultural benefits that may accrue

are that trans-border languages may be developed and widely acknowledged by Africans throughout the region without current stigmatization that still plagues some languages due to fear of ‘othering’ of its speakers. Furthermore, due to ease of movement of people which may result from full implementation of TFTA objectives, more cross pollination of cultures (in terms of food, languages, clothes, etc.) may be a direct benefit to member states.

Influx of people from fellow African countries into SA does not only put strain on SA but also on immigrants home countries due to brain drain to SA in the quest for the so called green pastures. Therefore, to curb this, SA should genuinely ‘reach-out’ to struggling countries in the continent thereby helping decentralise opportunities as more jobs would be created in those countries. Afro-pessimism should be transformed to Afro-optimism through social entrepreneurship which gives innovators sense of ownership and responsibility. Therefore, we first and foremost need to change our very OWN perceptions and pessimism about Africa if we are to convince the rest of the world otherwise.

Role of SA in Boosting Intra-Africa and Intra-TFTA Member States Trade

South Africa’s role to boosting inter-continental trade is huge. South Africa should be playing a leading role in the continent in transport infrastructure and communication (ICT) and perhaps in Tourism as well. The reason being that SA is the second biggest economy in the Africa (after being overtaken by Nigeria in 2015) and it is at the forefront of ICT revolution continentally (Mungai 2016). If South Africa is to do well in all the three indicators (transport, communication and tourism) it should extend them and share its experience with the rest of the continent because, as the saying goes, ‘no man is an island’. Furthermore, the importance of this synergy and cooperation begs the statement that ‘if you are doing it alone, you must be doing something wrong’. Hence the importance of sharing of knowledge by South Africa with the rest of TFTA member states, especially in the service provision sector like banking and financial sector.

Below is a list of some innovative projects that could be harnessed and improved so as to speed the process to an integrated continent (economically, politically, and culturally) so as to realise the United States of Africa vision and envisioned by our forebears like Nkrumah and Gaddafi.

1. Investing in our countries and continent first is of paramount significance. The following regional blocs: ECOWAS, SADC, COMESA if improved can play a much bigger role in catalysing intra-Africa trade. These trade blocs generate “over \$1-billion dollars of regional trade annually. However, what is critical to note is that only 7.6% of trade within the mentioned trade blocs is intra-African” All Africa Media (2012). This shows immense underinvestment in intra-African trade and this is bad news for the continent.

2. Rejuvenating African values and principles in all aspects of our lives so that we spark patriotism and African Pride spirit. i.e., Ubuntu, Black Consciousness (Steve Biko), remembering and realising Steve Biko's words that "Black man, you are on your own" Steve Biko (1978). Engaging in self-sustainable business practices (social entrepreneurship), assuming and making our unified stance known in the international arena and platforms is paramount. We need to realise that as much as we need the FDI's, the investors need us the most. This is because the amount of arable land we have coupled with the abundant mineral resources and recently, oil deposits, which unfortunately have so far been a resource curse for most African States. Because of these and many more reasons, we should realise that we have the upper hand in negotiation tables, be it in the Bretton Woods institutions or World Economic Forums. Africa must be assertive and note that 'SIBANYE, HARAMBE' WE ARE ONE and without this much needed cooperation not only economically but also politically, we are doomed and will continue to be exploited and even self-exploit.
3. Due to the lack of adequate infrastructure on the continent, it goes without saying that it (infrastructure development) is the backbone of any country and continent because it is through things like roads and railways and easy and cheaper communication (ICT) that the economy will grow. Not only will the GDP increase but it will translate into human capital development unlike the so called hidden hand of the self-regulating economy which is said to miraculously trickle-down.
4. Entrepreneurship gives innovators a sense of belonging and pride when their ideas are materialised. Of utmost importance, especially in the African context is promotion of social enterprises because these types of businesses don't only have profit motive, they are in fact inspired by tackling social problems, so they have social responsibility niche at heart. Young people in Africa are better positioned to be at the forefront of the social enterprise 'revolution' because they are the ones facing dire unemployment. What we need is just to be given enough space and resources in the form of capital so could enact our ideas.
5. There is a white elephant railway project that is in the pipeline in Southern Africa called SADC Railway Revitalization Policy Dialogue This project is under the auspices of a mega company called NSLP (an investment holding company). "NLPI has already invested US\$130 million in the construction and rehabilitation of a 1,613 kilometre rail corridor stretching from South Africa, through Zimbabwe and Zambia, up to the Democratic Republic of the Congo (DRC)" SADC (2012). This arguably is the most fundamental intra-Africa infrastructure investment that seeks to enhance trade in this region. If this project is successful, it will be a giant step that the continent would have taken in an effort to boost trade amongst African states.

Here is an illustration of the role that ICT can play if fully exploited especially by youth entrepreneurs. An international ICT colloquium called ICT Indaba was hosted in the city of Cape Town in June 2012. It was organised by the South Africa department of Communications and had the support of International Communication

Union. It was geared at “formulating an African Agenda to promote ICT as a catalyst for social and economic development on the continent” All Africa Media (2012). It is encouraging to see that ICT as a technological tool to promote intra-African trade is gaining momentum through various quarters.

Conclusion and Recommendations

The timely adoption of the Tripartite Free Trade Area by all its member state is surely embraced by many, and its potential of increasing intra-Africa trade and unifying Africans is something to commend. However, like its predecessors (SADC, COMESA, EAC), it will face numerous challenges which may pose its sustainability at risk if not sufficiently and frankly tackled and planned for in advance. This article sought to explore and interrogate the TFTA by firstly underscoring some of the most important benefits to regional integration. Secondly, it attempted to explain blind spots challenges that lay ahead for the TFTA and caution those involved in its full scale implementation in its member states about what challenge to anticipate and how to avoid them.

Obscure challenges to regional integration such as social and cultural barriers, economic dependency syndrome, and diversification conundrum were explained in some detail. Cutting across most opportunities and potential challenges facing TFTA is poor infrastructural capacity in Africa and lack of harmonization of immigration policies. An overarching recommendation to policy makers is that political integration of Africa should be initiated concurrently with economic integration efforts such as the TFTA. Without this approach, efforts to have an African Economic Community that functions optimally will ultimately be in vain because a ‘glue’ that holds and operationalises all these agreements is political institutions.

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The Regionalism-Innovation Nexus: The ECOWAS Experience



Adeoye O. Akinola

Introduction

The West African sub-region has experienced decades of dire socio-political and economic decline and marginalization within the global economic order. Early hopes of rapid development in post-colonial Africa were quickly dashed by a series of problems ranging from poor economic policies, to impoverishment, civil wars, inept political leadership and political instability (Akinola 2010). Bundu observes that:

Economic problems appear to have accumulated over time as policymakers battle with chronic food shortages, high population growth rates, deforestation and desertification, excessive dependence on commodity exports, deteriorating terms of trade, huge balance-of-payments deficits, government deficit financing, and increasing indebtedness (both domestic and external). Nowhere in West Africa have development strategies been successful in reversing the structural imbalances of our economies. (Bundu 1997, p. 29)

The need to promote intra-state economic prosperity and sustainable development motivated sub-regional integration, which was seen as a vehicle to successfully drive West Africa's developmental agenda. The Economic Community of West African States (ECOWAS) was created to enhance the sustainable socio-economic development of this sub-region. However, its efforts to achieve the desired levels of regionalism and development have been stunted by a lack of innovation.

Spearheaded by Nigeria and Togo, early efforts to establish this historical sub-regional body were resisted, especially by the Francophone countries and their colonial master, France. However, the treaty establishing ECOWAS was finally signed in Lagos by the member states on 28 May 1975 (Akinoyemi et al. 1983). Article 2 of the treaty states that it aims at enhancing cooperation and integration with the

A. O. Akinola (✉)

Department of Public Administration, University of Zululand, KwaDlangezwa, South Africa
e-mail: AkinolaA@unizulu.ac.za

establishment of a West African economic union as an ultimate goal; and also improving the living standard of the people, and ensuring economic growth and strengthening relations between member States (ECOWAS 2012a).

However, despite the establishment of ECOWAS:

Infrastructure, which should be a rudimentary fuel to development, is at its worst state in the community. Inter and intra-regional railings, road networks, energy, telecommunication facilities as well as expedient border ancillaries is still at an uncomfortable state. In the areas of telecommunication, ECOWAS's proposed fused telecom network – which will link the entire region is still an optical illusion as inter regional calls are charged at international rate while commuters bear the rage of roam tariff/charges. A modernized and expanded network which would have a direct bearing on business activities and trade is yet to be achieved. (Ogbonna et al. 2013, p. 107)

While West African states have recorded some measure of economic growth in the past decade, “economic growth in most of the sample countries has been achieved through factor accumulation rather than through significant improvements with input combinations that are associated with innovation” (UNECA 2015, p. 1). Africa has come to realize the important role played by innovation in the region's efforts to achieve sustainable development and enhanced integration. This led to the organization of the first Africa Innovation Summit (AIS) in Cabo Verde (UNECA 2015), which was attended by the West Africa Institute (WAI).

Other attempts have been made to promote deeper integration in the sub-region and thereby facilitate development. However, the quest for innovation occupies back stage in ECOWAS' regionalism and developmental agenda. This has been cause for major concern among academics and other stakeholders in the integration project. Regional economic integration involves more than market liberalization and free migration (Bundu 1997); vibrant regionalism requires concerted innovation to tap the significant resources and potential (human and material) of this region. It is against this background that this article explores the convergence between regionalism and integration in West Africa.

Conceptual Clarification

Integration is a process whereby political actors in many different national settings are persuaded to shift their loyalties, efforts, expectations and political activities toward a new centre, whose jurisdiction extends to pre-existing national issues (Haas 1964). Gasarai describes regional integration as a process whereby neighbouring states with similar degrees of productive forces establish a structural framework to achieve an integrated system of production (Biswaro 2012, p. 8). Regionalism was originally conceived “as an endogenous process, that is, development that arose from conditions internal to and specific to each region in question” (Badic et al. 2011, p. 2244). While this describes the European experience, this viewpoint has changed over time.

The globalization of the world economy, and the proliferation and antecedents of regional blocs across the world led to a shift in the conception of regionalism. Bjorn Hettne, one of the earliest critics of the ‘Eurocentric’ notion of regionalism, argues that it can be “understood from both exogenous perspectives (outside in) and endogenous perspectives (inside out)” (Badic et al. 2011, p. 2244). Exogenous perspectives posit that external socio-political and economic dynamics triggered the emergence of regional blocs, while the endogenous school of thought holds that the motivations for regionalism are determined by the set of actors within the region (Deutsch 1989; Haas 1964). Thus, contemporary regionalism is “seen as a new political landscape in the making, characterised by an expanding cast of actors (states and non-states) operating in the regional arena and across several interrelated dimensions: security, development, trade, environment, identity, and so on” (Badic et al. 2011, p. 2244). Regionalism is also conceived as both a driver and beneficiary of innovation. Invariably, by bringing a network of people and institutions together – the main constituents that set innovation in motion – even a loose connection between two or more countries is bound to facilitate innovation and related creative activities. The cross-pollination of ideas and experience greatly benefits innovators. They can turn the knowledge gained through this process into innovations, contributing to competitiveness within the integrating bloc of countries (UNECA 2015, p. 3).

The sustainability of such webs of interconnection is conditional on the implementation of consistent innovative ideas and endeavours.

Innovation is therefore the introduction of new elements or a new combination of old elements in a complex organization (Sandbo 1998). Sandbo (1998) adds that it is not about discovering new ideas, but creatively using new elements, discoveries and problem solving ideas. Innovation has become an important factor in economic development over the past 10 years, because society has been in an economic trough. Economic growth requires innovation (Sandbo 1998, p. 3). Much of the literature on innovation focus on technological development, technical research and Research and Development (R&D). While some scholars focus on the individuals that create and develop the new elements; others emphasize the development of the market sector or the service sector (Sandbo 1998, p. 4). Innovation is at the heart of human, socio-political and economic transformation of society:

Innovation is a necessary condition for the diversification of a country’s patterns of production and trade and for the reorientation of the economy towards more productive, higher-value-added sectors (what is referred to as ‘structural transformation’). It is estimated that technological progress and factor efficiencies are responsible for some 50 percent – and sometimes even more – of observed economic growth rates. (UNECA 2015, p. 2)

Innovation therefore refers to a mind-set that translates into activity which leads to new and improved ways of achieving a particular goal. This could involve new scientific, industrial, technological, business, organizational or indigenous discovery or development.

Theoretical Exposition

Theories on regional integration describe the motivation for and processes of European regionalism. Functionalist theory is the most widely-used to understand the unification of Europe under a supranational organisation, the European Union (EU). Functionalist theory maintains that international activities are organised around basic human needs like transportation, health and welfare, cultural activities, agriculture, trade and production (Mitrany 1966). According to Ernst Haas, functionalists:

Are interested in identifying those aspects of human needs and desires that exist and clamor for attention outside the realm of the political. They believe in the possibility of specifying technical and ‘non-controversial’ aspects of governmental conduct, and of weaving an ever-spreading web of international institutional relationships on the basis of meeting such needs. (Haas 1964, p. 6)

These important needs transcend national borders and are hence entrusted to professionals under an organised regional body. For instance, innovative multinational industrialization led to the establishment of the European Economic Community (EEC) that later transformed into the EU in 1957. As far back as 1950, the European Coal and Steel Community had begun to unite European countries industrially and economically, prompting six countries, Belgium, France, Germany, Italy, Luxembourg and the Netherlands, to establish what we know today as the EU (European Union 2015).

The changing character of European integration from economic to other shades of integration – cultural and political – brought neo-functionalism to the fore. Neo-functionalism, which dominates European scholarship, focuses on the “spill-over” from economic convergence to political integration as experienced in Europe (Deutsch 1989; Haas 1964). This is also the case when it comes to ECOWAS, but with a different trajectory. Economic convergence was expected to lead to political unification; however, this process was not driven by professionals or industrialists but by West African political leadership that was not familiar with the intricacies of functionalism. This is a major reason for the lack of innovation and ECOWAS’ failure to achieve the goals of rapid development and economic convergence.

Identification of a need is the first driver of innovation. Haas notes that the “functionalist notion of function also carries the connotation of cognitively perceived need on the part of the actor, leading to the creation of an organizational task designed to meet the need” (Haas 1964, p. 6). West African actors in the integration project consistently identify needs, and create the necessary institutions to meet these needs, but these institutions lack funding or organizational efficiency and do not have the capacity or skills to be innovative in meeting the urgent need for development. Unlike the EU that was established to consolidate development in Western Europe, ECOWAS was established to instigate economic development.

Furthermore, Marchal (1965) notes that integration as a result of development is very distinct from integration as an instrument or precondition of development. Economic integration can be perceived as the historical product of evolving

technical, economic, and social structures; or it can be the product of conscious efforts on the part of human societies, acting collectively, to improve their economic conditions as a matter of necessity and policy choice. Marchal maintains that, as a product of history, integration is first and foremost the result of social transformation; it cannot simply occur anywhere or under any conditions.

Perroux (1966) adopts a similar approach, centred on three important questions: Who integrates? Through what process? And to whose advantage? The motivations, historical trajectory, objectives and mechanisms of achieving regional integration differ from one part of the world to another. For instance, integration of the Caribbean and Pacific islands is geared towards resolving regional problems in the transportation sector, while in the Southern Africa sub-region it was directed at the struggle against apartheid in South Africa and the subjugation of the region by the apartheid regime (Corrie 1999). The West African economic integration project was driven by the ruling class due to the need for socio-economic cooperation to achieve tangible development of the sub-region.

According to Ernest Mandel, economic convergence is generally driven by the transnational capitalist classes for increased capital accumulation; the EU is a case in point (Biswaro 2012, p. 7). Bisiworo notes that the capitalist class made concerted efforts to crack the iron walls that divide states to promote a unified economy capable of strengthening the international competitiveness of the European capitalist mode of production. According to the author, the creation of a single European market reflects the concentration of investment and the internationalization of European industries, rather than a desire by welfare-maximizing states to justify the distribution of capital among member states. Therefore, the unified market is the end result, rather than the precursor, of the production and trade revolution that favours larger industries; this is innovation in practice.

ECOWAS and the Innovation Question

This section examines how a lack of innovation has impeded ECOWAS' attempts to deepen regional integration and trigger sustainable development in West Africa. The absence of an innovation policy is the missing link in West African integration and development initiatives.

Research and Development (R&D)

The new global international economic order and the need to strengthen regional competitiveness has triggered a rapid rise in the knowledge-intensity of production, where knowledge comprises research and development (R&D), design, engineering, maintenance, and management, as well as marketing. Mytelka claims that:

Most developing countries in Africa and elsewhere lack the critical mass and technological infrastructure necessary to meet the challenges of a rapidly changing and increasingly competitive world market. Regional cooperation could help overcome these constraints by providing a framework for the adoption of new formulas for stimulating innovation. (Mytelka 1997)

Similarly, the Organisation for Economic Cooperation and Development (OECD) maintains that:

Technology and other innovation-related phenomena, along with corporate organization and the proper use of human capital in all the phases of the production process, now represent one of the main pillars of competitiveness ... These features are not simply the attributes of individual firms, but also, to a large extent, those of national or local environments where organisational and institutional developments have produced conditions conducive to the growth of the interactive mechanisms on which innovation and the diffusion of technology are based. (OECD 1992)

Innovation has thus become a vital link in the relationship between research, trade and development. Development itself is a continuous process of transformation, adaptation, and adjustment in advanced industrial and developing countries alike.

Research and Development is one of the decisive elements and the bedrock of innovation. This is one area where ECOWAS is lacking. Africa, especially West Africa, has witnessed a consistent jettisoning of R&D which dates back to the acceptance of the neo-liberal economic ideology (in the form of the Structural Adjustment Policy – SAP). The International Financial Institutions' (IFIs) imposition of the SAP during the 1980s and 1990s had a negative effect on African states, especially their capacity to invest in R&D. The financial resources, will-power, discipline and skills required to innovate, adapt, and diversify are seriously lacking in West Africa. The IFIs' liberalization of African economies opened up the sub-region to the uncontrolled importation of goods and services, significantly stunting research innovation and R&D in West Africa. Foreign assistance ultimately eroded the capacity of West African labour forces to imbibe innovative professionalism.

The SAP constrains states' financial capacity to invest in R&D, while the ensuing harsh economic conditions resulted in a brain-drain. Universities budgets were cut and there was a lack of substantial funding for research centres, contributing to the dearth of innovation, scientific or technological discoveries and R&D. Nation-states' culture of neglecting innovation seeped into regional structures; the result is continued jettisoning of innovative endeavours and the production of knowledge.

The divergent forms of violence that have confronted post-colonial West African states called for an alternative to the ineffective liberal framework of conflict resolution that could not prevent the bloodletting in Liberia, Sierra-Leone, Nigeria and Cote D'Ivoire, where the institutional fabric of the state was shaken to its foundation. Investment in research and effective partnerships with think-tanks (universities and research institutes) in the area of conflict prevention and settlement would guarantee lasting peace in the sub-region. For instance, customary laws and practises should be strengthened – through innovative research – to refine the traditional systems to involving the monarchs and chiefs in conflict prevention, management and

settlement (Williams 2011, p. 192). Successful economic integration and development depends on sustainable regional peace and security.

West Africa should also utilize the immense potential of its diaspora. India has established “policy and institutional frameworks aimed at leveraging the contribution that its diaspora can make to the country’s development agenda, in particular with regard to science and research and the attainment of scientific excellence” (UNECA 2015, p. 10). Scientific excellence can only be achieved through research, and ground-breaking research is driven by highly skilled professionals, the majority of whom have migrated to developed societies in search of ‘greener pastures’ (Tanner 2005). In partnership with member states, ECOWAS should begin to convert the ‘brain-drain’ to ‘brain-gain’ by benefiting from the huge potential offered by the diaspora to promote initiatives and innovations in science and technology. According to UNECA,

This is to enable the transfer of knowledge, philanthropy and networks from the diaspora to provide technical know-how and investment capital. Members of the diaspora can have a significant impact as investors, mentors, sources of talent and catalysts for policy change. (UNECA 2015, p. 10)

Why has research been relegated to the background in the integration project in Africa, particularly in West Africa? Could this explain the dearth of scientific innovation and multi-national technological development as well as indigenous knowledge advancements? It would seem that the answer is in the affirmative. Political meetings have taken the place of professional engagement. Political leadership is the driver of regionalism in West Africa, unlike in Europe, where industrial innovation triggered the establishment and expansion of the EU. This is not due to the evolution of ECOWAS or the composition of the stakeholders of the regional body at inception; rather, the challenge lies in the ECOWAS leadership’s unwillingness to effectively involve technical experts, like think-tanks, who have the skills to stimulate innovation, especially through R&D and create an enabling environment for innovation.

Science and Technology

Stakeholders in integration projects continue to reiterate the need for the ECOWAS Commission to create an effective Directorate for Science, Technology and Innovation due to “the key role and importance of these sectors for the socio-economic development of the sub-region” (ECOWAS 2012b). This is geared towards enhancing national policies on innovation and to create special funding for R&D in science and technology. It is important that ECOWAS not be solely responsible for innovation; all state parties should be involved.

More than 80% of the West African population is agrarian with very little technological awareness. Technological transfer has been rare, with local content ignored. Poor science education has worsened the situation. While many science

students are eager to learn, there is inadequate equipment for laboratory work. Little attention has been paid to industrial and scientific needs and research; there is no drive for new discoveries. As part of the colonial legacy, Africa is a receiver of finished goods. Colonies were exploited for raw materials to feed industrialization in the advanced capitalist countries (Ake, 1981). Africa requires sophisticated indigenous technology. Ironically, decades after political independence, African countries have not taken ownership of scientific innovation or significant indigenous strategies to drive the continent's development.

In South Africa, the Khomani San community of the Southern Kalahari, which borders South Africa, Botswana and Namibia, continue to display exemplary indigenous knowledge in plants and traditional healing (Wynberg, Schroeder & Channels, 2009). Francis et al. (2016) note that many of their traditionally produced drugs are used as energy-enhancing and slimming aids across the world. This underlines the importance of indigenous creativity and traditional knowledge systems, which have "become the new lens through which African states may engage differently – and on their own terms – with many parts of the world" (Francis et al. 2016). The community, that uses about 59 wild plant species in its on-going Traditional Plants Project, seeks to commercialize it through partnerships with state and non-state actors within the Southern African sub-region. The project is one of a series of activities engaged in to integrate the Khomani San with international capitalism. The use of traditional knowledge generation and transfer to spur African growth and development is a lesson for West Africa.

Energy and Power

Unlike the advanced economies that have the capacity for innovative scientific discoveries to boost regional partnerships and development, integration in developing countries should target the utility of existing resources – both human and material – using a planned, systematic and centralized approach to production to meet the region's needs (Biswaro 2012). Due to the lack of correspondence between political boundaries and ecological zones, certain issues pertaining to resource management would benefit from a regional approach. The need for regional collaboration in river basin management is an obvious case in point, and a number of regional programs designed for this purpose already exist, including the Senegal River Valley Development Organization (OMVS) and the Gambia River Valley Development Organization (OMVG) (Laverne 1997).

Although Africa has been working on the development of intra-state energy projects that have the capacity to generate and distribute energy not only to the host countries but to neighbouring states, achieving this lofty goal across Africa seems a distant dream. For now, sub-regional initiatives seem to be the most practicable. For instance, the Grand Ethiopian Renaissance Dam is expected to generate annual electricity output equal to the country's current annual electricity consumption (UNECA 2015, p. 3). While a number of dams have been built in West Africa,

efforts to harness their potential are lacking. ECOWAS could partner with state and non-state organizations for enhanced utilization of the region's water resources.

Sarfoh (1993) notes that Africa's water resources have the potential to generate approximately 300 GW of hydroelectricity, of which less than 4% is currently exploited. Although Sarfoh does not present the corresponding figures for West Africa (where the potential is surely far lower due to the flat terrain), he identifies hydropower as the natural energy base that offers the best prospects to satisfy West Africa's future electricity needs and advocates the inter-connection of the region through hydroelectric schemes as a catalyst for political and economic unification as well as accelerated development. This is particularly pertinent in a region with an erratic power supply and inadequate energy sources.

The persistent energy crisis has been of major concern to stakeholders of West African sub-regional development projects in past decades. States have struggled to guarantee the regular supply of energy required to enhance livelihoods and economic development in the region; hence, the need for an ECOWAS energy project. Article 28 of the revised ECOWAS Treaty provides for the coordination and harmonization of member states' energy policies, which is regarded as "an important step in the integration of the energy sector in the sub-region" (UNECA 2013, p. 176).

Since 2005, ECOWAS has made giant strides in accelerating member states' cooperation on power and energy policies through the implementation of common policies and enhanced cooperation in these sectors. In 2006, this resulted in the adoption of an ECOWAS/WAEMU regional policy on access to energy infrastructure for rural and semi-urban populations. UNECA notes that:

This regional policy was made tangible by the ECOWAS/WAEMU white paper on a regional (energy) policy. The white paper aims to provide access to improved fuels for domestic use and to sustainable electricity services for the majority of the population of the countries of West Africa between now and 2015. (UNECA 2013, p. 177)

The World Bank has offered funding for the establishment of the African Bio-fuels and Renewable Energy Fund (ABREF) and has supported "feasibility studies of projects, activities to strengthen capacities and technology transfer related to bio-fuels and renewable energies" (UNECA 2013, p. 178). This fund is managed by the African Bio-fuels and Renewable Energy Company (ABREC) in Lome (Togo), which was established to achieve ABREF's objectives in West Africa. ECOWAS also created a specialized institution, the West Africa Power Pool (WAPP) to promote the convergence of regional electrical systems; it aims to supply affordable and stable electricity to member states (ECOWAS 2011, p. 7).

With regard to petroleum resource unification within the sub-region, Nigeria currently transports 11.3 billion cubic meters (11.3 BCM) of natural gas per day across the West African sub-region (Benin, Togo and Ghana) as part of regional collaboration to supply gas to West African countries and European markets through Algeria (Akinola 2010, p. 18; Obanijesu et al. 2008). Gas required for thermal and industrial needs is transported by means of a 1033 km pipeline network, of which 617 km is a submerged offshore pipeline network. This project has facilitated the

development of a pragmatic management scheme, robust leak exposure and a predictive model for the natural gas flow pattern in a water body.

With about 5.118 trillion cubic meters (out of a global reserve of 206.4 trillion cubic meters), Nigeria has the fourth largest gas reserves in the world, while Ghana had 22.65 m³ as at 1 January 2014 (CIA 2014). Almost 78% of Africa's natural gas resources are located in the Niger-Delta oil community of Nigeria (Obanijesu et al. 2008). However, most of this is wasted through gas flaring instead of the more acceptable gas-trapping or gas-storage for other usages.

Nigeria remains Africa's largest energy producer, but also has the second highest gas flaring rate in the world; about 1.4 billion cubic feet of gas is flared into the air in the Niger Delta each day (Royer, 2012). Thus, Nigeria and the West African region as a whole have not demonstrated their capacity to be innovative in converting the wasted gas to effective use within the West Africa zone and beyond. An effective regional partnership with Nigeria and Ghana could enable the sub-region to become one of the largest suppliers of gas in the world. The project, which commenced in 2005 under the West African Gas Pipeline Company (WAPCo), is executed through a partnership among Chevron West African Gas Pipeline Limited (36.9%); the Nigerian National Petroleum Corporation (24.9%); Shell Overseas Holdings Limited (17.9%); Takoradi Power Company Limited (16.3%), Societe Togolaise de Gaz (2%) and Societe BenGaz S.A. (2%) (Shell 2011; Obanijesu et al. 2008).

A Representative of Shell in Nigeria noted that,

The West African Gas Pipeline will have an immensely positive impact, both for Nigeria and for her neighbours. SPDC is proud to help deliver this project ... it will also contribute towards realisation of the Federal Government's objective to enhance regional economic cooperation and development whilst capturing the opportunity to reduce associated gas flaring. (Shell 2011)

However, years after the completion of the pipeline, there has been less than optimal productivity (Ogbonna et al. 2013, p. 107).

Transportation Sector

One of the major impediments to intra-state trade in Africa, particularly in West Africa, is poor transportation networks. It is easier and more convenient to travel from West Africa to a location outside Africa, than to travel within the region. There is also a lack of innovation in advancing intra-African trade in services. For instance, African states are currently projected to import between \$98 and \$183 billion in services from outside the region; the removal of barriers to trade in services within Africa could re-allocate these businesses to African industries (UNECA 2015, p. 2). Corrie maintains that:

While regional cooperation refers to all efforts by a group of countries to address issues of common interest, regional economic integration is aimed mainly at reducing barriers to the

free movement of goods, services, capital and persons ... regional integration is seen first and foremost as an economic process, despite the fact that the political dimension is also essential. (Corrie 1999)

The compelling evidence of stunted development in sub-Saharan Africa is compounded by a poor transportation system, particularly road transportation, which accounts for about 80–90% of inter-urban transportation of goods and people (Jagne 2010, p. 17). The situation with regard to intra-state transportation within West Africa is even worse. This is a major impediment to enhanced development in the sub-region. Although a Regional Road Transport and Transit Facilitation Programme was established to resolve this problem (Jagne 2010, p. 17) no visible progress has been recorded in this important sector.

One of the consequences of over-reliance on road transportation is over-congestion, which is a disincentive to travel and prevents the smooth and timely passage of goods within the sub-region. In a quest to ease the gridlocks and address constraints in the intra-state movements of goods, vehicles and passengers, the EU granted the ECOWAS Commission 63.8 million Euros in technical assistance for the “Transport Facilitation Project” (ECOWAS, n.d.). However, there has been little discernable progress.

No rail transport links the West African region. One of the essential corollaries of development and increased regionalism is expansive transportation. This thus represents a policy gap in the region’s integration initiative. Furthermore, enhanced industrial production, food security, and trade depends on viable, affordable intra-state transport within the West African zone. ECOWAS should be innovative in funding or seeking foreign or private partnerships to invest in rail transportation as:

Free movement of persons, goods, services and capital is very strategic for the actualization of the ECOWAS’s vision of a borderless community with closely knit economic base that possesses the capacity to meet the social, cultural and technological aspiration of member states. (Ogbonna et al. 2013, p. 108)

Other sub-regions like Southern Africa benefit from a vibrant intra-state rail system that links about six countries (UNECA 2013).

Agricultural Sector

West African Heads of States adopted the ECOWAS Agricultural Policy (ECOWAP) as a mechanism to harmonise the Comprehensive Africa Agricultural Development Programme (CAADP), the agricultural constituent of the much-celebrated New Partnership for Africa’s Development (NEPAD). This policy was designed to transform peasant and rudimentary farming methods into a modern, technologically driven agricultural system to trigger agricultural effectiveness and efficiency. The regional body was expected to involve the private sector in achieving the lofty goals of agricultural sustainability and food security in West Africa.

The ECOWAP also aimed to promote investment at state and sub-regional levels through six components: improved water management and enhanced management of other shared natural resources including forest and fish resources; sustainable development of farms through the dissemination of innovative ideas and technologies; the development of agricultural value chains and promoting markets; innovative mechanisms to increase agricultural productivity and storage infrastructural development; prevention and management of food crises and other natural catastrophes through effective early warning systems; and institutional strengthening that includes capacity coordination and monitoring and evaluation (ECOWAS Aid for Trade, *n.d.*). However, ECOWAS has been unable to offer the incentives and harness the creativity required to achieve these lofty goals, thereby subjecting the region to food importation and hunger.

From Lagos to Ghana, large tracts of arable land exist which could be used for an 'ECOWAS Farm'. Regionalism is promoted by highly skilled personnel with the capacity for optimal performance, especially with regard to technical issues like mechanised farming. Between 2002 and 2004, West Africa imported food products to the value of approximately 5.44 billion USD (UNECA 2013, p. 145). It is astounding that West African states still import food like rice, maize, fish and chicken. Much of the West African sub-region is located along river banks, paving the way for the development of fish farming. ECOWAS needs to exploit such opportunities. Olomola (1993) advocates for improved management of Africa's abundant fisheries through intraregional cooperation, joint efforts at stock management, regional cooperation in fisheries research, and a range of other activities to add value to the region's fisheries.

Africa suffers an acute shortage of farm labour; a trend associated with ill-treatment of workers that has heightened the food crisis on the continent (IRIN 2005). ECOWAS should promote improved wages and working conditions that could serve as templates for farms in the region.

Concluding Remarks

This article traced the connection between innovation and enhanced regional integration in the West African sub-region. The lack of innovation is impeding deeper integration and sustainable utilization of the human and material resources of this economic bloc. ECOWAS focuses too much attention and overinvests in the political aspects of regionalism, neglecting economic convergence. This is not to dismiss the relationship between politics and economics, or to downplay the role of political stability and cohesion in economic prosperity; however, there is a need to develop greater economic synergy among ECOWAS member-states. It is important to identify the complementary innovative policies necessary for increased integration and trade convergence between neighbouring countries and identify key points of collaboration in various public activities.

With respect to research, ECOWAS needs to devise multi-national, fresh approaches to skills acquisition that enhance innovation. It has the responsibility to create a policy environment that is more conducive to innovation. Can a new institutional structure be devised to drive innovative ECOWAS research programmes? Of more importance is developing institutional capacity for theory-building (inductive research) rather than theory-testing (deductive research). ECOWAS (2012b) research is unlikely to materialize unless there is a “market” for it. As long as all policy decisions are national in orientation due to the weakness of regional institutions, most research is likely to address national issues rather than those of concern to the region in general. Aside from making a significant contribution to knowledge production and the generation of new ideas, the regional body is expected to facilitate intra-state transmission of new innovations and offer incentives for the advancement of ideas.

Another grey area in the ECOWAS integration project is its over-reliance on and imitation of the European integration model. The West African stakeholders in the integration process are quick to forget the different motivations for and aspirations of EU unification and the moderate success it has recorded in enhancing regional industrialization, exporting liberalism and promoting global competitiveness. Innovation should therefore not only be seen in terms of scientific and technological discovery, but also in relation to indigenous discovery or advancement.

Nation-states, especially in Africa have come to realise the futility of a nationalistic approach to development due to historical realities and their subservient roles within the global economic order. Therefore, regionalism is conceived as the most viable mechanism to drive West Africa’s development. Innovation is the essential corollary of sustainable development and improved regionalism in the sub-region; it should therefore be at the heart of ECOWAS development and integrative projects.

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Institutional Capacity and Regional Integration: Reflections on the Composition and Powers of the ECOWAS Parliament



Ikenna Mike Alumona and Stephen Nnaemeka Azom

Introduction

One of the challenges facing the African continent in the twenty first century is how to strengthen the capacity of domestic economies for effective and meaningful participation in the increasingly competitive global economy. The challenge is compounded by systematic relegation of African countries to the backwaters of global trade and investment and uninspiring efforts of the World Trade Organization (WTO) in multilateral trade negotiations. In grappling with this challenge, promotion of regional trade and economic integration has been identified as one key element. Highlighting the essence of regional integration in Africa, Ake (1981) noted that African formations need to cooperate to be strong enough to deal with the powerful multinational companies operating in Africa; overcome the constraints placed on industrialization and development by the small size of the internal markets; mobilize more capital for large-scale development; and exert better terms from their economic relations with international organizations, development agencies and other regional organizations.

Regional integration is considered from two complementary perspectives. First, it is seen as a means of achieving greater trade relations among nation-states by lowering trade barriers and making provisions for free movement of capital, people and labour with a view to fostering strong economic linkages between people (Polaski 2004). Regional trade blocs thus have the goal of economic integration.

I. M. Alumona, Ph.D (✉)

Department of Political Science, Chukwuemeka Odumegwu Ojukwu University, Igbariam, Anambra State, Nigeria

S. N. Azom, Ph.D

Department of Political Science, Federal University Lafia, Nasarawa State, Nigeria

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This usually involves the construction of shared executive, judicial, and legislative institutions which anchor and drive the process of integration.

The second perspective has to do with the institutional character of integration. That is, the character of the institutions put in place to propel the process of integration. This essentially is a governance question, about whether regional bodies have the mandate to address general concerns, and if so, how they are in fact addressing them. The role, for example, which regional institutions and structures play in regulating trade, overseeing and enforcing free movement of people and goods, ensuring good governance and human security (Martínez 2004). The institutional perspective appears to be the core challenge facing integration in Africa. This is due to the relative non-existence or recent creation of the law-making (legislative) institution.

At the sub-regional level, West African states, in the last four decades, have intensified efforts to attain sustainable economic development and self-reliance through regional economic integration. The Economic Community of West African States (ECOWAS) has been at the vanguard of regional integration in the sub-region, with emphasis on the expansion of the regional market as the corner piece of its comprehensive development strategy. Unfortunately, the original mandate of ECOWAS which focused primarily on promoting economic co-operation and integration with a view to forming a Monetary and Economic Union was seriously hamstrung by administrative bottlenecks that hindered the realization of regional economic integration in West Africa (Adebayo 2002).

In view of this challenge, the Revised ECOWAS Treaty of 1993 was basically designed to accelerate and deepen economic integration among member states. The Preamble of Chap. 2, Article 3 of the Treaty seeks to achieve economic integration through liberalization of trade between member states, removal of all impediments to free movement of factors of production, as well as harmonization of national economic and fiscal policies of member states. Articles 6 and 13 provide for an Economic and Social Council, an ECOWAS Court of Justice and an ECOWAS Parliament. In 1994, the Protocol pertaining to the creation of ECOWAS Parliament was elaborated and signed by member states. The Protocol entered into force on 14 March, 2002 after the mandatory approval by nine member states.

ECOWAS Parliament is a forum for dialogue, consultation and consensus for the representatives of the people of West Africa. The aim is to promote sub-regional integration. The forum provides capacity building to parliamentarians. It undertakes election observation and parliamentary diplomacy missions, and its members actively set the regional agenda in national parliaments (Eze 2004). More fundamentally, ECOWAS Parliament engages in a number of activities to promote and deepen good governance, democracy and regional integration.

The democratic character of a parliament expresses a universal notion of representation, decision-making and responsiveness to the yearnings and interests of the citizenry. The linkage between the people of the sub-region and the ECOWAS Parliament is, therefore, critical for the survival of regional integration project since it was envisaged that ECOWAS Parliament would, through its debates, resolutions and recommendations, deepen trade relations among member states.

While a body of literature such as Chacha (2008), Ebobrah (2009), Ehigiamusoe and Udefuna (2012), Kingah and Cofelice (2012), Ogochukwu (2008), Philip (2013), Shehu (2015), Yang and Gupta (2005), among others has already accumulated on the institutional mechanisms of ECOWAS integration, the effect of lack of democratic credentials in the composition and powers of the Community Parliament on the prospects of deepening regional integration in West Africa is yet to receive systematic treatment. The crucial role of institutions in providing the right framework for regional integration has also been widely acknowledged (ECA 2006). However, while a consensus appear to exist on the relevance of well-defined institutional building blocks in undergirding regional integration, the reality in Africa raises questions on whether institutions have played their expected role. It is against this background that the effect of lack of democratic credentials in the composition and powers of the Parliament of the Economic Community of West African States on regional integration in West Africa is problematized in this chapter.

Accordingly, the study contributes to the extant knowledge on the institutional character of ECOWAS integration in nine sections. The first is the introduction followed by the second section which presents the theoretical perspective. The third section briefly X-rays the formation of the ECOWAS. The fourth section focuses on the formation of the ECOWAS Parliament. The fifth section dwells on the composition of the ECOWAS Parliament. The sixth and seventh sections examine the powers of the ECOWAS Parliament as well as the linkage between the ECOWAS Parliament and challenges of regional integration respectively. The final section concludes the study.

Theoretical Perspectives

Variants of liberal institutionalism or theories of integration such as functionalism, neo-functionalism, intergovernmentalism and complex interdependence theory have emerged to explain global and regional (economic) integration. Generally, these theories hold that in the midst of anarchy or absence of supranational institutions, there is cooperation in international system and order is facilitated through international institutions, norms and regimes. The ultimate result of this would be shifting upward of sovereignty from state to regional or global level (Burchill and Linklater 2005).

Functionalism, for instance, contends that state's inability to control security challenges would make international cooperation essential. However, it fails short of advancing the totality of environment within which the functional arrangements would obviate the national political structures. Neofunctionalism, which espoused the concept of positive spillover effect, reflects gradual integration. It also fails to account for integration stagnation. Liberal intergovernmentalism, in highlighting the centrality of national governments in controlling integration, glosses over integrative aspects caused by day-to-day policy-making (Ujupan 2006). In sum, the dominant theories of integration are Euro-centric, focusing essentially on

European Union which is portrayed as a reference model and ideal type. As a result, they are inadequate in analyzing the shortcomings of state-driven regional integration project inherent in the character of the post-colonial state, particularly in Africa.

Against this backdrop, this study adopts the Marxist theory of the state as developed and employed in the analysis and elucidation of the peculiarity of the post-colonial state by Alavi (1973), Ake (1985), Ekekwe (1985), Ibeanu (1998) among others. The basic propositions of Marxist theory of the state as articulated by these scholars are:

- (i) The post-colonial state is a creation of imperialism and as such, has followed a developmental strategy dictated by the interest of imperialism and its local allies.
- (ii) The post-colonial state rests on the foundation of the colonial state whose major pre-occupation was to create conditions under which accumulation of capital by the foreign bourgeoisie in alliance with the ruling elite would take place through the exploitation of local human and other natural resources.
- (iii) The post-colonial state is also constituted in such a way that it mainly caters for a narrow range of interests: the interest of the rapacious political elite in comprador and subordinate relationship with foreign capital.
- (iv) The basic features of the post-colonial state are authoritarianism and lack of relative autonomy and legitimacy. The state enjoys limited independence from the social classes, particularly the hegemonic social class, and so, is immersed in the class struggles that go on in the society.
- (v) The sovereignty of the post-colonial African state is compromised by the fact that it is deeply dependent on the ex-colonial powers and the international community to solve its developmental and other problems, including those directly associated with regime survival.
- (vi) Capacity for policy implementation has been considerably limited and substituted by non-governmental and faith-based organizations, and an informal sector.

Political and economic integration is seen as a panacea for resolving Africa's socio-economic and political challenges. Hence, post-colonial states have enjoyed almost absolute monopoly of action in this regard, despite their inherent weaknesses. They have also remained sole actors in the establishment of institutions and multiplicity of agencies and bodies that implement policies and programmes at regional and sub-regional levels with a view to driving and deepening regional integration.

In addition to the above is the challenge of weak institutional capacities to formulate, implement, coordinate and monitor regional integration agenda arising from the fragile institutional architecture prevalent at the national level. It is precisely at this level that the ultimate responsibility to ratify and implement regional integration protocols, policies and programmes squarely rests. For instance, of the 34 protocols and conventions that had been ratified and entered into force as at May 2005 in Africa, there was an average of three-and-a half years between signing and ratifying them. Nine protocols took 5 years or more to come into force, while a simi-

lar number have not been ratified by the required number of states to come into effect (Senghor n.d.). These challenges confront virtually all regional blocs in Africa, including the Economic Community of West Africa States (ECOWAS).

The original mandate of ECOWAS was riddled with several hiccups which undermined the realization of economic regional integration in West Africa. Article 5 of the ECOWAS Treaty of 1975 which mandated the Authority of Heads of State and Government to determine the general direction and control of the performance of the executive functions of the Community did not help matters either. The expectation that the region would achieve policy complementarities and harmonization through the domestication of protocols, and regional development for its citizens was however hampered by slow ratification and implementation of protocols.

Furthermore, the establishment of the ECOWAS Parliament as contained in the provisions of the ECOWAS Revised Treaty of 1993 and Protocol A/P2/8/94 of 1994 on establishment, structural composition, membership and powers of the ECOWAS Parliament relegate both proportional representation of the citizens of member states in ECOWAS integration process and majoritarian principle in indirect election of members of the ECOWAS Parliament from the National Assemblies of the 15 member states and, therefore, failed to demonstrate popular participation of citizens of member states in ECOWAS integration process. In a similar vein, the powers of the ECOWAS Parliament which are merely advisory render it incapable of addressing the core challenges to regional integration through effective law-making.

The shortcomings of state-driven regional integration project inherent in the character of the post-colonial state are therefore seriously implicated in the slow pace of regional integration in West Africa. This is true since effective regional integration requires effective and functional state system.

The study is qualitative and analytical. Documentary method was used to generate secondary data from books, journal articles, official publications and conference papers, while unstructured elite interview was used to generate primary data to complement the evidence drawn from the secondary sources. We elicited information from four respondents purposely drawn from the principal officers of the ECOWAS Parliament and the Secretariat of ECOWAS Commission, Abuja. The first category enabled us have insight into the composition, powers and functions of the ECOWAS Parliament, while the second category provided answer to the nature and process of decision-making and implementation. The data generated were analyzed using qualitative descriptive analysis based on systematic logical deductions.

Economic Community of West African States (ECOWAS) at a Glance

Established on 28 May, 1975, ECOWAS is an outcome of integration efforts pioneered by Nigeria and Togo. Earlier efforts to co-ordinate economic co-operation in the sub-region dates back to 1963, with a conference on Industrial Harmonization in

the sub-region in Lagos, Nigeria. In 1967, another conference was held in Accra, Ghana where agreement on the Articles of a proposed Economic Community in West Africa was signed. An interim Council of Ministers mandated thereafter to prepare a Draft Treaty for the proposed community recommended that the inaugural meeting be held at the level of heads of states and government. The Heads of States and Governments that met in Monrovia in 1968 only signed the protocol for a regional group, without adopting the Draft Treaty and the Protocol on customs union presented by the interim council (Thompson 1990).

In 1972, the process was revived by the Heads of State of Nigeria and Togo by mandating their officials to streamline a framework for community co-operation based on inclusiveness, realizable objectives and flexible approach (Adebayo 2002). A proposal for a joint Nigeria-Togolese delegation embodied in a Draft Treaty was subsequently reconsidered and finally signed on 28 May, 1975, by the Heads of States and Governments/Representatives of the 15 member countries of West Africa, thus, marking the end of over a decade of strenuous efforts to institutionalize a framework for co-ordinating sustainable development and collective self-reliance in West Africa.

ECOWAS was established as a practical approach in addressing the economic dilemma of the sub-region that is devastatingly entangled in excruciating poverty, underdevelopment and external economic dependency on the one hand, and as an institutional manifestation of the inevitable necessity for co-operation and collaboration in the socio-economic needs of the sub-region on the other (Ogbonna et al. 2013). Integration of the sub-region became inevitable in view of the need to grapple with neo-colonial challenges at the first instance, and on the long run square-up efforts to take a strong stand in the global capitalist economy. In a nutshell, ECOWAS was established to coordinate and promote trade, national co-operation, monetary union and sustainable development in West Africa. The main channel for the realization of that aim was through the harmonisation and co-ordination of national policies in areas of economic, socio-cultural and political activities. Its four commissions deal with the following functions: trading; immigration; monetary interaction; industry; natural resources and agriculture; transportation and communications; and social and cultural issues (Ehigiamusoe and Udefuna 2012).

In addition, ECOWAS strongly recognises the development and expansion of the regional market as the cornerstone of its comprehensive development strategy. As clearly stated in the Preamble of Chap. 2 Article 3 of its Revised Treaty, ECOWAS fosters and deepens economic integration through liberalization of trade between member states, removes all impediments to free mobility of factors of production, and harmonizes national economic and fiscal policies of member states. This is with a view to enhancing economic stability and raising the living standards of its peoples (Ehigiamusoe and Udefuna 2012).

In the past three and half decades, West African states, through the implementation of policies and adoption of protocols, have channelled their efforts in the struggle to attain sustainable development and economic self-reliance through regional economic integration. Furthermore, ECOWAS, with the Africa Action Plan (AAP) of the African Union (AU), “leads and coordinates implementation of the New Partnership for Africa’s Development (NEPAD) programs in West Africa, including

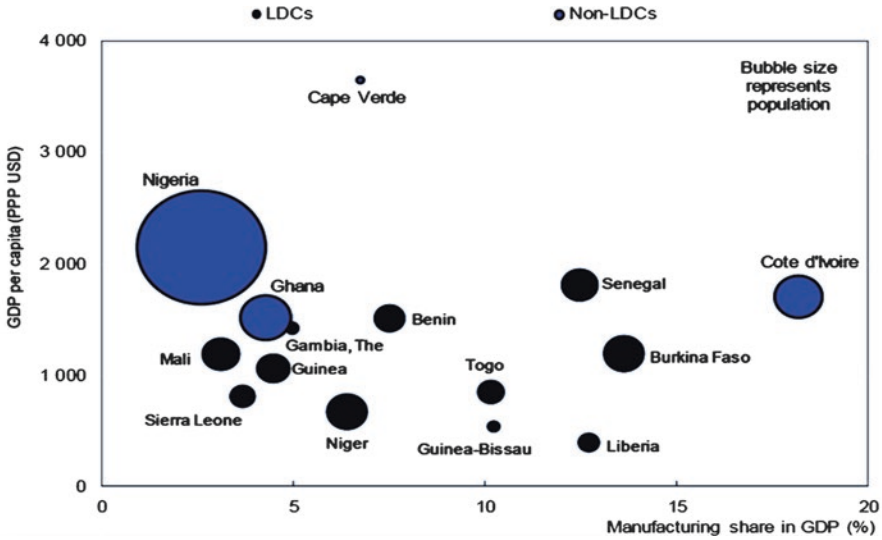


Fig. 1 Size and Economic Structure of ECOWAS Members. (Source: Uexkull 2012)

the Comprehensive African Agriculture Development Program (CAADP) and the Program for Infrastructure Development in Africa (PIDA)” (African Development Bank 2011, p. 1). Altogether, regional integration has progressed slowly despite the adoption of protocols and policies for sustained integration.

Meanwhile, ECOWAS member states are heterogeneous. They differ considerably in colonial history, natural resource endowments, and institutional and administrative systems. At one end of the scale is Nigeria, rich in human and natural resources, and at the other end is Burkina Faso with poor human and natural resources (See Fig. 1). Virtually all ECOWAS members are classified as Least Developed Countries except Cape Verde, Nigeria, Ghana, and Cote d’Ivoire (Uexkull 2012).

The remarkable differences in natural endowments and economic strength of ECOWAS member states constantly determine the depth and quality of their participation in regional integration programs. The differences, to a great extent, accounted for the slow pace of regional economic integration in West Africa. To this effect, the 1993 Revised ECOWAS Treaty established a number of institutions, including the ECOWAS Parliament to drive regional integration in the sub-region.

Establishment of the ECOWAS Parliament

The original mandate of ECOWAS was replete with several administrative bottlenecks that hampered the ultimate realization of economic regional integration in West Africa. The Report of the Committee of Eminent Persons (CEP) established

by the Authority of Heads of States and Governments to review the 1975 ECOWAS system identified three inherent weaknesses of the ECOWAS organs to include: one, the powers of the Authority of Heads of States and Governments (AHSO) were ambiguous. The mandate as contained in Article 5 of the ECOWAS Treaty of 1975 was vague. Two, the power of the Council of Ministers, as contained in Article 6 of the ECOWAS Treaty of 1975, was restricted and thus it had no original or even delegated power. Third, except sanctions for non-payment of budgetary contributions as provided in Article 54 of the ECOWAS Treaty of 1975, there was no binding force to the decisions of the institutions of ECOWAS, including the AHSO, on the member states (Aly 1995). Aside these weaknesses, the institutional setup of ECOWAS was merely functional with less emphasis on democratic principles (Okafor 2014).

The 1993 Revised ECOWAS Treaty thus marked a radical shift in the structure, character and orientation of West African co-operation. The Treaty established a number of institutions to address the shortcomings of the preceding ECOWAS Treaty of 1975. The institutions and their responsibilities are presented in Table 1.

The Revised ECOWAS Treaty of 1993 includes many areas of focus that were initially not part of the aims of the Community. In Article 4, there is a newly added

Table 1 New ECOWAS institutions and their responsibilities

	Institutions	Responsibilities
1	ECOWAS Parliament	The ECOWAS Parliament is made up of deputies from all national parliaments in the sub-region. They are not elected directly – like those of the European Parliament – but sent proportionally by national parliaments. The ECOWAS parliament has only an advisory role.
2	ECOWAS Court of Justice	The Court of Justice deals with all matters between member states relating to the ECOWAS treaty (such as interpretation of the treaty). Individual citizens of ECOWAS member states can appeal to the Court if an action by a member state infringes the rights of a citizen under the ECOWAS treaty.
3	ECOWAS Bank for Investment and Development (EBID)	Previously a Fund, the EBID is modelled after the African Development Bank and other similar institutions. Its task is to provide and facilitate funds for investment in the sub-region, either generated by itself from interest received, contributions from member states or funds from donors.
4	West African Monetary Agency (WAMA)	The WAMA – the former West African Clearing House – is the common monetary institution for the whole of ECOWAS, including the CFA Franc zone. Its task is to support convertibility and currency stability and to pave the way for a region-wide monetary union once the Eco currency is adopted.
5	Mediation and Security Council	When there is a security crisis in the sub-region, the Security Council meets either at ministerial or heads-of-state level. It has the final say in the deployment of the ECOWAS standby force (formerly known as ECOMOG) if intervention in a regional conflict seems necessary.

Source: Adapted from Ann-Sofi, R. (2004) ECOWAS and West Africa's future, problems or possibilities? Umea Working Papers in Political Science, no 3

section on the Community's fundamental principles. Beyond these broad principles, the Treaty devotes an entirely new chapter to what might be regarded as the social dimension of West African integration. Chapter XI covers a broad spectrum of topics from human resources, to cultural and social affairs, women, population and even the press. In a nutshell, the Revised ECOWAS Treaty of 1993 was designed to realign the framework and structures of ECOWAS to accelerate and deepen economic integration and political co-operation among member states (ECOWAS Treaty of 1993).

In 1994, Protocol A/P2/8/94 pertaining to the powers, composition, functions and organization of the ECOWAS Parliament was elaborated and signed by all ECOWAS member states. The Protocol entered into force on 14 March 2002 after the mandatory nine member states had approved it, as a forum for dialogue, consultation and consensus for representatives of the peoples of West Africa with the aim of promoting integration (ECOWAS 1994). The Protocol contains essential elements of democratic order such as separation of powers between the Executive, Legislative and Judiciary arms; empowerment and strengthening of Parliaments; independence of the Judiciary, access to power only through free, fair and transparent elections; popular participation in decision-making, among others (ECOWAS 2001). It also contains modalities for the composition of the ECOWAS Parliament as well as its powers and functions.

Composition of the ECOWAS Parliament

Regional integration requires meaningful political will, robust laws and well-equipped institutions with effective programmes and activities as basic prerequisites (UNDP 2006). These requirements imply that parliaments should be at the forefront to drive regional integration. As an institution, parliament is constitutionally empowered to play the triple role of representation, law-making and oversight responsibility.

Upon its inauguration, the ECOWAS Parliament was therefore expected to assume the legislative and oversight functions in the West African integration processes, particularly as the ECOWAS moves from a community of states to a community of peoples, with strong determination to foster and deepen integration in the West African sub-region. However, the ECOWAS Parliament is far from exercising these roles due to disproportional representation of member states, relegation of 'majoritarian' principle in the election of members of the ECOWAS Parliament, and the ECOWAS Parliament playing advisory rather than law-making responsibility. This sub-section critically examines these factors.

ECOWAS Parliament is the assembly of peoples of the Community and its members represent all the peoples of West Africa. It has a total of 115 seats as against 120 seats contained in the Protocol A/P2/8/94 establishing the ECOWAS Parliament. Each of the 15 member states has five seats at least. The remaining seats are shared to the member states based on population (see Table 2).

Table 2 Membership compositions of ECOWAS Parliament

S/N	Member states	Statutory seats	Additional seats	Total seats	Percentage
1	Benin	5	–	5	4.2
2	Burkina Faso	5	1	6	5.0
3	Cape Verde	5	–	5	4.2
4	Côte d’Ivoire	5	2	7	5.8
5	Gambia	5	–	5	4.2
6	Ghana	5	3	8	6.7
7	Guinea	5	1	6	5.0
8	Guinea Bissau	5	–	5	4.2
9	Liberia	5	–	5	4.2
10	Mali	5	1	6	5.0
11	Niger	5	1	6	5.0
12	Nigeria	5	30	35	29.1
13	Senegal	5	1	6	5.0
14	Sierra Leone	5	–	5	4.2
15	Togo	5	–	5	4.2
	Total	75	40	115	100

Source: Adapted from the Article 5 of ECOWAS Protocol A/P.2/8/94 of 1994

The composition of the ECOWAS Parliament is thus based on proportional representation. Consequently, Nigeria has 35 seats, Ghana 8 seats, Côte d’Ivoire 7 seats, while Burkina Faso, Guinea, Mali, Niger and Senegal have 6 seats each. The others: Benin, Cape Verde, the Gambia, Guinea Bissau, Liberia, Sierra Leone and Togo have 5 seats each.

The principle of proportional representation in the ECOWAS Parliament has implications for decision-making process, democratic character, and the overall objective of furthering the interest of ECOWAS citizens and deepening regional integration. In fact, ECOWAS Parliament is the only regional assembly in Africa that adopts the principle of proportional representation. All other regional assemblies allocate equal number of seats to each member state, notwithstanding the size of the population. In Southern Africa, populations vary from 1 million in Swaziland to more than 43 million in South Africa. In the Intergovernmental Authority for Development (IGAD) region, they range from 460,000 in Djibouti to 66 million people in Ethiopia. Yet, member states of IGAD and The Southern African Development Community’s Parliamentary Forum (SADC-PF) are represented by five parliamentarians each (Okafor 2014; Terlinden 2004; World Factbook 2001).

Members of the ECOWAS Parliament are not directly elected. They are rather elected indirectly from the national assemblies of Member states or their equivalent institutions or organs. Article 7 of Protocol A/P.2/8/94 relating to the ECOWAS Parliament provides that members of ECOWAS Parliament should be selected through indirect election. According to sub-section (ii) “pending the time members of Parliament are elected by direct universal suffrage, the national Assemblies of Member states or their equivalent institutions or organs shall elect such Members

from amongst themselves.” The election of members of the ECOWAS Parliament from the national assemblies of Member states in effect amount to a relegation of majoritarian principle and this has serious implications for democratic participation and representation. The election modes for members of regional assemblies and the degree of popular participation (which in most cases lack credibility) in these processes determine the democratic legitimacy of the ECOWAS Parliament.

In sum, the establishment of the ECOWAS Parliament has failed to engender popular participation of citizens of member states in ECOWAS integration process. The provisions of ECOWAS Revised Treaty of 1993 and Protocol of 1994 (Protocol A/P.2/8/94) on composition, membership and powers of the ECOWAS Parliament relegate ‘majoritarian’ principle in the election of members of the ECOWAS Parliament and proportional representation of the citizens of member states in ECOWAS integration process. The institutional arrangement of the ECOWAS Parliament has rendered it a deliberative body rather than a law-making organ.

Powers of the ECOWAS Parliament

The establishing Protocols of the ECOWAS Parliament delivered it as a consultative and advisory body, without legislative powers. Disappointingly, the original mandate has subsisted, despite a desire expressed by the Authority of Heads of States and Governments in Supplementary Protocol A/SP/3/06/06 of 2006 and the existential realities to have a Community Parliament with directly elected members and exercising full legislative powers. The ECOWAS Parliament is thus limited in both legislative and remedial powers and is at a considerable distance from the centre of influence as regards the implementation of regional integration. This fundamentally differs from what obtains in other regional parliaments across the world. For instance, the European Parliament shares equal legislative powers with the Council of the European Union. This empowers the EU Parliament to adopt European laws and to amend or reject the content of European legislation (Karuombe 2004).

The ECOWAS Parliament neither exercises oversight powers nor law-making functions. It rather serves as a platform for dialogue and consultation of the representatives of the people of West African with a view to promoting sub-regional integration. The Parliament has an advisory status which empowers it to only make recommendations on the issues relating to integration project to the relevant institutions and organs of the Community. In essence, ECOWAS Parliament functions to the extent of powers granted to it by the Authority of Heads of States and Governments. ECOWAS Parliament also receives its budget from the regional executive and this implies a high degree of dependence which is not ideal for the independence and autonomy of a Parliament.

The Supplementary Protocol A/SP/3/06/06 of 2006 which transformed the ECOWAS Executive Secretariat into a Commission further relegates the ECOWAS Parliament through new legal mechanisms which make ECOWAS decisions directly applicable to member states without going through the process of ratification by

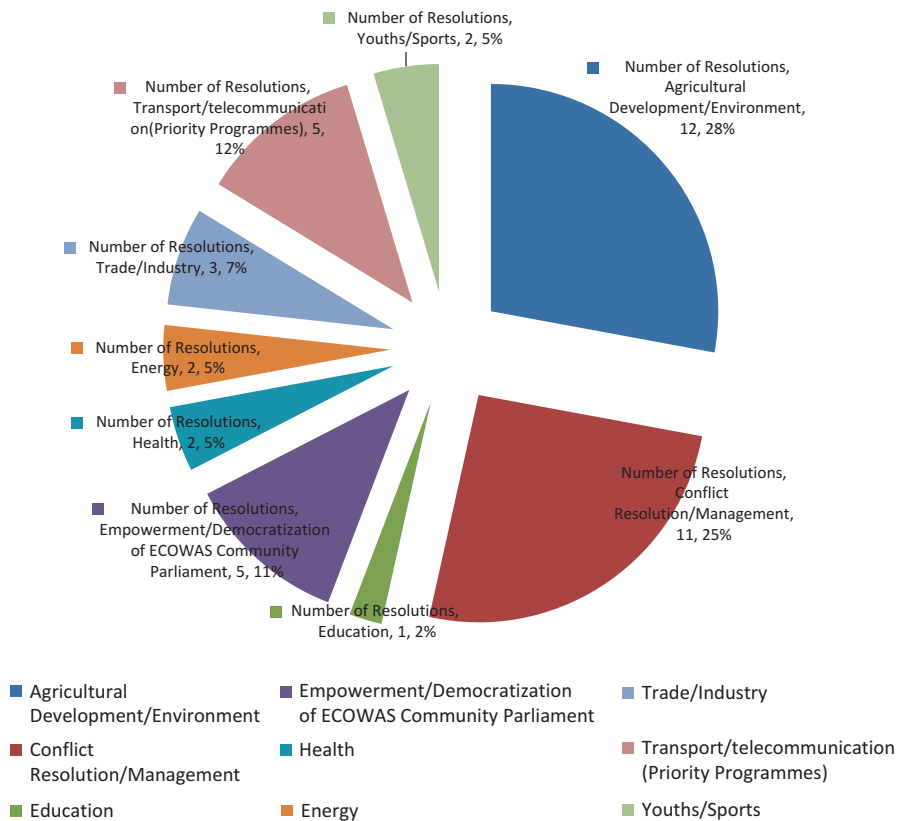


Fig. 2 Major resolutions of the ECOWAS Parliament, 2002–2015. (Source: Adapted from the information provided by the Chief Librarian of ECOWAS Parliament during a face-to-face interview)

national parliaments (ECOWAS Parliament 2012). These developments have elevated ECOWAS to a supra-nationality status with consequent implications on the powers and functions of its institutions, particularly the ECOWAS Parliament, as Fig. 2 indicates.

The Figure shows that the Community Parliament has deliberated on a wide range of issues and presented resolutions or recommendations to the Commission. Within the modest efforts of the Community Parliament, however, the core challenges to regional integration in West Africa such as commitment to vertical trade relations, production and sale of primary products, multiple security posts at the national borders of ECOWAS member states were either left untouched or not frontally addressed through its resolutions and/or recommendations. The institutional deformities of the ECOWAS Parliament account for the obvious weakness. We proceed now to examine these challenges.

ECOWAS Parliament and Challenges of Regional Integration

West African sub-region has long tradition of ties with industrialized countries. France, Britain and US can be regarded as the superpowers in West Africa, even though their engagement has varied over the years (Whiteman and Douglas 2004). France has traditionally maintained close political, economic and military relations with her former colonies. Britain, Portugal and U.S. have maintained more moderate relations for many years. The most important explanation for global attention is perhaps an awareness of the supply of natural resources. The continent in general and the West African sub-region in particular has become a vital arena of strategic and geo-political importance for the US, EU, China, India and other emerging powers (Klare and Volman 2006).

The European Union has extensive relations with West Africa, in addition to the ties of member states due to their colonial past. Foreign aid, trade and peacekeeping are some areas in which connections are well developed. EU is the West African states' leading trade partner, accounting for almost 40% of the regions' trade in 2005 (Klare and Volman 2006). West African exports to EU are dominated by minerals and agricultural products. EU exports to West Africa are dominated by electrical and transport equipment, medicines and dairy products.

India and China are among Africa's largest commercial partner. China exports a wide variety of products to West Africa. India's relations with West Africa have historic roots in shared experiences as former British colonies. Trade relations between India and the British West African colonies developed during the colonial era and bilateral relations continued to evolve economically and politically, after independence. In recent years Indian foreign policy towards West Africa has been more focused on building stable economic relations. One of India's foreign policy goals is to significantly increase the country's role in the West African region (Singh 2007).

The vertical relations of West African states with the technologically advanced countries, as painted above, constitute a major economic challenge that undermines regional integration. The economy of the Community has posed serious challenges to the attainment of its purpose. Member countries are ranked within the brackets of Highly Indebted Nations, poorest countries by wealth estimate and or within the parameters of any other measurement indicators commensurable with underdevelopment, rural economy or otherwise (Ogbonna et al. 2013). They produce and sell primary products. As a result, they engage more in vertical trade relations with industrialized countries that need the primary products than horizontal trade relations with countries of West Africa. Tables 3 below highlights the trend in vertical trade relations among member states of ECOWAS.

The narrowness of the Community's market is one of the major factors that fosters vertical trade relations. Despite all the efforts to integrate the economies of the member states, the Community's market is narrow and intra-trade relations have remained abysmally low and uninspiring because member states are all producers of homogenous raw material (see Table 4). Moreso, trade within the Community is

Table 3 West Africa's key trading partners in trade in goods (million €)

	2004	2007	2010	2013	Share (%)
West Africa's imports in goods					
World	37,653	63,295	86,479	112,894	100.0
EU28	13,002	19,072	22,025	24,907	22.1
China	2,780	7,618	14,872	21,572	19.1
WA ^a	4,058	5,434	7,167	10,317	9.1
USA	2,204	3,468	5,343	7,831	6.9
India	910	2,185	2,779	4,982	4.4
S. Korea	2,240	4,201	5,548	4,911	4.4
West Africa's exports in goods					
World	38,172	64,107	77,354	100,232	100.0
EU28	10,037	15,837	19,556	34,602	34.5
India	417	5,941	8,025	10,400	10.4
WA ^a	3,836	5,117	6,560	9,387	9.4
USA	13,273	23,156	22,802	9,374	9.4
Brazil	2,829	4,065	4,521	7,475	7.5
China	674	986	1,873	4,647	4.6

Source: European Union (2016, p. 22)

^aWA refers to intra-West Africa trade, i.e. trade among the 16 West Africa countries

Table 4 Primary trade commodities of ECOWAS member states

	Country	Primary products
1	Benin	Cotton, crude oil, palm products, cocoa
2	Burkina Faso	Cotton, livestock, gold
3	Cote d'Ivoire	Cocoa, coffee, timber, petroleum, cotton, bananas, pineapples
4	Gambia	Peanut products, fish, cotton lint
5	Ghana	Gold, cocoa, timer, tuna, bauxite, aluminum, manganese ore, diamonds and recently oil (at a small scale)
6	Guinea	Bauxite, alumina, gold, diamonds, coffee, fish, agricultural products
7	Mali	Cotton, gold, livestock
8	Niger	Uranium ore, livestock, cowpeas, onions
9	Nigeria	Petroleum and petroleum products 95%, cocoa, rubber
10	Senegal	Fish, groundnuts (peanuts), petroleum products, phosphates, cotton
11	Sierra Leone	Diamonds, cocoa, coffee, fish
12	Togo	Re-exports, cotton, phosphates, coffee, cocoa

Source: Odularu (2009)

yet to be demonopolized; imports are not streamlined and custom procedures are not transparent (Imohe 2007). For instance, only about 6% of Nigeria's exports (mainly oil) were traded with ECOWAS members (mainly to Ghana and Cote d'Ivoire) (see Fig. 2). The implication is that outside crude oil, Nigeria would not



Fig. 3 Intra-West African trade, 2013. (Source: European Union 2016)

have anything to export to other West African countries. As regards import, less than 2% of Nigeria’s imports originated from ECOWAS states (mainly Benin, Ghana and Cote d’Ivoire). On the average intra-ECOWAS trade, according to Alaba (2006), is about 11% of trade with non-ECOWAS countries. Table 4 and Fig. 3 show more succinctly primary trade commodities of ECOWAS member states as well as the volume of intra-regional trade.

The point being made is that individual West African states produce similar primary products and this has hindered intra-West African trade in particular and the whole process of regional integration project in general.

The unimpressive intra-trade relations of member states of ECOWAS is aggravated by the tenacity at which member states breach the provisions of ECOWAS legal instruments on freedom of movement in a bid to guard their borders. Multiple check-points within the West African sub-region as presented in Table 5 below demonstrate that the whole essence of economic integration of the community is a theory yet to be absolved in practice by most states of the community.

A commonly adduced reason for breaching the provisions of ECOWAS Protocols on free movement is the rising level of trans-border criminal activities. However, while the problem of trans-border crimes has remained a dominant theme, the implementation of provisions of ECOWAS legal instruments on free movement of

Table 5 Official checkpoints on selected routes of West African highways, December 2010

Highway	Distance (km)	Number of checkpoints	Number of checkpoints per 100 km
Lagos to Abidjan	992	69	7
Lome to Ouagadougou	989	34	4
Abidjan to Ouagadougou	1122	37	3
Niamey to Ouagadougou	529	20	4
Cotonou to Niamey 1036	1036	34	3
Accra to Ouagadougou	972	15	2

Source: Ogbonna et al. (2013)

goods and persons has remained a big challenge. The negative role of law enforcement officials has been the most immediate obstacle.

The incessant checkpoints on selected routes of the community highways are characterized by inhuman treatment and extortion from commuters; officers arbitrarily impose charges for stamping of passport at checkpoints (Ibeanu *n.d.*). The story of what West African citizens go through in the hands of border security officials is the same in the West African sub-region. The multiple checkpoints, harassments, extortion and intimidation at the borders of member states of ECOWAS is more than ever choking to moribund the objective of the Community, which is the establishment of a common market (Ibeanu *n.d.*, p. 11).

The untoward implications of its weak institutional capacity for regional integration notwithstanding, the Community Parliament, though without constraining power, has a large consultative and advisory role, which allows it discuss all the policies and programmes of the ECOWAS. Thus, by providing regional forum for dialogue and consultation, the Community Parliament promotes public participation in regional governance. Ultimately, this is relevant for two reasons: one, it encourages greater political, cultural and social contract between the peoples and institutions across the sub-region (Karuombe 2008). Two, it catalyses the internal development of the assembly and the wider policy of the ECOWAS. Again, the Community Parliament stands out as the only regional assembly whose founding document foresees direct general elections of its parliamentarians. Although at present, members of the ECOWAS Parliaments are selected from national parliaments, and the planned transition to universal adult suffrage is likely to be delayed, this remains an innovative approach to regional integration, which other regional assemblies in Africa can adapt in dealing with the challenges associated with the election modes for members of regional assemblies and the degree of popular participation, both of which determine the democratic legitimacy of regional assemblies.

Conclusion

The provisions of ECOWAS Revised Treaty of 1993 and Entry-into-Force-Protocol (Protocol A/P.2/8/94) of 1994 on composition and membership of the ECOWAS Parliament relegate proportional representation of the citizens of member states in ECOWAS integration process. On account of disparities in natural resources and population of member states, the provisions of the protocols also undermine the decision-making process and democratic character of the Parliament as well as the overall objective of furthering the interest of ECOWAS citizens and deepening regional integration. More fundamentally, the provisions of the protocols neglect majoritarian principle in the election of members of the ECOWAS Parliament with serious implications for democratic participation and popular representation.

The institutional deformities of the ECOWAS Parliament have thus rendered it incapable of addressing, through its resolutions and/or recommendations to the Commission, the core challenges to regional integration in West Africa. Member states of ECOWAS produce and sell primary products. As a result, vertical trade relations with technologically advanced countries have been accorded priority more than intra-trade relations among member states, which have remained abysmally low and uninspiring. This is further compounded by multiple security posts at the national borders of ECOWAS member states and inhuman treatment commuters go through in the hands of border security officials. The ECOWAS Parliament is not frontally addressing these challenges through effective law-making, and in fact, may not in the foreseeable future due to its weak institutional capacity.

The ECOWAS Parliament is established to provide a wider space for democratic participation of the citizens of member states for the purpose of advancing and deepening regional integration. Unfortunately, the Parliament is hamstrung in the performance of real legislative functions to drive regional integration in the sub-region. Therefore, the decade-old proposal for the enhancement of the powers of the ECOWAS Parliament from its present advisory status to a co-legislative and decision making body as contained in the Draft Supplementary Act presented to the ECOWAS Commission should be considered and approved without further delay.

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Innovation and Economic Development in West Africa: The Challenges of Implementing ECOPOST in Nigeria



Adetola Odubajo

Introduction

One of the fundamental objectives of states in the contemporary state-system is the guarantee of economic growth and development, hence, the continuous setting of development agendas to meet recurring challenges. The agendas are usually planned to cater for national needs on immediate, short and long-term basis. The subsisting character of the international system requires that a sharper focus be directed towards the creation of science, technology and innovation agendas as the platform upon which to launch the development efforts of states. However, the capacity to drive science, technology and innovation initiatives is missing in most African states. Since the 1960s, solutions to national development challenges have been hinged on inter-state collaborations through regional integration but unfortunately, most of the emergent organizations face challenges that prevent them from performing at optimal level. Some of the challenges include; lack of political will on the part of member-states, inadequate funding, etc.

The whole idea of regional integration is traceable to David Mitrany's functionalist ideology. Functionalism promotes inter-state collaborations for the purpose of protecting common interests and providing for mutual needs. According to Mitrany (1966), functionalism is built around states' integration in limited functional economic and technical areas for the purposes of meeting human needs across boundaries. In effect, the aim of regional integration is "to call forth to the highest possible degree the active forces and opportunities for cooperation, while touching as little as possible the latent or active points of difference and opposi-

A. Odubajo (✉)

SARChI: Africa Diplomacy and Foreign Policy, Faculty of Humanities,
University of Johannesburg, Johannesburg, South Africa

Department of Political Science, University of Lagos, Lagos, Nigeria

tion” (Mitrany 1966: 58). Functionalism paved the way for the emergence of neo-functionalism, as promoted by Ernst B. Haas, Amitai Etzioni, among others. While the central argument of functionalism is retained, the neo-functionalist thesis argues that “the interaction of political forces” (Wunderlich 2007: 13) remains immanent in the reality of regional integration.

Overtime, regional organizations have been found as suitable actors in the drive for attaining national development agendas. In this regard, the African Union, European Union, and ECOWAS, among others, have been mandated to assist in driving the development agendas of member-states. For the purpose, and in recognition of its importance, the creation of science, technology and innovation platforms continue to top the agenda of international organizations. The process is made complete when member-states anchor their development plans on region-wide STI initiatives. In effect, the member-states and by extension, the region benefit from the strategy. Specifically, regional collaboration and cooperation is meant to hasten and enhance the prospects of achieving national development.

As a foremost member of ECOWAS, Nigeria is expected to derive immense benefits offered by the sub-regional collaboration and cooperation. It is believed that the domestication of ECOWAS Protocols for development and especially in the area of science, technology and innovation initiatives would provide the opportunity for Nigeria to realize her development aspirations. However, despite the display of interest by various administrations through policy pronouncements, there is little evidence to show that Nigeria is reaping commensurate benefits from ECOWAS development agenda for the sub-region. Essentially, the ECOWAS Policy on Science and Technology has not found expression in the Nigerian environment. This work would elucidate on two of the factors responsible for the anomaly.

The chapter is divided into five parts, starting with the introduction. This is followed by explanations on regionalism as a mechanism for development. The subsequent parts address the issues of Nigeria’s development crisis, thereby amplifying the need for a concrete development plan in which the ECOPOST can signal a positive direction for fostering development. The final part elaborates on the challenges confronting the implementation of ECOPOST, and some suggestions are proffered for overcoming the challenges.

Regional Economic Integration and National Development Nexus

The logic of existence and relevance in the contemporary international system can be found in the interdependent nature of international relations. Various forms of collaborations and cooperation arrangements are required, especially to guide against undermining and threatening the existence of sovereign political entities. Both rich and poor nations, and the relatively weak and powerful, seek cooperation across boundaries in the bid to advance and protect national interests. Accordingly, “international organizations have become indispensable instruments within the international system” (Bennett 1995: 23).

Historically, the focus of leaders and philosophers regarding international relations was about avoiding wars and conflicts, obviously because of its attendant destructive nature. The exertions culminated in the formulation of “ideas for resolving state differences and for promoting intergovernmental cooperation that today’s organizations owe their major ideological debt” (Bennett 1995: 9). These ideas had remarkable influences on the outcome of The Hague Conferences of 1899 and 1907 and the Versailles Peace Conference of 1919 where the framework of the earliest most elaborate attempt at creating a peaceful and harmonious world of the modern times was fashioned. These gatherings created international organizations with focus on the security dimension of inter-state relations, “while economic and social questions were given only perfunctory consideration” (Archer 2001: 3).

Specifically, regional economic integration “grew out of the post-Second World War international situation, and developed integrally within the Cold War system that marked the subsequent forty years” (Axline 1994: 1). Europe stands tall in providing institutional expression for the creation of regional economic organizations. The 1951 Treaty of Paris that created the European Coal and Steel Community (ECSC) provided the basis for the first ever institutional platform for regional integration. The success led to the metamorphosis of ECSC to the European Economic Community (EEC) in 1957 and subsequently, European Community (EC) in 1967 and finally the European Union (EU) in the 1993 Treaty of Maastricht. Europe thus became the architect of “a state of affairs or a process involving attempts to combine separate national economies into larger economic regions” (Bende-Nabende 2002: 11).

The glaring success of Europe’s early attempt at regionalism triggered the embrace of the idea in the developing world. States in the developing world got their cues from the example of the European Community by commencing the initial efforts towards economic integration in the late 1950s and early 1960s with specific focus on “traditional free trade areas” (Axline 1994: 2–3). Examples of organizations that were berthed on that institutional framework, include, Latin American Free Trade Area (LAFTA) and Caribbean Free Trade Association (CARIFTA). El-Agraa (1999: 1) describes the development as “a state of affairs or process which involves the amalgamation of separate economies into larger trading regions”. The second generation of regional organizations had a focus on regional import substitution. With this, attention shifted from the customs union model of the first generation to industrialization as a means to economic development. The third generation focused specifically on the issue of collective self-reliance in which case the essence of integration of national economies involved “joint political action in a range of areas that included trade, aid, political, and security matters formed and area of joint activity that defined regional cooperation” (Axline 1994: 4). This period was the commencement of the creation of broad regional organizations characterized by “discriminatory removal of all trade impediments between at least two participating nations and with the establishment of certain elements of cooperation and coordination between them” (El-Agraa 1999: 1). The fourth generation signified the trend of regional cooperation in the new world order. The defining character of the period are, “(a) a move back to measures of trade liberalization, often on the basis of overlapping bilateral agreements rather than multilateral regional

obligations ... and (b) specific cooperation on individual projects or programmes among several countries". Beyond the restrictive emphasis on economic issues, regional economic integration has emerged in contemporary times "as part of a strategy for the focusing of loyalties upon the institutions, symbols or even, what have been called, the icons of the larger area ..." (Taylor 1993: 7).

Theoretically, the concept of regionalism is derived from the practical demonstrations of Western European governments of the 1950s to evolve systems of collaborations among sovereign political entities. By the end of the Second World War, it became apparent to European statesmen and intellectuals that the realist theoretical foundations of state-centric character of international relations could no longer be sustained. Thus, alternatives in form of supranational foundations, such as, federalism, functionalism and neo-functionalism, for ordering international relations, began to gain currency. Regionalism as a representation of "a general phenomenon, denoting formal and often state-led projects and processes and a body of norms, values, objectives, ideas and a type of international order or society" (Schulz et al. 2001: 5, cited in Wunderlich 2007: 3) for development purpose became the dominant ideology. Since the end of the Second World War, the international system has been visited with two waves of regionalism; "Old Regionalism" and "New Regionalism".

The Old Regionalism thinking dominated intellectual discourses between 1945 and the early 1980s. The idea is premised on national development through the advantages of regionalism. Development in this instance is narrowly defined as "economic growth" (Doidge 2007: 3). Furthermore, emphasis is placed on "modernization', essentially defined as industrialization, made possible by foreign exchange generated through commodity exports" (Doidge 2007: 4). However, the structural defects of the international system made regionalism a repugnant idea to the less developed economies of the world, who by design, bear the brunt of the structural defects of the core-periphery bifurcation of international political economy. The nature of regionalism at that point in time merely sustained the unequal exchange regime between the developed world and the less developed countries to the detriment of the latter. After implementing methods hinged on extricating the poor South from the dominance of the rich North through protectionists' policies, it was discovered that this was a weak way of changing the strong deficient institutionalized character of the international system. However, the failure of this strategy prompted the need by developing countries to exploit "the economies of scale available as a result of regional integration, through, for example, withdrawing behind common external tariff barriers, market- and industry-sharing arrangements etc." (Doidge 2007: 5). In part therefore, "regionalism was seen by Third World structuralists as a tool in the struggle to end the exploitative and dependent relationship between LDCs and the industrialized North" (Doidge 2007: 5). Although as claimed by Hettne and Soderbaum (1998: 2), "the old regionalism was generally specific with regard to objectives and contents, and often had a simple and narrow focus on free trade arrangements and security alliances"

The importance of regionalism as a reliable strategy for development soon enveloped the world, cutting across geographical space. However, the post-1980s event

of globalization encouraged new interpretations for the processes of regionalism as a development agenda. According to Hettne and Soderbaum (1998: 1): “The ‘new regionalism’ refers to a phenomenon, still in the making, that began to emerge in the mid-1980s, in contrast to the ‘old regionalism’ that began in the 1950s and faded away in the 1970s”. The changes in the content and context of regionalism are the result of the changes in the dynamics of international political economy. One of the most critical change with telling effects on regionalism is described by Hettne and Soderbaum (1998: 2) as, “the end of ‘Third Worldism’ and changed attitudes towards (neoliberal) economic development and political system in the developing countries”. Hettne and Soderbaum (1998: 2) submits:

The new regionalism is a comprehensive, multifaceted and multidimensional process, implying a change of a particular region from relative heterogeneity to increased homogeneity with regard to a number of dimensions, the most important being culture, security, economic policies and political regimes. The convergence along these dimensions may be a natural process of politically steered or, most likely, a mixture of the two.

ECOWAS’ Development Initiatives

ECOWAS was created during the closing era of old regionalism, and as such been privileged to have existed during the two waves of regionalism. ECOWAS responds to the transformation from old regionalism to new regionalism through the reworking of its structure and processes. The demands of new regionalism is compelling, for according to Hettne and Soderbaum (1998: 4):

In sharp contrast to the old regionalism, which was often inward-oriented and explicitly exclusive in terms of member states, today’s regionalism is extroverted rather than introverted, which reflects the deeper interdependence of today’s global political economy.

The history of the creation of ECOWAS is traceable to the exertions of Nigeria’s immediate post-independent regime. The political crisis and the subsequent civil-war that threatened to dismember Nigeria’s corporate existence scuttled the possibilities of success in this regard. However, the post-civil-war military regime seized the gauntlet and led a passionate and determined campaign for the realization of a region-wide political/economic integration fashioned after the European model of the time. The determined drive was motivated in part by the desire to concretize a good neighborliness policy between Nigeria and its immediate neighbors in the West Coast of Africa. It can be argued that the desire was somewhat more of a necessity geared towards the protection of the national interests as a result of the challenges that Nigeria faced through the activities of some of its neighbors during the 30-month civil-war (Bobboyi 2011: 101–102). In effect, Nigeria’s motive for leading the integration effort had both political and economic considerations (Ezenwe 1983: 12). Judging from the civil-war situation, it became apparent that the authority and sovereignty of the Federal Government of Nigeria could be undermined by the activities of neighboring countries, hence, the need to reignite the passion for collaboration and cooperation. Gowon (1984: 19) captures the whole essence thus:

By reason of its size, population and oil resources, Nigeria constitutes a core state, with no interest in territorial aggrandizement but concerned, understandably, with its own security, and therefore, with the stability of the region. These objectives are best served by policies of political cooperation, economic integration, and adoption of a form of economic self-reliance.

Owing to the polarized nature of the West Africa political milieu at the time, as a result of the antagonisms and suspicions against Nigeria by France on the one hand, and her former colonies (notably, Cote d'Ivoire) on the other, the post-war government confronted tremendous challenges in the efforts at creating the organization.

- (a) How to allay the fears of Francophone West African states about the alleged threat of Nigeria's economic and political domination of the sub-region; and
- (b) The attempt by a European Economic Community (EEC) – backed France to consolidate the exclusive solidarity of the Francophone states in West Africa, a solidarity which, in fact, had characteristics of anti-Nigerianism.

In order to further demonstrate the Nigerian government's genuine interest in creating a sub-regional organization for the overall benefits of all, the government warmed up to Nigeria's immediate neighbor to the west (Republic du Togo) – a French-speaking state, to partner in the process of realizing the purposes of the integration. In the bid to involve all states, the Nigerian government made several concessions to pacify the French-speaking areas. With emphasis on appeasing the security concerns of the French-speaking areas and to demonstrate Nigeria's non-interest in territorial expansion, the government fashioned the new initiative after the form of integration process in the then European Economic Community. While Nigeria may claim to be the initiator of the establishment of ECOWAS, the efforts of Togo, Liberia, Cote d'Ivoire, Ghana, Senegal, and others, are well noted in history (Afolabi 1984: 46–48). Instructively, the organization was meant to focus on the development of member-states through collaboration in institutional processes in order to afford the governments and peoples the opportunity to interact on the basis of oneness for the purposes of collective self-reliance. Thus, the prospect of development is expected to be advanced through region-wide institutional and legal frameworks.

By the 1990s, a number of African countries were ravaged by civil-wars; West Africa had its share of ugly experiences that resulted from decades of political marginalization, economic strangulation and socio-cultural disharmony. For this purpose, necessity and exigencies dictated that the mandate of ECOWAS be expanded to accommodate the security concerns of the sub-region. The ECOWAS Peacekeeping Force, named, the ECOWAS Monitoring Group (ECOMOG) was set-up through the political leadership provided by the Nigerian authorities to restore peace to war ravaged Sierra-Leone and Liberia. The logic in the Peacekeeping enterprise is that instability and wars in any state within the region if not curbed would have tendencies of similar instability in other parts of the region. Moreover, it is only a state of political stability that can provide the enabling environment for economic development and social harmony. Nigeria's role in the formation of ECOWAS "was based on the perceived linkage between regional peace, on one hand, and development and national stability and security on the other hand" (Obi

2009). It is therefore not unusual that Nigeria has played a leading role in maintaining peace in the sub-region.

Most of the member-states of ECOWAS fall within the group of the least-developed states in the world, “the countries of the sub-region thus possess all the characteristics of under-developed economies” (Asante 1980: 70). With an estimated population of 340 million people, the 15-member organization is composed of states with diversity in capabilities and characteristics. From outset therefore, the aim was to provide collective support through institutional mechanisms for the development of the region at the national level, which will ultimately reflect positively on the development of the sub-region as a whole. Specifically, both the original and revised treaty aim to accelerate the development of the region through customs union, free-trade zones, under an overarching legal framework that cuts across the region, in order to provide incentives for growing business, remove obstacles against the freedom of movement of people, thereby enhancing the development potentials of member-states. However, the continuous lack of industrial capacity has stunted the prospects of growth and development especially in the critical sectors. The major drawback for industrialization was the absence of a science, technology and innovation agenda for the sub-region. In response to this situation, a revised treaty was adopted to meet with the challenges of the 1990s and beyond. The revised treaty among numerous changes focused and emphasized on the need for the development of a science, technology and innovation (STI) agenda in order to enhance progress and development within the region. In this respect, Chap. 5 of the Revised Treaty, titled, “Co-operation in Industry, Science and Technology and Energy” outlines the sub-region wide strategy for enhancing the growth of science, technology and innovation. Article 27 of the chapter reads:

- (a) Strengthen their national scientific and technological capabilities in order to bring about the socio-economic transformation required to improve the quality of life of their population;
- (b) Ensure the proper application of science and technology to the development of agriculture, transport and communications, industry, health and hygiene, energy, education and manpower and the conservation of the environment;
- (c) Reduce their dependence on foreign technology and promote their individual and collective technological self-reliance;
- (d) Cooperate in the development, acquisition and dissemination of appropriate technologies; and
- (e) Strengthen existing scientific research institutions and take all necessary measures to prepare and implement joint scientific research and technological development programmes.

This mandate notwithstanding, ECOWAS rolled out its policy on Science and Technology in 2012. Essentially, the policy is meant to give direction to the task of the Directorate of Science, Education and Culture. The outline of the mandate and vision of the directorate clearly shows the centrality of the development of science in the work of ECOWAS. In summary, ECOPOST is meant to address the following issues in the sub-region:

- Build capacity to conduct research through the establishment of training programs, holding workshops and organizing discussion forums
- Encourage scientists and researchers by awarding research grants and facilities trips
- Promote coordination and complementarity between research institutions and industry
- Encourage networking between scientists and research institutions in member-states and improve the means of obtaining results through scientific research
- To provide technical assistance to member-states to implement policies and adequate research programs, according to the technological needs of each state
- Encourage the participation of women in scientific specialties and in the establishment of policies and decision-making in sciences, etc.

The above was designed to form the fulcrum of the development agenda in ECOWAS. Indeed, Nigeria like all other member-states is expected to key into the agenda, by collaborating with the Commission and the other member-states to attain national development.

Nigeria's Development Challenges

By all standards, Nigeria can be regarded as one of the world's most richly blessed countries. Buried under Nigeria's earth across the length and breadth of the country are various categories of resources; metals (tin), precious stones (marble) and industrial minerals (barytes, gypsum and coal). This is in addition to large deposits of the much treasured crude-oil and various agricultural products, such as; groundnuts, palm-oil, cocoa, citrus fruits, among others. Furthermore, Nigeria is home to huge measures of natural gas, columbite, bitumen, limestone, iron ore, asbestos, etc. It is officially acknowledged that "precisely forty four (44) solid minerals are found in commercial quantity and are spread across the 36 States and FCT Abuja of the Federation" (see <http://www.nipc.gov.ng/index.php/opportunities-by-sectors/solid-minerals.html>). The high volume and quality of natural resources is complemented by the human resource as represented in the relatively high population of over 100 and 70 million people. According to the 2006 Census Figures, 53.2% of the population is in the working age-group of 15–65 years of age. This condition should invariably translate to high capacity output in terms of overall development and economic benefits. Furthermore, the human-resource is of high quality and value as shown in the number of Nigerian professionals in many fields of human endeavor both at home and in the diaspora.

It is therefore expected that such a country richly blessed in human and material resources should be one of the most developed countries in the world, essentially because the two major elements or factors (human and material resources) that can galvanize development: a buoyant economy as predicated on world-class industrialization, exist in Nigeria. In effect, the missing link in the combination of

abundant human and material resources is a collection of visionary leadership that could articulate coherent policies with the support of the critical mass of the people that would provide the enabling environment for the development of the state. On this score, Nigeria has failed woefully, and therefore the country remains a potentially great country, while being unable to reach its potentials. The contradiction in the available resources and the level of development in Nigeria is aptly described as “development exceptionality” (Akanle 2013). The author argues:

Nigeria remains one of the developmental puzzles in Africa. This state of affairs largely reflects the disconnect between the abundance of Nigeria’s natural and human resources and its extraordinarily reversed socioeconomic development. The interrelatedness of this trajectory is one of disjuncture, even when the developmental potentials of the nation are not in doubt (Akanle 2013: 31).

From all development indicators, Nigeria has turned out as one of the least developed countries in the world. When juxtaposed against its potentials, the country’s condition is symptomatic of the ‘Wretched of the Earth’ (Fanon 1963).

Compared with its African neighbors, Akanle (2013: 32) contends:

... no other country has the human-resource base of Nigeria, few earn as much foreign exchange from oil and other natural resources, and few has natural resources as diverse. Nigeria is about the most resource-endowed and the richest nation in sub-Saharan Africa, and it has the largest economy in Africa..., yet its people remain among the poorest in the world (Akanle 2013: 32).

Over the years, successive administrations have made efforts to reverse the trend of the contradictions between Nigeria’s human and material endowments and the fact of the country’s underdevelopment. One of the fundamental areas of concentration for galvanizing Nigeria’s economic growth is the development of science and technology capabilities. This is understandable owing to the fact that the development of science and technology capabilities has been identified as a fundamental route to the attainment of economic growth and development. In essence, the ability to deploy science and technology capabilities is crucial to sustainable economic prosperity. This time-tested path led to the creation of the Fourth National Development Plan (1981–1985) (Darma 2014), which was the first government-initiated policy plan to focus on the development of science and technology as the pathway to economic growth and development. To further assure the success of the Plan, especially the interest in science and technology, the government for the first time established the Federal Ministry of Science and Technology, which among others was charged with the:

... promotion and development of scientific and technological research; formulation of national policy on science and technology; liaison with universities and polytechnics and the promotion and administration of technology transfer programs (Fourth National Development Plan).

The Nigerian government further cemented the initiative in 1987 by instituting a policy on science and technology. The policy was expected to “reactivate various research projects reportedly stalled in some of the local research institutes, and coordinate and upgrade the technical manpower available in the country ...” (Davies

1998: 144). Essentially, “the thrust of the policy is to utilize Nigeria’s human and material resource endowment to transform the country into an industrial giant within a decade ...” (Davies 1998: 147–148). An outline of the aims of the policy is presented below;

1. Promote scientific and technological manpower development;
2. Develop local capital goods industry by initiating design engineering and copy technology activities
3. Exploit and utilize Nigeria’s material resources to maximum effect
4. Encourage local research and development activities in both private and public enterprises
5. Finance the development of science and technology through public and private sector contributions; and
6. Create a scientific culture through the inculcation of science and technology in the thinking and working process of Nigerians

By 2012, the policy was revised in line with the Transformation Agenda of the Jonathan administration. This time the general objective was to;

Facilitate the acquisition of knowledge to adapt, utilize, replicate and diffuse technologies for the growth of SMEs, agricultural development, food security, power generation and poverty reduction.

This is broken down into specifics, thus:

- (a) Support the establishment and strengthening of organisations, institutions and structures for effective coordination and management of ST&I activities within a virile National Innovation System (NIS).
- (b) Encourage and promote creation of innovative enterprises utilising Nigeria’s indigenous knowledge and technology to produce marketable goods and services.
- (c) Support mechanisms to harness, promote, commercialise and diffuse locally developed technologies for the production of globally competitive goods and services that intensively utilize Nigeria’s raw materials
- (d) Facilitate and support the creation and maintenance of up-to-date, reliable and accessible database on Nigeria’s ST&I resources and activities.
- (e) Promote activities that enhance effective ST&I communication and inculcation of ST&I culture in Nigerians.
- (f) Create and sustain reliable mechanisms for adequate funding of ST&I activities in Nigeria.
- (g) Initiate, support and strengthen strategic bilateral and multilateral co-operations in science, technology and innovation activities across all sectors of the economy.

On the basis of critical assessment, these are laudable objectives, but the extent of the failure of implementing these objectives can only be found in the reality of Nigeria’s underdeveloped conditions. While government pontificates on the necessities for developing the science and technology capabilities of the state, concrete results have not followed policy. The inability to build on national policy is also reflected on the sub-regional policy initiatives.

Challenges of Implementing ECOPOST in Nigeria

The ECOWAS Policy on Science and Technology is a broad proposal that articulates the mechanisms for achieving sub-region wide enhancement of the science, technology and innovation potentials of member-states. In this regard, critical elements that are fundamental to the attainment of the goals are well-stated. It is however the responsibility of each state to create the enabling environment for implementing the relevant sections of the policy. For Nigeria, some prevailing domestic conditions have prevented the successful implementation of ECOPOST. Arguably the most two critical factors are; low quality of education, and the challenges of inadequate infrastructure.

The low quality of basic education is a major hindrance to Nigeria's capacity for development in the field of science, technology and innovation. No doubt, there is an intricate linkage between qualitative basic education and the development of science and technology. This linkage can be drawn from a tripod; the capacity of instructors, the availability of the equipment required for training, and the intellectual abilities of the students. In general terms, the capacity of instructors/teachers is suspect; there is dearth of equipment required for training, thus, the generally low quality of graduates. At present, the standard of education in Nigeria is at its lowest ebb (Duze 2011). The school system has been taken over by various ills (ranging from malpractices, and incompetent teachers/instructors) which invariably result in poor quality graduates, and by extension, dearth of manpower required for taking up scientific researches. For most, the poor foundation at the primary school level is carried through to the tertiary level where the scientific thinking that should ordinarily have been built overtime ought to be consolidated upon. Davies (1998: 152) sums it up thus:

A good educational foundation would have influenced enthusiasm for science and technology in the general public, already enslaved by a culture of superstition, that have prevented the development of a scientific community in the country.

Furthermore, the Nigerian public education sector is continually rocked by crises, often times triggered by government policies. A common consequence is the regular lock-down of institutions and the suspension of academic activities which is detrimental to quality teaching and learning with grave consequences for research activities, especially in science and technology. Thus the environment limits the possibilities of advancing the frontiers of knowledge.

In addition to the plethora of woes in the school system is the unacceptable manner in which Nigerian research institutes suffer from government neglect. A number of the research institutes have been made and left moribund. Indeed, the deplorable state of research institutes is evidence of the low research and development culture of the Nigerian government. Low funding as a result of poor budgetary allocation and the dearth of qualified researchers impede the output of research institutes.

The second point of departure is the issue of inadequate infrastructure that is prevalent in Nigeria. The situation has stunted the growth of Nigeria's advancement

in the field of science, technology and innovation. Without the functioning of requisite infrastructure, the prospects of developing capabilities in the area of science and technology would remain hampered. Unfortunately, Nigeria's infrastructure deficit is in the region of N5.91tr (Okon 2016). This humongous sum translates to inability to provide the required infrastructure support for engagements in science and technology initiatives. Perhaps the most important infrastructure with significant effects on research in science, technology and innovation is electricity power supply. Most practical researches in these areas would require the availability of electric power. Nigeria suffers the predicament of incessant epileptic power supply system. It is unjustifiable that a country of over 170 million people could only generate a paltry 2500 MW of power at its peak (www.nercng.org). This inadvertently shows the country is unprepared for research activities in the field of science and technology. Unfortunately, there appears no end to the deficient nature of power supply, thereby signaling a never-ending concern for the deplorable state of research activities in the fields of science, technology and innovation.

By and large, the two factors highlighted above partly account for the lack of proper and adequate development of the science, technology and innovation capabilities of the country. Both the Fourth National Development Plan and the subsequent National Policy on science, technology and innovation failed to achieve the objectives. From all indications, except solutions are sought for the problems of low quality education and inadequate infrastructure, Nigeria's capability for science, technology and innovation would remain hindered. It is only solutions to these challenges that can guarantee benefits from ECOPOST.

Conclusion

It requires no further reiteration that the development of science, technology and innovation capabilities is a *sine qua non* to the development of the economy of any nation. In exploring the relationship between economic development and science and technology, Wad (1984: 330) notes:

In the main, this tradition views science and technology as central to the development process and the problem is seen as chiefly being to establish and to promote scientific and technological infrastructure, to encourage the development of scientific communities and R & D institutions, and to improve the processes of transfer and adaptation of technology

Instructively, a science, technology and innovation agenda can be used to address the critical problems of food security, water safety, health-care challenges, environmental sustainability and housing problems. Thus, it is incumbent upon the government of Nigeria to reactivate the mechanisms for developing this essential aspect of the National Development Plan to be incorporated into the National Policy and the ECOWAS Policy on Science and Technology. According to Wad (1984: 331): "Science and technology policy therefore becomes a matter of making the right investments in R & D, training and education, information systems, etc." In order to achieve this, some fundamental adjustments should be undertaken.

The first step is to review the standard of education in the country. Overwhelming attention must be paid to the primary level education, since this is the first step in the process of laying a solid foundation for high quality graduates. In this regard, science education must receive adequate attention from the authorities because of its significance on the development of STI agendas. This effort must be complemented with deserved attention on research activities. For this purpose, government must reenergize research institutes through provision of funding for required equipment and machinery, recruitment and retraining of scientists and technologists.

The import of adequate infrastructural development, especially constant power supply on the development of science, technology and innovation has been articulated in this piece. Therefore, government must work on its power generation strategy to ensure constant power supply in the shortest possible time in order to boost the chances of developing the STI potentials of the country.

Finally, it is pertinent to reemphasize that Nigeria's path to the development of science, technology and innovation remains thorny. With Nigeria's commitment to ECOWAS, the country ought to derive commensurate benefits from all that ECOWAS has to offer. In effect, the Nigerian government must key into the advantages of ECOWAS Policy on Science and Technology for the purposes of developing the country's science, technology and innovation potentials.

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The Role of Cloud-Based mHealth Disease Surveillance System in Regional Integration: A Case of the Ebola Crisis in ECOWAS



Lang Loum and Dikeledi A. Mokoena

Introduction

To deliver safe, effective, high quality and affordable care in the twenty-first century, strategic adoption of an interoperable health information system infrastructure is needed to transform healthcare from paper-based system to an electronic, interconnected regional healthcare system. Many studies have shown the importance or benefits of a disease surveillance health information system. Access to up-to date disease surveillance information can minimize deaths as a result of any disease outbreak. Timely access to diagnostic information can bring about several benefits regarding workflow, patient care, and disease management. These benefits can also result in theoretical net cost savings (Maass et al. 2008). A host of academic articles and agency reports have argued that ICTs can make a substantial contribution to improving health and healthcare in developing countries (see Chetley and Trude 2006). This chapter looks into the role of mHealth in Disease surveillance and how it could be implemented at a regional level for strengthening regional health system.

According to Kahn et al. (2010) *m-health* is the use of portable electronic devices for mobile voice or data communication over a cellular or other wireless network of base stations to provide health information. Mobile health (mhealth) projects have already been implemented in many countries and it is providing lots of healthcare initiatives throughout the world, especially in developing countries. In a recent study by the UN and Vodafone titled, “mHealth for Development: The Opportunity of Mobile Technology for Healthcare in the Developing World,” over 50 of these

L. Loum (✉)

School of Information Technology and Communications, University of the Gambia,
Kanifing Campus, The Gambia

D. A. Mokoena

Department of Political Science, University of Pretoria, Tshwane, South Africa

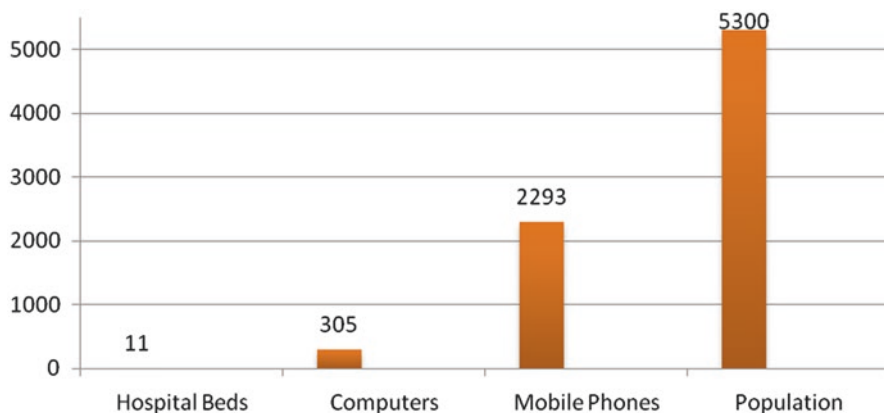


Fig. 1 Technology and health-related statistics for developing countries (millions)

types of projects throughout 26 countries were discussed. They have shown that the biggest adopters of mobile technology were India with 11 projects South Africa and Uganda with 6 each. Examples of such mHealth projects include:

- Sending mobile phone owners updates on diseases via SMS.
- Letting health workers in Uganda log data on mobile devices from the field.
- In South Africa, the SIMpill is a sensor-equipped pill bottle with a SIM card that informs doctors whether patients are taking their tuberculosis medicine.
- In Uganda, a multiple-choice quiz about HIV/AIDS was sent to 15,000 subscribers inviting them to answer questions and seek tests. Those who completed the quiz were given free airtime minutes. At the end of the quiz, a final SMS encouraged participants to go for voluntary testing. The number of people who did so increased from 1000 to 1400 over a 6-week period.

According to a UN foundations and Vodaphone report, there are 2.2 billion mobile phones in the developing world, 305 million computers but only 11 million hospital beds (see Vatsalan et al. 2010). Figure 1 below shows that the power of mobile phones should be harnessed to promote health services in low resource settings.

As mentioned above, South Africa and Uganda are already utilizing mHealth projects for the health sector however migration challenges propel us to look into cross-border health systems and the role of ICT in regionalization.

ICT, Regional Integration, Regionalism and Regionalization

Akpan-Obong and Parmentier (2007) argued that information communication technologies (ICT) are imperative for integration within and between countries to enhance the flow of communication, information, and production. They also

critiqued that in as much as ICT plays a role in integrating the world, development ought to be interlinked with regional integration. Moreover, mutually reinforcing policies and approaches to development vary and thus the evaluation system of integration may be measured based on economic growth as opposed to other indicators. Acharya (cited by Fioramonti) critiqued the concept of regional integration arguing that it is Eurocentric and an idea originating in Western Europe with minimal applicability outside Europe (2013: 153). It is with this critique that we find ways of thinking about the processes of regional integration and ICT health care systems.

“[R]egional integration describes the process of supranationalization of authority in a given policy field, which requires some degree of shared sovereignty.” (Fioramonti 2013: 152). The criticism of the European model has swelled up discourse resulting from the nuances and peculiarities of regions. Moreover, the top down model of integration has been criticized by various scholars, the latest one being Oloruntoba (2016, 2017) who emphasized the regionalism critique that there should be transcendence over the state-led regionalism to “reflect the multilevel and multi-stakeholder complexities that define the old regionalism” (Oloruntoba 2016: 2). Regions are social constructs carved through the process of human interactions, fluid cultural landscapes and political discourse. Thus the importation of one model onto other distinct contexts is a limitation. Africa's unique history and context requires an endogenous innovative response to regionalism.

Acharya (2016) also argued that regionalism is not a European idea yet theories of regionalism and intellectual discussions are locked within a European Union (EU)-centric approach. Regionalism is a “state-led process of building and sustaining formal regional institutions and organizations among at least three states” (Borzell and Risse 2016: 7). Oloruntoba (2016) highlighted the difference between regionalization and regionalism stating that regionalization is broader and much more encompassing than regionalism because it denotes “an empirical process of change from relative heterogeneity and lack of cooperation towards increased cooperation, integration, convergence, coherence and identity in a variety of fields” (Oloruntoba 2017: 326). He further reiterated that regionalism denotes the process of integration while regionalization speaks to the outcome thereof. West African Health Organization (WAHO) is an example of a regional organization facilitating regionalism. WAHO was established in 1987 through the ratification of the ECOWAS protocol by the 15 heads of states in the sub-region. The objective of WAHO is,

the attainment of the highest possible standard and protection of health of the people in the sub-region through harmonization of the policies of the member states, pooling of resources and cooperation with one another and with others for a collective and strategic combat against the health problems of the sub-region. (Article III, paragraph 1 1987, Protocol of WAHO)

With the infrastructure and resource challenges faced by WAHO, ICT becomes an avenue for resolving some implementation issues. ICT was envisioned by Akpan-Obong and Parmentier (2007) to play a functionalist role of integrating states. A functionalist theory perspective to integration is a European approach to integration and has largely been centered on economic growth as a goal. However, in this case it can also contribute to social elements of regional intergration.

ICT can play a role in the facilitation of the objectives of WAHO or any regional health unit, how this can be done will be discussed later on in this chapter. For now it is worth noting Akpan-Obong and Parmentier's critique against the limitations in viewing ICTs as interlinking with the objectives of regional integration and economic development. They called for discourses beyond ICTs, regional integration and economic development (2007: 4).

In the context of this chapter, ICTs are envisioned to play a role in regionalization and regional health systems. "Regionalization ... connotes processes of increasing economic, political, social or cultural interactions among geographically or culturally contiguous states and societies ... regionalization emphasizes transnational relations between non-state actors such as firms, interest groups and non-governmental organizations (NGOs)- not merely as drivers of region building but being directly involved" (Borzel and Risse 2016: 8). Migration constitutes part of the processes that facilitate interactions among states and societies. In terms of a regional health system, Lampsas, Vidalis, Papani, Vagelatos (2002) built a system which would operate as an infrastructure foreseen to play a role in development and penetration of ICTs. Their model is designed to capture regional health care data and establish a network to be utilized at the level of regions and sub-regions. The project discussed in this chapter extends this system to a regional disease monitoring mechanism. An mHealth disease surveillance system at the country level was developed with the Republic of the Gambia as a case study. A regional disease monitoring system would aid in the context of migration and the monitoring of disease outbreaks. ICTs through health information systems (HIS) play an important role, before delving into HIS, the paper now moves on to highlight scholarly linkages between migration and disease.

Mobility of Diseases and the History of Migration in West Africa

Barnett and Walker (2008) explained the role played by migrants in altering the demographic characteristics of infectious disease including the challenges faced by national health professionals to respond to these diseases. Gushulak and MacPherson (2004) highlighted that a migrant's health is influenced by health environments of the country of origin, the environments they travel through and the destination environments. Migrant populations in Africa, as with the rest of the world, are complex in terms of composition. There are migrant seasonal workers, refugees, asylum seekers, international students and so forth. Barnett and Walker including Monge-Maillo and López-Vélez (2017) have provided their analysis in the European context; however this study is premised on the sub-region called ECOWAS. The Economic Community of West African States (ECOWAS) has a rich history of migration from the pre-colonial era to the contemporary period. Economic challenges faced by West African countries characterized by small economies with the

exception of Nigeria and Cote d'Ivoire, have affected employment opportunities resulting in large numbers of unemployment. West African migration has been influenced by poverty, poor economic performances, population pressure and endemic conflicts (Adepoju 2005: 1). Colonial labour regimes entailed legislation which stimulated regional labour migration and the institutionalization of cross-border migration. "Migration from and within the sub-region includes temporary cross-border workers, female traders and farm labourers, professionals, clandestine workers and refugees and are essentially intra-regional short term and male dominated..." (Adepoju 2005: 1).

Adepoju (2005) mentioned that the regional labour migration system of West Africa was stimulated by economic policies resulting in countries such as Mali and Togo being labour exporting countries with labour largely composite of mine workers to the Gold Coast and Ivory Coast. Togo, Burkina Faso, Mali among other countries are predominantly labour exporting countries, while Nigeria and Ghana mainly exported labour in response to volatile economic conditions in the 1960s and 1980s respectively. Moreover, highly skilled migrants have been circulating in the region between countries such as Senegal, Ghana, the Gambia, Nigeria, Cote d'Ivoire, Burkina Faso and Togo. Women have largely been instrumental in the facilitation of intra-regional trade through commercial migration. TMALI, (forthcoming) have found that migrants operating within the informal sector have largely benefited from the ratification of the protocol of the Treaty on Free Movement of persons in West Africa and the social challenges faced by the migrants indicate the importance of fast tracking regional citizenry. However, at the formal levels, intra-regional trade in West Africa remains at a dismal 10–15%. Moreover, the recent case in West Africa with the outbreak of Ebola had an impact on economic trade and the transboundary impact of the disease calls for responses that transcend national communities.

Ebola and Sub-Regionalisation of Disease

The Ebola virus disease, formerly referred to as Ebola Haemorrhagic Fever, is transmitted to people from wild animals and spread through human transmission (Rewar and Mirdha 2014). Between 2014 and 2015, the outbreak affected rural and urban areas in West Africa. Its first recorded break out was in 1976 in Central Africa. The disease was found in the Democratic Republic of Congo and its neighbouring countries namely South Sudan, Gabon, Congo and Uganda (Weyer and Blumberg 2014). The DRC had another outbreak in 2018. The outbreak of Ebola has negative implications for migration and cross border trade as it was noted in the case of ECOWAS where national responses had implications for regionalism processes. TMALI (forthcoming), also showed that new regionalism approaches are making headway with cross border trading within the informal economy. It has been largely argued that integration is being fast tracked by cross border informal traders and thus the closure of borders has implications for people's livelihoods and other regionalism endeavors.

The study shows that despite the slow traction in regional integration in Africa at the formal level, West Africans and Southern Africans are already integrating and migration is an integral part of the process. However, diseases such as Ebola threaten the economic progress not only of informal sector but the mainstream economy too. “Selected cases of Ebola in Nigeria and Senegal led to desperate measures including closure of borders, flight cancellations and bans on regional conferences in a bid to contain the spread ... and further threatened the regional integration agenda of ECOWAS” (WANEP 2014: 1). According to Vickers and Games (2015) Sierra Leone, Guinea and Liberia were the most affected countries, they shared that investment in those countries had severe implications on economic growth, the aversion led to “−0.2 percent in Guinea, 3 percent in Liberia and −2.0 percent in Sierra Leone (down from pre-Ebola estimates of 4.3 percent, 6.8 percent and 8.9 percent respectively)”. Moreover, multinational companies in those countries disinvested. Tourist revenue also dropped tremendously.

The Ebola crisis resurfaced again in 2016 and Liberia closed its borders after the death cases in Guinea were reported since the 29th of February 2016. In 2014, 12 West African countries had closed their borders as a result of the spread of the disease, for instance Cameroon closed its borders with Nigeria. Nigeria was affected by Ebola through patients who migrated to the country from the affected countries. This indicates how unmonitored migration of affected individuals plays a role in the spread of the disease. For instance, in the South African case in 1996, haemorrhagic fever was detected upon the death of a nurse after exposure to a medical doctor who had previously worked with patients in Gabon where there was an outbreak (Weyer and Blumberg 2014). Shutting down migration is not a productive response either. Take for instance the countries which had reported cases of the disease, mainly Sierra Leone, Senegal, Guinea, Nigeria, research shows that there were socio-economic implications for the closure of borders in their region. Thus there is a need for innovative interventions that will help us make informed decisions. The proposed system will also help in providing upto date data on the rate of infections of any disease outbreak and sites of infections. This includes the monitoring of potential carriers to avoid cases such as what happened in South Africa whereby the patient could not disclose that he had just emigrated an area with a Ebola outbreak. The challenge of disparities in terms of health care facilities inevitably leads to medical migrants thus increasing probability of the spread of diseases.

At a more generic level, it is unfortunate that despite its importance for evidence-based decisions, health information systems in many developing countries are weak, fragmented and often focused exclusively on disease-specific program areas (WHO Health Metric 55). An integrated regional disease surveillance system will provide the basis for public health professionals to look at the health system from broader and more comprehensive points of view. Quality information is essential for not only health information practitioners but also for guiding policy makers in the evidence based decision making necessitated by budgetary constraints as well as in monitoring and control disease outbreaks.

Health Information System for Regionalism

In many West African countries, there have been few developments in the area of Health Information Systems (HIS). This is mainly attributed to the lack of proper health information system infrastructure, lack of finance to setup and maintain the information systems, lack of trained IT staffs, lack of research in the Health Information System of the country, just to name but a few. However, there have been initiatives to improve the HIS by the governments and organizations such as WAHO are best positioned to manage HIS. The first step in developing an information system is to develop a plan for the information infrastructure. Investments in an integrated regional disease surveillance health information system can be aligned and leveraged around such infrastructure to build stronger core health information systems supporting better regional health service management, regional health policy, and stronger regional health systems ultimately supporting regionalism commencing in the ECOWAS sub-region.

The health information system developed for the Republic of the Gambia is hereby extended to the regional and sub-regional levels aimed at assisting non-state organizations such as WAHO to advance one of its functions which is epidemiological surveillance.

Health Information Systems

Health management information incorporates all the data needed by policy makers, clinicians and health service users to improve and protect population health. AbonZahr and Boerma (2005) defines HIS as combination of people, equipment and procedures organized to provide health information to health workers (and others) in a way that enables them to make informed decisions. According to Suggs (2006) HIS should support the following actions: collection of data, transmission of data, processing and analysis of data, presentation of data, information use in planning and management. The health information systems are expected to provide health workers and health managers with a systematic tool for decision making. However, different studies have showed that the Health Information Systems (HIS) of developing countries are not optimal enough to support decision-based management, (Sander et al 2005).

Cloud Computing

Computing is being transformed to a model consisting of services that are commoditized and delivered in a manner similar to traditional utilities such as water, electricity, gas, and telephony. Cloud computing is still under development, and as such,

there is no universally accepted definition. There are different stages of development in terms of cloud computing and different perspectives grant a different understanding of the cloud (Tana and Ai 2011). Cloud computing provides the facility to access shared resources and common infrastructure, offering services on demand over the network to perform operations that meet changing business needs. The location of physical resources and devices being accessed are typically not known to the end user. Shaikh and Haider (2011) define cloud computing as a set of resources and services offered through the Internet. US National Institute of Standards and Technology (NIST) defines cloud computing as a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction.

For an increasing number of organizations worldwide, cloud computing provides a quick and reasonably priced way to tap into IT infrastructure as an Internet service. Many studies have shown that cloud computing can reduce the cost of hardware and software for organizations. Nir (2010) emphasized that the developing world must exploit the opportunities afforded by cloud computing while minimizing the associated risks to allow access to advanced IT infrastructure, data centers, and applications and protect sensitive information (Nir (2010)). A cloud computing infrastructure for Africa will go a long way in reducing cost for the implementation of HIS services and it would contribute Africa's 4th industrial revolution.

Proposed Architecture

Cloud Based Medical Information Exchange System

In terms of the link between cloud computing and regional health care, we first propose the health data information exchange system with cloud computing to help medical institutions share information. See Fig. 2.

The Central Compartment: This compartment contains five servers, namely; an index server, audit, access, web server and certificate authority server. It has two web interfaces for physician and patient, that is, physician workstation (PW) and patient centered retrieval (PCR) Li et al. (2001). The central compartment serves as the mediator to fetch information from the Resource Server (RS). It only stores basic information of patients and link to the RS which contains the bulk of surveillance information. The Policy maker interface provides policy makers with disease surveillance information in an easy-to-understand format. On other hand, the Physician interface is designed for physicians.

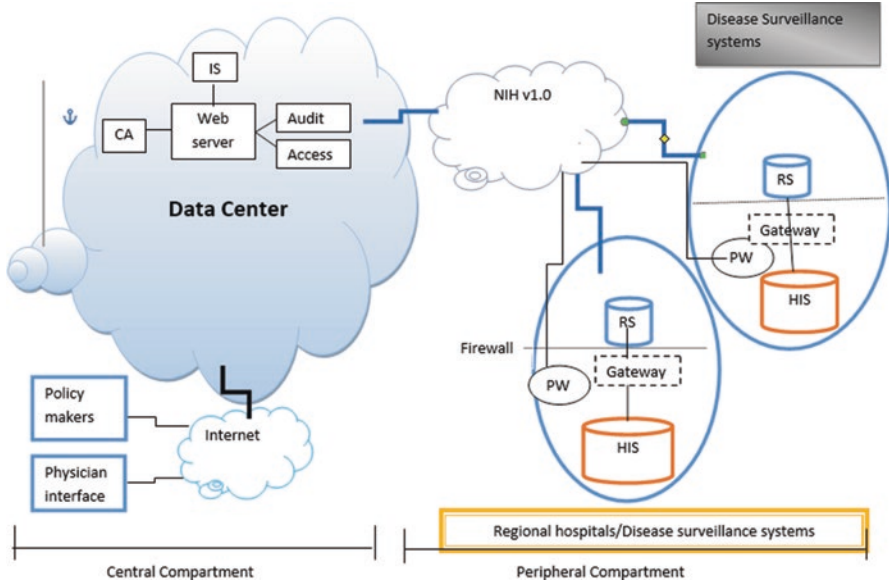


Fig. 2 Cloud based MIES architecture

The Peripheral Compartment: This compartment is located on local hospital or countries disease surveillance system and it consists of the RS and gateway. It fetches data from the disease surveillance system and transforms it into a format the RS can use. The gateway can be customized according to each country’s data sharing policy thus responding to unique privacy concerns. Both the central and peripheral compartments will link through the Internet via a Virtual Private Network (VPN).

Web Server: This helps to deliver content via the web and can be accessed through the Internet. The primary function of the web server is to deliver web pages on the request of clients using the Hypertext Transfer Protocol (HTTP).

It works when a web browser initiates communication by making a request for a specific resource using HTTP and the server responds with the content of that resource or an error message if unable to do so. The resource is typically a real file on the server’s secondary storage, but this is not necessarily the case and depends on how the web server is implemented.

While the primary function is to serve content, a full implementation of HTTP also includes ways of receiving content from clients and storing data. The function of the web server in our architecture is to host the health information database and delivers it to clients via a web-based interface.

Index Server: Indexing Service is well suited for querying and indexing Web content. It integrates with a web server to provide low-maintenance indexing and querying of sites hosted on it. The Index server provide links that a user can utilize to retrieve patient data from resource servers (RS) located in a hospital's local database through a web-based interface hosted by the web server.

To provide search features on a web server, you must first configure Indexing Service to identify the searchable Web content. Then you develop a search page, either as an Active Server Page (ASP) or as a static query form. After developing the query form, you must develop a web page for displaying query results. Indexing Service then returns the search results in a web page you create. You can also provide hit-highlighting so that readers can see the location of the text they are searching for in the pages found by the query.

In addition to querying, you can develop web pages to administer the content index on the web server. These administration forms make it possible to create a custom, Web-based administration interface for Indexing Service.

Certificate Authority Server: When dealing with people's information, a very important aspect comes to play. That is, security and privacy of their information being kept. The CA is used to make sure that patient information is secure and access by only authorized people. The CA server makes sure only registered and authorized users have access to the servers. A security matrix that employs data sensitivity, three-zone confidentiality models and user's role is used to determine the access right. Societal and legal concerns about privacy and confidentiality must be satisfactorily resolved in EMR.

Audit Server: The audit server provides all the access history logged to the last detail to guarantee accountability.

Access Server: Is a server that is dedicated to handling users that are not on a LAN but need remote access to it. The *remote access server* allows users to gain access to files and print services on the cloud server from a remote location via vpn. For example, a user who dials into the cloud network from home will dial into the remote access server. Once the user is authenticated s/he can access resources as if s/he were physically connected.

Resource Server: The RS is a computer that resides outside each surveillance firewall. It accepts data sent by the gateway program and stores it in a relational database format while it updates the index server back in the central compartment whenever necessary. In reality, the gateway can read from and write to the RS, while the central compartment performs only read action, thereby making sure that the hospital will have the utmost control over their patient data.

Gateway: The gateway retrieve data from a hospital's HIS and transform it into the format recognized by the RS. The gateway is a program that should be customized according to each hospital's native database. It can be customized to each hospital's policy of data sharing. For example, interval of updates, type of media, type of exams and tests can all be determined by the hospital in the way that impacts least to its HIS.

Public Health Disease Surveillance Systems

We adopted the epidemic intelligence framework as the one used in Taiwan in their disease surveillance center. It divides the monitoring system into two: indicator-based surveillance and event-based surveillance (See Fig. 3 for the frame work).

- A. **Indicator-based surveillance:** The indicator based is the traditional form of disease surveillance. The indicator based surveillance systems include systems to identify risk including techniques such as; Mandatory notification: It is mandatory for hospitals to report via the Internet to CDC website upon the identification of any deadly disease. The Laboratory surveillance is meant to gather data from labs across the country. Sentinel surveillance to monitor the rate of occurrence of specific conditions to assess the stability or change in health. School based surveillance to keep tract diseases in children etc.
- B. **Event based surveillance:** Event-based surveillance is the organized and rapid capture of information about events that are a potential risk to public health through various media such as TV news, Internet, radio etc. This information can be rumors and other ad-hoc reports transmitted through formal channels (i.e. established routine reporting systems) and informal channels (i.e. media, health workers and nongovernmental organizations reports).

It is crucial to have different surveillance systems in a country to monitor different diseases as outbreaks are inevitable and can occur at any time. In ECOWAS, there are few surveillance information system to monitor disease outbreaks in this

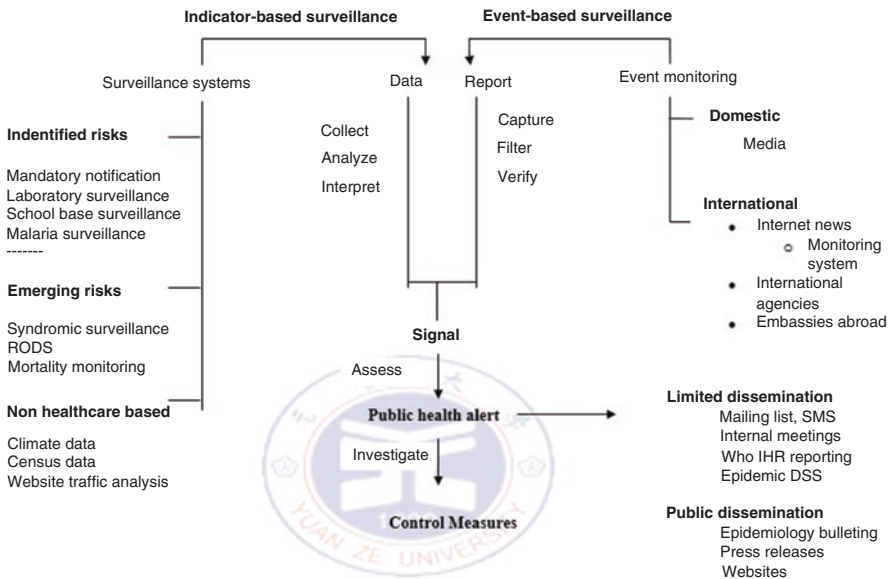


Fig. 3 Epidemic framework adopted from Taiwan’s CDC

disease volatile region. Diseases like malaria and HIV AIDS are high in this part of the world. It is therefore necessary to use surveillance information systems to monitor the health of the population at all times.

Cloud mHealth Architecture and Technical Solution

The information system built takes three-tier architecture (Client-Server-Database) and is implemented using JavaScript, HTML5, CSS3, PHP, MySQL and Ms SQL server 2008 for the data warehousing (Fig. 4). The front end (Client – tier) consists of two interfaces optimized for desktop and mobile web interfaces (Figs. 5 and 6). We adopted and modified Taiwan’s CDC infrastructure backend and then designed a new front that is a mobile optimized version. We adopted their back end data warehouse which helps in the data analysis part (Figs. 5 and 6). The use of HTML5 with CSS3 enables the separation of content and presentation in different files. Mobile devices have very different characteristics such as screen size. The separation of the content and the presentation enables writing the content once, and changing the style and layout to suit different mobile devices with various CSS.

We used the idea of responsive web design and server scripting (RESS) to design for different devices with different capabilities that are connecting to our web server. The idea of responsive web design alone is not enough as the user agent string of

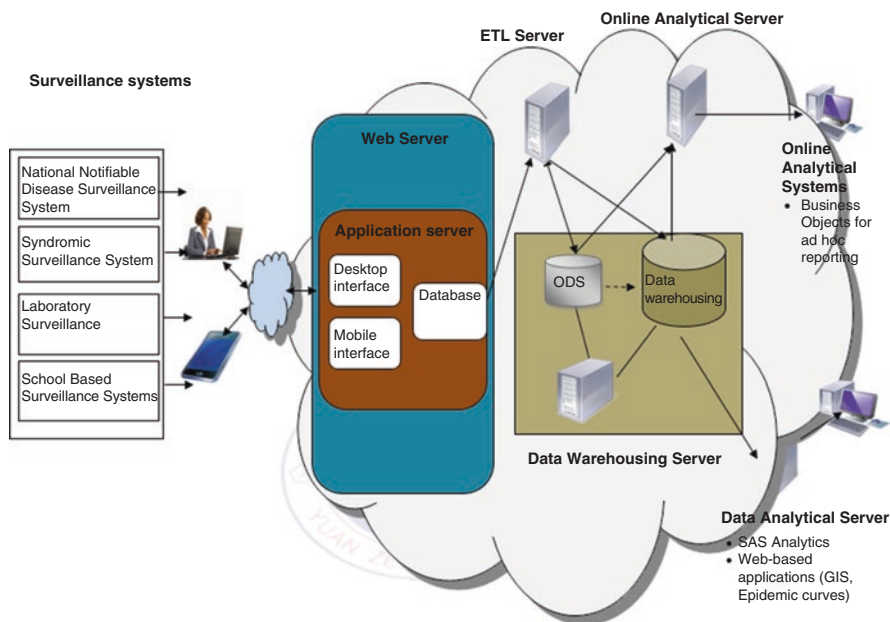


Fig. 4 Cloud m-Health architecture

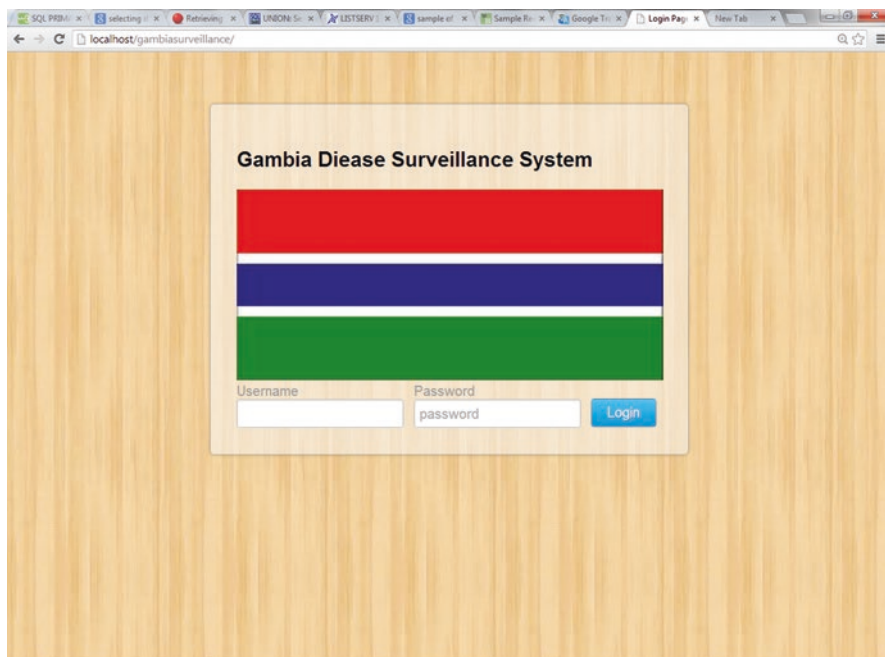
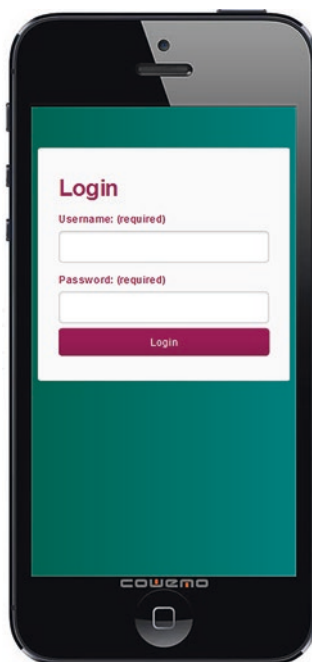


Fig. 5 Desktop login interface

Fig. 6 Mobile login interface



devices could be manipulated thereby passing wrong information about the device connecting to our website. Hence, we used the WURFL library to make sure the right information is passed to our website.

We implemented this concept using the WURFL library. The WURFL Database API is a PHP & MySQL/MSSQL/MongoDB based library designed by ScientiaMobile. It uses the Wireless Universal Resource File (WURFL) to detect the capabilities of mobile devices.

In this architecture, any device with 3G capability can be used to access the web server via GSM mobile infrastructure. All they need to buy is a mobile phone with 3G capabilities and users will be able to login into the surveillance portal, choose one of the surveillance systems to report (Figs. 7, 8, and 9).

At the back end is a data warehouse which consists of the following: Data warehouse server, an ETL Server, online analytic system and a data analytic server (Fig. 10).

In this architecture, data is pulled from the surveillance systems by the **ETL server**. ETL is short for **extract, transform, and load**. Its function is to pull data out of the surveillance databases and place it into the data warehouse to create consistent, accurate information. The ETL is used to transfer data from one database to another, to form data marts and data warehouses and also to convert databases from one format or type to another. Data from the different surveillance systems as well

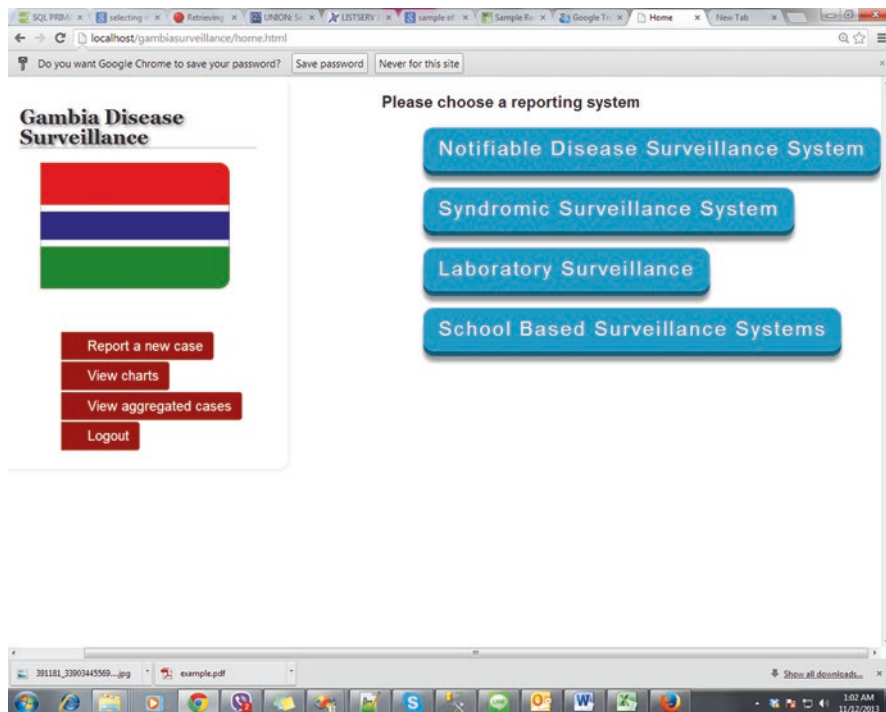


Fig. 7 After login on using desktop

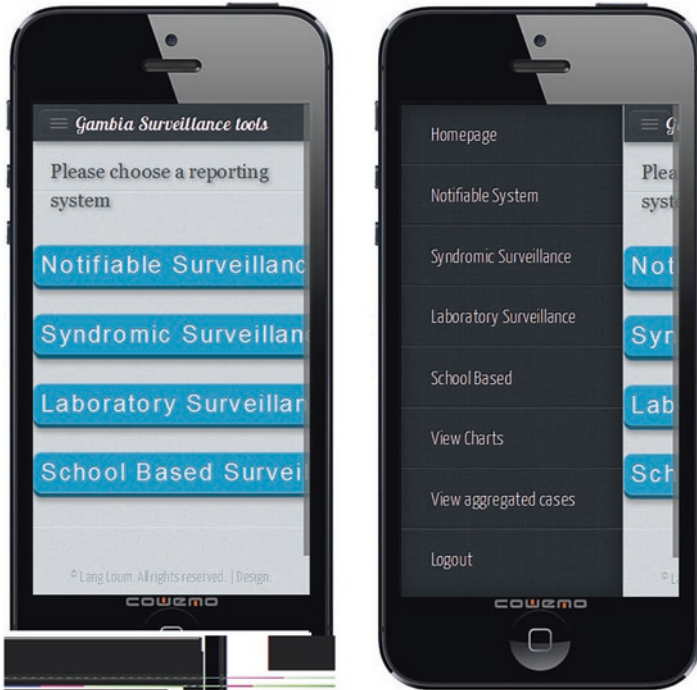


Fig. 8 Mobile interface after login

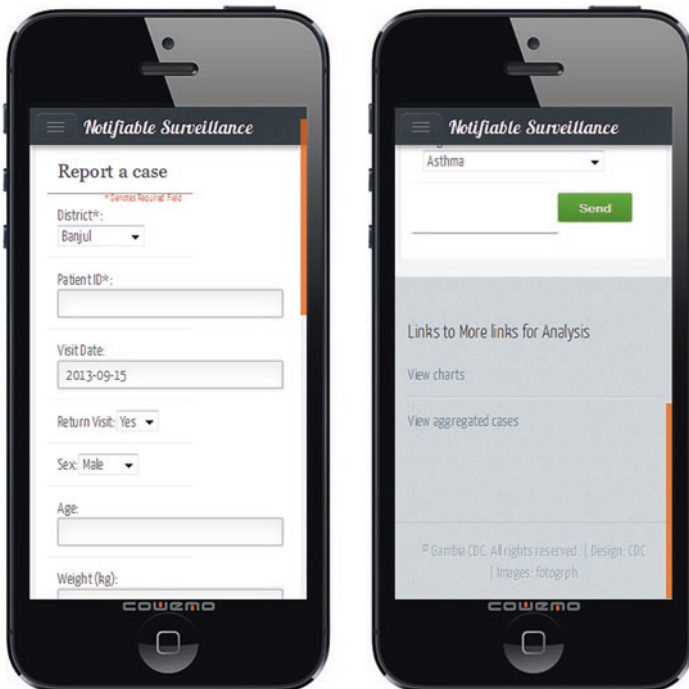


Fig. 9 Notifiable disease reporting interface

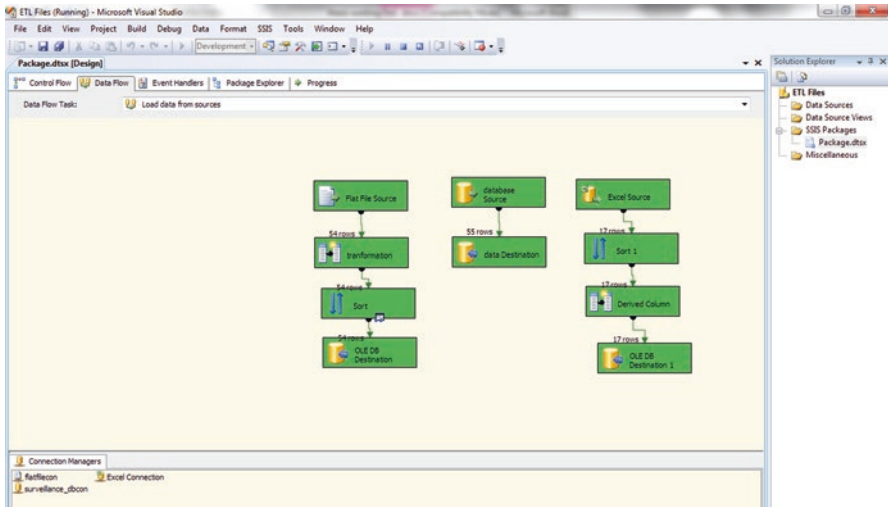


Fig. 10 ETL process

as from different sources (csv, txt or excel) are extracted, transformed to the right format and loaded into a database by the ETL. This helps to organize, clean and put data in a table for further analysis.

We used Ms SQL server 2008 Server Integration Services (SSIS) tool to create our ETL server. Data from the different sources and in different formats is extracted, transformed and loaded into our surveillance database.

ODS stands for operational data store, it is a database designed to integrate data from multiple surveillance systems for additional operations on the data. The data is then passed back to operational systems (e.g. ETL, analytic server) for further operations and to the data warehouse for reporting, as shown on the figure above. Because the data originates from multiple sources, the integration often involves cleaning, resolving redundancy and checking against business rules for integrity.

The **data warehouse** is a database that collects and stores all the integrated data from the different sources in one format and ready for use by management for decision making. It is a central repository of data which is created by integrating data from one or more of the surveillance systems.

The **Online Analytical Server** is a tool that provides analysis of the data stored in the data warehouse and the ODS. *Online Analytical Server* tools enable users to analyze different dimensions of multidimensional data. The *Online Analytical Server* sits between the Online Analytical Systems and the data warehouse. It understands how data is organized in the database and has special functions for analyzing the data.

In Microsoft SQL server 2008 we used SQL Server Analysis Services and the SQL Server Reporting Services (SSRS) tools for analysis and reporting the data in our data warehouse in the prototype we developed. Microsoft calls these services BIDS (**Business Intelligence Development Studio**), it has a user friendly GUI and is used

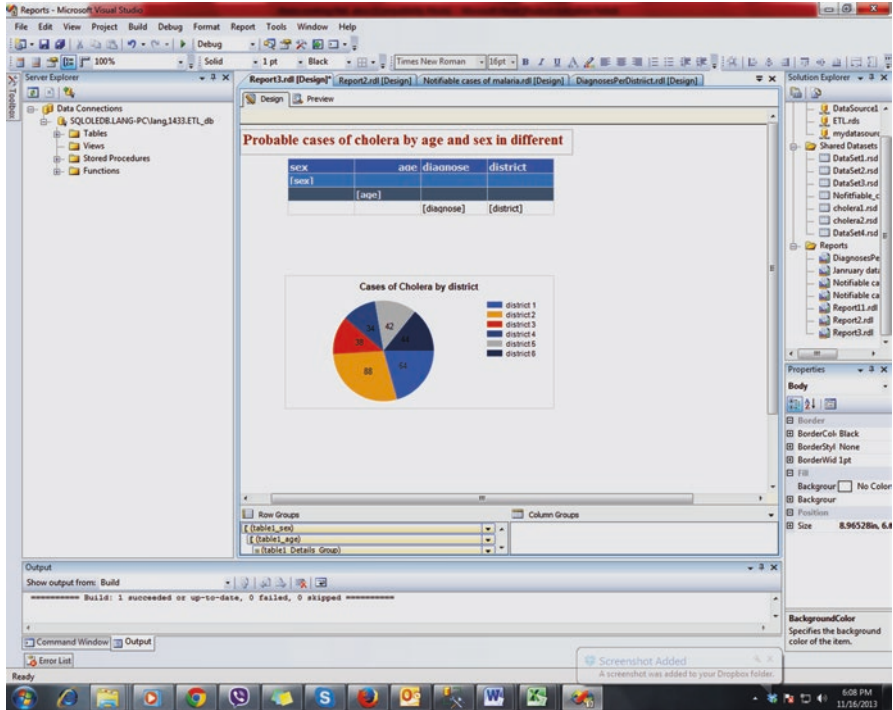


Fig. 11 A sample report of a outbreak in Report Server

to develop data analysis and Business Intelligence solutions utilizing the Microsoft SQL Server Analysis Services, Reporting Services and Integration Services.

This figure above shows that these reports created can be viewed via the web or as part of a Microsoft Windows application or any SharePoint site. You can also create data alerts on the reports published to a SharePoint site and receive email notifications when report data changes, so it's a very handy tool made easy for developers by Microsoft.

The **Data Analytic Server** is similar to the Online Analytic server which uses software tools such as SAS, web based applications etc. to provide analysis of the data from the data warehouse to the users.

In this paper we have highlighted that no one country can make such an infrastructure work. Therefore, to have other countries at regional level to participate in the implementation of such projects is important. Regional bodies such as SADC and in partnership with regional health bodies such as WAHO in the case of ECOWAS, must take the lead in bringing such information systems at the regional level. These bodies have the power to come up with IT policies and procedures to help countries adopt and fully collaborate in the implementation of such projects.

Discussion and Conclusion

From the investigation done during this research, we were able to study in detail the ECOWAS health information infrastructure. Although the ECOWAS's health information management departments have been doing a lot to make improvements in the health information infrastructure, there exists a lot of gaps which need to be filled. One of the findings of this research with regards to why the health information system of countries is weak is the fact that the information management department of the HIS lacks IT professionals. Most of the people responsible for the health information system are not information management specialists; hence, they lack the necessary skills to develop and maintain the infrastructure. The study also found that there is lack of legal and regulatory framework to guide and govern the HIS in most ECOWAS countries. This problem is amplified by the fact that supervision and routines to guide health workers are inadequate. Power, internet and computers have a high amount of interruption, and the software used for health information management is generally poor. Finally, most of the hospitals have no form of information system which makes data accessible within and outside hospitals.

The mhealth cloud disease surveillance system proposed is cheap and makes use of new technologies for disease surveillance and monitoring. It does not only provide disease monitoring but helps decision makers to access information easily using their browsers. When used, this can help monitor outbreaks, hence prevent border closures in the future and other consequences for regional integration. Due to limited time and capabilities, this study had some limitations. In this research, we only considered in detail the technical aspect of the health information infrastructure. Other aspects of the infrastructure such as people were not studied. Even though we have used server side scripts such as the WURFL library, there is a tendency that user agents could be fake there by passing wrong device information to the webpage. Furthermore, we did not put more focus on the data analysis part of the mhealth system. We were focused more on showing that it could work.

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Higher Education, R&D, and Challenges in National Innovation System Building of Angola



Eurico Josué Ngunga

Introduction

This article relies on several readings related to higher education and National Innovation Systems (NIS). The main objective is to analyze the problems of higher education in Angola, and the challenges of R&D in order to have sustainable development in that country, by taking into account the changes in the patterns of economic development. The discussion comes from a comparison between the ranking of universities in the world and in Africa. Moreover, I found that it is of paramount importance to make sure that the nature of this work dictates an interdisciplinary approach because a rich body of literature was used to explain Higher Education, R&D and National Innovation System, including approaches found in economic, social sciences and humanities.

Broadly, it focuses first, on problems of Angolan universities and their context. Secondly, it relies on belief that higher education plays a key role in promoting economic growth, and diminishing the plethora of problems, and it can help to eradicate extreme poverty in Angola. Finally, it concludes that higher education can produce significant benefits as a whole, improving technological catch-up and, in doing so, may help to maximize Angola's potential to achieve more rapid economic growth given current constraints.

In this regard, a relationship among actors of the National Innovation System (NIS) is crucial to operating in this worldwide landscape. Universities must be considered as one of the actors that play an important role in the development. It is the role of universities to recognize their capabilities in order to enhance Research and Development (R&D) and play a more important role in their local communities.

E. J. Ngunga (✉)
Agostinho Neto University, Luanda, Angola

Historical Context

Angola is a country which, on its historical context on the African continent, has carried out the fight for colonial liberation which was achieved in 1975. The quest for freedom of expression and the possibility of managing its own resources has been substantial as Angolans endeavour to perpetuate their idiosyncrasies identity in spite of globalization.

As illustrated by Santos (2001),

The Angolan liberation struggle in the twentieth century should be focused, with its own specificity, as intrinsically linked to the evolution of resistance caused by the expansion of the world capitalist system. In this perspective, reduce this fight to a purely political dimension means limit it to the achievement of independence, the struggles for political power and belittle its fingertips. The Angolan national liberation struggle has, at its base, a rich content. His building is, first and foremost, a matter of cultural identity, essential and permanent institutions to build their own element, based on the recognition of differences, and to develop a social, national and popular project based in dispute. (p. 3)

However, the struggles of Angolans are made with the purpose of perpetuation of African values. These values are defined by cultural traits that underlie the native language, rituals, idiosyncratic acts, dance, music, art and technique of each African nation. According to Mourão (1996, p. 5), the consolidation of the nation, as a project, became the target with several consequences from a scientific and technological and cultural-historical view, depending on the specific experiences of each country.

Hence, it is necessary to know the cultural idiosyncrasies of Angolans, with all differences throughout the country. I talk about these idiosyncrasies which had the purpose of abolishing outright colonial ideals that only subdued the indigenous. As stated by Nito Alves, “One day in Angola, scanners street citizens [...] not only blacks but also whites and mestizos, racism will disappear.” (Nito Alves, in Mateus, 2007, p. 162).

The colonial process carried out in Angola resulted in cultural and intellectual reduction of Angolans perpetrated by the Portuguese, leading them to a spirit of defeat and feelings of worthlessness. But it is important to take into account that this process had its obstacles, as a proportion, albeit small, of Angolans still managed to do actions that inhibited in certain parameters, the colonization process of devastating exploitation.

As illustrated by Santos, “although Angola has adopted ad hoc the Portuguese as official language, Angolan diligently maintained their cultural idiosyncrasies within national languages (native), the management practices of the common good, in the rites of passage and local religious beliefs. (Santos 2001, p. 4).

In this ideal, from the point of view of identity, among others, the Angolans maintained especially the nomenclature of their African ethnic groups, respectively, Umbundo, Kimbundo, Lunda–Tuchokwe, Ovakwanyama, Vangangela, Ambundu, Nganguela – Tchinganje, Ovandonge, Nhaneca-Humbe, Ovahelero, Ovambo (Fig. 1).



Fig. 1 Map groups of Angola Ethnolinguistic. (Source: In Institute of Geodesy and Cartography of Angola Map of Angola ethnolinguistic (adapted), apud Fernandes, J.; Ntongo, Z. (2002:57). Angola: Peoples and Languages, Luanda: Editorial Nzila. http://www.triplov.com/letras/americo_correia_oliveira/literatura_angolana/anexo3.htm. Access: 27.11.2013.)

It is worth stating that these ethnic groups carry on their ancient heritages the great features called Bantu ethnolinguistic trunk. According to Silva (1992, p. 183), Bantu means “people” or “men.” It is the plural of *munto*, “the man”. The term exists in almost all Bantu languages. And is the oldest with its meaning.

Many of the cultural characteristics of these ethnic groups are defined by Silva, “It seems that food producers were those who spoke the proto-Bantu. They had words for palm oil, vegetable, fig, bean, olive, mushroom, guinea hen, goat, dog. And perhaps to steer, although the term also meant “buffalo”. They had names for bush and scrub, but not for meadow or pasture (Silva, 1992, p. 186).

Among these populations, one could see markedly a technological activity of iron and ceramics and they structured their own molds of organizational training. However, this profile would suffer, of course, a drastic change in European colonial process. The process of colonization of Africa was complete before the end of the First World War, when virtually the entire continent had reorganized and divided by European powers (Reis 1999, p. 30).

In this process, “the Portuguese colonial regime incarnated the encounter between different African social formations and the nascent Portuguese and European capitalism. The late nineteenth and early twentieth century marked a period of articulation of these non-capitalist formations with domination of European capitalism. Artificially, and according to interests of Portuguese, German and British bourgeoisie in the region, constitute a geographic, political, economic and social space called Angola. (Santos 2001, p. 10.)

However, this process would not hold for long, because soon after, during the 1960s, a large part of the occupied territories became independent. The desire to deploy a neocolonial regime apparently proved a failure, not due to the industrialization of Angola, but basically because of decolonization itself (Ferreira 1985, p. 107).

In this process, Angola became independent, precisely in 11/11/1975. Such independence, geographically, promoted Angola to a prominent position in Southern Africa, economically and militarily. This is because the engine of Angola’s economy is the liquid gold – oil; producing nearly 900,000 barrels a day. Moreover, Angola is the second largest oil producer in sub-Saharan Africa where crude oil accounts for 90 percent of total exports; it means more than 80 percent of government revenues and 42 percent of the country’s GDP. Hydro-Electricity is also very important, supported by large and powerful rivers that cross the country. Diamonds, Agriculture, timber and manufacturing also account for Angola’s rising economy in this part of the continent (Henry 2014) (Table 1).

As pointed out by Aisa (2012), South Africa has economic and military power disproportionately superior than all other countries, but Angola has stood out among the other countries in the region due to the puissance of its economic growth, size and experience of its armed forces and the experience acquired after the victory in their civil war and some stability operations in neighbouring countries. Even though it may seem paradoxical, the struggle for the construction of the Angolan nation replaces the country in its true context, in Southern Africa. No more it comes to choosing between Portuguese colonialism or neo-colonialism and national liberation as a political achievement, but between greater global integration and regional integration (Santos 2001, p. 21). This process will rigorously promote the Angolan citizens an idea of continuing education through education.

In this scenario, after 1975, Brazil was the first country to recognize Angola as an independent, free and sovereign of Portuguese colonial interference. This recognition enabled the implementation of bilateral relations between the two countries in education, bringing to Brazil students to attend Secondary level, Higher and Postgraduate institutions. This is important because due to the civil war, the institutions were destroyed and as a result, there is no sufficient human capital to manage the institutions across the country. In this vein, since the independence, Brazil has helped Angola taking into account their common history and language. After this process of independence Angola created 18 provinces that make up the territory today. (See Fig. 2).

As illustrated by Fig. 2, Angola is situated in the southwest of the continent, on the western coast, in the southern region, between latitudes 4° 22’ and 24° 05’. It comprises 18 provinces, 163 municipalities and 547 communes and 1271 villages. It

Table 1 Southern Africa: Security forces and proportion of the population, 2011

	DR Congo	Angola	South Africa	Burundi	Zimbabwe	Uganda	Rwanda	Tanzania	Zambia	Namibia
Active Af	119,251	107,000	62,082*	20,000	29,000	45,000	33,000	27,000	15,100	9200
Army	110,000	100,000	37,141	20,000	25,000	Na	32,000	23,000	13,500	9000
Air force	2548	6000	10,653	0	4000	Na	1000	3000	1,6000	0
Navy	6703	1000	6244	0	0	Na	0	1000	0	200
Reserves	0	0	15,071	0	0	0	0	0	3000	0
Paramilitary forces	20,000	10,000	12,382**	31,050	21,800	1800	2000	1400	1400	6000
Total	139,251	117,000	89,535	51,050	50,800	46,800	35,000	28,400	19,500	15,200
Population	67,827,495	18,992,408	50,492,408	8,518,862	12,644,041	33,796,461	10,277,212	45,039,573	13,257,269	2,212,037
Af/population	0,00205	0,00616	0,00177	0,00599	0,00402	0,00138	0,00341	0,00063	0,00147	0,00687

Notes: * Includes military health professionals; ** includes civil staff working in the quartermaster of Afif. Source: Africa Institute of South Africa, 2012. <http://www.isn.ethz.ch>. Accessed in 12/11/2014



Fig. 2 Geographic map of Angola. (Source: http://www.embaixadadeangola.com.br/v2/index.php?option=com_content&view=article&id=58&Itemid=69. Accessed: 27/11/2013.)

is bordered on the north by the Republic of Congo and the Democratic Republic of Congo, the east with the Democratic Republics of Congo and Zambia, to the South by the Republic of Namibia and west by the Atlantic Ocean a length of 1650 km. [...] The territorial extension of Angola is approximately 1,246,700 km², with an estimated population of 16,037,000, which provides a low population density in the order of 12,86 inhabitants per km² (Oliveira 2010, p. 23).

General Economic Situation in Angola

The years that followed the proclamation of independence in 1975 were of defense and territorial integrity of Angola. This Country experienced a civil war that lasted 27 years. Such war not only destroyed much of the industrial infrastructure, it lost a lot of valuable time for socio-economic development of the country. Thus, in 2002, Angola reached peace, after an agreement between the main parties such as Popular Movement for Liberation of Angola (MPLA) and National Union for Total Independence of Angola (UNITA). In doing so, this Country has experienced a fast growth in the social and economic field.

As pointed out earlier, this growth is mainly sustained by the oil sector, but it is important to note that we observed a higher rate of growth for non-oil sector, from 2007 (see Table 2. This ratio has remained and, somehow, is indicative of commitment to diversifying the economy taken previously by the Angolan government.

At this time, Angola is experiencing a massive rebuilding of its physical infrastructure and human capital process. Although this growth has not been uniform for all sectors of national life, everything indicates that the observed growth in the extractive industry (oil and minerals) can help to create conditions to foster growth in lagging sectors (PNCTI 2011). Gross domestic product has continued to grow despite the fluctuation of oil prices and the global economic recession observed, with particular emphasis in 2009. Oil production accounts for over 50% of GDP, constituting 90% of export earnings of the country.

Due to the instability of the international oil market, the Government has made the commitment to economic diversification a strategic priority. Other important components of GDP have been obtained from sectors such as banking, agriculture, and forestry. The vulnerability of oil markets is a constant concern for the government, given the country's extreme dependence on oil. In addition, there are concerns about the environmental impact of oil exploration and extraction activities, particularly the effect of coastal activities in fisheries industry (Table 3).

According to the Ministry of Foreign Affairs, the Angolan economy is overwhelmingly dependent on oil revenue. In recent years, the oil industry and the high international prices of their products fuelled the rise in the rate of growth of the country. Increased oil production supported an average growth of over 15% per year from 2004 to 2007. Between 2008 and 2011, the economy recorded Angola smaller, but equally significant, growth rates, bearing in mind that the demand and

Table 2 Global growth of the Angolan economy (%)

	2004	2005	2006	2007	2008	2009	1° Sem. 2010
Growth Rates (%)							
GDP	11.2	20.6	19.5	23.30	13.80	2.41	4.30
Oil GDP	13.1	26.0	21.2	20.40	12.30	-5.10	7.10
Non-oil GDP	9.0	14.1	17.2	25.40	15.0	8.31	2.0
Diamonds	-	-	-	2.69	-8.19	4.60	-5.30
Construction	-	-	-	37.10	25.60	23.80	-18.41

Source: Ministry of Planning, National Plan 2011–2012

Table 3 Main economics indicators (2012)

Nominal GDP	USD 114.8 billion
GDP Real growth	6.8%
GDP “per capita”	USD 5.681
GDP PPP	USD 126.21 billion
GDP PPP “per capita”	USD 6.244
Inflation	9.6%
International reserves	USD 33.41 billion

Source: <http://www.brazilglobalnet.gov.br>.

Accessed in 18/11/2014

International oil prices experienced some shrinkage, especially in 2009/2010. In 2011, the growth of Angola’s economy was 3.9% and in 2012 8.4%. In Africa, Angola was the country that had the fifth highest real growth of the economy in 2012. The latest IMF estimates for Angola indicated real growth of 6.2% in 2013 and 7.3% in 2014. (Brazil Global Net 2014).

Although having submitted such growth, the country still remains dependent on foreign markets to strengthen its economy. Because of this vulnerability to oil markets and extreme dependence on crude oil, the Angolan government is working hard to (Minfin 2004) diversify the economy by creating tax bonds to strengthen the productive sector (industries, companies, stores). Each Ministry is involved to give their account in the sense of implementing the Angolan government programs.

The focus on science, technology and innovation is key to supporting the growth and plays a key role in promoting sustainable development. This support should focus above all in the areas described below as critical to boosting the economy with regard to the environment, management and responsible use of natural resources.

Areas such as Education and Training, Higher Education, Scientific Innovation and Technological Development, Agriculture and Fisheries, Telecommunications and Information Technology, Oil, Gas and Mineral Resources, Health, Water, Energy and Environmental Resources were identified by national experts and the United Nations as of great importance to the national economy (PNCTI 2011).

Education as Strategic Tool for Development: Rankings

As pointed out earlier, we currently live amidst profound economic and social changes in the global context. This, in turn, has resulted in changes and paradigmatic shifts in regard to the values and mission of universities, including their role in addressing the challenges of social development. That is, both in the developed and Developing Countries, the main emphasis is now on how universities may serve the society in general through direct flow of information from ongoing research (Brundenius et al. 2009).

This is true because in the context of developing countries the challenges are colossal and universities should play a crucial role to enhance the creation of innovative and technical capabilities that, in turn, will foster the socio-economic and industrial development of societies. This role of universities must be effectively thought through in order to enhance Research and Development (R&D) and better define their place in local communities. In this token, a long-term vision on Higher Education, Science, Technology and Innovation, with a favorable environment for R&D Universities is necessarily because it can put the country on the path toward a knowledge-based economy, and foster Angola's competitiveness in Africa and overseas.

As pointed out earlier, universities plays an important role in any society. They serve as a strategic tool for socio-economic and sustainable development through their three missions: Education, Research and academic entrepreneurship in order to capitalize the knowledge of any society. The knowledge of sustainable development comes from the understanding of the Humanity and its precedents. This means to be the ability to make sustainable development to ensure that it meets the needs of the present without compromising the ability of future generations to meet their own needs. By the way, the concept of sustainable development does not imply limits – not absolute limits but limitations imposed by the present state of technology and social organization on environmental resources and by the ability of the biosphere to absorb the effects of human activities. But technology and social organization can be both managed and improved to make way for a new era of economic growth (47/187 Brundtland Commission Report 1997).

Africa cannot escape of this rule, in order to solve its problems in a systematic and coherent pathway. For example, the fluctuations of the world economy and other imbalances that result from the process of globalization passes necessarily by creating policies that support the development in the society. Despite efforts by various governments, Africa remains the continent that has the lowest rates in terms of scientific and technological performance. The universal experience proves that the University is a center of creation, dissemination and catalyzes the development of a scientific society. But it is necessary that it works synchronized with Government's targets and public and private companies and/or institutions and other actors, vice-versa.

Thereby, the development of Higher Education in Africa, in general, is characterized into three main stages: The Colonial Higher Education, Higher Education and Post Independence Current System of Higher Education. This is all to say that the Higher Education in Angola and in other African territories was based specifically on scholastic model, in which scientific research was insignificant. In other words, there was no significant attention to basic and applied research as it was in the metropolis. Soon after independence, African countries have not been able to consolidate and develop the Universities and Scientific Research inherent to them, for various reasons, among which are: Lack of experience of governance; Lack of well-trained staff; Brain drain; Lack of investment and that associated with the outbreak of civil wars in some regions of the African continent (Teta 2011).

This is a problem that most African countries see facing today on recovery and improvement the higher education institutions, being far from the universities of scientific and academic enhancement. Although there is no strict and directly proportional relationship between socio-economic, technological growth and the ranking of top universities, is important to understand that universities play an important key role for the development of the countries. In addition, they can promote scientific and technological research and help to guarantee the sustainable development in several areas.

Given the anomalies that occurs in implementations of policies for scientific and technological development in Angola, it is important to note that there is not actually a symbiosis among Government, universities, firms and all actors. The feeling of uncertainty in the economic sphere is quite patent. Firms, Government seems to be exogenous to the process of knowledge production. In this case there is no exchange of accurate information to leverage the economic growth of the country.

Thus, knowing that the Angolan government has put on the frontline actions towards a based-economy building, the tertiary education in Angola needs more a strategic steps which stem from a strong relationship between policy-makers and private and public institutions. As Santelices (2010) quotes, it will translate into the ability to advise institutions, companies vice-versa on how to solve problems. In this vein, the World Bank pointed out the key role of tertiary education in *Accelerating Catch-Up: Higher Education for Growth in developing countries especially in Sub-Saharan Africa*. The report advocates that human capital gains from tertiary education can potentially foster and increase technical efficiency, spur innovation, and improve economic and export competitiveness (2008a).

Thus, countries can also use information and communication technology to promote higher-skilled jobs and add value to exports (Bloom et al. 2014). However, to merely increase the number of higher education institutions is not the best way for a sustainable development and economic growth. A corresponding improvement in quality is of a huge importance to foster knowledge production. In addition, to monitor this new an emphasis on knowledge economy has been put in the frontline of World Bank concerns for developing countries, such as (Bloom et al. 2014) (1) favorability for knowledge development within the economic and institutional regime; (2) education; (3) innovation and; (4) information and communications technology.

The next table (Table 4) shows that the best universities are located in developed countries. Powered by Thomson Reuters, the subject tables employ a range of indicators, taking into account five categories:

- Teaching: the learning environment
- Research: volume, income and reputation
- Citations: research influence
- International outlook: staff, students and research
- Industry income: innovation.

Thus, according to the table above, I found that among the top 20 of Top 200 universities, existing in the years 2014 and 2015, there are 15 Universities of the United States of America, 3 Universities of United Kingdom. The others, 1 University of Canada, 1 University of Russia, and 1 University of Switzerland. Nevertheless,

Table 4 World University rankings 2014–2015

1	California Institute of Institute (Caltech)	United States	94.3
2	Harvard University	United States	93.3
3	University of Oxford	United Kingdom	93.2
4	Stanford University	United States	92.9
5	University of Cambridge	United Kingdom	92.0
6	Massachusetts Instit. of Technology (MIT)	United States	91.9
7	Princeton University	United States	90.9
8	University of California, Berkeley	United States	89.5
9	Imperial College London	United Kingdom	87.5
10	Yale University	United States	87.5
11	University of Chicago	United States	87.1
12	University of California, Los Angeles(UCLA)	United States	85.5
13	ETH Zurich – Swiss Federal Institute of Technology Zurich	Switzerland	84.6
14	Columbia University	United States	84.4
15	John Hopkins University	United States	81.0
16	University of Pennsylvania	United States	80.9
17	University of Michigan	United States	79.9
18	Duke University	United States	79.4
19	University of Toronto	Canada	79.3
20	Northwestern University	United States	79.2

Source: <http://www.timeshighereducation.co.uk> (2014). Accessed in 11/19/2014





































the only African University which appears among the top 200 universities in the world is the University of Cape Town in 124th position. Although these rankings are not always exact, they approximate the actual picture of the level of scientific research in the world. The lack of investment in scientific research in Africa is one of its major constraints that has endured over the years.

Also, it is important to notify that in 1973, developing countries accounted for only 5% of publications, and India, South Africa and Argentina (i.e., only one African country) were part of the top 25 in 2006. The percentage of publications in developing countries spent 20%, with the contribution of countries to emerging economies in Asia (14.8%), particularly China (7%) and Africa was approximately 2%. Taking into account that China, in Asia, increased by over 100%, Brazil, in Latin America, registered an increase around 50% for the same period. This meant to show the indicators of growth in the economy also observed in these same countries (Teta 2011).

In this sense, is important to observe a relationship between the ranking of Top 100 Universities in African countries and the development they should enhance in where they are settled as it follows on Table 5:

Thus, according to the Top 100 ranking Universities and colleges in Africa by 4icu.org University Web Ranking, it appears that, among the top 30 universities, 9 are from South Africa and Egypt are 8. Among the top 50 universities appear to other African countries like Morocco, 5, Mozambique, Sudan, Kenya, etc. However, no one university in Angola appears among the top 100 in Africa.

Table 5 Top 100 of African Universities/2014

1	University of Cape Town	S. Africa	
2	University of Pretoria	S. Africa	
3	Universiteit Stellenbosch	S. Africa	
4	Cairo University	Egypt	
5	The American University in Cairo	Egypt	
6	University of the Witwatersrand	S. Africa	
7	University of South Africa	S. Africa	
8	Mansoura University	Egypt	
9	Alexandria University	Egypt	
10	Rhodes University	S. Africa	
11	University of the Western Cape	S. Africa	
12	University of Dar es Salaam	Tanzânia	
13	Assiut University	Egypt	
14	Ain Shams University	Egypt	
15	University of KwaZulu-Natal	S. Africa	
16	Université Mohammed V – Agdal	Morocco	
17	University of Nairobi	Kenya	
18	Université de Ouagadougou	Burkina Faso	
19	University of Johannesburg	South Africa	
20	University of Ilorin	Nigeria	
21	University of Lagos	Nigeria	
22	Makerere University	Uganda	
23	University of Botswana	Botswana	
24	University of Ghana	Ghana	
25	Benha University	Egypt	
26	Obafemi Awolowo University	Nigeria	
27	Universidade Eduardo Mondlane	Mozambique	
76	Libyan International Medical University	Libya	
77	Kenyatta University	Kenya	
78	Université Kasdi Merbah de Ouargla	Algeria	
79	Universidade de Cabo Verde	Cape Verde	
80	Strathmore University	Kenya	
97	MISR University for Science and Technology	Egypt	
98	October 6 University	Egypt	
99	Madonna University	Nigeria	
100	Fayoum University	Egypt	

Source: <http://www.4icu.org/topAfrica> (2013–2014). Accessed in 11/19/2014

The absence of a directly proportional relationship between scientific development and socio-economic growth, as we said earlier, we can mention the case of Angola, though that does not appear in the ranking of the top 100 African universities is the 6th

largest economy in the continent today, resulting from Oil investment for socio-economic development. This may explain the lack of investment in other sectors that are not related to the oil industry. Despite some government efforts, there are still difficulties to collect and systematize data on the science that is practiced in Africa.

According to the Forum on Higher Education, Research and Knowledge (Scientific Committee for Africa) held in Dakar in 2002, these following problems were identified taking into account the scientific research in Africa:

- Few research results;
- Inadequate policies to support research;
- Lack of funding;
- Lack of infrastructure for research;
- Lack of training in research level;
- Lack of access to scientific journals;
- Lack of access to information and communication technologies.
- Lack of oriented researches

In addition, regarding the reasons mentioned above, another problem is the lack of a networking among Professors, students, institutions in order to operate in the same pathway.

According to the reports of the Ministry of Higher Education, Science and Technology of Angola, there is a drive to increase the indicators of scientific research and technological development in the country, guiding the creation of more universities and research centers. For this purpose, reforms were undertaken in the subsystem of Higher Education when the Angolan Government recently created seven new Public Universities (Decree 07/09), seeing a major input in academic and investigative scenario. The creation of new universities had materiality from expansion of then only Angolan University – Universidade Agostinho Neto – UAN. In 2008 with the creation of those universities, the other Angolan provinces are provided with courses in the humanities and social sciences, and timidly with courses in engineering. This landscape comes from the lack of infrastructures across the country to support this actual challenge.

Challenges in R&D

Scientific and technological research demand special attention from public and private universities and private institutions. Because they play an important role in the technological and innovation empowerment of peripheral countries in order to achieve substantial levels of socio-economic development. The table below illustrates the relevant importance of R&D (Table 6):

This table effectively illustrates the best way to leverage a systematic and pragmatic (R&D) knowledge in order to achieve development of a society, especially in Angola. It can help in providing a set of possibilities to gear the country in terms of human capital, infrastructures and good science policies.

Table 6 Functions of scientific-technological research

11	Cultural value: Contribution to universal knowledge
22	Formative contribution: Update knowledge training. Possibility that our professionals can use knowledge generated in different parts of the world. Training in the rational analysis of alternatives process. Increase of rationality in decision making of public and private systems.
33	Contribution to the development: In direct, through the creation of new knowledge and technology shape. In an indirect way, through the craft of being researcher. It translates into the ability to advise institutions, companies on how to solve problems.

Source: Adapted from Santelices (2010)

According to UNESCO's Institute for Statistics (UIS), in 2013, R&D indicators are not 'just figures' – they tell a story, or rather, several stories. First, they tell you whether or not your country's strategic goals for R&D are being met or are at least within reach. The European Union (eU), for example, has set the goal of investing 3% of gDP in R&D, while the African Union (aU) is aiming for 1%. However, the data show that greater efforts are needed to reach these goals, with the eU investing the equivalent of 1.97% of gDP (2012) and falling to 0.41% according to the most recent estimates for the aU (<http://www.uis.unesco.org>. Accessed in 11/25/2014).

Beyond the problems which were pointed out earlier, after the period of the liberation of Angola followed by the independence in 1975, the Angolan government has partnered with the Government of Cuba in the context of secondary and higher education. Currently, after a long period of civil war, Angola has benefited from Cuban teachers who are scattered throughout Angola to bolster and sustain the seven new universities created recently. Means that the number of Professors and highly prepared technicians is minimal to solve the lack of mastery of modern science, Technology and Innovation in order to put the country in the pathway of development.

Some of the reasons which put Angola outside these Rankings and in the lowest positions in education is the

- Low visibility of Research Outcomes for policymakers;
- Lack of Convergence between academic agenda and policymaking agenda;
- Reduced Feedback which discourage researchers participation;
- Insulated research centers across the country;
- Weak infrastructure of Universities across the country
- Lack of well prepared Technicians.

This all to say that what distinguishes — and continues to handicap — Angola and other African countries is its lack of mastery of modern science and technology. Without advanced competency in these areas, nations cannot harness the full power of scientific research and technological tools to solve the many health, energy and development challenges confronting them (Khumbah, Foote 2014). The System of

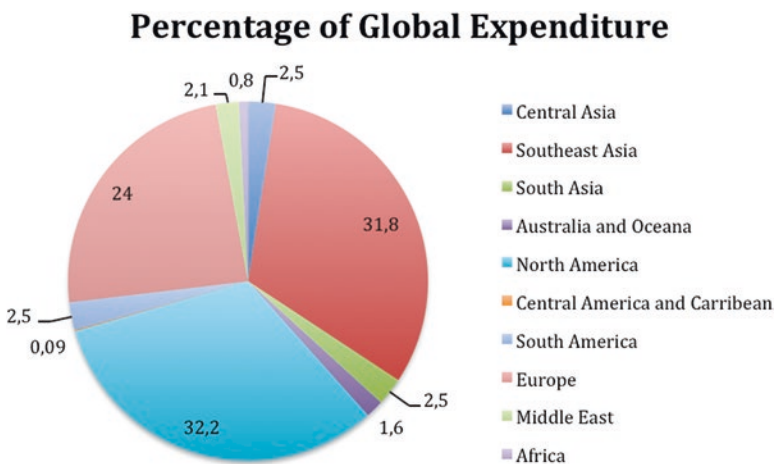
Education is currently incipient, requiring improvements on its institutional structures and training in order to reach high education levels. Because, according to the two Ranking tables, Angola does not appear in any position.

To have at least high level capabilities is necessary to have policies which promote investment and pragmatic knowledge to facing the realities and challenges at the national and international levels. This is in order to emphasize the importance of R&D and their functions in modern societies to promote capacities for an effective social and economic development, and diminishing the plethora of diseases which plague Angola.

Thereby, this effectively illustrates the best way to leverage sustainable development and economic growth based on the production of systematic-pragmatic R&D knowledge. This is an essential condition in order to develop and assess the activities of education and R&D, given the concerns of the Country in terms of local social-economic and industrial relevance condition.

This requires to the Angolan government programs, considerable budgets for higher education. This is, of course, starting within the base of the educational pyramid that can overcome the remaining technical problems affected in Angola and also in most African countries which are in the periphery of the development. Because, according to estimates from the education budget of a single country like France, Germany or Italy, overcome the educational expenses of all governments in Sub-Saharan Africa, together (UNESCO 2007).

Knowing that the Science is the cornerstone of the development, one can see below the Global R&D expenditures, by region in 2011. Regarding the pie chart, Africa appears in the last position after Central America and Caribbean. This puts it below the development targets of UNESCO adopted by heads of state at an African Union summit in 2007 for African countries.



Pie Chart 1 Percentage of Global Expenditure: 2011. (Sources: National Science Foundation, National Center for Science and Engineering Statistics, estimates (August 2013). Based on main Science and Technology Indicators of OECD data (2013/1); Accessed in February 19th, 2015)

North America, Southeast and Europe, together invested more than 80% on science, technology and innovation until 2011. Regarding the global economic and financial crises that has plagued several countries, even so, in 2013 the percentage of GDP Expenditure in R&D in OECD countries rose by 3.2% in real terms from 2012 through 2014. This recent growth has been driven by a strong increase in R&D performed by universities, society and business, while R&D expenditures in government institutions in Africa are estimated to have fallen.

On the other hand, in the last 5 years, some African countries such as South Africa, Uganda and Malawi have invested more than 1% of their Gross Domestic Product (GDP) on R&D, putting them on the considerable path of development. South Africa comes out on the forefront of the significant efforts in R&D Expenditure with a Gross Expenditure on R&D (GERD) around 1.5% of GDP by 2014 (<http://unctad.org>, accessed in 02/23/2015). This explain, hence, the top position of South Africa on the Ranking.

Challenges to the National Innovation System

The absence of a directly proportional relationship between scientific development and socio-economic growth is a reality in the case of Angola. Thus, in order to overcome this plethora of problems, successful Angolan universities will be those that have strategies to create a knowledge advantage by supporting research and fostering knowledge transfer. However, it will only be possible with the creation of a strong relationship with all actors of the NIS, with the identification of priorities as a part of a national strategy with funding mechanisms, to help move the agenda forward.

In the Angolan Post Civil War, the systematization of Science, Technology and Innovation has been at the heart of discussions, debates and conferences among the Ministry of Science and Technology, other Ministries and some scholars. However, as previously mentioned, several situations such as – Inadequate policies to support research, lack of funding, Lack and weak infrastructure, and lack of access to ICTs – still persist. This landscape is the main cause which constrains the national innovation system in Angola.

The recently-established Policy of Science, Technology and Innovation or Política Nacional de Ciência, Tecnologia e Inovação (PNCTI 2011) in Portuguese of Angola released important information about the situation of Science, technology and innovation. The report stresses, that there is a lack of coordination between the various actors of research and scientific, technological development and innovation, as well as the dispersion of initiatives and endeavours to a National System of Science, Technology and Innovation (SNCTI) building. It has been harming the implementation and development of best R&D's practice, resulting consequently in bad results, characterized by immediatisms, and not sufficiently integrated actions toward innovation and technology development.

As pointed out above, the poorest countries are the most vulnerable to the effects of climate change and all sort of diseases. Therefore, building innovation systems in

Angola, policies (Mylteka 2003) must not only be directed towards ensuring the presence of critical actors and building a number of new competences. It requires, nevertheless, an uptake of different competences and capabilities among actors that will enable the change of this landscape in country.

Meeting the challenges of national innovation system building in Angola requires an understanding of what Joseph Schumpeter (1997) postulates as the importance of interaction for learning and innovation and its systemic properties of the process in order to foster a sustainable development. In doing so, some actions must be taken into account such as creating the local linkages that support the change of production processes with the goal of bringing costs down, increase efficiency and strengthening the economic structure in the country.

As mentioned earlier, the National Policy of Science Technology and Innovation of Angola (PNCTI) is an overarching document that is an official statute approved by the Angolan Government in 2011.

The objectives of this statute are organized according to three main axes:

1. **Organization and Development of the National System of Science, Technology and Innovation** which is based on four essential components such as highly qualified human capital; institutions with the means and conditions required for the performance of research, development and innovation; networks and exchange processes, national, regional and international, maximizing the access to knowledge and a legal and organizational framework to promote the achievement of results;
2. **Contribution of Science, Technology and Innovation for Sustainable Development** which has the aim of raising the scientific level of culture of the Angolan citizen; the contribution through which Science Technology and Innovation (STI) is able to foster the development on social, cultural and environmental issues across the country; the incorporation of scientific and technological knowledge and innovation capacity, to support economic and business development; the use of science, technology and innovation aiming at supporting the country's governance;
3. **Funding of the National System of Science Technology and Innovation (NIS)** which plays a core role to boost the scientific and technological development, impacting on socio-economic development.

Therefore, building these three legal instruments are essential to bet decisively on significant improvements in all sectors – Public & Private. Hence it will enable a feasible environment to create and strengthen a network of knowledge institutions such as universities and other R&D organizations, productive companies in agriculture, and strong industries as a whole.

From a Schumpeterian perspective, the performance of individuals or institutions in adverse contexts requires the actors to develop selective capabilities and systematization of their actions to confront these local phenomena. Schumpeter has referred to this process as creative destruction through which some actions must be taken into consideration such as learning by doing (Arrow 1962); learning by using (Rosemberg 1982) and; learning by interaction (Lundvall 1988).

This emphasis on utilizing and fostering local knowledge, expertise and goods and services in combination with conventional metrics of science, technology and innovation is the pathway to experiencing innovation in developing countries as whole. Otherwise, African countries will remain in the backwardness of science, technologic and innovation, hindering the sustainable development. As Viotti says (2002), most innovation, taking place in developing countries is related to the absorption of technology and competence-building rather than resulting in introductions of new-to-the-world innovations.

Conclusion and Recommendations for Additional Research

As I pointed out earlier, the Angolan Government set up seven new public universities in 2008. Thus, they must make efforts in terms of identifying local problems and possibilities in order to enhance developmental research – I mean Development Research which is focused on relevant, useful and important concerns. If there are no concerns and questions, there can be no research (<http://www.etu.org.za>) – which is relevant to them. In doing so, the benefits could be enormous to communities, provincial governments and, of course, the country. To promote developmental research, however, Angolan universities may need to re-examine the way they assess and reward research, and ensure that their rules and regulations in no way discourage academics from embarking on developmental research or disadvantages them. “They equally need to establish closer links with the community, review their approach to teaching and learning and provide experiential learning opportunities to their students through short attachments” (Mohamedbhai 2014).

For example, Angola comes from a long civil war which plagued its people profoundly in several forms. These universities, as important centers of knowledge, should make efforts, exploring childhood intellectual development, examining urban programs or understanding the problems associated with soil devastation in the South of Angola, examining the water of ponds which were poisoned by bombs.

Therefore, taking into account the global economic recession, due to the oil crisis, the Angolan success universities will be those who have crucial strategies to create a knowledge advantage by supporting research and foster knowledge transfer. Also they will have to mobilize S&T Strategy, seeking to foster Angola’s competitiveness through investments and activities in core principles areas:

- Promotion of a World-class excellence;
- Building a Science, Technology and Innovation environment;
- Promotion of an Entrepreneurial Advantage;
- Creation of Knowledge Advantage;
- Creation of People Advantage;
- Promotion of the Traditional Knowledge;
- Consideration of Natural resources and renewable energy;
- Investment on health and related life sciences technologies;
- Investment in Information and communications technologies.

This is because the future will be increasingly dependent on long-term vision on science, technology and innovation, promoting a favorable environment for R&D. Nevertheless, a networking among Universities, Government, Companies and other actors of the National Innovation System are crucial to reach high levels of education in Angola and knowledge-based society. As the World bank recommends, Angola must put in the frontline of its actions, (Bloom et al. 2014) creating a human resource development strategy, (b) make creative financial arrangements that enhance policy goals and ensure that institutions can create long-term plans; (c) allow institutions to make their own decisions, but create accountability mechanisms; (d) encouraging practical real-world learning opportunities; (e) creating national and regional postgraduate training programs; and must (f) find alternative ways to provide lower-cost tertiary care.

Thus, some other avenues for further research are evident and necessary, considering that new research points to specific actions through which the Angolan government can take to strengthen higher education. In doing so, it will undoubtedly enhance innovation and technological development, and increase economic growth. As Mia Couto (2013) says, it is clear that more technical staff do not solve itself the misery of a nation. If a country does not have strategies aimed at producing profound solutions, then all this investment will not produce the desired difference.

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Part III
Sectoral Innovation and Integrated
Development in Africa

Regional Integration and Knowledge Flows: Effect on Manufacturing Productivity in Southern Africa



Alexis Habiyaremye

Introduction

The tacit nature of technological knowledge often renders face-to-face interactions a necessity for technology to diffuse because knowledge circulates best locally (Kesidou and Szirmai 2008). It is through those interactions that tacit knowledge can be translated into explicit, usable new knowledge. This explains why geographic proximity is important for technological learning by facilitating direct interactions and knowledge diffusion. Thanks to its impressive diamond deposits and its geographical proximity with the South African economy, Botswana is thus well poised to benefit from mastering and applying technologies that already exist in its southern neighbour. Botswana's geographic and economic proximity with South Africa is thus one of its most important winning cards for a successful technological catch-up and long term-growth.

The argument that Botswana can derive many productivity and growth advantages from its interactions with South Africa is also rooted in the various theories of international knowledge flows and their implications for economic performance of the recipient. These theories stress the importance of knowledge as a weightless production factor that can diffuse across national borders through various channels, such as trade and investment flows that embody technological knowledge as well as management knowhow and practices (Barba Navaretti and Soloaga 2001). Grounded in the endogenous growth literature, they emphasise two mechanisms of international technological knowledge transfer: transmission of ideas that can be traded independently from goods and the trade in intermediate inputs and capital goods that incorporate new ideas, known as 'the lab-equipment model' (Rivera-Batiz and

A. Habiyaremye (✉)
Human Sciences Research Council, Cape Town, South Africa
e-mail: habiyaremye@merit.unu.edu

Romer 1991). These theoretical insights are confirmed by substantial empirical evidence such as Coe and Helpman (1995); and Keller (1997, 2002).¹

Capital goods imports embodying technological knowledge contribute to knowledge flows, productivity growth and technological rent spillovers into the importing country as has been demonstrated among others by Keller (1995), Hakura and Jaumotte (1999), Mazumdar (1999), and Eaton and Kortum (2001). Cross-border equity investments contribute to technological knowledge flows by bringing capital, proprietary technology, technical skills training and advanced management practices to the host country, thereby increasing productivity and competitiveness of domestic firms (Djankov and Hoekman 1998; Aitken and Harrison 1992). Finally, licensing enables the transfer of disembodied technology in form of blueprints, designs, and production processes that enhance existing production methods and techniques in the host country. In addition to these market-transaction knowledge flows, various technological spillovers arise from demonstration effects (Akamatsu 1962), linkages (Gachino 2006), or allocative efficiency (Caves 1974). Applying the above argument on Botswana's manufacturing sector, this study argues that productivity growth in the manufacturing sector will be positively affected by the volumes of imports of capital goods, equity investments and the value of licensing agreements with technologically advanced countries in general and South Africa in particular.

However, the amount and degree of sophistication of technology that developing countries can adopt and efficiently utilise, depend among other factors, on their supply of technical and managerial skills and their interactions with technologically more advanced countries. For many, if not most developing countries, catching up technologically depends on the extent to which they are able to learn and position their systems of innovation to best take advantage of knowledge flows from developed as well as from other developing countries. Countries that succeed in transforming scientific knowledge and technical innovation into profitable economic productivity are the ones that become economically successful. Such economies enjoy technological benefits because they possess a complex, integrated system of human capital, infrastructures, and institutions for translating new knowledge and innovation into economically viable new products and processes (Feinson 2003).

Such systems, now known as 'national innovation systems (NIS) or national systems of innovation (NSI)', have increasingly been recognised both as a supplement and as an alternative analytical framework to standard macroeconomic perspective on development. This study takes the NSI approach to analyse how regional economic integration with South Africa affects knowledge flows to neighbouring Botswana and facilitates its effort to reduce dependence on diamond exports. The knowledge flows between the economies of South Africa and Botswana are analysed by examining three transmission mechanisms, namely import of capital goods, cross-border equity investments, and technology licensing.

¹Barba Navaretti and Tarr (2000) provide a detailed review of the various theoretical models that conceptualise how trade and their interactions affect knowledge diffusion, together with the corresponding empirical evidence.

By relating the intensity of interactions to the measures of technological learning achieved by the various manufacturing industries in Botswana, this study enables us to evaluate their ability to adopt, internalise, and diffuse new technologies, and thereby contribute to the country's diversification effort. The remainder of the paper is organised as follows: the next section delineates the NSI functions as they explain the interactions and knowledge flows between various actors in these two neighbouring countries, and explains how it can serve as a framework to analyse technological learning. Then section three presents the existing interactions and outlines a theoretical model linking three categories of business interactions and knowledge flows on the one side to the manufacturing productivity and skills upgrading on the other. The findings are discussed in section four while the final section summarises and concludes.

NIS as Analytical Framework for Knowledge Flows

According to Lundvall (1992), the concept of national systems of innovation can be traced back to Friedrich List (1841), who took into account a wide set of national institutions (such as those engaged in education and training) as well as infrastructures (like networks of transportation of people and commodities) as crucial to the development process of productive forces. The modern revival of this concept has emerged sometimes in the late 1980s under various approaches including the Aalborg University approach (Lundvall 1985) and the US approach (Nelson 1988). This notion of NSI was introduced into contemporary debate by Freeman (1987: 1) who defines it as 'the network of institutions in the public and private sectors whose activities and interaction initiate, import modify and diffuse new technologies'. As a prominent actor in NSI, the government has the responsibility to contribute to the formation of the human and social capital needed to evaluate, choose, implement, and modify foreign technologies.

Various attempts have been made to schematise the flow of information and resources between environment and national systems of innovation, and to map the actors and linkages that make them function. An analytical distinction has been made between a narrow innovation system concept, which includes the institutions and policies directly involved in scientific and technological innovation and a broad NSI perspective which takes into account the cultural, social, and political environment of the country being examined. Schematically, NSI can thus be represented as a systemic structure of people, organisations, and institutions interacting to fulfil various interconnected functions that are essential to effecting technological change.

The NSI linkages, which reflect the absorptive capacity of the entire system are determined by the flow of knowledge and resources between the institutions and organisations via the formal and the informal channels. The production of technological knowledge is not sufficient to generate technological innovation. The critical role of NSI is the circulation of knowledge and resources between enterprises and

other actors involved in the implementation technological progress. For innovation systems to be a catalyst of sustainable technical change, they must fulfil the following functions, as stressed by Johnson (2001)²:

- Supply of incentives for firms to engage in innovative activities;
- Supply resources (capital and competences);
- Guide the direction in which actors deploy resources;
- Recognise the potential for growth;
- Facilitate the exchange of information and knowledge;
- Stimulate/create markets;
- Reduce social uncertainty about how others will act and react; and
- Provide legitimacy for the innovation.

Hekkert et al. (2005) propose a set of indicators that may be used to assess the fulfilment of these functions in a system of innovation. As a result of interactions among the various functions, they may have reinforcing features, as the fulfilment of a given function might have a positive effect on the other and vice versa. Thus, the overall performance of the system is to be assessed on the basis of the overall diffusion of technology over time.

The application of NSI as a framework of analysis must be articulated around the various functions that national innovation systems perform. This means that countries, industrial sectors and firms assess their success in effecting technological change by evaluating the overall performance of the functions of their innovation systems. However, as a consequence of contextual and institutional differences between the innovation system of the developed and developing countries, it has been argued that developing countries need their own specific approach to NSI (Juma et al. 2001).

One of the arguments in favour of specific approach to NSI in developing countries is that NSI cannot be pushed to be in alignment with neoclassical theories of growth in developing countries as indicated by Lundvall (1997). This has led Edquist (2001) to propose the concept of systems of innovation for development (SID), which has a number of key differences with the NIS approach taken in developed countries:

- Product innovations are more important than process innovations because of the effect on product structure;
- Small, incremental innovations are more important and more attainable than radical ones;
- Absorption (diffusion) of existing technologies is more important than the development of innovations that are new to the world;
- Innovations in low- and medium-technologies are more attainable than those in high-technology systems or technology frontier.

²Alternative lists of NSI functions have been suggested by Rickne (2001); Johnson and Jacobsson (2001); Liu and White (2001); Jacobson et al. (2004) and Hekkert et al. (2005), but all share the same core functions and attributes.

Under this approach, the most important attribute of NSI is to stimulate technological learning. Though not sufficient alone, active learning is a necessary condition to achieving long-term sustainable development. This explains why development scholars have put emphasis on the building of absorptive capacity by developing nations or their ability to acquire, learn, and implement the technologies and associated practices already in use in developed countries (Dahlman and Nelson 1995). The promotion of learning and national absorptive capacity through various NSI components is thus indispensable for long-term industrial and economic development.

According to the OECD (1987), economic growth arises over the longer term from the interplay of incentives and technological capabilities within an institutional framework. Lall (1992) groups technological capabilities at the national level under three broad headings: physical investment, human capital, and technological effort. Incentives comprise three broad categories: macroeconomic stability, competition, and factor markets conditions. Finally, institutions reflect the rules of the game that emerge from the functioning of the market and facilitate transactions, interactions, and learning. Institutions act to alter capabilities and change incentives. They therefore can serve to modify behaviour by changing expectations and attitudes. Following Lall (1992), this study uses this three-pronged approach involving the interplay of incentives, capabilities and institutions to analyse numerous factors influencing technological learning that takes place as a result of the interaction between South Africa and Botswana. It goes next over some of the elements of the systems of innovations in both South Africa and Botswana in order to examine how these stimulate interactions and technology flows between the two countries.

South Africa-Botswana's Proximity and Technological Interactions

SA Technological Capabilities

In the years since the end of the apartheid, South Africa has intensified its economic integration with its African neighbours to become one of the top-ten investors and trading partners of many African countries, displacing companies from the former colonial powers in Europe. Despite its current sluggish growth, the country's economic strategy remains anchored in a further integration with its regional neighbours for a shared development. Its major strengths include its physical and economic infrastructure, natural mineral and metal resources, a growing manufacturing sector, and strong growth potential in the tourism, higher value-added manufacturing, and service industries.

With a PPP-adjusted gross domestic product (GDP) estimated at US\$7235 billion for 2015 (US\$13,300 per capita), the country remains the economic and technological powerhouse of Africa (second only to Nigeria in terms of total GDP) and represents a great opportunity for its neighbours as a source of technological

knowledge. It is also the knowledge hub of the continent, with world-class academic institutions as well as cutting-edge technological leadership in some domains. The country leads the continent in industrial output (40% of total output) and mineral production (45%). As for its skills and knowledge base, many of its 23 universities are world-class academic institutions, with leading technological capabilities in some domains of research such as liquid fuels and atomic energy.

Botswana's Absorptive Capacity

In spite of consistent efforts aimed at economic diversification, Botswana's economy is still heavily dependent on raw diamond exports and faces many challenges in its efforts to move to high value-added activities in other industries. Like other industrializing nations, Botswana has increasingly recognised that successful economic development is narrowly linked to the capacity to acquire, absorb, apply, and disseminate modern technologies within its economy. However, since most of technological innovation takes place through deliberate research and development (R&D), and world R&D activities are highly concentrated in a small number of industrialised countries, Botswana will have to depend on technological knowledge developed outside its borders. Here it is important to bear in mind that the engineering and management skills required in acquiring the capacity to optimise resources and assimilate the acquired technology are quite complex. Various kinds of high quality training are needed to embody in the personnel of the recipient firms the skills, knowledge, and expertise applicable to particular products and processes.

Botswana's capabilities, incentive system, and institutions remain relatively less strong than their South African counterparts and need to be further strengthened. Notwithstanding these limitations, the economic and technological leadership of South Africa represents a huge growth opportunity for its neighbours and its potential is far bigger than any aggregated statistics can suggest.³

Regional Integration and Knowledge Flows

The existing interactions between the two economies and the knowledge flows they represent are already indicative of the growth and diversification advantages of this proximity. Interaction with South Africa accounts for more than 60% of total foreign direct investment stock in Botswana and more than 70% of the needed capital equipment imports (Grobelaar and Sotetsi 2005). Regional cooperation programs

³Nonetheless, some scholars, like Alden and Soko, have alleged that South African companies operate like sub-imperial agents as they care less for backward integration or growing local capabilities of indigenous companies.

play a non-negligible role in facilitating these interactions. The most important is the Southern African Customs Union (SACU), in which free and unimpeded trade takes place among members. SACU consists of Botswana, Lesotho, Namibia, South Africa and Swaziland.⁴

Botswana sources the lion's share of its imports from its SACU partners, thus mainly from South Africa. In line with the Southern Africa Development Community (SADC)'s Regional Indicative Strategic Plan, which recognises the importance of science and technology in stimulating economic development and regional economic integration, the African Cooperation Unit within the Department of Science and Technology (DST) is also responsible for engaging with SADC partners to develop and strengthen national systems of innovation so as to provide scientific and technological solutions for sustainable socioeconomic development.⁵ Over the past few years, the DST has engaged in a number of projects in policy and capacity development to achieve these objectives. Such interactions, although they undeniably contribute to facilitating or speeding up technological knowledge flows, fall beyond the scope of the current analysis.

Economic Proximity and Productivity Growth

Rationale and Methodology

For the analysis of the effects of these knowledge flows, panel data from ten manufacturing industries were used, for which the intensity of the above three indicators of interaction was put in relation to the productivity growth and technical skills upgrading. Moreover, with the industrial sector in Botswana being narrower than that of South Africa, it was argued that the primary mechanism through which the acquisition of foreign technologies contributes to productivity growth is by widening the range of productive activities, especially by spurring new activities that can increase the diversity of export. In order to support this line of thinking, the present study extends the technological sophistication framework used by Hunt and Tybout (1999) by adding to it features borrowed from the capital goods trade framework developed by Mutz and Ziesemer (2008) and use it to investigate how Botswana has used imported embodied technologies to expand its industrial basis or upgrade its existing production techniques.

Mutz and Ziesemer base their model on a modified version of a two-gap growth model with imported inputs as introduced by Bardhan and Lewis (1970). That

⁴Some authors have argued that South Africa benefits more from this Custom Union than other members and that some of the initiatives that could have deepened further regional integration in the subregion have been frustrated by the country.

⁵Its major strengths include its physical and economic infrastructure, natural mineral and metal resources, a growing manufacturing sector, and strong growth potential in the tourism, higher value-added manufacturing, and service industries.

model emphasises the insight that for developing countries, imported inputs paid for by export are the major mechanism of growth in the relation between export and growth in the short run, as advanced by Khan and Knight (1988). In Mutz and Ziesemer (2008) model, the importation of capital goods and the elasticity of export demand contribute to explaining the growth behaviour of developing countries. The simplifying assumption made of no domestic production of capital goods is a fair approximation for many least developed countries and is thus suitable to analyse the case of Botswana.

Estimation Model Data

The industry-level data used in this analysis are based on the data files compiled by the author from the records of the Enterprises and Establishments Register (EER) and Botswana Exporters Association as until the end of September 2005 and the survey conducted among manufacturing firms between July and September 2006. The EER is a computerised database of enterprises and establishments in Botswana. It is mainly used as a sampling frame for economic surveys and contains relevant information on all business activities in the country.

Botswana's capital import data were compiled from the records of the Botswana Central Statistics Office (CSO), a governmental department in the ministry of finance and development planning, and from the UN Comtrade database. The CSO records the current as well as the 1993 constant dollar value of capital imports from customs declaration documents. Goods declared at ports of entry/exit are classified according to the harmonised commodity description and coding system of Botswana, which is an adapted version of the internationally recognised harmonised commodity description and coding system. The official currency used in customs declaration documents as from the introduction of the Single Administration Document (SAD) in May 2002 is the Pula (local currency). Although goods can originally be declared in different foreign currencies, an exchange rate is given for any particular currency and this is used to finally convert that currency to the Pula. Equipment import volumes from South Africa amounted to US\$363.708 million (CSO).

The manufacturing value added data of the selected manufacturing industries are compiled by the author from the records of the CSO, the ministry of trade and industry, Botswana Confederation of Commerce, Industry and Manpower (BOCCIM) and the Exporters Association Botswana (EAOB) during his research in Botswana. Data on manufacturing employment labour input and capital stock were also compiled by the author from the EAOB, BOCCIM and CSO records. Finally, the data on foreign equity ownership and technology licensing agreements are gathered from company surveys conducted by the author.

Results

In the aggregated data, capital import were found to have a significant influence on the productivity growth as well as on the industry growth in the sales of new operating firms in the various industries. The share of skilled labour is also very important in increasing productivity, while size difference does not seem to translate in significant productivity differences. To allow for a comparison between South African and other foreign firms, the study estimated regression coefficients for all firms and estimated them again after removing all South African firms. The reason for this is the limited total number of firms in the manufacturing sector that does not allow a matched sample of South African and non-South African firms with similar characteristics.

The results suggest that the better market knowledge of South African investors translates in better productivity gains from imported technologies. Industries where more firms use licensed technologies are also more likely to increase their productivity as can be derived from the significantly positive coefficients of the technology licensing variable. Across the manufacturing sector, positive and strongly significant coefficients for the lagged capital imports and the share of skilled labour were found, while the coefficient of contemporaneous capital import remained insignificant.

The estimated results indicate that the effects of imported capital on productivity growth are subject to time lags of between 1 and 2 years, while the effects of skilled labour input are likely to affect productivity increase immediately. The Granger causality test confirms the precedence of capital goods import on the corresponding productivity growth. These results thus confirm existing view that capital imports in a given period influence productivity in subsequent periods.

The next step was to examine with panel data how the import of machineries and equipment impacts on the productivity growth, skills intensification, and expansion of the various manufacturing industries. As in the aggregated data, the estimated panel results show imports to have a significant influence both on the productivity growth and on the industry growth expressed in sales of new firms in the various industries. The ownership control structure visibly produces significant differences. Industries with a higher proportion of foreign-owned firms seem to gain more productivity growth from knowledge flows than those with a higher predominance of domestic ownership, while this productivity advantage becomes less pronounced if South African firms are removed from the analysis, as indicated by the lower regression coefficients. Foreign-owned companies tend to import technologically more sophisticated capital goods and implement management and organisational practices that increase productivity faster in comparison to domestically owned firms.

The results for the industry expansion show that import and the proportion of skilled labour are the most important factors associated with industry expansion. Foreign equity investment is also significant in explaining the entry of new firms in

operation but this significance disappears when only non-South African firms are included in this analysis. South African equity investments thus account for a significant share in the expansion of the manufacturing sector in Botswana.

Summary and Conclusions

In this chapter, the NIS-based approach was used to analyse the role played by the interaction between South Africa and Botswana in fostering technology diffusion between the two countries and contributing to Botswana's effort to reduce its dependence on diamond exports. Using industry-level data, the study investigated whether external interactions, technological effort and technological interactions within Botswana's innovation systems have spurred an import-induced productivity growth. The results from industry-level panel data analysis show that productivity in Botswana's manufacturing sector has been an increasing function of their interactions with their South African neighbour, namely by imports of capital goods that embody technological knowledge. Moreover, the examined manufacturing industries have been increasing their technical skills intensity, mainly as a result of incumbent technological and skills upgrading induced by interaction and business links with South African entrepreneurs.

Finally, the analysis results show that industries that have more linkages with technologically more advanced South Africa in the form of intra-industries trade stand to gain more from their interactions, although these results are not statistically strong because of the embryonic stage of Botswana's export activities outside the diamond sector. This suggests that South Africa is playing the role of a leading goose in a regional flying geese paradigm. The potential gains from increased intensification of economic and business ties with South Africa are enormous not only for Botswana, but for the entire southern African sub-region. In order to curb the dependence on diamond exports, Botswana will have to pursue the intensification of its interaction with the South African economy, and further align important capital resources and more sophisticated technological skills are necessary to boost its manufacturing exports capabilities and achieve its diversification objectives.

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Regionalism and Failure of the African Manufacturing Sector: Technology Transfer Policies as a Missing Link



Deus Costantine Shirati

Introduction

In comparison to 20 years ago, Africa has many opportunities for economic transformation and development in general. Macroeconomic policies in many African countries are becoming favorable aiming for economic growth and development. For more than 5 years now, economic growth for African countries has been impressive (AfDB 2017). Increased Foreign Direct Investment (FDI) and trade between Africa and Asia have been on increasing record (OECD 2008). However, development of the manufacturing sector has remained almost stagnant compared to the state led economic approaches that were adopted by African countries soon after independence from the 1960s to late 1980s. For instance, Africa's total world export share from 2000 to 2007 was at the average of three percent (3%) (ECA 2009). For East African Countries, the manufacturing share to Gross Domestic Products has remained below 10% for over 20 years (UNIDO 2008).

The need to integrate Africa both politically and economically has continuously been acknowledged (Mugabe 2011). Article one (1) of African Economic Community Treaty of 1991 recognized the importance of regional integration in promoting economic self reliance and sustainable development of the African continent. To date, most of the African countries have integrated their economies through institutional arrangements such as the Common Market for Eastern and Southern Africa (COMESA), the East African Community (EAC), Economic Community of West African States (ECOWAS) and Southern Africa Development Community (SADC). Regional economic integrations are instrumental for African countries to put their economic diversities and resources together, enlarge their market share and also form one strong trading block.

D. C. Shirati (✉)

STIPRO-Science, Technology and Innovation Policy Research Organization,
Dares Salem, Tanzania

Similarly, Science and Technology policies has been emphasized both at regional and country levels. Article 15 of the African Economic Community Treaty urges institutions to strengthen their capabilities and cooperation in order to use science and technology to improve the quality of life of the citizens of their countries (OAU 1991). The EAC created the East African Science and Technology Council in 2007 whereas SADC established a desk dedicated to science and technology and a protocol to promote cooperation in science and technology. Moreover, in 2005, ECOWAS designed a framework for common science and technology programmes while COMESA has been implementing programmes to harmonize regulatory measures for biotechnology and ICT development.

It should be understood that there has been failure to effectively implement policies that would promote transfer of technology within member states and within regional blocks in Africa. This is due to a number of factors including the integrated nature of African economy to the world economic systems more than to Africa itself. The major trading partners are China, India, France, United States of America (USA), Spain, Italy, German, Netherlands and United Kingdom (IMF 2017). Notwithstanding efforts towards regional integration and STI policies at regional and country levels most of the African economies remain largely resource-based. In this context, most of the exports are natural resources in raw form going to more industrialized world with minimal value-added content while simultaneously importing capital goods and consumer products (NEPAD 2010).

Given the above background, this chapter focus on the analysis regarding failure of the manufacturing sector under regional integrations in Africa due to weaknesses in technology policies. Specifically, the chapter demonstrates the failure to leapfrog technology for the manufacturing sector through FDIs, failure to build and protect local technology by integrating African market in terms of exports and imports. There is also policy weakness in creating diversifying production patterns within regional integrations in Africa and lastly, inability to build global competitiveness at regional and country levels on the continent.

Regional Integration and Technology Transfer Through FDIs in Africa

The formation of regional integrations in African countries have been instrumental in benefiting great industrial economies both within Africa and from outside Africa. These include South Africa, China, Japan and India (Chang and Green 2003). The dominant players do enjoy reduced tariffs across Africa because most of the African countries have membership in more than a single regional integration arrangement. For instance, Tanzania is a member of SADC at the same time member of EAC. The integration has membership with other economic integrations such as the Economic Partnership Agreement (EPA) between the European Union and the Southern African Development Community (SADC) EPA. Under the SADC EPA, the EU

grants Botswana, Lesotho, Mozambique, Namibia, and Swaziland 100% free access to its market whereby the EU fully or partially removed customs duties on 98.7% of imports coming from South Africa. Under the agreement, the Southern African Customs Union (SACU) removes customs duties on about 86% of imports from the EU (EU 2016). It should be observed with within the same regional block (SADC), there are member states such as Tanzania who are not in the SADC- EPA arrangement but they would still be affected because their industrial products will have to compete with those from the EU who are enjoying customs duty free as SADC member states. The situation provides opportunity for the most giant economies to dominate the weaker economics due to weak policy frameworks to link FDI with the development of manufacturing sector through transfer of technology from multinationals to local firms.

Despite the fact that FDI inflows have been on the rise in Africa, structural transformation remains to be the most notable challenge. Structural transformation in the African context means transformation of the system of “production” from the existing one that is dominated by primary extraction and low value-added agriculture and services, to one in which high value is added through the application of technology, and innovation with better linkages between economic sectors. The African economy needs structural transformation to reduce the share of relatively dominant sectors of today (agriculture and raw minerals/fossil fuels) in the economy to the manufacturing and value added services (Abugre and Ndomo 2014).

Studies inform that FDIs in Africa do not have the spillover effect of promoting growth and boosting the manufacturing sector through technology transfer to the host countries (Asiedu 2006; Diyamett et al. 2011). This is because of the weak legal and policy frameworks to facilitate the spillover effects to host countries among developing countries. Although the relationship between FDI and growth is unclear (da Costa 2012). Other studies found a positive relationship between FDI and growth (De Gregorio 1992; Oliva and Rivera-Batiz 2002) however, are dated. Moreover some conditions are required to be in place in order to FDIs to contribute to the growth of the host country’s economy. Moreover, there are conditions that needs to be in place for FDIs to contribute to the growth of host country’s economy. In accordance with spillover theory, industry and country specificities have a strong relationship with spillover occurrence. The theory suggests that there should be a high degree of learning capabilities and technologies absorbing capacity in the FDI host state allowing for local firms to learn and adopt technology from foreign firms. Apart from changes in macroeconomic policies, industrial best performance depends policy environment that offer better innovations and new knowledge absorption conditions to make host country more competitive which is hardly found across Africa (Gachino 2010).

Africa is the leading continent with higher resource-based raw and semi-processed goods exports. Unprocessed goods accounted for about 80% of African export products in 2011 compared to other regions such as 60% from Brazil, 40% from India and 14% from China. In similar regard, most green-field economic activities in Africa went to natural resources based activities (AfDB et al. 2013). However, recent data shows a decline of about 20% of Africa share of raw material

traded to EU EU-28. As for 2014 data, the value of imported raw materials from developing mostly from Africa was worth EUR 37.0 billion with a varying market share ranging between 50% and 60% (EU 2017). This suggests the mismatch between GDP growth and social economic development. It results into poor industrialization, high unemployment rate particularly for youth, poor income levels of individual citizens and inability of government to finance social services (education, health, water and improved settlement) due to limited tax based (Abugre and Ndomo 2014). It should be noted that investment regulations do not impose leapfrog of technology to advance the manufacturing sectors instead, it provides a room for investors to extract resources for exportation.

Integration of Africa to the World Economy

There is an agreement among scholars that Africa's sustainable development is dependent upon breaking of the vicious circle of commodity dependence to independent and productive manufacturing sector. Manufacturing sector does not only guarantee sustainable economic development but will also foster integration with other economic sectors such as rural and urban economies, agriculture and processing activities, consumer and intermediaries (Shivji 2009). Given the current situation, Africa is more integrated to the world economic system that it is integrated to itself despite the existence of regional economic integrations (NEPAD 2010). Not having strategic policy mechanisms to promote technology in infant industries has led to the widening gap between what is being produced and what is consumed on the continent. There is disarticulation between agriculture and manufacturing whereby agriculture exists independently of the industrial sector due to incased importation of readymade good and exportation of agriculture and natural resources in raw form (Shivji 2009). Available data as presented in Tables 1 and 2 suggest that intra-trade within Africa in both imports and exports is limited compared to trade between African states and other nations outside Africa.

Data presented in the three Figs. (1, 2, and 3) above implies that African countries are still suppliers of raw materials to the rest of the world and mainly consume industrial products from the rest of the world particularly industrialized countries from Europe, America and from the Asian tigers including China, Japan and India. It is also evident that Africa's manufactured goods does not find its way into the markets outside Africa but are sold within the region (Africa). The domination of African markets by developed country due to absence of effective policy mechanism to create linkages between international trade and FDIs to the development local industrial sectors in Africa dates several years back. As it was observed by Page and te Velde (2004: 20)

Most investment in Africa does not come from other African countries, because of the important shares of the EU and the US. Total inward stocks are \$167 billion, dwarfing total African outward investment of \$40 billion. Perhaps more surprisingly, most African

Table 1 Exports from EAC in 2009

Burundi	Kenya	Tanzania	Uganda	Rwanda
Food, beverages, and tobacco processing	Food, beverages, and tobacco processing	Food, beverages, and tobacco processing	Food, beverage, and tobacco processing	Food, beverage, and tobacco
Textile and apparels	Refined petroleum products	Paper and printing	Chemicals incl. Rubber and plastic	Textile and apparels
Construction materials	Textile and apparels	Chemicals	Paper and packaging	Wood and paper
Leather	Leather and footwear	Wood processing	Textile and garments	Construction materials
Building materials	Building materials	Mechanical industry	Leather and footwear	Chemicals
	Chemicals	Leather and textiles	Steel and steel products	Steel and steel products

Source: UNIDO, sub- regional study (2009)

Table 2 Researchers by sector of employment (headcount) percentage shares

	Total	Business sector	Government sector	Higher education sector	Private non profit organizations
Cameroon	100	3.4	6.5	90	a
Gabon	NA	NA	NA	NA	NA
Ghana	100	13.8	61.8	24.4	a
Kenya	100	3.1	30.7	63.0	3.2
Mali	100	3.7	33.7	47.6	15.0
Malawi	100	58.3	a	42.6	a
Mozambique	100	a	97.3	a	2.7
Nigeria	100	a	10.7	89.3	a
Senegal	100	0.2	2.1	96.4	1.3
South Africa	100	20.8	9.3	69.2	0.7
Tanzania	100	a	21.8	72.6	5.6
Uganda	100	4.7	50.2	45.1	a
Zambia	100	5.7	32.4	59.8	2.1

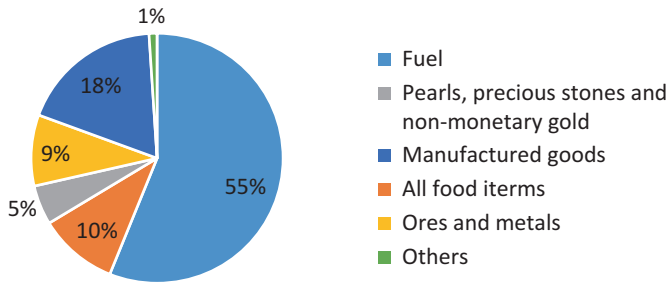
Source: NEPAD (2010)

*Sector not Surveyed

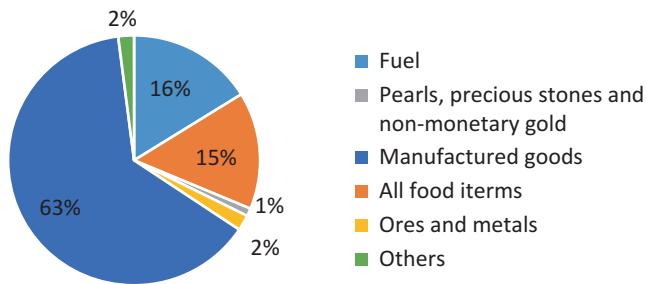
investment does not go to other African countries because of the very high share of South African investment which goes to the EU. This was \$15 billion in 2002, i.e. over 40% of total African outward stock. In addition, \$2.3 billion of South African investment was in the US and 0.7 billion in Australia, another 10%. Only \$1.4 billion of South African outward stocks were in other African countries, accounting for 3.6% of total African outward stock, and less than 1% of total African inward stock.

Whereas regional integrations were supposed to create favorable environment not only for investment, investment in the manufacturing sector through building local technological capacity, harnessing technology from outside Africa through

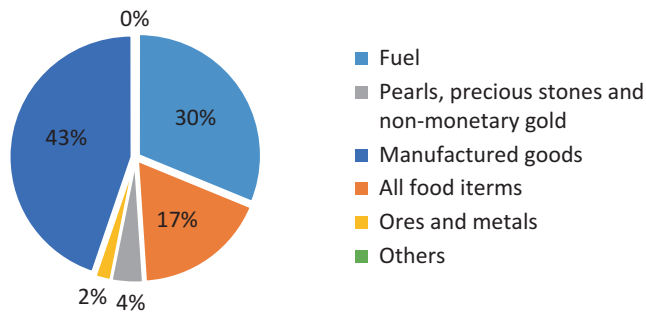
Africa's Exports to the Rest of the World



Africa's Imports from the Rest of the World



Intra-Africa Exports



Figs. 1–3 Composition of Africa’s trade by main sector, 2010–2015 average. (Source (UNCTAD 2016))

FDI and other economic arrangements remains unachievable. Regional integrations in Africa have remained the platforms to extend political relations with insignificant benefits in advancing the manufacturing sector. Regional integrations have failed to design sound technology transfer policies to reduce or cut off the commodity dependency vicious cycle which is necessary for economic transformation in Africa (AfDB et al. 2013).

The Challenge of Economic Diversification Among Regional Integrations in Africa

There is lack of technology policies to encourage diversification of economic sectors at regional and member states levels among most regional integrations in Africa (NEPAD 2010). The need for Africa economic diversification away from the primary sectors is not only important for internal economy but it is also pre – requisite for effective economic integration of goods and services (AfDB 2010a, b). Primary sectors (agricultural and natural resources) normally depend on environmental factors such as nature of the soil, mineral resources deposits, and climatic conditions. It means that neighboring countries are likely to be located in similar environmental conditions and since neighborhood appears to be among the considerable factors for integration in Africa, it is not surprising for countries in certain regional block to have same productions of goods and services. In this context, there are limited economic opportunities especially for exchanging goods and services given the disadvantage of the expanded markets resulting from integration. In table (Table 1) exports from the five EAC countries (Burundi, Rwanda, Tanzania, Kenya and Uganda) are presented, it shows that the five countries all of them have major exports in foodstuffs, beverage, textiles and tobacco, almost similar other products for all five countries under EAC.

The EAC case does not stand alone in sameness of goods produced by member states. The Economic Community of West Africa States (ECOWAS) treaty was agreed on 1975 and revised on 1993 to promote economic cooperation among its member states. The regional block has been important in facilitating movement of people, development of infrastructure at regional level and ensuring regional security however, intra trade within the region has remained a challenge due low economic diversification (Fernando et al. 2016). Like other regional integrations in Africa, ECOWAS does not have technology specialty policies based on comparative and competitive advantages and hence there is exportation and importations of same goods and services among its member states. The graph below (Fig. 1) presents data regarding ECOWAS exports to EU (Fig. 4).

Building Competitiveness Based on Comparative and Competitive Advantages

Africa as a region and its sub regional integration organisations such as EAC, SADC, COMESA and ECOWAS have not been investing significantly in building technological capabilities. Available data indicate that Africa spent less on R&D in comparison to the rest of the world, in 2000. It spent less than 1% of the world's expenditure on R&D whereby Asia accounted for 30.5%, North America 37.2%, Europe 27.2% and Latin America and the Caribbean for 2.9% of the total world expenditure on R&D. apart from that, most of the R&D activities in Africa are not based on action

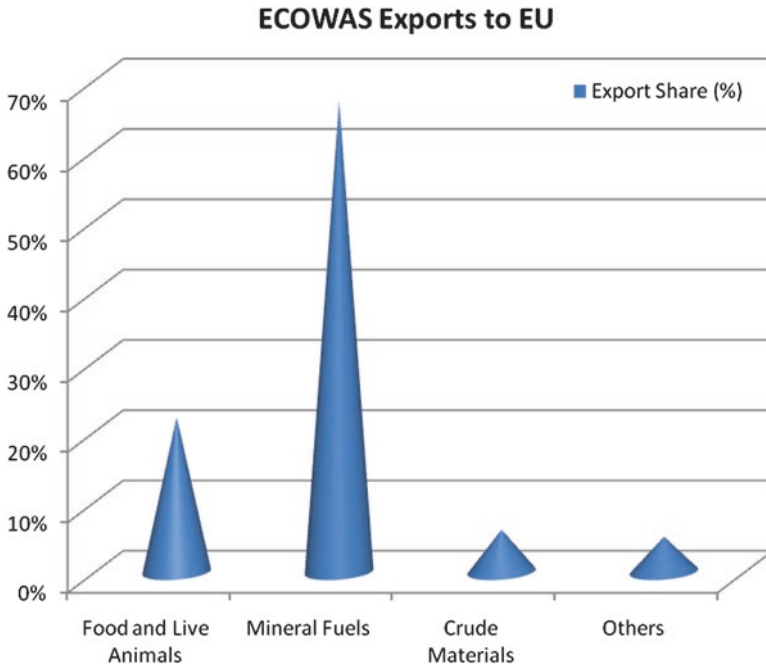


Fig. 4 Exports from ECOWAS to EU. (Source: Eurostat (Online Data Code: DS_018995))

research to boost productivity, they are not laboratory based but rather they are basic research undertaken for knowledge by Higher Learning Institutions (HLI) or policy research for advocacy which are not utilized because of the antagonist relationship between governments and Civil Society Organizations (NEPAD 2010). As presented in Table 2 below, most of the researchers in Africa are employed by HLIs followed by governments with exception of Malawi, South Africa and Ghana as countries with more than 10% share of researchers in the Business sector.

The above presented data have implications for building technological capacity for global competitiveness in Africa. It is due to the fact that research activities in government or HLIs is not easy for them to boost productivity since they are aimed at advancing knowledge to address policy issues. It should be acknowledged that technology and innovation taking place in business particularly in the industrial sector is very essential in enhancing the manufacturing sector.

Additionally, given the limited expertise among African countries, the issue of specialization in production of goods and services among member states to regional integrations has not been actualized among the regional integrations blocs in Africa. In other integrations economic integrations such as those involving the fastest growing Asia tigers, it is productivity that defines the specialization among member states in order to benefit from the extended markets. For about two decades ago, integration involving China, Turkey and India revealed different paths and economic patterns among the three countries (UNCTAD 2002). Through their agreement and specializations, China has

become an assembly country, strongly integrated in the international segmentation of production processes in Asia whereby Turkey's high-tech imports consist mainly in capital goods, and correspond to a classical form of technology transfers, aimed at upgrading local industrial capacities. Turkey's foreign trade is dominated by its traditional complementarities with Europe. Moreover, India was left responsible to produce goods with its level of technological capabilities by then. This kind of specialization is not articulated among in policy frameworks guiding regional integrations among African countries.

Conclusions

This chapter finds that African manufacturing sector has been at poor performance for about two decades. Regional integrations have not contributed in reviving the industrial performance due to ineffective policies in building local technological capabilities both at regional and member-states' level. Specifically, regional integrations have not been instrumental to enable Africa to leapfrog technology through FDI's, regional integrations have not had effective policies to integrate Africa to itself that it is integrated to the external world in terms of import and exports. Moreover, technology and innovation policy approaches need to be designed in order to facilitate economic diversification among countries and among region in Africa, members of particular regional blocks do produce same low value added products for exports hence failure of trade amongst themselves. Furthermore, regional integrations have failed to enhance building of competitiveness based on comparative advantages. There is little investment in R&D activities and research works are concentrated in the government, NGOs and in higher learning institutions. There is less research work in the private sector hence the link between research and production is less likely to happen. Integrations are more political than economic since there is less specializations in terms of manufacturing technology strategies.

Based on the analysis, a number of suggestions could be made as a way forward towards African prosperity in the manufacturing under regional integrations. One is to have policies at regional level that ensures leapfrog of technology through FDI's that would build the powerful manufacturing base in Africa. For instance, there should be regulations that would oblige FDI's to export manufactured goods instead of raw materials or low value add products. Another important measure is to urge members of regional integrations to utilize their local markets which means producing with the focus of local markets. This will be useful to integrate Africa to itself economically. Regional integrations should have policies that encourage diversification of African economy from relying on primary sectors of production. This includes giving tax incentives for manufactured goods exported within the region than low value added products. Lastly, it is important to build global competitive capacity based on competitive and comparative advantages among member states in Africa. Investment in research with linkages to the productive private sector should be encouraged. HLI and the government need to build strong interlinkages with manufacturing firms in the private sector and undertake research geared towards enhancing the manufacturing capacity.

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Intra-African Trade and Innovation in the Agricultural sector



Foluso Akinsola and Motunrayo Akinsola

Introduction

The strong resolution from the Abuja Treaty in 1991 was to ensure all African countries strengthen and establish various regional blocks to be able to take advantage of regional benefits of (economies of scale, better terms of trade, and efficiency in production). However, the unwillingness of most African government to innovate and specialise in agricultural product has inhibited a lot of African countries from enjoying the benefits from the dynamic market opportunities of regional trade.

However, the enthusiasm and interest most that African leaders had when they made the Abuja treaty of 1991 has been reduced by the slow growth and past failures of regional integration initiatives. The reality can be found in the result of the inter-woven and overlapping regional organizations among various African region (World Bank 2009). The inherent idea of forming regional trade is because small economies are uncompetitive because of their high transaction cost, lower terms of trade and diseconomies of scale. They can strive to overcome these limitations by specializing and trading regionally and internationally.

This chapter argues that the major problem lies in the focus of the intra-trade. Regional trade should be based on a premise of common agreement and solution. Many African countries in recent years are plagued with the problem of hunger as a result of drought and climate change. The paper believes intra-African trade should be focused on investments in agriculture that will have multiplier effects and help augment economic growth and improve the welfare of subsistence farm-

F. Akinsola (✉)

Department of Economics, University of South Africa, Pretoria, South Africa

Department of Economics, University of Lagos, Lagos, Nigeria

M. Akinsola

Department of Economics, University of South Africa, Pretoria, South Africa

ers. The chapter is organised as follows: In section “[Regional Integration and Intra-Trade in the African Region](#)”, we present regional integration and intra-trade in Africa while section “[Agricultural Innovation and Intra-African Trade](#)” offers overview of agricultural innovation and intra-African trade. Agricultural Innovation that fosters entrepreneurship and economic growth is discussed in section “[Agricultural Innovation That Fosters Entrepreneurship and Economic Growth](#)” while section “[Conclusion](#)” concludes.

Regional Integration and Intra-Trade in the African Region

Regional integration can be defined as “any policy designed to reduce trade barriers between a subset of countries regardless of whether those countries are actually contiguous or even close to each other” (Winters 1996). Integration aims at abolishing discrimination between local and foreign goods, services and factors (Salvatore 1997). Economic integration has also been defined as a process of eliminating restrictions on international trade, payments and factor mobility (Carbaugh 2004). Economic integration aims at uniting two or more national economies in regional trading agreements. According to Biswano (2003), regional economic integration involves the process of trade, economic and financial convergence of integrating states.

The World Trade Organisation (WTO) has held several discussions over the years on the Doha Development Agenda. The discussions focus on transmission mechanisms to promote multilateral trade integration in the WTO. However, slow progress in achieving multilateral trade integration has increased interest in regional integration through bilateral and regional trade agreements to increase development in the region. The African Union (AU) Head of States Summit in 2012, agreed on establishing Continental Free Trade Area by 2017, thereby creating a continental market (Hammouda et al. 2009; Anyanwu 2014).

Intra-African trade could form part of the process of achieving regional integration and stimulating sustainable and inclusive development in Africa. More specifically, intra-African trade has enormous potential to create employment, food security, boost investment and foster economic growth in the continent. Intra-African trade provides economies of scale for African countries to address a major constraint to export competitiveness due to the small size of their national economies and geography/transport costs. It helps to enhance product and export diversification, hence increasing the prospects for growth and development in the individual countries and the region. Easy movement of goods and services in intra-regional trade enhances competition in the local markets, thereby increasing productive efficiency and price convergence in the region.

Intra-regional trade also promotes the mechanisms for technological innovation and development, increasing capacity to compete with more advanced economies on the international market. In addition, it promotes positive motivations for African

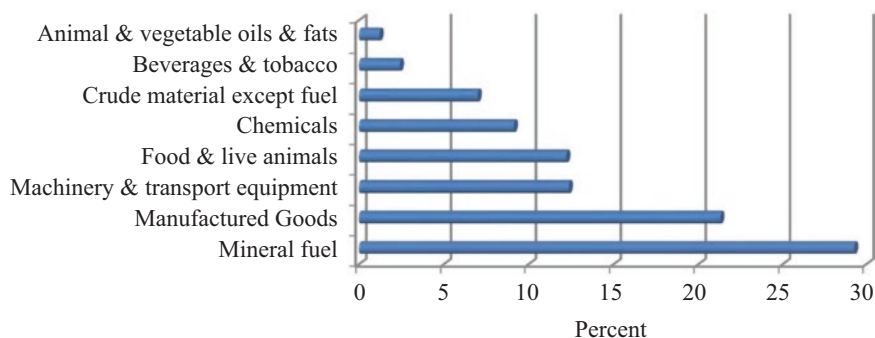


Fig. 1 Structure of Intra-African Trade, 2010. (Source: UNECA et al. (2013) and Anyanwu (2014), Compendium of Intra-African & Related Foreign Trade Statistics 2011, UNECA, Addis Ababa, February)

governments to adopt less distortionary domestic policies and more disciplined macroeconomic management (UNCTAD 2013).

Figure 1 shows the composition of intra-African trade, dominated largely by mineral fuels, followed by manufactured goods, and machinery and transport equipment. The figure also indicates that intra-African trade in agriculture and food is relatively low therefore, focus on considerable increase of food and agriculture is necessary in enhancing intra-African trade visibility to the rest of the world, along with manufactured goods.

There are great opportunities and prospects if only African countries could integrate their economies like their counterparts in other continents of the world. For example, 60% of Europe's trade is within its own continent, the same is true for Asia and 40% for North America, while Africa can only boast of 12% of its exports to move around other countries in its continent. One of the major problems is delineating between the personal political ambition of African leaders and the harsh economic realities they face. To pursue regional integration, 14 trading blocs have been set up; however there is low political and economic will to empower these institutions. Loss of sovereignty and policy space was mentioned as the obstacles by the director of Trade Law Centre (TRALAC) for Southern Africa. As established by Biswaro (2003), regional integration is characterized by the establishment of joint institutional mechanisms and a degree of shared sovereignty. Although this may be true in theory, it is very difficult in practice, especially in Africa, as it involves giving up a percentage of the country's power when taking decisions. This is confirmed by Biswaro (2003), when he argues that existing regional integration schemes in Africa function in a governmental rather than an international mode, and the actual sharing of sovereignty is least possible. Most countries belong to at least two and many belong to three of the trading blocs, however, informal trade tend to blossom. Many goods escape custom inspections that record official trade flows. Goods such as Sorghum and cassava do not show up in the figures but are traded informally.

Trade integration in the African region can only thrive when countries produce what other countries in the continent are eager to buy. However, the region has continued to produce what it does not consume and consume what it does not produce. This is a major obstacle to the development of intra-trade regional integration in Africa. Similarly, non-tariff and regulatory barriers in various African borders are still very high and cause a great impediment in the movement of goods, services and capital across Africa. Over 80% of Africa’s exports are shipped overseas, mainly to Europe, US and China. Another problem is poor infrastructure backed by complex and conflicting trade rules. The absence of reliable transportation system, energy and information and technology poses major obstacles in attaining regional integration. Figure 2 depicts the intra-regional trade for the major trade regions in the world. Africa has the lowest regional trade among the selected regional zone in the world.

The effect of regional integration on member countries can be divided into Static and Dynamic Effects. The static effects come as a result of resource allocation in response to changes in relative prices, while dynamic effects are as result in change in efficiency, economies of scale and level of investment and growth. Traditional economic theoretical assumption states that if countries’ economic production is in areas where they have comparative advantage to others, costs and prices will be lower thereby resulting in “productive efficiency”. Economic theories view tariffs and quotas as barriers to free flow of goods within a region. In practice, states are unwilling to adopt complete free trade liberalization and therefore form trade poli-

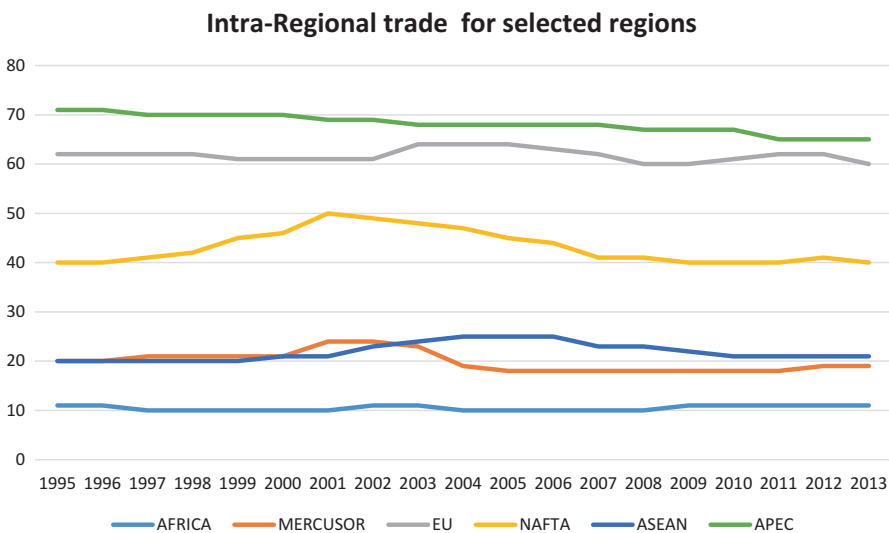


Fig. 2 Intra-Regional Trade for Selected Regions (%). (Source: Anyanwu (2014;7). NB: APEC Asia-Pacific Economic Cooperation; ASEAN Association of South East Asian Nations; EU European Union; MERCOSUR Southern Common Market; NAFTA North American Free Trade Agreement)

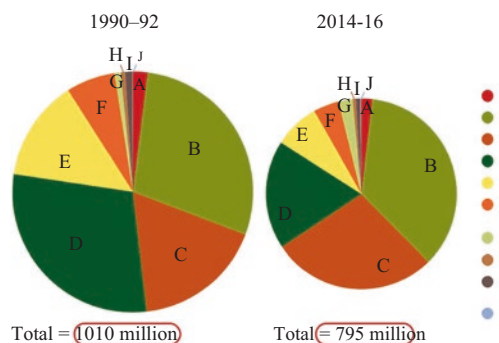
cies to minimize strains in trade flows within their region. These policies produce both static and dynamic effects (Negasi 2009).

The static effects can be defined as changes that occur in the equilibrium market price and quantity before and after the creation of a trade or an economic bloc. The static effects can further be divided into traditional (trade creation and trade diversion impacts) and non-traditional effects. Trade creation occurs when for a given product; high cost of production of domestically produced goods is substituted for lower cost production located in a partner country as a result of regional integration while trade diversion occurs when lower cost goods imported from outside the region is substituted for higher cost goods produced within the region.

The dynamic effects occur from the impacts on productive capacity and potential output, and the consequential impact on income growth (Radelet 1999). Most researchers tend towards the presence of dynamic gains in developing rather than static gains. Economies of scale is said to be achieved by enlarging and diversifying markets for firms in member countries whose output would be too little if restricted to the domestic market (Langhammer and Hiemenz 1990; Robson 1987). The dynamic gains refer to stimulation of investments in production for export and associated industries (Negasi 2009). The benefits associated with economies of scale to trade and welfare under customs unions are numerous. Corden (1972) believed economies of scale enhances cost reduction gains, improves regional intra-trade, reduces barriers to trade which in turn will reduce output prices as firms and industries in the region's member countries cater for larger markets both domestic and abroad. Infrastructures aiding intra-trade is also enhanced as transportation and communication networks are likely to be easily available and affordable in the region.

Agricultural Innovation and Intra-African Trade

According to FAO et al. (2015), 23.2% of the population in Sub-Sahara Africa (SSA) are undernourished in 2014. This is prevalent as a result of drought, rising food prices, climate change and political instability in several countries in SSA. Similarly, growth in demand for food production in sub-Saharan Africa (SSA) is projected to increase over the next 20 years due to expected population and income growth. For example, Delgado (1999) states that milk production and dairy product consumption are expected to grow in the region by 3.84% annually between 1993 and 2020. The good news is that at the same time increased domestic food production in most African countries has the potential to generate income, employment and stimulate economic growth. This would thereby improve the well-being of rural populations especially through regional integration (Delgado 1995, 1997; Staal et al. 1997). Figure 3 shows that the progress towards improved food security is still slow and uneven across regions. Though, there has been a considerable progress has been in developed world but progress has been very slow in SSA and South Asia (Fig. 4).



	Number (millions)		Regional share (%)	
	1990-92	2014-16	1990-92	2014-16
A Developed regions	20	15	2.0	1.8
B Southern Asia	291	281	28.8	35.4
C Sub-Saharan Africa	176	220	17.4	27.7
D Eastern Asia	295	145	29.2	18.3
E South-Eastern Asia	138	61	13.6	7.6
F Latin America and the Caribbean	66	34	6.5	4.3
G Western Asia	8	19	0.8	2.4
H Northern Africa	6	4	0.6	0.5
I Caucasus and Central Asia	10	6	0.9	0.7
J Oceania	1	1	0.1	0.2
Total	1011	795	100	100

Fig. 3 The changing distribution of hunger in the world: numbers and shares of undernourished people by region, 1990-92 and 2014-16. *Note:* The areas of the pie charts are proportional to the total number of undernourished in each period. Data for 2014-16 refer to provisional estimates. All figures are rounded. (Source: FAO et al. (2015:10))

The World Economic Situation and Prospect (WESP) (2014) are a bit optimistic about trade in Africa. They believe that Intra-regional trade in Africa is still small but competing well with other developing countries, particularly China but are still constrained with lack of infrastructure, overlapping regulations and restrictive border crossings. “While import demand in many African countries is rising, there

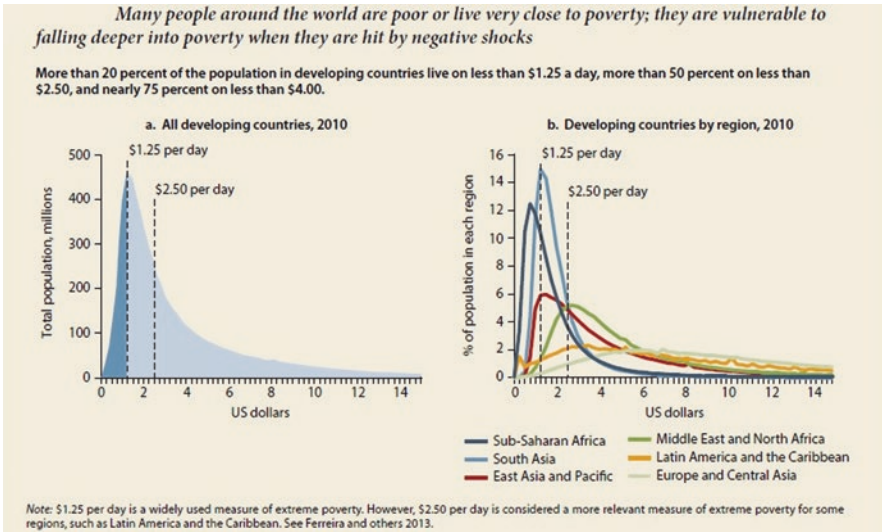


Fig. 4 Total Global Population Living in Poverty. (Source: World development Report, 2014 based on World Bank PovcalNet Database)

is a widening disparity in the types of goods that are imported; a small but growing class of urban consumers is driving demand for more sophisticated consumer goods”(WESP (2014:38)).

Many intra-African trade should be focused on investments in agriculture that will have a multiplier effects and help augment economic growth. Many countries in Africa are still net food importers, but recent variation in food prices will significantly affect a lot of people in the African region especially the rural poor household. According to the World Bank (2015), “Africa has the potential to feed Africa”. However, only 5% of Africa’s imported cereals come from other Africa countries Staple foods can be exported from areas of surplus production across the continent to malnourished and improvised rural areas (World Bank 2015).

Overall, lower commodity prices will also help towards reducing current-account deficits in many African countries. However, subsistence farming is still very vulnerable and unsustainable in most Africans countries, therefore, incorporating small-holder farmers into a regional integration blocs with other African countries will help to alleviate poverty and increase food security in the long run. Regional agricultural commercialization will assist many African household to not only escape the pains of poverty but will also have a concomitant effect in reducing risk and transaction costs to individual subsistence farmers (Heltberg and Tarp 2002; Delgad 1995).

Schneidman and Lewis (2012:13) states that although African countries have not effectively utilized the various benefits in the United States’ African Growth and Opportunity Act (AGOA) since only roughly 6000 duty-free, quota-free product lines allowed by AGOA have been exploited. These would create a great intra-African trade and increase the competitiveness of African businesses especially the agri-

cultural sector. However, to benefits from trade liberalization, there must be coordination and redesigned policies among the Africa region that will not undermine cooperation among African countries in their production of exports.

Anderson, (2003) suggests that both South Asia and Sub-Saharan Africa (SSA) are still doubtful of the benefits from trade liberalization especially when it comes to tariff preferences and agricultural trade reforms. Anderson (2003) further assess the Doha Development Agenda's multilateral trade negotiations (MTN) round for low-income countries. He concluded that for SSA countries to benefit from the Doha Development Agenda, they need also to reform their own domestic product especially both in the farm and textile products and factor markets so there will be an inclusive and holistic growth opportunities in the domestic countries. However, these can only be achieved through innovation.

The impetus of innovation to enhance economic growth and development dates back from the early days of Schumpeter (1912) and Neo-classical theory of Solow (1956) to Marshall (1980) where technology and knowledge were seen as exogenous variables introduced to the system to augment growth in the long run. Schumpeter believes that the role of innovation and entrepreneurship is impetus to economic growth and development. He asserted that innovation produces profit for an organisation and can augment growth and investment, bringing new opportunities.

The Neo-classical theory of technology progress was assumed to be homogeneous to different countries in the long run since growth path of different region would eventually 'converge' over a long period of time (Howells 2005:1222). However, the paradigm has shifted to accommodate technology progress and knowledge that are viewed to be endogenously determined by different countries and regions. According to Temple (1999) and Howells (2005) the neo-Schumpeterian growth models assumed that technological progress evolved as entrepreneurs invest in new ideas and increase knowledge based human capital (intellectual property right) in research. In other words, innovation is seen as a private good instead of public good which can be in form of investment and introduced to enhance economic growth and development.

Table 1 shows the gross domestic product, services and the export of good and services in different African countries between 2001 and 2012. Table 1 also depicts that only four African countries specialise solely on export of food and agriculture between 2001 and 2012 (Somalia, Guinea-Bissau, Malawi and Côte d'Ivoire). Although we also have a lot of mixed exporters (Eritrea, Kenya, Namibia, South Africa, Lesotho, Swaziland, Togo and Uganda) but there are still deficiency in trade among African countries.

UNCTAD recommends that Africa should develop an intra-African trade with a "more sophisticated composition than its present commodity exports to the rest of the world and a higher intensity of services component — the link between human capital and high value added services (i.e. having good software developers, well-trained financial expertise etc.) needs to be better supported" (UNCTAD (2015:119). The organisation also notes that without the intervention of the government and African Regional Economic Communities to exploit "knowledge-intensive trade" opportunities both in higher value global and regional value chains for goods and

Table 1 Growth in real gross domestic product, services and exports of goods and services by country, 2001–2012 (Percentage)

Exports specialization	Gross domestic product		Services		Exports of goods and services	
	2001–2004	2009–2012	2001–2004	2009–2012	2001–2004	2009–2012
<i>Food and agriculture</i>						
Côte d'Ivoire	−0.42	2.52	−1.29	8.55	1.37	4.20
Guinea-Bissau	0.81	2.59	−0.71	2.46	−3.14	0.06
Malawi	2.48	2.89	3.42	0.47	14.61	2.09
Somalia	3.25	2.60	3.44	1.94	1.32	3.14
<i>Fuels</i>						
Algeria	5.02	2.62	4.92	5.21	3.40	−3.96
Angola	8.04	4.13	7.39	4.57	1.98	−4.00
Chad	17.00	7.05	9.00	9.51	45.89	−0.25
Congo	3.19	7.25	7.18	8.04	−2.41	0.47
Equatorial Guinea	33.81	2.62	21.25	12.11	22.14	−1.12
Gabon	0.70	4.60	1.60	4.36	−2.13	0.09
Libya	4.17	11.70	6.10	6.86	7.14	11.87
Nigeria	12.43	7.03	11.67	11.72	4.60	8.05
South Sudan	.					
Sudan	7.34	4.61	7.51	2.45	9.69	2.39
<i>Manufactured goods</i>						
Lesotho	2.94	4.80	2.84	4.95	23.84	0.03
Tunisia	4.49	2.17	5.57	3.61	3.41	1.49
<i>Mixed exporters</i>						
Benin	4.42	3.53	4.06	3.41	1.86	2.08
Burkina Faso	5.81	5.68	7.50	7.86	3.54	26.19
Burundi	2.45	10.46	9.63	10.39	5.48	−1.77
Cameroon	4.06	3.66	7.30	4.21	1.77	−0.86
Central African Republic	−1.07	3.00	−5.04	3.41	−9.43	5.52
Egypt	3.49	3.45	3.76	4.01	7.69	−4.64
Eritrea	2.64	5.58	4.31	7.95	2.50	84.22
Ghana	4.98	8.73	5.06	8.73	−13.09	17.96
Kenya	3.26	4.37	3.16	5.02	7.65	4.86
Morocco	5.50	4.02	4.62	4.71	6.42	1.68
Mozambique	8.96	7.05	7.53	7.33	32.24	13.82
Namibia	5.62	3.70	5.02	5.10	6.95	0.40
Niger	3.84	5.20	2.49	4.52	−0.10	16.01
Senegal	4.45	3.13	5.22	3.45	4.60	4.33
Sierra Leone	15.13	11.76	12.57	5.87	30.69	72.33
South Africa	3.48	1.89	4.12	2.58	1.58	−2.24
Swaziland	2.02	0.73	2.93	2.46	6.17	6.95

(continued)

Table 1 (continued)

Exports specialization	Gross domestic product		Services		Exports of goods and services	
	2001–2004	2009–2012	2001–2004	2009–2012	2001–2004	2009–2012
Togo	1.21	4.52	−2.99	9.82	5.20	12.87
Uganda	6.95	5.20	8.03	6.19	15.60	−2.54
United Republic of Tanzania	6.98	6.61	7.46	7.79	13.28	17.33
Zimbabwe	−4.31	10.38	−3.29	7.28	−22.85	62.33
<i>Ores and metals</i>						
Botswana	3.41	2.63	3.57	7.50	0.85	−0.28
Democratic Rep. of the Congo	3.45	6.00	3.80	5.52	38.33	5.99
Guinea	3.10	2.40	1.85	1.11	2.95	10.07
Mali	6.51	2.96	5.00	0.49	7.30	5.55
Mauritania	3.60	3.86	7.91	5.82	0.42	5.80
Zambia	4.67	7.04	4.32	6.05	28.41	12.13
<i>Services</i>						
Cabo Verde	5.10	2.38	5.79	2.94	−0.97	3.26
Comoros	2.43	1.91	1.61	1.91	0.39	2.04
Djibouti	2.70	4.50	2.16	4.97	4.89	14.00
Ethiopia	5.31	10.25	4.94	12.31	17.43	0.87
Gambia	4.44	3.68	0.84	5.30	−18.94	60.30
Liberia	−5.46	8.65	−0.83	7.95	2.35	7.93
Madagascar	2.10	0.11	1.40	−0.66	3.15	0.36
Mauritius	3.80	3.51	5.30	4.38	−0.18	5.17
Rwanda	7.38	7.42	8.73	9.07	25.66	15.65
Sao Tome and Principe	4.05	4.86	6.07	3.65	1.25	3.82
Seychelles	−2.33	3.32	−2.01	3.59	−2.21	−1.43
<i>Developing economies</i>	5.33	5.25	5.41	5.40	8.68	4.36
<i>Africa</i>	5.27	3.41	5.04	4.60	4.66	−0.48
<i>America</i>	2.62	2.88	2.77	3.35	5.08	2.78
<i>Asia</i>	6.51	6.29	6.78	6.30	10.04	5.11

Source: UNCTAD secretariat calculations, based on data from UNCTADStat; United Nations Conference on Trade and Development (UNCTAD 2015: 18–19)

Note: Figures relate to annual growth in value of GDP and services and exports of goods and services at constant 2005 dollars, averaged over the given periods

services, little progress will be achieved. These imperatives can only be achieved through a well-developed Innovative structure that requires technical training systems and higher education.

Agricultural Innovation That Fosters Entrepreneurship and Economic Growth

Many developing countries consider regionalism as a panacea to the economic challenges of African countries and a way of stimulating economic growth and development especially after the adverse effect of global financial crisis around the world. The fundamental nature of free trade areas in Africa is that member states recognise the importance of the development and strengthening of trade through the elimination of intra-regional barriers.

Some progress has been made in the attempt to foster regional integration in Africa. These include: some major creation of regional integration in recent years:

- June 2011 launch of negotiations for a Tripartite Free Trade Area (TFTA) stretching from Libya and Egypt to South Africa. The proposed TFTA would merge three existing blocs, including the Southern African Development Community, the East African Community (EAC), and the Common Market for Eastern and Southern Africa. Proponents of this initiative envision that TFTA will include 26 countries with a combined GDP of over \$1 trillion and an estimated consumer base of 700 million people.

Larger trading blocs facilitate economic growth that in turn enhances the expansion of small scale farmers which can ultimately reduce poverty. It is estimated that the free trade area initiatives of the three existing regional blocs in Africa led exports among the 26 member states to increase from \$7 billion in 2000 to over \$32 billion in 2011. (UNCTAD 2015).

These efforts build on going integration process in the EAC, including a customs union, common market, and proposals for common currency as well as political federation. The five member countries (Burundi, Kenya, Rwanda, Tanzania, and Uganda) account for 135 million people with a total GDP (at current market prices) of about \$80 billion, representing a powerful consumer base.

The region is currently negotiating the establishment of a monetary union to advance and maintain sound monetary and fiscal policy and financial stability. The negotiations are attempting to take into account the limitations of the euro area by including provisions for fiscal integration and financial stabilization. If adopted as envisaged, the monetary union would yield Africa's first genuine regional economy, which would attract foreign direct investment and bolster consumer spending and growth of the middle class.

Conclusion

Agricultural innovation can only transform intra-African trade especially in the agricultural sector if regional blocs embrace strong structures and ensure that best practices and technological breakthroughs are given major priority. Agriculture has played a significant role in most African growth (Ghana, Ethiopia,

Tanzania and Lesotho). There should be rapid technological improvements in greenhouses, plantation and increased production among African regions. For example, countries with requisite capacity can develop a vegetable greenhouse for planting, characterized by low cost, low pollution, and high productivity.

The cluster development program of Agricultural food crops (Juma 2015) based on three interlinked measures: encouraging cooperation and networking between companies and R&D institutions; strengthening the knowledge, skills, and expertise required by key development actors (people and institutions) to promote the development and functioning of clusters; and forming clusters in practice. Agricultural innovation can only transform intra-African trade especially in the agricultural sector if regional blocs institutionalise strong structures and ensure that best practices and technological breakthroughs are given the major priority. Agricultural sustainability can also improve the welfare of the rural people’s livelihoods, stimulate economic growth and development as well as augment regional food security.

Increase in the production of domestic food production will help to stimulate growth and development in the long run. For these to be achieved, African countries must change their approach about the mirage of trade liberalization by substituting local production of agricultural goods with the importation of manufactured processed goods. In addition, increased agricultural sustainability can also improve the welfare of the rural people’s livelihoods, stimulate economic growth and development as well as augment regional food security.

Appendix

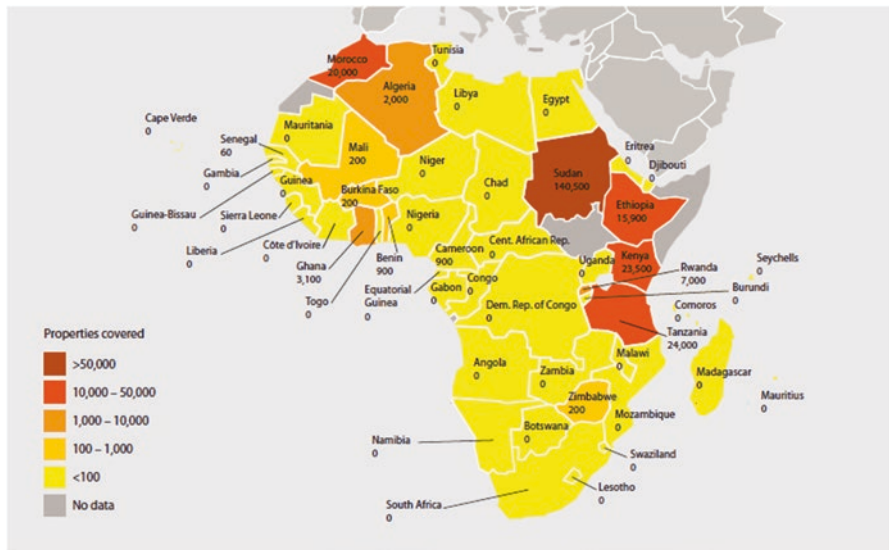


Fig. 5 Penetration of crop insurance in Africa

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Unemployment and Informal Entrepreneurship in Zimbabwe: Implications for Regional Integration



Kingstone Mujeyi and Wilbert Zvakanyorwa Sadomba

Introduction

The greatest challenge facing the economy of Zimbabwe today is that of unemployment, particularly for the youth. Given that the education system churns out huge numbers of youths into the labour markets every year, very few of these manage to secure employment in the formal sector. It seems their salvation is in skills training and eventual joining of the informal sector (Chiripanhura and Makwavarara 2002). Most of them are absorbed by micro and small enterprises (MSEs) (Mpofu 2010). However, the rate of absorption has not been high enough to match the high unemployment figures in the formal sector. This has given rise to brain drain and massive migration into the diaspora in search of employment opportunities. The major destinations have been within the Southern African region, particularly South Africa, and overseas, mainly the United Kingdom and United States of America. Those that opt to remain in the country have to endure employment and entrepreneurship under precarious conditions associated with the informal sector. Like in many developing countries, most businesses in the informal sector of Zimbabwe are illegal under existing laws (Gumbo and Geyer 2011). However, informal employment and entrepreneurship continue to flourish because the businesses, along with illegal micro-enterprises seem to be the only possible source of income for most young people, particularly in urban areas.

K. Mujeyi

Department of Agricultural Economics and Extension, University of Zimbabwe,
Harare, Zimbabwe

W. Z. Sadomba (✉)

Centre for Applied Social Sciences (CASS), University of Zimbabwe, Harare, Zimbabwe

There is mounting evidence worldwide that the majority of jobs in the future will be created in the MSE sector (ILO 2000; Mamman et al. 2007). It can, therefore, be argued that the panacea to Zimbabwe's youth unemployment problems lies in the growth and development of the MSEs, the majority of which are operating in the informal economy. In Zimbabwe, like many other Sub Saharan African countries, the MSE sector has been identified as an important vehicle for economic participation by the youth as well as poor and low income households (Mhone 1996; Dhemba 1999; Gumbo and Geyer 2011). However, a key question that arises in the inquisition of the role that informal entrepreneurship plays relates to formalization and transition to the mainstream economy. Thus, government policy towards the informal economy has remained ambivalent with the sector at times being hailed for employment creation while at others being regarded as a drag on the economy. This lack of consistence on the part of government has seen activities of the informal economy being tolerated at times while at others they are clamped down upon through invoking of draconian laws inherited from the predecessor colonial regime (Kanyenze et al. 2011).

Tackling widespread informality in terms of entrepreneurship, youth employment and productive activities has become a matter of priority on the agenda of Zimbabwe's inclusive growth and sustainable development policy discourses (GoZ 2002, 2013). The government of Zimbabwe (GoZ) has embarked on an indigenisation and economic empowerment programme that seeks, among other things, to empower youths through promotion of entrepreneurship. However, support offered through the various youth empowerment programmes has not been enough to enable them to invest and operate formally registered businesses. This, coupled with dwindling job opportunities in the formal sector, has resulted in the flourishing and intensification of informal activities. The question that arises has to do with what this high level of informality implies for development of the Zimbabwean economy. Within the policy discourses, there is debate about whether informality is a way for entrepreneurs to escape excessive taxing and regulation or a mere reflection of stagnation or decline in formal sector growth (Simpsons 2010). Recently, the GoZ, through the Minister of Finance and Economic Development's 2014 Mid Term Fiscal Policy Review acknowledged the fact that the informal sector has become the virtual economy, hence the need to put measures and adopt strategies that target the sector for revenue collection (GoZ 2014). This acknowledgement could signal a change of perception by the Government but whether this change would affect overall strategic planning to position the sector advantageously in economic development of the nation remains unclear.

Following a decade-long economic crisis that caused a severe melt-down of the overall macroeconomic environment, the informal economy has thrived to become the virtual economy, supplying the country's basic goods and services owing to the literal collapse of the formal sector. The question therefore is whether finally Government seriously considers the informal economy as vital to economic growth beyond just revenue collection. This question arises because historical trends seem to indicate high ambivalence on the part of Government about the informal economy. The Government of Zimbabwe adopted a multi-currency system, commonly referred to as 'dollarization', in 2009 which replaced the Zimbabwean Dollar whose

value had been heavily eroded by hyperinflation. Common prognosis was that informal activity would gradually subside in response to improvement in the overall macroeconomic environment but reality on the ground suggested otherwise; informal economic activity actually intensified.

One overwhelming characteristic of Zimbabwe's economy today is its duality, with the industrial structure typified by pronounced firm-size heterogeneity - multifarious MSEs, operating outside the regulatory framework of the state, co-existing with large formal enterprises. Unlike in many developing countries, informal entrepreneurship has not been growing fast during the post independence until the recent decades beginning late 1990s which was also mainly in response to rapid urbanisation and the limited ability of the formal sector to absorb the influx of job seekers (Chirisa 2009, 2013). The 1970s and '80s decades witnessed massive but forced urbanisation caused by high internal displacement caused by the guerrilla war that ravaged the rural areas. Rural to urban migration was unprecedented but the informal sector growth remained stunted, reflecting inherited colonial legacy that outlawed and suppressed black entrepreneurship through legal and policy measures (Dhemba 1999). Thus, although there was progressive decline in the ability of the formal industry to absorb surplus labour, the informal sector response was pronounced much later, a decade and half after.

The informal economy has grown from contributing less than 10% to GDP at independence in 1980 to a recorded high share of 70% in 2008 (Makochekeka 2010). The restructuring of labour markets under liberalisation is sometimes viewed as the main cause of inadequate formal employment which in turn pushes up informalisation (UNDP 2008; Meagher 2013a). A national survey of MSEs conducted in 2012 by Finmark under the auspices of the Ministry of Small and Medium Enterprises and Cooperative Development (MSMECD) established that the informal economy is home to some 3.5 million small businesses owned by 2.8 million entrepreneurs and provide about 5.7 million jobs (Finscope 2013). This implies that the informal economy has become the biggest employer, accounting for close to 90% of men and women of working age in Zimbabwe.

While 72% of the entrepreneurs were found to be sole proprietors, about 800,000 of the firms employ 2.9 million people. The report also estimates that 85% of the MSEs are informal and responsible for about US\$7.4 billion that is circulating outside the formal economy. The country's 5 year national development strategy, ZIMASSET (Zimbabwe Agenda for Sustainable Socio Economic Transformation), recognizes informal entrepreneurship's role in fostering inclusive and sustainable economic recovery and empowerment of livelihoods (GoZ 2013a). Again the 2014 Fiscal Policy statement delivered by the Minister of Finance and economic Development recognized the fact that 'the old economy has died and a new economic order has arisen spearheaded by the growth of the small business sector and indigenisation' (GoZ 2013b). As such, the MSMECD has redefined one of its policy thrusts so as to create an enabling environment to facilitate formalisation and growth of the sector. Whether this policy stance signals genuine policy climb-down and sincerity on the part of the GoZ with regards to accepting reality that 'informal has now become the normal' is still to be seen.

Given that the informal economy has grown so large relative to the formal economy questions arise about where the real regulatory power now lies. Does this mean that the informal economy has become the dominant regulatory force in the economy? Does this growing size of the informal economy alter its relationship with the state? If 'informal has become normal', what exactly does this mean in terms of the regulatory interface between the informal economy on one side and the state and local governments on the other? To answer these questions, this chapter (paper) interrogates historical trajectories that have shaped the evolution of informal entrepreneurship and youth employment in Zimbabwe. It draws extensively on data from a country-wide survey of informal firms operating in the metal industry of Zimbabwe conducted in 2012 to make a case for the important role informal entrepreneurship is playing in promoting youth employment and inclusive growth. The survey was conducted at 15 centres in eight of the country's 10 provinces. The chapter (paper) outlines the key features for analysis of Zimbabwe's youth employment and informal entrepreneurship in the metal industry.

Literature Review

Unemployment in the Zimbabwean Context

The definition of unemployment adopted in Zimbabwe is a situation where supply of labour by the economically active group (those aged 15 years and above) exceeds demand (ZIMSTAT, 2012). The unemployed in this case are those who have no work to do but are currently looking for work or available for work. Despite unemployment being one of the undesirable features of the performance of the Zimbabwean economy, reliable time-series data are non-existent (Ncube 2000). Statistical data to determine trends, structure and dynamics of the unemployment problem remain sketchy. A study carried out by the International Labour Organisation (ILO) in collaboration with the then Central Statistical Office (now ZIMSTAT) in 2008 showed that despite a sharp fall in formal sector employment since the late 1990s, Zimbabwe's unemployment rate had remained below 10% (Luebker 2008). Recent official data available on unemployment are those from the 2011 Labour Force and Child Labour Survey (LFCLS) which collected labour force information from economically active persons aged 15 years and above. The results of the LFCLS showed that only 10.7% of the economically active segment of the population could be categorised as unemployed (ZIMSTAT 2011). While these figure have been met with disbelief in Zimbabwe and elsewhere, the studies assert that they are based on consistent application of the international definition of unemployment.

However, it is important to note that the unemployment rate alone is only of limited utility in the assessment of a country's labour market situation since it does not reflect the quality of employment. For instance, the LFCLS regards unpaid family labour contributors as employed workers while in other studies, these are regarded as unemployed. For this reason, unemployment figures of up to 90% are

sometimes quoted. The contention is around how to treat employment in small-holder agriculture, particularly communal farming. Historical official data on employment trends reveal that the unemployment rate rose from 10.8% in 1982 to 21.8% in 1992 before peaking at 29.5% in 1995 (Ncube 2000). It is widely accepted that most people who are not engaged either in agriculture or formal employment survive through engagement in informal activities. The informal economy is said to be efficient at generating job opportunities at very low costs for at least some segments of the population. In Zimbabwe, self-employment and micro-enterprise activity in the informal sector have been pivotal in absorbing significant proportions of workers who lost their jobs in the formal economy since the ESAP era of the 1990s and the period of economic meltdown.

Informal Entrepreneurship: A Challenge for Achieving Decent Work?

The International Labour Organisation (ILO 2014) notes that informal entrepreneurship thrives in a context of high unemployment, underemployment, poverty, gender inequality and precarious work. Due to the relative ease of entry, owing to low capital, education, skills and technology requirements (GoZ 2002, 2011), the informal sector plays a significant role in income generation but majority of its entrepreneurs are driven by necessity to survive and have access to basic income-generating activities. The informal economy is said to be characterised by acute decent work deficits and a disproportionate share of the working poor (Ibid). There is ample empirical evidence to suggest that workers in the informal economy face higher risks of poverty than their counterparts in the formal sector (FINSCOPE 2013; Heintz 2012; Simpsons 2010; Luebker 2008, Kanyenze 2004; MacPherson 1998, 1991; Daniels 1994). The ILO (2014) report acknowledges that while some informal entrepreneurial activities offer reasonable livelihoods and incomes, majority of the people engaged in them are exposed to inadequate and unsafe working conditions. When compared to their counterparts in the formal sector, they generally have low literacy and skills levels, inadequate training opportunities, lower and less certain and regular incomes (Komollo 2010). Their work is either excluded from, or effectively beyond the reach of social security schemes as well as safety and health related labour protection legislation (ILO 2014).

The term informal entrepreneurship refers to “all economic activities by workers and economic units that are – in law or in practice –not covered or insufficiently covered by formal arrangements” (ILO 2009). There is no single approach to defining informality and the definitions used in theoretical and empirical researches often lack consistency from one study to the next (Heintz 2012). The notion that the informal side of the economy escapes clear definition is reflected in the language used to describe it, with such words as ‘murky’, ‘shadow’, ‘hidden’, and ‘underground’ emerging. In concrete applications, the definitions of informal employment, the informal sector, and the informal activities differ depending on

whether the focus is the enterprise, the employment arrangement, or the economic activity in question (Ibid).

The concept of 'informal sector' has generated some controversy with some authors objecting to the concept of informality, arguing that it is judgmental and gives the impression that those in it are 'irresponsible and unreliable' (Heintz 2012; Simpson 2010; Luebker 2008; Kanyenze 2004). Much of the controversy has centred on the reference to use of the word 'sector'. Proponents of the informality concept prefer using the term 'informal economy', even though it still contains the conceptual weakness of denoting a distinct and separate entity (Kanyenze et al. 2003). In the case of Zimbabwe, the major GEMINI (Growth and Equity through Microenterprise Investments and Institutions) studies (1991, 1993 and 1998) avoid the term informal economy or sector and instead prefer to use the term micro and small enterprises (MSEs) (MacPherson 1991, 1998; Daniels 1994). The standard ILO definition excludes the 'hidden' or 'underground' or "illicit" activities (see ILO 2007, 2009; Heintz 2012). This means those activities that deliberately infringe the law are not included in the definition of informal activities. Criminal and socially undesirable activities are also not included, for the same reason. However, with the extension of the concept to cover the informalisation of the modern economy (recourse to casual, part-time, contract and other forms of precarious work), the concept appears extended and 'grey areas' still remain (Heintz 2012; Simpson 2010; Kanyenze et al. 2003).

Global Perceptions About Informal Entrepreneurship

Perceptions about the informal sector are not isolated to the Zimbabwean Government alone as globally, public policies have generally treated the informal economy as an impediment to development and governments have actively deterred its existence using stringent regulations and punitive measures to minimise incentives for those considering participation in the sector (Heintz 2012; Williams 2005). However, McPherson (1996) observes that while informal entrepreneurship is generally discouraged either directly or indirectly in many countries, recently, this perception has changed as an ever-growing number of scholars, policy-makers, and members of the assistance community have begun to examine the potential of this sector as a vehicle for sustainable growth. This widespread recognition of the expansion of the informal economy in developing countries has great implications for Zimbabwe as it seeks lasting solutions to its economic woes. However, political tactics of the Zimbabwean Government make it difficult to judge the level of commitment of this country and therefore safely predict future policies and actions towards informal entrepreneurship.

Informal entrepreneurship has always been viewed as an important vehicle for employment creation and income generation for significant proportions of people in developing countries, particularly the youth (FINSCOPE 2013, Naude 2010, Branzei and Abdelhour 2010; Thurik et al. 2008). However, Acs (2008) challenges

this argument as he notes that in developing countries, unemployment and poverty levels keep rising despite reported growth in the number of entrepreneurs in both formal and informal sectors. China and India are the most notable of many developing nations that have succeeded in advancing economic growth and development because of small-scale entrepreneurship (Anderson et al. 2003). For instance, the Chinese economy in 1978 was ranked number 100 on global rankings but has since moved to second position. This great stride is attributed to supporting small businesses (Ibid).

The lack of significant development in some developing countries, especially in Africa, is attributed to the type of entrepreneurial activities dominating in these nations, which have failed to foster the perceived benefit of reducing unemployment (Acs 2008). Research has attributed the limited economic benefits from entrepreneurial activity in developing countries to the type of entrepreneurship (Thurik et al. 2003). Again, historical analysis could be informative. How can Zimbabwe's informal sector be characterised, noting changes in trend of its development. This is critical in assessing whether the ambivalence of GoZ's policy is based on genuine unreliability of this sector as foundation of the whole economy as India and China have demonstrated. When the informal sector is recognised as the virtual economy how is that economy itself characterised in the eyes of the describer? If it is considered as a retail economy as opposed to a producing economy then the GoZ's policy ambivalence could be appreciated.

Theoretical Framework

While numerous theories have been put forward regarding the role of entrepreneurship in economic development, the best known is the view of Joseph Schumpeter (1883–1950). According to Schumpeter, an entrepreneur is “an agent of change” who introduces a new product or a new method of production. The entrepreneurship may be in the form of opening a new market or discovering a new source of supply (Ohyama et al. 2009), or in bringing about a new organizational structure of an industry. Schumpeter's ‘creative destruction’ theory views entrepreneurial innovation as a process through which entrepreneurs bring about industrial mutation, where the economic structure is incessantly revolutionised from within; thereby destroying the old system while creating a new one.

In recent years a strong belief has arisen among scholars and policy makers that entrepreneurship is a vital driver of employment and economic growth for both developed and developing nations (Branzei and Abdelnour 2010; Acs 2008; Thurik et al. 2008; Van Praag (et al) and Versloot 2007; Mahajan and Banga 2006). However, moving from macroeconomic scenarios to the micro foundations of entrepreneurship, there are defensive- or necessity-driven entrepreneurs and opportunity-motivated entrepreneurs (Acs, 2008). The defensive or necessity entrepreneurs are those who form a new business because they need income to survive and not because of market opportunities and innovative ideas. According to Naudé (2010), this kind of

survival-driven entrepreneurship is predominantly diffused in the developing countries, where poverty and lack of job opportunities in the wage sector regularly push a large number of people into entrepreneurial activities. These necessity-driven entrepreneurs are those who started their own firms as a result of personal situations such as failure to find a suitable role in formal employment, thus forming a new business was the best existing option (Reynolds et al. 2005). This is presumed to be the case in the Zimbabwean context where unemployment has been on the rise since the adoption and implementation of the economic structural adjustment programme (ESAP) during the 1990s at the behest of the Breton Woods institutions (IMF and World Bank).

On the other hand opportunity-motivated entrepreneurship is driven by the existence of unexploited opportunity. According to Acs (2008), for significant economic development to take place, a higher opportunity: necessity ratio is needed, and if necessity ratio is higher than opportunity ratio then there will be little economic development. The ratio of opportunity to necessity entrepreneurs is higher for high-income countries and lower for low/medium income countries (GEM Report 2010). Acs (2008) in his study on how entrepreneurship is good for economic growth, using data from the GEM 2004 global report, found a strong correlation between the opportunity: necessity ratio and the per capita income of different countries. His argument was that countries with higher opportunity entrepreneurs have a positive correlation with per capital income, whilst those with higher proportion of necessity entrepreneurs are negatively, if not at all, correlated. This suggests that most of the entrepreneurial activity in many African countries with low incomes is necessity driven and because of this, over the years these countries have not realised significant economic benefits from entrepreneurship.

Empirically a world-wide research project, the “Global Entrepreneurship Monitor” (GEM), has collected survey data using uniform definitions and collection techniques on potential and actual entrepreneurship since 1999, and it has covered 60 developed and developing countries (see Reynolds et al. 2005). The project reports the rates of entrepreneurial growth across different countries of the world. The reported statistics are based on the two definitions of entrepreneurship namely the opportunity-motivated and necessity-driven entrepreneurs. The survey results show that on average, developing countries have significantly more entrepreneurs than developed countries. Entrepreneurship rates are high in developing countries reflecting incomplete development of formal wage sectors in these countries (Ibid).

The context and dynamics of the informal metal industry of Zimbabwe make the analysis in this paper fit well into the Schumpeterian theory of entrepreneurship. Based on the ‘creative destruction’ theory of Joseph Schumpeter, it can be argued that structural adjustment and economic reforms in Zimbabwe, have led to the gradual destruction of the formal sector of the economy leading to an expanded role of informal entrepreneurship (Mujeyi, forthcoming). Economic growth dynamics over the past two decades have accelerated the informalisation of the economy. The lack of stability and predictability of formal institutions in the context of economic reforms have forced many economic agents to migrate into the informal economy where institutions are less likely to have drastic and unanticipated changes (Meagher (2013a).

Methodology

The study was carried out between September 2012 and February 2013 at 15 centres in eight of the country's 10 provinces. Of these provinces, two (Bulawayo and Harare) are entirely urban while six (Manicaland, Masvingo, Mashonaland Central, Mashonaland East, Mashonaland West and Midlands) included rural growth points. However, metal working is concentrated within the two urban provinces of Harare and Bulawayo with Magaba home industry of Mbare in Harare and Renkini Bus Terminus of Makokoba in Bulawayo being the major hives of activity. One characteristic of informal metal working operations in all the study sites is that they are located in proximity to bus termini for long distance buses which ply the rural routes to target farmers and other people travelling to rural areas. Data were collected from informal metal workers operating at designated and undesignated places in urban areas and rural growth points. The study relies on primary data collected both quantitatively and qualitatively. Quantitatively, a total of 602 respondents were interviewed using a structured questionnaire. Qualitative techniques employed in this study include observation and in-depth interviews. Selection of respondents was done purposively to get data from only those who were directly involved in metal working. Purposive sampling was chosen amongst other sampling techniques due to lack of reliable data and information on the activities of the metal workers since there have been no previous studies focusing on the subject to the best of the author's knowledge. Each metal worker had an equal chance of being included in the sample through random selection of the identified entrepreneurs. Therefore, the sampling focussed on metal workers only, leaving out those who do not engage in metal working. Despite high possibilities of biased selection of respondents, the purposive sampling technique was the most suitable given the set-up of the study site.

Results and Discussion

The survey found that merely 4% of the entrepreneurs in the informal metal industry are female confirming findings by MacPherson (1998) who observed that a marked shift by female entrepreneurs from manufacturing to trading was occurring at a rate of 3.1% per annum during the period 1991–98. While female entrepreneurs constitute the greater proportion of the informal economy, majority of them are in service related enterprises. The average age of active players in the metal industry is 35 years indicating the generally unfavourable macroeconomic conditions obtaining in Zimbabwe, particularly with regards to youth unemployment. School and college leavers who are increasingly being churned out of the country's education system are resorting to informal entrepreneurship as an employment strategy. Secondary school graduates (67%) dominate the metal industry with over 80% of the entrepreneurs having at least completed secondary education. Those who failed to attain at least primary education are almost insignificant (2.8%). The fact that over 80% of the entrepreneurs in the informal scrap metal industry have at least

graduated from secondary school speaks volumes about the quality of human capital and skills available in the industry. This is despite the low reputation and generally lack of attractiveness of informality as a source of employment and form of entrepreneurship. Employment opportunities in the informal economy are said to be characterised by varying degrees of dependency and vulnerability, with women and youths particularly vulnerable to the most serious decent work deficits (ILO 2014). The insignificant participation of women in the informal metal industry could be explained by these decent work deficits, including violence, sexual harassment, corruption and bribery, and other forms of exploitation and abuse associated with informality (Ibid).

However, under normal circumstances, informality should decrease as we move up the education pyramid, attaining its lowest levels for highly skilled workers (Mudavanhu et al. 2011; ILO 2014). The ILO and UNEP identify skills development and adaptation thereof within the labour force as one of the necessary and strategic conditions for a rapid and feasible transition to and implementation of green economy (ILO 2011; UNEP 2011). However, on the negative side, the availability of a highly skilled labour force paints a bleak picture on the country's economy and formal employment system in terms of its capacity to bring the job market into equilibrium. The implication is that there is currently oversupply of human resources on the job market more than what the formal employment system can absorb.

Key players in the informal metal industry of Zimbabwe comprise entities such as sole traders, household enterprises, cooperatives, private companies, and partnerships. The young entrepreneurs are mainly graduates from vocational training centres and technical colleges who would have acquired technical expertise/skills but fail to land jobs in the formal job market. Since they cannot afford to remain unemployed, they end up becoming entrepreneurial, creating jobs for themselves and sometimes for friends and family members in the informal economy. Enterprises in the informal metal industry almost entirely duplicate activities undertaken in the formal economy with business conducted with high level of flexibility to adjust to the needs of customers. The informal entrepreneurs are involved in such trades as manufacturing (65%), marketing of products (12.1%), raw material supply (11.7%) and assembling (11.2%). They operate mainly from growth points in rural areas and at designated and non-designated points in urban areas, including backyards, open spaces, market places and road sides.

A wide range of products are made from the informal metal industry targeted at various customers. Majority of producers (90.8%) produce implements, equipment and machinery for agricultural purposes followed by 83.2% who produce building materials. Metal furniture and basic tools are produced by 52.2% and 46.9% of the producers respectively while industrial equipment is produced by 23.5%. Some producers interviewed revealed that their products were preferred by customers due to their durability when compared to imported products and those made of imported metal originating mainly from China, locally nick-named 'zhing zhongs'. Consumers of goods produced in the informal metal industry comprise mainly individual or household customers as indicated by 97.8% of the respondents. Other

firms within the informal sector (59.2%), formal sector firms (46.6%) and cooperatives (41.8%) are important consumers of products made from scrap metal by the informal entrepreneurs. It is interesting to note that significant proportions (23.3% and 12.3%) of the informal entrepreneurs indicated Government and non-governmental organizations (NGOs) respectively as customers. This is another case of the government contradicting its policy stance with regards to informality. From the foregoing results, it can be noted that the market for informal metal industry products is highly diversified, comprising both formal and informal entities apart from the dominant individual/household customers. The fact that some formal entities, including public institutions, are purchasing products manufactured in the informal economy can be interpreted as a reflecting the dominant role that the segment is now playing in the economy. As such, it is common sense to find customers, including the government, having no alternative markets to source for the products except the informal economy.

About 80% of informal metal workers have no alternative income source besides the metal business. The average monthly wage per worker in the informal metal industry is US\$232.00. This is slightly below 50% (44%) of the national monthly total consumption poverty datum line and 41% above the national monthly food poverty datum line. In terms of employment, 25% of informal metal enterprises employ an average of 2 temporary workers but can go up to a maximum of 15 workers. Those employing fulltime workers constitute 67% of the operators and they employ 3 workers on average, going up to a maximum of 16 workers. Other types of workers comprising mainly of unpaid family members and relatives as well as business partners are also employed but at significantly lower levels (3.3%). The average workforce employed by these operators (2 workers) signifies the prevalence of micro and household based enterprises in the informal economy. Recent data and studies on employment in Zimbabwe indicate that informal entrepreneurship accounts for close to 90% (87%) of the country's workforce through a national establishment of 3.4 million businesses of which 71% are sole proprietors, 24% are micro enterprises employing 1–5 workers, 4% are small businesses employing 6–30 people and only 1% being medium enterprises employing over 30 people (ZIMSTAT 2013; FINSCOPE 2013). These statistics imply that the informal economy has become the virtual economy. They are critical for informing policy and strategies that the GoZ and other stakeholders must employ when dealing the issues of informality, youth employment and entrepreneurship.

The survey also sought to determine the nature and extent of informality within the metal industry and found that only a few firms are registered with the registrar of companies (13.5%) and licensed with local authorities (37.5%). Despite the registrations and licensing, the firms are not fully adhering to regulations laid down for operating formal businesses such as tax remittances and social security contributions. The major reasons for non-registration by unregistered firms were highlighted as lack of sufficient funds to operate a formal firm (59%) and high taxes (23%) while 11% perceives the registration process to be cumbersome. The 2012 MSE study found that the registration process is very complex and costly for firms that may want to formalise their operations; involves multiple steps, takes about 90 days

and requires up to US\$685 (FINSCOPE 2013). However, 87% and 79% of the informal metal firms respectively, have intentions to license their operations and register their firms in the future since majority of them (92%) are having problems with state agents (50% police and 42% local municipal inspectorate). Interestingly, 17% of the operators do not see any advantages of registering their operation while 25% perceive improved access to loans or financial assistance and 44% see improved chances of selling their products to the state and private sector.

In previous studies, 80% of small firms could not identify any advantages of registering their firms during the GEMINI survey of 1993. As such, 95% of the firms were not paying taxes as the high tax rates discouraged them from formalizing their operations. The study highlighted that the expectation of the entire informal economy formalising once regulations were revised was questionable since the majority of MSEs preferred to continue operating outside the formal sector. It recommended that any reforms, therefore, needed to take into account the heterogeneity of MSEs, including differences by size and across sectors (Daniels 1994). Under the existing system, legislation typically applies to all firms regardless of size, but is enforced for only a minority of firms, a situation that creates uncertainty and criminalizes many income-generating activities.

However, there is also the role played by other push factors such as ‘voluntary’ rejection of formal sector conditions by the young entrepreneurs that should not be underplayed. There are widespread phenomena of ‘multiple modes of livelihood’ and ‘straddling’ – which refer to the holding on to a formal job while carrying out one or more informal activities aside. These phenomena, according to Meagher (2013a), tend to defeat the notion for tendency to evade costly social security obligations. Again, the commonly held notion that people are pushed into the informal economy by the desire to evade taxes is weakened by the fact that most informal entrepreneurs pay numerous formal as well as informal fees which are usually way above the mandatory tax levels (Ibid). Local authority licence fees are often collected through designated officials in the operating areas, a situation that makes evasion difficult for the entrepreneurs (Meagher 2013b). In addition, the informal entrepreneurs also pay a range of informal taxes, such as association fees, security levies to vigilante groups, and other levies for diverse forms of service provision (Ibid).

Conclusions and Policy Implications

Since government policy towards informal entrepreneurship in Zimbabwe has remained lukewarm and sometimes contradictory, a key question that arises in the inquisition of the role that informal entrepreneurship plays in providing alternative source of employment for youths relates to formalization and transition to the mainstream economy. However, given the ambivalence of government policy towards informal entrepreneurship and contemporary discourse around this segment, the question should no longer be about whether the GoZ should continue seeking to

employ more punitive measures to clamp down on the sector but rather of how to create a conducive environment for players in the sector to formalise their business ventures under preferential conditions. The analysis of this paper has shown that informality represents an entry point for emerging young entrepreneurs. Thus, barriers to formalisation (such as indiscriminate tax thresholds) hinder their enterprises from growing and realising their potential. The latter has implications for the competitiveness of the broader economy in the sense that failure of potentially competitive MSEs to grow owing to burdensome regulations will result in them being unable to effectively compete with larger formal enterprises (see IDRC 2010). In the Zimbabwean context, the informal economy has become the 'real' economy. Thus, this understanding of informal entrepreneurship and its implications for sustainable development is important.

However, looking at Zimbabwe Government's treatment of the informal sector in the recent past, the inheritance of draconian colonial laws and its punitive approaches to this industry (e.g. Operation Murambatsvina/Restore Order attacks), it is equivocal if this position of the sector in sustainable economic growth is fully appreciated. Furthermore, Zimbabwe Government's fiscal allocations to this sector compared to other sectors, does not sufficiently demonstrate seriousness in relation to this sector. For much of the post-Independence period, the informal sector was seen as an inconvenient reality that would disappear with economic modernization. However, young Zimbabweans have continued to display great ingenuity by creating jobs for themselves as informal entrepreneurs. Informal entrepreneurship has kept many people in employment during the turbulent years and continues to play this significant role up to this day. Informal entrepreneurship has thus sustained youth employment and economic activity in Zimbabwe and helped prevent the country sliding into high open unemployment despite the adverse economic conditions (Kanyenze et al. 2011).

However, most informal entrepreneurs still find themselves on the fringes of the law due to burdensome regulations and high cost of compliance. Despite a significant proportion of their firms having been registered under the country's laws, they often lack the required local authority issued operating licenses, or violate zoning by-laws that prohibit commercial activity from undesignated areas such as residential areas (Chirisa 2013, Kanyenze et al. 2004). Many of these by-laws and regulations originally date back to the colonial period. Back then, they were introduced by the settler government deliberately to suppress independent native entrepreneurship thereby protecting white-owned businesses.

The analysis of this paper has thus argued and emphasised the need for creation of a conducive policy environment to facilitate the transition. The policy environment should provide for a comprehensive and integrated framework which identifies a diverse set of policy areas that address the negative perceptions towards informality while at the same time maintaining the significant role it plays such as job-creation and income-generation. The challenge remains the creation of a working space that can facilitate incorporation of informal entrepreneurship into the mainstream economy. Whilst informal entrepreneurship continues to be the main and in most cases the only source of livelihood for the majority of young people in

Zimbabwe, the question of informality remains a national development challenge. The global discussion on the informal entrepreneurship has focused on such issues as working conditions of workers and other challenges from an employment perspective (Meagher 2013b). This chapter (paper) posits that it is important to review the role from the perspective of entrepreneurship and youth empowerment in line with the reality that informal entrepreneurship has become the norm in Zimbabwe. Thus, informal entrepreneurship has a huge role to play in ensuring sustainable development, particularly with regards to employment creation and sustainability of livelihoods for a significant proportion of urban households.

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Analysis of Agricultural Innovation and Decision Making among Maize Farming Household in Nigeria: A Gender Approach



Opeyemi E. Ayinde, Tahirou Abdoulaye, Mammo Muchie,
and Oluwafemi O. Ajewole

Introduction

Food crop production in Nigeria is mostly at subsistent level from small holding farms yet; the World Bank (2007) reported that agriculture accounts for over 70% of the active labour force, and more than 23% of the Gross Domestic Product in Nigeria (GDP). Agriculture is the mainstay of the majority of Nigerian rural poor, producing major food crops comprising cereals such as sorghum, maize, rice; tubers which include yams, cassava; legume such as groundnut and cowpea. Maize is one of the worlds' three primary cereal crops. It occupies an important position in world economy and trade as a food, feed and industrial grain crop. The importance of maize in Nigeria cannot be over emphasized, with the country producing 43% of

O. E. Ayinde (✉)

Department of Agricultural Economics and Farm Management, University of Ilorin,
Ilorin, Nigeria

South African Research Chair Initiative (SARCHI) on Innovation and Development,
Tshwane University of Technology, Pretoria, South Africa
e-mail: opeyemi@unilorin.edu.ng

T. Abdoulaye

International Institute for Tropical Agriculture, Ibadan, Nigeria

M. Muchie

South African Research Chair Initiative (SARCHI) on Innovation and Development, Tshwane
University of Technology, Pretoria, South Africa

O. O. Ajewole

Department of Agricultural Economics and Farm Management, University of Ilorin, Ilorin,
Nigeria

maize grown on West Africa (Olarinde et al. 2007). However, increase in maize production in Nigeria has been achieved greatly by expansion in area harvested rather than increase in yield (Olaniyan 2015). Transformation lies in using innovation to improve the products and services delivered by actors in the production process (Ayinde et al. 2013a). Technological innovation refers to a process driven by an intention of imposed changes, managed, accompanied, collaboratively or individually elaborated in view of introducing, suppressing, restructuring or displacing an element or system within an established context (Adamczewski 1996).

Agricultural production has been closely linked to both gender in the African country with women playing vital roles in food production, processing and marketing in Nigeria; producing about 60–80% of total output (Rahman et al. 2004), and contributing about 60–80% of agricultural labour force (Mgbada 2000). They also contribute more than two-thirds of their produce towards household subsistence (Rahman et al. 2004). Gender plays an important role in influencing decision making on production, marketing, and technology adoption in Nigeria (Fakoya et al. 2010). The Nigerian women have proved to be more than a mere “bench warming” spectator even in the midst of a male dominated professional congregation. Available evidence and statistics show that role of women in agricultural production cannot be trivialized (Ogunlela and Mukthar 2009).

In recent years, development practitioners have become increasingly interested in questions relating to the distributional impacts of technological change in agriculture (Doss and Morris 2001). Ayinde et al. (2013a) opined that, it is of importance to have strategy to put men and women’s concerns and experiences at the centre of research design, implementation, monitoring, and evaluation. This involves looking at the socioeconomic settings of men and women to ensure that they benefit equally – often referred to as “gender mainstreaming”. Bridging the gap in access to technology between men and women, we could increase productivity; Ayinde et al. (2013b) further affirmed that technological adoption among male and female farmers is crucial to improving the productivity in the face of productivity constraints such as climate change.

Despite the contribution of women to maize production in Nigeria, women, however lack influence over the agricultural research and development agenda; this important role of women’s income in both male-headed and single-headed households was either minimized or not well understood by agricultural authorities (Ajewole et al. 2015; Ayinde et al. 2013a). Actors involved in the production innovation process include women who are faced with formidable obstacles. In other words, recognition of gender imbalances, differentials in gender roles in agriculture and decision making as related to maize production, technological transfer and subsequent poverty reduction has not been accorded the required emphasis. This research analyze maize innovation, constraints faced by male and female farming households and decision making among maize farming household in Nigeria.

Integrating Africa Women Decision Making In African Agriculture: The Problematique

In implementing the 10 – year (2013–2020) strategy of African Development Bank, particular attention will be to fragile states, agriculture and gender. Increasing the capabilities and opportunities of women can boost the productivity and participation of half of African Population (ADB 2013). African Development Bank (2014) reported that some areas of the law, such as family laws governing marriage, divorce, inheritance, and land rights, limit women’s economic rights, hindering their economic and social decision making and restricting their ability to enter into contracts or to own, administer, or inherit assets and property. Close to half of all sub-Saharan African countries designate the husband as head of the household, restricting the legal status of married women. Up to 15% of sub-Saharan African countries limit women’s choice of the matrimonial home, and up to 30% restrict married women’s exercise of trades and professions.

Promoting gender equality in agriculture will in the long run help address the gender specific constraints that reduce their productivity and limit their contributions to agricultural production, economic growth and the well-being of their families. It will also reduce hunger and extreme poverty. This is because, when and if women farmers have equal access to the agricultural resources and rewards, they will be better able to participate in and contribute to agricultural development. Closing the gender gap in agriculture would put more resources in the hands of women and strengthen their voice within the household – improving the food security, nutrition, education and health of the children (FAO 2011).

Several African governments have undertaken and continue to pursue different initiatives to support women farmers. Land tenure systems will have to integrate gender issues into policy reforms. The significance of land is how it, in turn, frames access to other critical agricultural inputs. The enduring problem is that agricultural policies are initiated in a manner that make it difficult to measure any gender impacts, as policy reforms in Senegal have shown (Koopman 2009).

African governments and their development partners, both public and private, are the major actors in addressing the barriers of women farmers in agriculture. Thus, any practical recommendations will have to bear in mind the different motivations of each actor and integrate women decision making in their innovation and policies.

The way forward in integrate women in Africa Agriculture must consider, although there is the widespread acceptance of the significance of gender, the question is whether or not these actors are only being gender sensitive or whether they truly mainstream gender in their development planning and implementation process. This is because being aware of gender issues does not necessarily mean one is also taking gender issues seriously in planning and implementations;

- steps have to be taken to increase and extend data collection and dissemination systems.

- Data should be presented in a format that is more readily available and accessible to all stakeholders, having the different technological and varying contexts in mind.
- Innovation breakthrough should involve women needs and preferences. The breakthroughs in communication technologies have enhanced the use of mobile payment systems in places like Kenya (M-PESA) (Mas and Radcliffe 2011). These breakthroughs can also apply to women farmers and their needs in other African countries, given the proliferation of mobile technology systems on the continent.
- Again, a very simple, but meaningful step is how the provision of small-scale storage and dedicated sales stalls can improve the welfare and status of women in agriculture.

What institutions claim they do is quite different from what they actually do. The development paradigm in several African countries is based on foreign donors and project driven. One consequence is the never ending mantra from African governments about their lack of funds and the reliance on development assistance. With project-driven initiatives, several organizations in development do not have enough time to consult and incorporate the views of women in project design and implementation and some projects are rushed to meet end of year budget deadlines for the disbursement of funds. Projects thus end premature and governments do not follow-up to ensure the project is meaningfully executed. The suggestion is the need for viable and relatively well funded national development strategy. That implies African leaders have to rise up their role in the national development effort.

It is an opportune time to revisit the role of farmers' organizations with a gender orientation. Cooperatives, a veritable feature of the agricultural landscape in Africa for several years, have survived neo-liberal agriculture in Africa and are offering a new platform for their membership in forging relations with both state and non-state agricultural organizations and institutions (Francesconi and Heerink 2011; Bernard and Spielman 2009; Barham and Chitemi 2009; Wanyama et al. 2009). The key requirement is to focus on the needs of women farmers within the context of emerging cooperative associations, with clear guidelines on how to coordinate the needs of farmers across gender lines, nature of farming systems and types of crops.

Partnerships are always required in development, the emphasis should be on the nature of such partnerships. Partnership can only flourish in an atmosphere of mutual respect and a relative consensus on means and ends. The international donor organisations can have ambassadors for improving the status of women in agriculture in Africa. These ambassadors will be the direct link at national and local levels and responsible for giving timely and location specific feedback to the multilateral organisations. This means, there is a need for stronger partnership with national governments and local NGOs, especially as the international organisations cannot directly formulate policies that result in changes at the local level. They only suggest and encourage. A reconfiguration of external assistance can lead to a more direct support for women in agriculture at the national level. The implications of the existing global north and south divide has the potential to undermine any framework

for mutual respect and consensus building when it comes to the difficult and necessary task of negotiating a global compact on development. However, if the African Union continues to assume its leadership role in continental affairs, it can also use the emerging importance of resources on the African continent to strategically reposition the importance of the region in global development initiatives.

Finally, multilateral development institutions can raise awareness of the issues of gender inequality among national governments in sub-Saharan Africa. However, national policy makers and practitioners have to move beyond the issue of awareness and actually acknowledge the multiple roles that women and marginal farmers play in addressing hunger and malnutrition and to help with relevant interventions to meet their needs more effectively (Kent and MacRae 2010). That requires a bold resolve at systematic collaboration or cooperation among sectors in order to arrive at policy successes.

Conceptual Household Decision Making Models

When looking at the role of gender within households, many studies have focused on the sex of the household head in the analysis. There is a wide range of literature looking at gender and poverty, mostly conceptualizing the gender aspect as an issue of headship (Buvinić and Gupta 1997; Budlender 2005; Chant 2006; Finley 2007; Chant 2008; Deere et al. 2012). However, reducing the gender dimension to an issue of headship is problematic, as it gives only a partial view of gender relationships within households and overlooks the position of women in male-headed households (Budlender 2005; Deere et al. 2012).

There is a large body of literature on household behaviour and the development of models to predict this behaviour and its outcomes. Doss (1996) recognizes five types of models of household decision-making: Common preference model, unified household model, collective model, cooperative bargaining model, and non-cooperative bargaining models. Early studies assumed that households behaved as if they were single individuals, which is the idea behind the common preferences model and the unified household model. The collective model is based on the idea that households reach a Pareto efficient outcome, which means that no individual can be made better off without making someone else worse off. The cooperative bargaining model assumes that household decisions are made through a cooperative game in which bargaining power is a function of the outside options of the two bargaining individuals. Cooperative bargaining models are a subset of collective models (Doss 2013). Non-cooperative models assume that households do not pool their income and allow for individuals to make consumption and production decisions based on their labour and access to resources.

A lot of studies have tested these models and the assumptions associated with them for rural households in developing countries. There has been increasing evidence against the common preferences model and the unified household model. Although the concept of a “unitary household” is convenient, the empirical evi-

dence to support these simplistic models is scarce (Strauss and Duncan 1995). Alderman et al. (1995) suggest that there was sufficient evidence against the unitary model of the household. However, the unitary model is not always rejected completely (Doss 2013). For example, Quisumbing and Maluccio (2003) test the unitary versus collective model of the household for Bangladesh, Ethiopia, Indonesia, and South Africa and reject the unitary model as a description of household behaviour, but fail to reject the hypothesis that households are Pareto-efficient.

There is a large body of literature on the models of household decision-making, and some of the findings have been inconsistent with each other and have encouraged the further development of new and alternative models of intra-household resource allocation and decision-making. The recently developed Women's Empowerment in Agriculture Index (WEAI) is a new tool that measures the empowerment, agency, and inclusion of women in the agricultural sector and can serve as a diagnostic tool to signal key areas for interventions to increase empowerment and gender parity (Alkire et al. 2013). Alkire et al. (2013) document the development of the WEAI and present findings of a pilot in Bangladesh, Guatemala, and Uganda. Although the authors caution that the results are not representative of the whole countries, the study finds that in Bangladesh women are empowered in 43.2% of households sampled (WEAI = 0.762), compared to 27.3% in Guatemala (WEAI = 0.702) and 41.2% in Uganda (WEAI = 0.800). In Malawi, the WEAI score is 0.84 and nearly 52% of women have achieved adequate empowerment, making Malawi perform better than Bangladesh, Guatemala, and Uganda (Malapit et al. 2014). In Kenya, researchers found that women could increase their crop yields by approximately 20% if given the same access to the same resources as men (Saito et al. 1994). In Burkina Faso, it has been estimated that overall household production could increase by about 6% by more equitably distributing fertilizer and labour between male and female-farmed plots (Udry 1996). The Food and Agriculture Organization of the United Nations (FAO) estimates that if women had the same access to productive resources as men, they could increase yields on their farms by 20–30%. This increase could raise total agricultural output in developing countries by 2.5–4% and reduce the number of hungry people in the world by 12–17%, up to 150 million people (FAO 2011). In Nigeria, Ajewole et al. (2015) studied gender analysis of agricultural innovation and decision making among rice farming household. The result of the women empowerment results showed 76.60% of decision is made solely by male head, 7.80% is made by female and 7.09% of decisions are jointly made. It was advocated that, gender consideration in decision making be made a priority.

The WEAI is a promising new tool; larger surveys in more contexts can help identify key decision-makers in different types of production. Increasing opportunities for women can have a powerful impact on productivity and agriculture-led growth. Women are just as efficient agricultural producers as men and can achieve similar yields when given equal access to resources, including training and services.

Methodology

The study was carried out in southern guinea savannah (SGS) of Nigeria. The sampling technique consists of three multi-stage stratified sampling. At the first stage, two states out of the three states in the SGS were selected purposively. The states with the highest seed distribution for on-farm trials were selected which were Kwara and Niger. The second stage involved selection of locations. In the two states there were four locations of DTMA trials, three of the locations with the highest varietal distribution were selected. The locations selected were Mokwa, Ilorin 1 (Unilorin) and Ilorin 2 (Alapa). The third stage involved selection of 280 maize farmers from the total population.

Data Collection

The study used the data from the maize farming baseline conducted by International Institute of Tropical Agriculture (IITA), Ibadan, Nigeria and primary data. The Primary data were collected with the use of structured questionnaire. The questionnaire included questions on the farmers' socio-economic characteristics, constraints and the preference of the varietal DTM planted.

Method of Data Analysis

Descriptive Statistics was used to investigate the socio-economic characteristics of male headed and female-headed farming household and available maize innovation, Likert ranking was done to rank the constraints faced by maize farmers while Least Significant Difference (LSD) was used to test for the significance level of the ordinal ranking of the constraints at 5% level of significance. Women empowerment index was used to examine the participation of women in agricultural decision within the households.

Likert Scale and Least Significant Difference (LSD)

Constraints facing the farmers were asked to be listed and the three most important constraints to the farmers was identified in their order of occurrence. The relative frequency with which a constraint was experienced was used to establish its ordinal rank. Least significance difference (LSD) was used to test the ranking for statistical significance using the method represented in pair-wise comparison at 5% level of significant. The LSD expression is given by:

$$\text{LSD}(\text{at } \alpha = 0.05) = 1.96 \times (\text{SF}(n) \times (n+1) / 6)^{1/2},$$

Where: SF was the number of surveyed farmers (disaggregated into sex)
n was the number of ranked constraints.

Computation of the Women Empowerment Index (WEI) following International Food Policy Research Institute (IFPRI 2011) and adapted by Ajewole et al. 2015:

Where:

WEI_{all} = women empowerment index for all decisions per respondent.

x = value of decision maker.

j = code for the specific decision matter.

d = total number of decisions replied by the respondent.

n = number of decisions.

The value ranges from 1.00 to 5.00

- A value of 1.00 means that the male head tend to be the sole decision maker
- Any value below 3.00 but higher than 2.00 means that female heads join in making the decisions but the decision of the male head dominates
- A value of 3.00 means both the female and the male head makes the decision jointly with equal contribution
- A value near 5.00 and higher than 3.00 means that the female head dominates in decision making than the male head.
- A value of 5.00 means the female head is the sole decision maker

Results and Discussion

Socioeconomics Characteristics of Maize Farming Households

The socioeconomic analysis of maize farming household is presented in Table 1. The result of the analysis showed that 21.1% of the respondent households are female headed while 78.9% are male headed. It also showed that majority of the male-headed household (37.65%) participating in maize farming are youths between the age bracket of 31–45 years; on the other hand, the female-headed households participating in maize farmers are older between age bracket of 61–75 years (33.9%). The implication of this probably mean the females ability to produce might be lesser compared to the males. The table also revealed that larger percentage of the males (59.7%) have access to formal education as compared to the females where only 20.3% of the female have access to formal education. This may probably affect their attitude to productive use of innovation and decision making; it probably implies that they do not have the advantages of what education could offer in term of; capacity building and efficient use of productive resources. The average maize cultivated area for the female headed household is less than 0.5 ha

Table 1 Disaggregated socio-economic characteristics of maize farming households

Household head sex	Frequency	Percentage			
Female	59	21.1			
Male	221	78.9			
Total	280	100.0			
Male			Female		
Age	Frequency	Percentage	Age	Frequency	Percentage
16–30	43	19.5	16–30	7	11.9
31–45	83	37.6	31–45	12	20.3
46–60	44	19.9	46–60	16	27.1
61–75	43	19.5	61–75	20	33.9
> = 76	8	3.6	> = 76	4	6.8
Total	221	100.0	Total	59	100.0
Mean	3.50		Mean	4.03	
Std. Dev.	1.119		Std. Dev.	1.144	
Education level			Education level		
No formal education	59	26.7	No formal education	35	59.3
Formal education	132	59.7	Formal education	12	20.3
Arabic education	28	12.7	Arabic education	8	13.6
Adult education	2	.9	Adult education	4	6.8
Total	221	100.0	Total	59	100.0
Mean	.88		Mean	.68	
Std. Dev.	.646		Std. Dev.	.955	
Household size			Household size		
<= 10	147	66.5	<= 10	48	81.4
11–20	63	28.5	11–20	11	18.6
21–30	9	4.1	21–30	0	0
31–40	1	.5	31–40	0	0
> = 41	1	.5	> = 41	0	0
Total	221	100.0	Total	59	100.0
Mean	1.40		Mean	.393	
Std. Dev.	.636		Std. Dev.	.221	
Maize cultivated area			Maize cultivated area		
<=5	151	68.3	<=5	55	93.2
6–15	60	27.1	6–15	4	6.8
16–25	7	3.2	16–25	0	0
26–35	1	.5	26–35	0	0
36–45	1	.5	36–45	0	0
> = 46	1	.5	> = 46	0	0
Total	221	100.0	Total	59	100.0
Mean	1.39		Mean	.254	
Std. Dev.	.689		Std. Dev.	.221	

Table 2 Distribution of farming household according to Use of Drought Tolerant Maize Variety

Gender		Frequency	Percentage	t-value
Female	Non-use	54	91.5	1.861
	Use	5	8.5	
	Total	59	100.0	
Male	Non-use	180	81.4	
	Use	41	18.6	
	Total	221	100.0	

much lower than the male headed household which is less than 2 ha; the implication of this is that female headed household probably have little access to productive resources needed to boost productivity. This result agrees with the findings of Ajewole et al. (2015) who reported that; female headed rice farming households have little access to productive resources as compared to male-headed rice farming households.

Analysis of the Use of DTMA Variety

Technological Innovation if properly understood from the gender perspective can foster increase in agricultural productivity (Tavya et al. 2013). DTMA Variety, whose objective is to decrease hunger and increase the food and income security of resource-poor farm families in sub-Saharan Africa (Bamire et al. 2010). The result in Table 2 showed that generally, the use of DTMA Variety which represent the innovation in this study is not properly harnessed among farming households in the study area. 81.4% of the male-headed household do not use the DTMA innovation as compared to the 91.%% female-headed households. The implication of this considering the potentials of the DTMA variety especially with the recent advent of climate change is that, farmers are likely to be producing lesser than their potential.

Gender Disaggregated Constraints Facing Maize Farming Households

Gender disaggregated constraint is presented in Table 3; the result showed the ordinal ranking of the constraints faced by male and female farming household in the study area. Access to credit, high cost of input and poor soil fertility are the major constraints facing maize farming household in the study area.

Table 3 Constraints faced by Maize Farming Households

Constraints	Male		Female	
	Score	Ranking	Score	Ranking
Access to credit	68	1	22	1
High cost of input	50	2	15	2
Poor soil fertility	34	3	7	3
Scarcity of labour	3	8	1	8
Delay in rain	11	6	3	5
Access to information	9	7	3	5
Distance to market	19	5	5	4
Low price of produce	27	4	3	5
LSD statistics				

Decision Making Analysis

Women are key part of mainstream agriculture, Ayinde et al. (2013a) reported that Gender shapes patterns of power relations, asset and wealth distribution and control, labour allocations, as well as preferences and aspirations within households. Therefore, paying attention to women's needs and voices will make it possible to meet their needs and as a result who does what in a household is an important part of the economic existence of the household. The level of women involvement in decision making as regards production of maize in the study area is presented in Table 4.

The result of the analysis conducted on household asset revealed that 54.5% of the decision as regards to what asset to own and how to use the asset is solely made by men within the household; when jointly made, 22.9% of the decision is male dominated, 10.7% of decision as regards the asset is made with equal proportion, and just about 4.6% of asset decision of the household is made by women. On the choice of innovation; 66.1% of the decision is solely made by male in the household, only 4.6% of the decision is solely made by the female while 9.6% of the decision is jointly made with equal contributions. Most of the decision jointly made is however made by male dominating such decision; this represents about 13.6% of the decision. Decision made on plot management; which include weeding, fertilizer application, chemical applications etc. revealed that 49.3% of the decision is solely made by men, 26.3% is made jointly with male still dominating, 13.2% of the decision is made with equal contributions from the male and female head of the households, 6.8% of the decision is made jointly with the female dominating and about 4.6% of the decision is solely made by the female-head of the household. Decision as regards harvesting of maize; which include time to harvest, frequency of harvest and type of labour to be used in harvesting revealed that; 71.1% of the decision is solely made by men, 10% of the decision has contribution from female head with male head still dominating, only 5% of the decision is jointly made with equal con-

Table 4 Results of the women empowerment index (Decision making)

Decision making about;	Freq.	Percentage
Household asset		
Male alone	152	54.3
Joint but male dominating	64	22.9
Joint with equal contribution	30	10.7
Joint with female dominating	21	7.5
Female alone	13	4.6
Total	280	100.0
Choice of innovation (DTMA seed)		
Male alone	185	66.1
Joint but male dominating	38	13.6
Joint with equal contribution	27	9.6
Joint with female dominating	17	6.1
Female alone	13	4.6
Total	280	100.0
Plot management plot		
Male alone	138	49.3
Joint but male dominating	74	26.4
Joint with equal contribution	37	13.2
Joint with female dominating	19	6.8
Female alone	12	4.3
Total	280	100.0
Harvesting of farm output		
Male alone	199	71.1
Joint but male dominating	28	10.0
Joint with equal contribution	14	5.0
Joint with female dominating	26	9.3
Female alone	13	4.6
Total	280	100.0
Marketing of Farm Output		
Male alone	186	66.4
Joint but male dominating	39	13.9
Joint with equal contribution	22	7.9
Joint with female dominating	17	6.1
Female alone	16	5.7
Total	280	100.0
General agricultural practices		
Male alone	228	81.4
Joint but male dominating	9	3.2
Joint with equal contribution	26	9.3
Joint with female dominating	4	1.4
Female alone	13	4.6
Total	280	100.0

tributions, 9.3% of the decision is dominated by female head and just about 4.6% of the decision is solely made by the female head. On marketing of farm output such as quantity to market; 66.4% of the decision is solely made by men; 5.7% of the decision is solely made by women, about 7.9% of the decision is jointly made with equal contribution from both male and female head, 6.1% of the decision is jointly made with females dominating and 13.9% of the decision is jointly made with males dominating.

On the average, considering the general production decision made in the household, 81.4% of the decisions are solely made by male head, 4.6% of the decisions are solely made by the female head, about 9.3% of the decisions are jointly made with equal contributions, 3.2% of the decisions are jointly made with male head dominating such decision while only about 1.4% of the decision is jointly made with female head dominating. The result of the women empowerment index shows the marginalization of women in decision making as touching agricultural activities in the household. These results agree with (Ajewole et al. 2015; Alkire et al. 2013; Rahman 2008; Ani 2003).

Conclusion and Recommendations

The study revealed that DTMA innovation usage among maize farming household is low; Technological interventions aiming to improve livelihoods that bring gender equity can become successful only when the prevailing gender roles in society and access to different livelihood opportunities are fully understood. The major constraints facing maize farming household includes; access to credit, high cost of input and poor soil fertility. Aside households whose head are majorly women, the result of the women empowerment index showed that women inclusion in decision making within the household is low. The study therefore recommends that; education of females should be prioritized, innovation usage should be advocated, social network should be intensified among farming households and gender consideration in decision making be made a priority in agricultural innovation process in Nigeria and in Africa as a whole.

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Social Innovations as a Response to Municipal Failures in Africa



Innocent Chirisa, Liasion Mukarwi, Abraham R. Matamanda, and Aaron Maphosa

Introduction

Urbanisation everywhere has created a host of problems that extend beyond the scope of the public and private sector organisations (UN-HABITAT 2009; Mugumbate et al. 2013). Among the problems identified are waste management, inadequate water supply, inefficient public transport, urban poverty, informality, urban inequality and social exclusion, especially of the urban poor (Kadi et al. 2012; FIG 2010; Smith and London 1990; Todaro 1981). These are social problems that have persisted for long and require social innovative approaches to address (Mulgan 2007; European Commission 2014). The high growth opportunity areas for social innovation include urban development, water management, transport and logistics and waste management. Social innovations have also been found to be more compelling in instances where there is need for sustainable development (Frost and Sullivan 2014). Considering the current situation in Africa where informality is on the rise mainly as a result of urbanisation that is not associated with industrialisation social innovations are increasingly being applied in different sectors hence this study will contribute by putting a debate for social innovation from an African perspective.

I. Chirisa (✉)

Department of Rural and Urban Planning, University of Zimbabwe, Harare, Zimbabwe

Department of Urban and Regional Planning, University of the Free State, Bloemfontein, South Africa

L. Mukarwi · A. Maphosa

Department of Rural and Urban Planning, University of Zimbabwe, Harare, Zimbabwe

A. R. Matamanda

Department of Urban and Regional Planning, Faculty of Natural and Agricultural Sciences, University of the Free State (UFS), Bloemfontein, South Africa

Overall, the contemporary African urban space is in a state of flux (Mandisvika 2015, UN-HABITAT 2010; Swilling 2010) with municipal authorities seeming to exacerbate the socio-economic challenges through marginalising the social innovations that are manifesting in the urban territories across the region. The actions of the municipalities to embrace social innovations and their failure to initiate such actions then contribute to the collapsing of the municipalities and their failure to fulfil their mandate of service delivery to the residents. In most instances, the informal overrides the formal which does little serve compromise the sustainability of the localities (Dube and Chirisa 2012; Kamete 2002; Swilling 2004). In simple terms, these municipalities as governing institutions have failed to address the problems currently haunting the towns and cities in Africa as evident from their failure to fulfil their mandates including creating an investment environment that enables for employment creation and productivity of the abundant labour (Tibajuka 2005; UN-HABITAT 2010). Social innovation has become the panacea to the shortcomings by the municipalities. This chapter seeks to provide a systematic discourse on the social innovations in contemporary Africa within the confines of sustainability (in the lens of its three critical pillars of ecology, economy and equity this statement contradicts with sticking to the social aspects only) in focus.

This chapter is an outcome of a desktop study, which reviewed various literatures and being buttressed by the examination of various examples and cases from across the region. Thus, several texts were engaged in conjunction with current newspapers and published articles to inform the authors on the contemporary social innovations in a many of African cities in response to the failures of respective municipalities. Developments on issues like street vending, building standards innovations, transport innovations, urban agriculture innovations as well as all other social innovations were drawn from current newspaper articles and recent literature found in published journals and articles. The analysis of the results in light of the current and the future economic, social and physical context of African countries was done through content and textual analysis. The results informed the policy options and recommendations presented in this chapter.

Context of the Study

Africa has de-industrialised in the past two decades which resulted in a fall in value addition, low productivity in most African countries have increased the rate of informal employment, hence informal activities now forms the economic base (Mandisvika 2015; Bandaiko and Mandisvika 2015; UN-HABITAT 2014). More so, most countries in Africa are grappling with a plethora of development challenges, which include food insecurity, poverty and inequality, high unemployment and lack of economic transformation (UN-HABITAT 2014, p. 2). It seems the public sector which is mandated to provide for the services in their respective areas of jurisdiction have failed due to a number of reasons that include poor governance, lack of financial resources and weak institutional capacity among others. The same

applies for Europe where a number of problems haunt governments at different levels and these include austerity, budget cuts, unemployment, ageing, migration and climate change. Furthermore, there are other multiple social, economic and environmental crises that are faced by societies all over the world, yet they are overlooked by either the private sector or the public sector (Pisano et al. 2015).

As illustrated, Africa is no exception as it is plagued by a plethora of problems that extend beyond economic to include social as well as environmental problems that tend to compromise sustainability. For Africa, the problems also seem to be too grand for the public sectors which are financially crippled, staffed with corrupt officials, poorly governed and highly politicised. As a result, individual citizens and civic organisations tend to come together in attempts to redress the aforementioned problems through social innovation (Bandauko and Mandisvika 2015; OECD 2011). These contemporary problems in African cities have given birth to social innovations as the low incomes and rising rates of urban poverty makes life difficult for the urban populace resulting in different approaches being adopted as safety nets amid these harsh conditions. Solving some of these social problems requires collective action that extends across national boundaries thus calling making it imminent for African countries to make concerted efforts to solve some of these problems. In this regard regional integration thus accelerates the success of social innovation due to the geographical expanse and diversity of ideas that emerge from different contexts. Social innovation then has become the panacea to these problems haunting planners and public institutions (Gerhuny 1983; Mulgan 2006). OECD (2011) affirms to the foregoing in that social innovation is present wherever new mechanisms and norms consolidate and improve the wellbeing of individuals, communities and territories in terms of social inclusion, creation of employment and quality of life. Social innovation is common in field where problems are intensifying, in fields where existing models are failing or stagnant and where new possibilities are not being adequately exploited (Mulgan 2006).

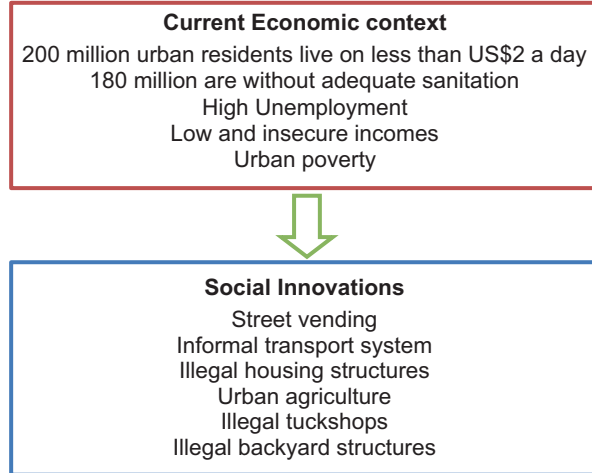
African cities are characterised by a variety of social innovations, which are manifesting in housing, waste management, water provision, food production (urban agriculture), public education, and economic welfare (vending) as well as, public transport. These innovations are nothing but a microcosm of the contemporary economic, social as well as physical realities. Basing on the point that social innovations are in most cases fire-fighting approaches by urban population in response to harsh economic conditions, they (the social innovations) are in contrary to urban planning principles; safety, order and promotion of public welfare. In response to this rejection of social innovations, Mulgan (2006) observes that social innovations happen all around us, many promising ideas are stillborn, blocked by vested interests or otherwise marginalised. The result is that a lot of efforts and initiatives are stifled and rubbished, yet they have the capacity to transform societies and bring about positive socio-economic and environmental change. It is also worrying that besides a few scholarship (Pinter 1985; Gerhuny 1983), little seems to be known about social innovation in Africa and in most instances there is a dearth of serious analysis of how social innovation is done and how it can be supported. The result is that many social problems remain acute or tend to get worse with each pass-

ing day and this call for a concerted approach to social innovation which requires major changes among government agencies, local authorities and various other institutions that have a stake in problem solving for the urban areas.

Overall, instead of being receptive to the notion of social innovation, the current African city planning and several municipal responses to these social initiatives instil to the urban populace the questions that, “*Does planning in African cities really work? Are not African planners just a group of blinds pretending to know how to direct the cities to economic, social as well as physical paradise?*” This is because unlike doctors whose mistakes can be buried, the planner’s mistakes are there to stay; the cities, which form economic hubs, are the planner’s workshops (UN-Habitat 2009). Understanding and conceptualising social innovations thus remains a pipeline dream in Africa where little attempt has been made to understand this seemingly complex and life-changing concept. Acheampong (2014) raises alarm bells that Africa’s development trajectory that is hinged on industrialisation and based on material resources is highly at risk and inadequate to address the dynamic and complex social problems. Therefore it is critical for Africa to rethink the current development agenda and consider integrating social innovation into national, regional and continental planning strategies. This analysis of social innovation at these various scales in Africa will be crucial if one considers the fact that what social innovation is now is different from what it was a decade ago and moreover, Caullier-Grice et al. (2012) argue that social innovation will take on different forms in rural India than urban parts of England due to differences in social needs and contexts. Furthermore, understanding the complexity of social innovation also becomes a challenge as some scholarship on social innovation for example the Skoll’s centre’s comprehensive document on social innovation broadly defines social innovation and identifies six different forms of social innovation, yet it fails to focus on social innovation from a regional level such as from the African context (Mulgan 2007). This then is a wakeup call for planners and institutions in Africa to appreciate the utility of social innovations in addressing the problems that are currently bedeviling the continent Africa. This viewpoint is alluded to by Acheampong (2014) who argues that it is fundamental to place society and their needs in the contexts of social innovations with the aim of identifying cutting-edge and sustainable solutions to address Africa’s pressing social problems.

It is against this background that, many African municipalities have adopted a plethora of strategies and policies on urban transport issues, housing issues, vending, urban agriculture, waste management, and water provision among others (Giddings 2007; Madlalose 2015; Mercer 2008; Chirisa et al. 2015). Either the strategies are pro-social innovations or against them and in most cases, they are doing nothing with such innovations (Chirisa 2008). It is crucial to note that in most cases the municipalities are pro- social innovations or do nothing about them more than they are anti such innovations. Such an approach is pivoted on the fact that African city management is not divorced from politics hence some municipal actions are affected by politicians who are blinkered on “the game of numbers” for political millage. This then points out the relevance of questioning sustainability of such responses to social innovation. If urban development cruise with its current

Fig. 1 The conceptual framework (Source: Authors' Creation (2016))



pace in this current direction, with the current context (holding other things constant), the African planner’s binocular projecting 20 years from now sees crisis, chaos and anarchy in African cities.

Literature Review and Conceptual Framework

As illustrated in the conceptual framework diagram (Fig. 1), the economic context in African cities is the cause of all forms of social innovations.

Activities rampant in African cities such as street vending, informal transport, illegal housing and business structures are manifestations of a negative twist in the economic tune (most Africans are succumbing to the ravages of harsh economic context). It is against the background of economic hardship that the urban population devise their innovative ways of surviving the tumour including back yard business, informal and illegal settlements, street vending, urban agriculture – crop production on open spaces, road reserves, wetlands and stream buffers, as well as chicken rearing in backyards.

Currently African urban space is in a state of chaos. Although this may be perceived as a curse, the situation has proved to be a blessing in disguise as citizens and various other institutions have been forced to become creative and adapt to the obtaining situation; through the social innovations that, some societies flourishing. Africans have come to adopt an innovative approach to the problems they face rather than wait for the local authorities and municipalities to come to their rescue. The informal activity (which makes the greater proportion of social innovations) is overriding the formal. In explaining informal development, several authors have propounded a variety of schools of thoughts; of relevance to this present study are the dualist school by Hart (1973) and Tokman (1978), the legalist school by De Soto

(1989; 2000) as well as the Structuralist School by Moser (1978); Castells and Portes (1989). These are crucial in the dissection of social innovation issues in African cities, as they give various explanations to the growth of informality. These various theories on informal developments also enlighten conclusions and recommendations as well as concrete solutions to the informality.

The dualist school explains the informal sector as a separate sector, which is not directly linked to the formal sector, but rather provide safety nets for the urban poor in times of economic crisis (Hart 1973). The dualist school also alludes to the point that the persistence of the informal sector manifest from the failure of industrial development and economic growth, hence it acts as a buffer for cyclical trends in the formal sector by providing a dumping ground for retrenched labour (De Soto 1989). This then means that, once sufficient level of economic growth is attained, the informal sector will gradually reduce in size. The Legalist School is of the view that the informal sector persists because people would be trying to avoid the costs and hassle associated with formalisation their developments following shying away from building standards, paying taxes and other formalities. In cognizance of these diverging schools on informal development, it is crucial to consider point that, the context (economic, social as well as physical) might demand that the members of the society behave in a formal way and another context demands informal behaviour. In most instances, the social innovators in Africa argue that they have to devise ways to dismantle the once impermeable fabric of the city necessitated by colonial regimes which process they call empowerment and redistribution of resource emerging the informality in housing, transport and service provision or manufacturing. These have put to task urban managers on issues to do with access, control, ownership and utilization of urban resources. Urban management is a process of balancing conflicting stakeholder interests as well as ensuring order, safety, welfare and amenity in the urban areas. Urban management also consider issues like sustainability; controlling the daily activities of the city to promote economic, social as well as physical welfare.

Social innovations are desirable in societies because they enhance society's capacity to act (Caulier-Grice et al. 2012). This argument is in line with the ideals of sustainable development which thrives to enhance the capacity of the society to improve its livelihoods in a socially, environmentally and economically sound way. The rationality of social innovation, according to Frost and Sullivan (2014), is on creating a shared value in society through the collaboration of various stakeholders such as companies, social enterprises, governments and charity organisations among others. Social innovation is defined as innovative activities and services that are motivated by the goal of meeting a social need (the aforementioned social problems) and that are predominantly developed and diffused through organisations whose primary purposes are social (Mulgan 2007). Recently, sustainability has become the benchmark for measuring the success or acceptability of development initiatives. So it means social innovation must also contribute to sustainable development, otherwise failure to do so means the innovations have failed. Phills et al. (2008) embrace the concept of sustainability in their definition of social innovation which is as follows "social innovation is a novel solution to a social problem that is more effective, efficient, sustainable, or just, than existing solutions and for which

the value created accrues primarily to society as a whole rather than private individuals.” From Phills et al. (2008) perspective social innovation is defined by the efficiency and effectiveness of the innovations which sums up to upholding sustainability for which the outcome is aimed at uplifting the welfare of the whole society rather than for selected individuals. One can argue that social innovation is the panacea to the current problems that are bedevilling contemporary Africa.

It can be seen globally that the objective of any city development plan is on achieving or promoting sustainability of the city or urban area. For it is through sustainability that places can flourish and exist for long. Solutions that seek to address the challenges haunting society must be oriented into the future rather than just looking at the problem at hand within the contemporary context. Sustainability is about addressing the social needs through means and ways that ensure that everyone in society benefits. Since social development is concerned with well-being of the society, it follows that social innovation has positive impacts in taking the cities on the sustainability pathway; this is in line with post 2015 global development agenda- Sustainable Development Goals that are succeeding Millennium Development Goals, expiring this year (UN-HABITAT 2014). Sustainable development includes development initiatives which put into consideration the future, thus a sustainable use of resources that does not compromise the future generations from enjoying the use of the same resources. Sustainability has three main pillars, economic sustainability, physical (ecological) sustainability as well as social sustainability. This means sustainability of any development or policy is assessed against the present as well as the future economic, social as well as physical wellbeing of the area. The rationality of sustainability in that some social innovations fail simply because the idea may be too expensive, unaccepted by society as a whole or simply it may be flawed by unforeseen side effects (Mulgan 2006). What this means is that a social innovation must be economically, socially and environmentally acceptable and befitting lest it becomes an ill than a social good. Sustainability of revision of housing standards in several African cities including Zimbabwe (Circular 70 of 2004) and slum upgrading approaches engaged in Namibia, and Ghana is measured against their present and future economic, social and the physical implications.

In Japan, for example, social innovations have been widespread following the 2011 tsunami and nuclear disaster (Frost and Sullivan 2014). These were compelled by the massive destruction on the country’s physical, cultural and socio-political landscape that resulted from the tsunami and nuclear disaster. In Australia, social innovations were the major developments in various sectors that include early agricultural co-operatives- led strategies. The Australian Government in 2013 highlighted that social innovation has been shown recently through Family by Family led by the Australian Centre for Social Innovation where families who have come through hard times help others find their way out. Social innovations have been widespread in India as communities seek to transform their livelihoods, with special focus being on entrepreneurship and emergence of small scale business in response to increasing levels of poverty and unemployment. In India, social innovation dates back to the times of Gandhi and it has been championed by different stakeholders chief among these being the civil society.

Social innovation does not occur in a vacuum. Rather its success depends on the commitment of various institutions to accept and integrate the innovations into the regional or national socio-economic plans. Of utmost importance is the financial mandate that is required to support social innovations. Examples of financial support for social innovation are evident through the establishment of social innovation funds in countries like United States, Australia, Italy, Columbia, India and the European Union (Frost and Sullivan 2014). Pisano et al. (2015) also highlights how several countries have established social finance infrastructure, such as social impact investing, enterprise or venture trust; these are to provide financial resources for social endeavours and business start-ups. These funds proved to be a life saver as they enabled the social innovators to realise their dreams. Box 1 summarises the key elements that define social innovation. From the experience of social innovation in Europe, it emerges that regional integration exists as both a driver and beneficiary of social innovation. This is so because regional integration proffers a favourable and enabling platform where social capital thrives due to the existence of multiple ideas, financial resources and human-capital. The European Commission institutionalises social innovation through establishment of strategies and plan which emphasise social innovation. Examples of such are Lisbon Strategy of 2004, Renewed Sustainable Development Strategy of 2006 and the Renewed Social Agenda of 2008 which all have solid inclination for social innovation for the European Union (Hubert 2010).

Box 1 Key Elements for Social Innovation

The five core elements that should be present to define a social innovation in the following terms:

1. *Novelty* – social innovations must be new as the innovators come up with unique ways and approaches that help to address the problems at hand,
2. *Implementation of the novel ideas* – social innovation involves the implementation of the new ideas so as to get results,
3. *Satisfy a social need* – there has to be a pressing challenge or socially recognisable suffering that has to be addressed by the social innovation, of which failure to address the problem would compromise the socio-economic well-being of the society,
4. *Effectiveness* – the social innovations must be more effective in addressing the social problems when compared with the existing solutions. The effectiveness of the social innovation can be measured in terms of its sustainability, and,
5. *Enhances society's capacity to act* – social innovation often empowers communities and allows them to take action which usually entails changes in social and power relations.

Source: Adapted from Pisano et al. (2015, p. 6–7).

In addition to the core elements that define social innovation, Frost and Sullivan (2014) present some factors that characterise social innovation and these are summarised in the forthcoming section.

- Spirit of creative, innovative, entrepreneurial, productive, successful and aspiring individuals/citizens and institutions that have a full belief in social change in light of the social problems haunting their societies;
- Proactive engagement of local stakeholders and beneficiaries. This translates into cross sector context where different stakeholders from different social circles work together and share ideas aimed at transforming their societies;
- Coordination and integration of societies in national and regional socio-economic planning through collaborations.

The foregoing sections have provided a review of the literature that relate to social innovations. The section considers the socio-economic problems that haunt urbanites and eventually compel residents and city managers to come up with social innovations aimed at addressing these social challenges. The success of social innovations depends on the creativity and coordination among various stakeholders in an area. The forthcoming section thus provides a synopsis of the social innovations that have been adopted in Africa in relation to the social problems that currently haunt the continent.

Results

Various stakeholders across Africa have adopted different social innovations in response to the failures by the municipal governments to provide adequate services which help especially the urban poor to transform their lives considering the current harsh economic context. These social innovations often manifest in urban housing, water and sanitation provision, waste management practices, urban food production (urban farming), economic livelihoods (vending) and public education. These innovations perpetuate risks and uncertainties to sustainable urban development in African cities and towns.

Informal Trading as a Social Innovation

A research in Kenya, Uganda, Zimbabwe, Ghana, Cote D'Ivoire and South Africa revealed that, though street vendors are operating in towns the informal trading business is unregulated and unprotected (UN-HABITAT 2014). In Africa, the informal sector as a whole is estimated to account for 60% of all urban jobs and over 90% of all new urban jobs. Mindful of the dynamism of state responses to street trading, this section reviews the empirical evidence. Informal trading being a dominant activity in almost every African city and following the argument of the Dualist

School, the growth of this informal trading is a response to a decrease in industrial production that made many people unemployed.

The informal sector has provided a safety net for those who lost jobs in this de-industrialisation process for example in Zimbabwe. Other than politics and economic meltdown, the closure of industries in Africa is also attributed to the effects of globalization where most of African countries are turning into retail economies; a market just for finished products produced in other countries, which have negative impacts on employment. The majority in Mozambique joined the informal sector following a massive retrenchment from the formal sector (Cape Town 2014). As a result; there is a gulf between the normal retailing space provided for in the African cities and the required space. Shortage of enough trading space in African urban areas have resulted in the unemployed public resorting to illegal trading, trading on the street pavements, vending in vendor carts or back of cars, some selling in illegal tuck shops. A variety of business activities that can be noticed along African streets include but not limited to selling of fresh foodstuffs and vegetables, medical drugs, cell phones, electrical gadgets, cars as well as bricks (Njaya 2014).

However the vending sites are incapacitated to accommodate all the vendors and also many of them are accused by the vendors of not having adequate passing feet to sustain their business hence street vendors still sprout along street pavements where they still display their wares along streets despite threats of eviction, (Newsday, 20 February 2015). In South Africa, the city of Johannesburg's street vending is also a problem despite the Operation Clean Sweep in 2013. The local authority removed all illegal vendors from the streets as its response to informal trading. Despite this city's harsh stance on informal traders in the city, street vending is still dominant in Johannesburg urban areas, (Cape Town 2014).

The response by African cities to this phenomenon through the adherence to conventional urban planning principles. In several African countries, as a response to social innovations, for example in Nairobi and Kampala, street vendors were on several occasions allocated vending sites outside the business district, which the vendors have continuously resisted by moving back to the CBD arguing that those sites were not convenient for the business as their usual sites had more customers as compared to these new sites. This only show that African municipalities are overwhelmed by this scenario and given the influence of politics and often these responses are met with disapproval by many hence to avoid serious wars they follow the politics of the day.

The Creation of Informal Settlements

In as much as housing in African cities is concerned, there are serious shortages of affordable housing prompting a multiplicity of social innovations by the affected urbanites (Giddings 2007). These manifest in a variety of ways shown by sprouting of squatter settlements, construction of substandard structures, construction of housing structures in wet lands, illegal building extension, building of un-approved

house plans and developing housing structures that are not inspected by the local authorities as specified in the building by laws. In summary, social innovation in building structures are evidenced in any form of housing development that is not in conformance with the existing bylaws, local plans as well as existing regulation (Giddings 2007; Mots'oene 2014). Through the aid of some nongovernmental organisations such as Dialogue on Shelter, the Harare urban poor living in slums are getting reprieve through in-situ slum upgrading. They are encouraged to form cooperatives where they contribute money towards the development of their neighbourhoods and buying of building material. In these cases the Harare municipality collaborated by offering technical assistance - (assisting in drawing of layouts, model house plans as well as in some process laying sewerage and water mains) to these people in the upgrade process. This Zimbabwean case has seen the Harare city council collaborating with the Zimbabwe Homeless People's Federation and Dialogue on Shelter for the upgrading of a former shanty settlement in Dzivarasekwa Extension. This was an in situ slum upgrading for 480 families (Payne and Majale 2012). Recently, the Harare municipality is in the regularisation process of Caledonia a big informal settlement accommodating several housing cooperatives in Harare.

In Namibia, the Windhoek city authority collaborated with Shack Dwellers Federation of Namibia, and the central government of Namibia through the Ministry of Housing in the slum upgrading process (Payne and Majale 2012). In the upgrading, the municipalities provided expertise and technocrats who worked with the members of the community. Accra in Ghana has done the upgrading of informal housing structures through the Participatory Slum Upgrading Program. The neighbourhood of Nkolbikok, located in Yaounde municipalities in Cameroon, for example, was selected and upgraded using this approach. Burundi also employed the participatory slum upgrade program in cities that include Bujumbura, Ngozi and Rutana where several shanty towns were regularised were up graded. Of relevance is noting that in these different countries these programmes aimed at improving the welfare of the urban poor through addressing water in adequacy, sanitation as well as issues of tenure and insecurity (UN-HABITAT 2015).

As far as housing in African is concerned, some social innovations were met with different responses but of importance is noting that though the existing legislative frameworks haven't fully considered social innovation as most of them were adopted from colonial master and are still being sluggishly adjusted, most municipalities are pro-social innovations. Also many of the municipalities due to constrained budgets, they are doing nothing about some informal developments.

Innovations in Waste Management

Waste collection is a challenge in African cities; this is because the municipalities are entangled in the liquidity crisis, making it difficult for them to afford the costs of collecting wastes. In developing countries, including Zimbabwe, the problem of solid and liquid waste management is becoming complicated and requires

long-term and sustainable programmes for its solution. According to UN-HABITAT (2006), less than 20% of urban solid waste is collected and disposed of properly in an effort to solve the problem of refuse, communities (Mudzengerere and Chigwenya 2012). This can be attributed to the problem of rapid urbanisation, inadequate funding of waste management services, frequent breakdown of refuse collection vehicles and more importantly an unstable macro-economic environment (Mushamba et al. 2014). This scenario in African cities waste collection, then results in a variety of social innovations by the public to both relieve themselves of the domestic garbage and to make a living from garbage. The public normally engage many initiatives that include the dumping of waste on open spaces, some recycle and some practice urban agriculture to locally use the waste.

Several municipalities have adopted waste recycling strategies by the informal sector, some municipalities support agriculture processes which enhance waste recycling as keeping of animal, making of composites, plastic containers, bottles and can recycling. EThekweni Municipality (Durban) in South Africa has already implemented a waste-to-energy project at its Mariannhill Landfill. Almost invariably, informal settlements and communities of waste pickers arise near formal solid waste landfills. Waste recycling can be lucrative where waste emanates from middle to upper income settlements. Garbage scavengers however live dangerously, with a high incidence of injuries and infection from sharp objects, medical waste and other hazardous substances in uncontrolled disposal sites (UN-HABITAT 2014).

Current by-laws in most African countries give responsibility for waste management to municipalities, which are often ill-equipped to deal with collection and disposal. Such by-laws are now an impediment to investment in waste management by the private sector. Imports of second-hand consumer goods and production and/or import of substandard products are all contributing to rapid increase in waste generation. Policies should be put in place and existing standards enforced to reverse this trend, (Toulmin 2009). Scavenging is one of the crucial part of waste handling in African cities, this is when various forms of waste is collected for reuse mostly by the urban poor, the relevance of scavengers in African cities was noticed by (Nyanzou and Jerie 2014). To show the relevance of scavenging both to waste management and welfare of the urban poor, the waste collection team in Harare also separates valuable waste during the collection exercise, where they will have their own collection sacks to put what they need for either reselling in Mbare or re-use.

Although 42% of the urban population of Sub-Saharan Africa has access to improved sanitation, low access levels in urban informal settlements can lead to higher risks of diseases. Lack of drainage and piped sewage do increase urban habitats for the anopheles mosquito, thereby increasing vector risk and spread of malaria even during dry seasons (UN-HABITAT 2014) informal housing and supporting infrastructure. In Zimbabwe, the incremental policy results in settlements as Hatcliffe Extension, Hopely and others with residents still relying on shallow unprotected wells, poor quality shared blair toilets, no schools and public utilities. This in turn is resulting in squatter like settlements which one-day cholera will sweep through. In Kampala (Uganda) the Kasubi-Kawala neighbourhood entered into a

partnership to recycle neighbourhood waste, of which 75% was organic, into animal feed, compost and alternative fuel. The Coptic Christian Zabbaleen in Cairo have traditionally collected the city's waste and now operate at scales large enough to bridge international price variations of recycled glass and plastic.

The current waste collection bylaws in African cities place much of the responsibility to collect waste in urban areas on the municipalities (UN-HABITAT 2012), however with the current waste collection challenges in African cities, making a policy which recognises scavengers would be a point in reducing the amount of waste to be collected by waste collection trucks. This can be done through either providing an organised scavenging practise, where scavenging time slots are given in every neighbourhood before the collection of waste by the waste collecting trucks. It is however crucial to note that effective consideration of scavenging in African cities is informed by a research into the type of waste collected. This enables the residents to group their household waste for the scavengers or give a day in a week for scavenging before the waste collection truck collects the waste to the dumping sites.

Innovations in the Transport Sector

Across Africa, even in a private car, a bus, motorcycle or a taxi, the time spend travelling within cities is getting longer, the costs are getting higher and the air getting dirtier. Accidents are still very high emanating from gross human error, dilapidated infrastructure, un-road worth rolling stock and poor road law enforcement (Mbara et al. 2014; Mbara 2015). The transport infrastructure in many cities in Tanzania, Malawi, Mozambique and Zimbabwe, is in a sorry state. The issue of congestion (peak problem) is also a major transport concern. In Dar es Salaam and Harare people spend hours to reach their work places (Mbara et al. 2014). This scenario is replicated in many African cities. Most of these economies are characterised by informal type of transport; composed of small pirate vehicles and commuter omnibuses which are named *kombis* in Zimbabwe, *Daladals* in Tanzania, *Damfos* in Nigeria and *Matatus* in Kenya. The issue of informal transport emerges as a response to a gap left by the formal public transport system but for Zimbabwean cities, the formal urban public transport has completely collapsed hence the dominance of these informal modes of transport (ibid). In some texts, they call the informal transport, para-transit meaning it operates parallel to the formal public transport system (Mbara 2015). These are social innovations to augment transport services supply but also to earn a living out of it. Though being chaotic, the social innovations in transport are affording urban citizens a livelihood (transport provision as a safety net to unemployment) and managed to increase flexibility and convenience in transportation in many cities.

As a social response to congestion, people are creating their own traffic lanes (sometimes getting in oncoming vehicle lanes) thus disobeying traffic regulations to make their way on congested roadways; this has exacerbated the rates of accidents.

The local authorities in most countries in developing countries are on the verge to regulate the operation of such informal transportation which always create a tag of war as they, operators, do not always comply. They take this regulation as a way of thwarting their operations and, in response, they often evade road blocks and operate on undesignated pick up and drop points (called *mushika-shika* in Harare) as a way of increasing revenue and run away from being punished by the law (Herald, November 26, 2015b). These innovations had increased the occurrence of accidents and also the corruption in the transport sector. Corruption is argued to be worst enemy when it comes to development in the country of Zimbabwe (Herald, October 20, 2015a, b). To continue operating, the operators normally offer bribes to officers on the road enforcing traffic by-laws or national traffic laws.

Regional Integration and Social Innovations in Africa

Regional integration aims at formulation of priorities on joint projects aimed at overcoming production and infrastructure deficiencies and building up regional public goods. Most proponents assert to the notion that it is very costly for countries in the same region not to integrate and move in economic harmony and cooperation. In this regard, regional integration has been pursued as an economic agenda in Africa with the aim of promoting socio-economic development in the continent's sub-regions (Niekerk 2017). In actual essence, it is the difficulties faced by African countries which compelled the states to integrate and make attempts towards combating these challenges (Hatzenberg 2011). Therefore, there have been some prospects for the success of particular social innovations considering that the movement of capital and labour has been relaxed between some countries in the region for example in Liberia and Sierra Leone; in SADC between Lesotho, South Africa and Namibia. Regional blocs, such as SADC, COMESA, SACU and IGAD have been instrumental in supporting social innovations in Africa through promoting trade, increasing returns and competition, attracting foreign investment as well as increasing bargaining and coordinating powers.

To a great extent, social innovations have been operating in a context that is supportive to the growth of the ideas and practices as a result of the regional integration in Africa. However, regional integration in Africa has not effectively contributed to the success of social innovations due to a number of reasons. The state of infrastructure in Africa has been identified as limiting effective regional integration and subsequently social innovations. This is so because in some instances there the low per capita densities of rail and road networks that remains in a sorry state makes it difficult for the flow of capital, labour and resources between regions, yet these are the life-blood of the success of social innovations (McCord et al. 2005). Political instability also threatens the success of regional integration and ultimately the fruits of social innovation are not fully realised. Examples have been the civil wars in Angola, Mozambique and DRC which complicated regional integration in SADC. Niekerk (2017) argues that weak institutional, financial and physical infrastructure and administrative capabilities also makes it difficult for social innovation to yield

effective results due to the implications on regions' economic growth, unemployment levels and poverty.

Discussion

This paper focuses on the social innovations that are adopted in contemporary Africa in response to the socio-economic problems currently bedeviling the continent Africa. From the literature that has been reviewed, it emerges that social innovations have traditionally been used to address socio-economic challenges that haunt cities. These social innovations are adopted when municipalities fail to address some of the problems due to a myriad of factors chief among them being poor governance systems and lack of financial resources to champion socio-economic development. Social innovations then are initiated by either the public or private sector in different aspects of the urban areas. It is also interesting to note that there is much investment in social innovation in the developing world and some parts of developing countries such as India. In some instances they are policies that guide social innovations. However, the situation seems to be different in Africa where there is no policy that guides social innovations. Social innovations for Africa are characterised by high levels of informality of which the results are two-fold. In some instances, the social innovations promote sustainability while in some instances they have done little serve exacerbate the sustainability of the continent Africa especially when municipalities do not support the initiatives. Examples are those in the transport sector and housing sector where social innovations are largely informal and do little in terms of promoting urban sustainability. On the other hand, the social innovations have been a blessing as they have transformed the socio-economic conditions in Africa and ultimately promoting sustainability in the continent. The African context thus lacks a policy framework or well-defined guidelines for social innovations which is the main reason why social innovation has not been able to bring much change when compared with other continents. Rather than have social innovations that advance urban sustainability, the social innovations in most African cities are now used for political mileage; hence, they end up creating a system where social innovations end up being the new urban norm in urban areas rather than a way to formal developments.

Conclusion, Policy Options and Practical Recommendations

There are a variety of social innovations and various municipal responses to such innovations in African cities, as have been illustrated in the paper. The gist of this paper has been on contextualising social innovations in Africa in relation to the socio-economic problems that haunt these cities as a result of the failure of municipalities to address these problems in contemporary Africa. The sustainability of these social innovations vary and depend on a number of local factors chief among

these being the responses of municipalities to these social innovations. Social innovations in Africa deviate from the institutionalized western models, a development, which rather perpetuates risks and uncertainties to sustainable urban development in the cities and towns. Populism has taken reign in most cities with politicians always riding on the tide and deepening urban poverty and increased environmental woes including compromising urban health and welfare.

It is therefore imperative to twist the attention of African municipalities from firefighting approaches to urban management to sustainable urban management principles, where their institutions and daily responses to social innovation take cognizance of the future of these cities as the current. In the case of street vending, a dialogical approach is the best as it both take cognizance, and provides a balance between conflicting facts that street vending provides safety nets for the unemployed masses in African countries. To understand the actions and reactions of the municipalities to social innovations, we must take cognizance of the key variables affecting the day-to-day city activities. These include city politics, where urban planning principles, current economic environment as well as political millage are contradicting key dictates of the practical reaction to any form of city development, hence a dictate of the city form. This means what African cities are today replicates these three forces at play and reflect on the dominant and recessive one in each city. If political mileage in dominant over the other two then the game of numbers dictates the city form, the social initiatives by the majority drive the city. In the current economic context, then some fire-fighting approaches to economic welfare of the majority dictates city form while the dominance of planning principles is manifested by an orderly, safe and liveable city where development is in the bounds of the operative planning tools.

In terms of illegal business in African cities, a key point to consider is economic, social as well as physical wellbeing of the decision by the municipality. Thus, what will the decision mean to established business, those employed in the informal business, and the public welfare today and some years from today? We recommend a systematic and governance approach to the whole matter of which all the parties involved have an equal footing in pronouncing the city or town they want hence a dialogical approach to city development. In response to the foregoing discussion, the following recommendations are worth considering if social innovation is to contribute to the sustainability of Africa:

- Promote the establishment of trusts and funds that may be used to fund the social innovations in Africa just like in Europe and Asia where special funds are set aside to promote social innovation;
- Let regional blocs in Africa build innovation-conscious and innovation capable societies.
- Let Africa pursue mutually reinforcing social innovation policies through formulation of national, regional socioeconomic policies that guide and provide the framework for social innovations such that there is a clear road map as to what has to be done in relation to each;

- Harmonise social innovations with other urban development initiatives so as to facilitate harmonious development and promote sustainable development;
- Encourage objectivity in urban development and avoid situations of clientilism which stifle the success of social innovations as well as some urban development initiatives;

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Science and Technological Capability Building in Global South: Comparative Study of India and South Africa



Swapan Kumar Patra and Mammo Muchie

Introduction

Economic success of a country is highly linked with the technological capability (TC) building (Kim 1980). TC is one of the main drivers of sustained economic growth and development (Romer 1990). Traditional growth theory emphasizes on the incentives for capital accumulation rather than technological progress. It considers innovation as an exogenous process or a by-product of investment in technology. Contrary to this, it is worldwide recognized now that TC building is a fundamental component of economic growth and welfare. Grossman and Helpman viewed innovation as a deliberate outgrowth of investments in industrial research by forward-looking, profit-seeking agents (Grossman and Helpman and 1993). Although, governments all over the world put their efforts in building TC, it is not equally distributed and there are regional variations among nations, regions and firms. Generally, knowledge is produced in a few extremely industrialized and developed countries. Even with the present phase of globalization, and with the increasing international trade, communications, Foreign Direct Investment (FDI), development of Information and Communication Technology (ICT) and many other means of technology transfer, the knowledge is not equally diffused geographically. On one hand, very few countries are always at the frontier of knowledge creation through technological innovation and learning. Also, majority of the countries are lagging behind. Many developing and less developed countries around the world

S. K. Patra (✉)

Post Doctoral Research Fellow, Tshwane University of Technology, Business School,
159 Skinner Street, Pretoria, Republic of South Africa

M. Muchie

Professor, SARChI-Innovation Studies, Tshwane University of Technology, Business School,
Pretoria, Republic of South Africa

have even not been able to absorb knowledge that is even considered outdated in developed countries (Archibugi and Coco 2004).

Governments in developing and developed parts of the world as well as other actors (for example multinational firms) are increasing their funding for research, based on the assumption that Research and Development (R&D) will bring progress. Both industrially developed and developing nations follow explicit strategies to increase their technological competency. So, it is worthwhile to measure the TC of nations (Mónica et al. 2012; Fagerberg et al. 2011). However, TC building is a long term process and requires a country to pass through different phases of learning, human resources management and infrastructure development (Lall 1990, 1992). According to Lall, “National Technological Capabilities” (NTC) are difficult to define or measure in quantitative terms. The process is complex and there is a general argument among the scholars that it is impossible, to quantify or compare precisely the NTC among different countries. The concept of NTC was initially applied to firm level and is now well established in the literature (Lall 1992, 165–186). However, firm level TC is not a cumulative manifestation of the national level TC because the aggregate firm level capability does not transfer directly to the national level (Lall 1998). As Lal pointed out that in the absence of direct quantitative measures of NTC, rough proxies can give a fairly good idea on national TC. For example, manufactured export performance, total factor productivity estimates, human resources and technological effort are used to map national level TCs in many studies (Lall 1998). Using these indicators, there are a number of studies which deal with technological and innovation capabilities (Archibugi and Coco 2004; Smith 2006; Castellaccia and Archibugi 2008; Fagerberg and Srholec 2008; Fagerberg et al. 2011). In this respect, the concept of ‘National System of Innovation’ (NSI), and its various actors are also useful. Moreover, the concept argues that the studies of the technological capabilities of countries are relevant, because they provide major institutional scope for the creation and dissemination of know-how (Lundvall 1992; Nelson 1993; Freeman 1997). The analysis of national capability with this framework is successfully applied in many developing countries (Mónica et al. 2012).

With this background, this chapter is an attempt to measure S&T capability of two developing economics viz. India and South Africa. The reasons for choosing India and South for this comparison are; *firstly*, because both the countries share similar socioeconomic and demographic conditions; *secondly*, both are multilingual, multicultural and plural society. *Thirdly*, both India and South Africa have colonial legacy and inherited most of their present S&T infrastructures from the colonial periods. *Fourthly*, S&T infrastructures of both countries are similar. For example, the university system is the major contributor of basic science. Government research agencies like Department of Science and Technology (DST), Council of Scientific and Industrial Research (CSIR) are the major research agencies forming the backbone of government research. These organizations in both the countries are involved in funding and commercialization of technologies related to social goals. *Finally*, India and South Africa are considered in many comparative studies along with others because they are in the BRICS group of countries (Brazil, Russia, India, China and South Africa).

This chapter is divided into the following sections. After the introduction, the short literature review section deals with the literature on BRICS countries and its various issues. The section research questions coming out from the TC literature which forms the empirical analysis part of the chapter. The result section starts with an overview of S&T policies taken with the span of time for both the countries. Further it takes an assessment of capabilities in different fields taking input (R&D expenditure, R&D manpower) and output indicators (high technology exports, publication, patent and technology balance of payments). Finally the chapter ends with a discussion section and concluding remarks.

Literature Review

Since the last decade Brazil, Russia, India, China and South Africa (BRICS) are at the prominent place in today's globalized world. According to 2010 estimate, these five countries accounted for about 43% of world population and 18% of world income (Nayyar 2016). It is widely acknowledged that the role of these countries in the global economy as producers and intermediate powers are growing. The relationship among these countries is strengthened with the 'Cape Town Declaration' where Ministers of S&T from BRICS committed to S&T cooperation (Kahn 2015).

With the emergence of BRICS, the scholarly literatures analyzing various aspects of BRICS are also growing. There are many studies coming up on economics of BRICS and on the mapping of S&T activities of BRICS (Hasan and Luthra 2014). For example Bouabid, Paul-Hus, & Lariviere, have observed that BRICS countries' scientific activities are enhanced by their high-technology exports but both the intra-BRICS high-technology flows and the intra-BRICS scientific collaboration are significantly weak (Bouabid et al. 2016). The collaboration of BRICS countries shows that inter-BRICS collaborations are stable with time. However, there is diverseness across different scientific areas among these countries (Finardi 2015). Moreover studies have observed that, BRICS countries have different growth trajectories in scientific research but they have similar approach in pursuing technological advancement. This shows the strong commitment of BRICS to improve their TC in the process of industrial development (Wong and Wang 2015; Inglesi-Lotz et al. 2015).

As it was mentioned earlier, the comparative studies among the BRICS nations are growing in an unprecedented way. Along with other measures, these countries have successfully implemented their Science Technology and Innovation (STI) policies in their respective nation-states (Scerri 2013; Krishna 2013a). Also with the span of time, governments adopted new policies replacing earlier policies looking at the pressing need of the time. The policies implemented time to time by these countries are indicating that these countries are committed to strengthen their local TC. These BRICS group of countries are somehow able to reduce their technological gap with the more technologically advanced countries through the catching-up process. In the long run, perhaps these TC building processes may further contribute in their economic and industrial growth (Salami and Soltanzadeh 2012).

Although there are many studies available on BRICS in their various aspects, the comparative studies of TC of India and South Africa are rare. In this light, this chapter will examine the S&T strength of both India and South Africa. The analysis of high technology export, human resource in R&D, R&D expenditure together with bibliometric data will perhaps give the empirical evidence of technological capability of these two countries.

Lall (1998) argued that government policies, institutes, infrastructure and a suitable interaction with already existed industrial structures, provide a distinctive “technology systems” for each country. This technological system has its own culture and dynamics. With all these factors the systems inherited and developed has its own dynamism with time and differ significantly between countries. In the long run, the countries may be similar in many respect but they develop their own technological trajectory (Lall 1998). Dynamism of TC is a key dimensions of a knowledge based society and economy. This study is an attempt to capture the TC dynamism from these two countries under the framework of TC. It is mentioned earlier that, it is difficult to precisely map the TC, there are some measures developed by many scholars (Fagerberg and Godinho 2004; Fagerberg et al. 2011; Fagerberg and Srholec 2008; Archibugi and Coco 2004, 2005; Sirilli 1997). Among the various measures, the indicators like investment on R&D, patent statistics, survey innovation, the technological balance of payments, the analysis of trade in high-technology products, bibliometrics or Scientometrics indicators, and the indicators of human resources are used in many studies (Sirilli 1997). With this context, this study seeks to answer the following questions:

- How the S&T systems developed and grew in Indian and South African context?
- What are the government policies taken to improve National Innovation System (NIS) from time to time?
- From the input side, as per the R&D investment, Scientific and technical manpower where do these countries stand?
- In the output side who are the better performer in terms of high technology export, technology balance of payment, publication and patents granted from the global patent databases?

To study the government policies, the government websites of both India and South Africa were consulted. Beside the government websites, the growth and evolution of Indian and South African government policies were taken from different scholarly literatures and secondary sources. The input side data, for example gross expenditure in R&D were taken from the World Bank database (available at <http://data.worldbank.org/>). Thus, data collected from different databases and various sources are collected in excel sheet and plotted to get result in the form of table, figures etc.

To measure the scientific capability, scholarly publication data was collected from the Scopus database of Elsevier science. To map the patenting activities, patent data were searched and retrieved from the United States Patent and Trademark Office (USPTO) and World Intellectual Property (WIPO) website.

Scopus is the largest citation and abstract database of peer reviewed scholarly publications and websites. The database was launched in November 2004 by the famous Elsevier publishes. It nearly includes 20,500 titles from more than 5000 international publishers. Scopus covers scholarly contents in almost all branches of science, social sciences and humanities. The database search engine offers search in their address search field to extract literature. Using respective countries name in the search field data was collected from the year 1990 to 2015.

USPTO issues patents to inventors and businesses entities for their inventions, and trademark registration for product and intellectual property documents. The patent data was collected from the USPTO database by using the abbreviated name for country of grantee in the database search form. The USPTO data is collected for this study purpose because US is the largest market and a patent is well protected in US market. Beside this, USPTO database is well maintained, search interface is quite strong and retrieves precise result. WIPO data were collected because many of the patent from developing countries are filed to WIPO though the respective patent offices. Hence the patent data collected from both the offices will perhaps give a clear picture of patent portfolio of both the countries.

Results

This section deals with the government policies adopted to improve S&T structure of the respective countries. This section will further group various input and output side indicators in different heads like R&D expenditure, R&D and technical manpower, technology balance of payment, scholarly publication and patenting patterns.

Government Policies and Institutions

It is already discussed in the previous section that government policies and the building of institutions and industrial structures provide a distinct “technology systems” for each country(Lall 1990, 1998).With this perspective, the policy measures taken by these countries certainly inherits some of its colonial institutions and legacies. However, this study traces the policy initiatives for both the countries after the establishment of democratic majoritarian government. In the case of India the policies are traced from 1947, after the independence from British rule. In the case of South Africa, it was from 1994 onwards after the end of apartheid era.

Indian S&T Policies and Institutions

After the independence in 1947, Indian government considered S&T as an important instrument for nation building. As a consequence, the government of India (GoI) adopted its first Industrial Policy in April 1948. Moreover, in order to build a self-reliant and prosperous India, the Planning Commission was set up in 1949 (Planning Commission is dissolved and now is replaced by National Institution for Transforming India (NITI) Ayog from January 1st 2015 onwards). The Planning commission started Five-Year Plans and also coordinates the activities among different departments to successfully implement the plans. During the First Five-Year Plan (1951–56), Council of Scientific and Industrial Research (CSIR), India's largest government R&D establishment was established. CSIR was established with an aim to achieve self-sufficiency in S&T (Mukhopadhyay 2014).

After the Industrial Policy of 1948 there were a number of resolutions announced. The second one was announced in the year 1956 followed by others in 1980, 1990 & 1991. With the implementation of Industrial Policy Resolution in 1956 the state played an important role to accelerate the economic growth and speed up the industrialization process. However, the ultimate policy objective was to achieve a 'socialist pattern of society' (Handbook of Industrial Policy and Statistics 2008-2009). In the year 1958, the government approved its first '*Science Policy Resolution*'. It was a major milestone in the history of S&T development in India (Rao 2008). During that phase of nation building and many new institutes were established. For example, Atomic Energy Commission (1948), the University Grants Commission (1956), and the Defense Research & Development Organization (1958). The first Indian Institute of Technology (IIT) was started in 1951 (Rao 2008). The second major policy document was 'Technology Policy Statement' adopted in 1983. The policy document stressed the need to achieve technological self-reliance. The implementation of this policy yielded positive results in attaining self-reliance in many high technology areas for example missile technologies, chemicals and pharmaceuticals, weather forecast and so on. The Table 1 shows the chronology of policy resolutions taken by Indian government with the span of time.

The Government of India opened its economy to the outside world in the year 1991. The new Policy adopted in that year brought a major change in every aspects of Indian economy including the Indian S&T landscape. The objective of the policy was to achieve economic growth, employment generation, and competitiveness in the industry, self-reliance, entrepreneurship development, FDI and linkages among firms, research institutes and universities. Above all, the government restrictions and monopoly in many industries was abolished except the industries which are of strategic importance (for example defence, nuclear programs) and all manufacturing activities were opened for competition.

In the backdrop of economic liberalization, globalization and ICT revolution a new S&T policy was adopted. In 2003 *Science and Technology Policy Statement* stressed the retention and attraction of human resources as a priority. Government also committed to increase its R&D investment up to 2% of its GDP by the end of the Tenth Plan (2012–17) (Science, Technology and Innovation Policy in 2013). After 10 years, the government again passed the *Science, Technology and Innovation*

Table 1 Chronology of Indian Policy initiative for S&T development

Name of the Policy	Year implemented	Purpose
Industrial Policy Resolution	1948	Industrial growth and economic development
Industrial Policy Resolution	1956	Economic growth, industrialization in a socialist pattern
Science Policy Resolution	1958	Encourage and sustain science and scientific research
Patent Act	1970	Enforcement of Intellectual Property (IP) and related laws, IP regulatory body
Industrial Policy statement	1973	Identified High-priority industries and investment from domestic large firms and foreign firms were allowed
Industrial Policy Statement	1977	Decentralization, industrial growth and prioritized small-scale industries
Industrial Policy Statement	1980	Promote competition, technological up gradation and modernization
Technology Policy Statement	1983	technological capability and self-reliance
Statement on industrial Policy	1991	Economy was liberalized to outside worlds, rules are liberalized related to Industrial Licensing, FDI, Foreign Technology Agreements, Public Sector Policy, and MRTP Act and so on
Patent Amendment act	1999	This amendment of 1970 patent act comply Indian patent regime with the WTO TRIPs Agreement. Product patents in the areas of drugs, pharmaceuticals, and agro-chemicals were allowed effective from retrospective date (January 1, 1995) ^a
The Science and technology policy	2003	Science and technology were taken together. Need felt in the increasing R&D investment
Patent Amendment act 2005	2005	India's patent regime into compliance with the WTO TRIPS Agreement. It extends the product patent protection to the areas of pharmaceuticals and agricultural chemicals. Provisions of patent in traditional knowledge, and genetic resources ^b
Science Technology and Innovation Policy	2013	“Science Technology and Innovation for the people”
National Intellectual Property Policy	2016	IP awareness, Generation of IPR, Legal and Legislative Framework, Administration and Management, Commercialization of IPR, Enforcement and Adjudication, Human Capital Development to “Stimulate a dynamic, vibrant and balanced intellectual property rights system in India”

^aPatents (Amendment) Act (1999)

^bPatents (Amendment) Act (2005)

Policy in 2013 (STIP 2013). The recent policy document is almost a revision of the 2003 policy. Among the many ambitious goals, the STIP 2013 has targeted to increase R&D expenditure to 2% of GDP by encouraging private sector contribution which was not fulfilled earlier (Krishna 2013b).

The STIP 2013 aimed to bring fresh perspectives to bear on innovation in the changing context. India has a huge pool of high skilled and talented scientists and engineers. Keeping in view of this skilled manpower, the policy document is putting emphasis on employing this huge talent pool to bring S&T together for sustainable development. The policy further emphasized to build an ‘innovation ecosystem’ in the country. The policy focuses “on both people for science and science for people and combine the benefits of excellence and relevance”. Above all, the main purpose of policy document is to bring ‘Innovation in Indian Context’. The policy document stressed the need to cultivate scientific temper among different social strata. To culture the scientific temper government has put stress on skill enhancement among the young population. Also, young populations are encouraged to make S&T as a lucrative career. Beside this, policy document has also stressed on the establishment of world class R&D infrastructure for gaining global leadership in some frontier areas of science by the year 2020.

The new STI Policy may be considered as an important step taken by the government for overall national S&T-based development. Followed the adoption of policy, a number of initiatives have already been taken by the government. For example, the decades 2010–2020 is declared as the “Decade of Innovation” and National Innovation Council is established. Moreover, STI Policy 2013 stressed the intellectual property issues which is further strengthened by the New National Intellectual Property policy document adopted in 2016. The policy is also aiming at producing and fostering research and innovation in universities.

The policy document has intended to create an environment for greater private sector participation in R&D. It has planned to forge international alliances and collaborations to meet the national agendas. It stresses on creating an environment for enhanced private sector participation in R&D. The key features of the STI Policy 2013 include, encouragement to young people in science, research, world-class infrastructure establishment for R&D to gain global leadership in some select frontier areas of science (Science Technology and Innovation Policy 2013; Mukhopadhyay 2014, 2015).

In sum, with the span of time, at the various stages of science and industrial policy reforms supported the country to pass through a long but perhaps a successful journey (Mashelkar 2008).

Indian National System of Innovation System (NSI)

NSI in India has evolved over time with an extensive infrastructure for the development of innovative and high skilled knowledge base like Biotechnology and ICT. R&D in India mainly takes place in the federal government and departments (Fig. 1). India has a large pool of technical manpower, a vast universities and research institute networks. Among the prominent institute of research and teachings are; Indian Institute of Science (IISc), Indian Institute of Technologies (IITs), a huge chain of government laboratories like Council of Scientific and Industrial Research (CSIR) Indian Council of Agricultural Research (ICAR) and a number of

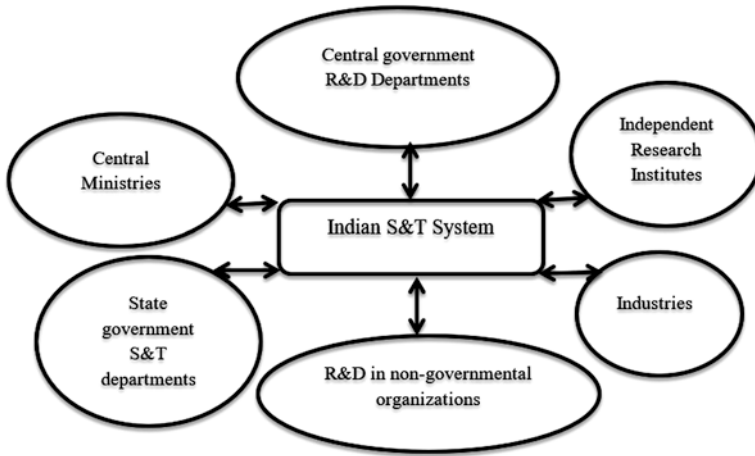


Fig. 1 S&T System in India. (Source: Department of Science and Technology Government of India 2016 <http://www.dst.gov.in/st-system-india>)

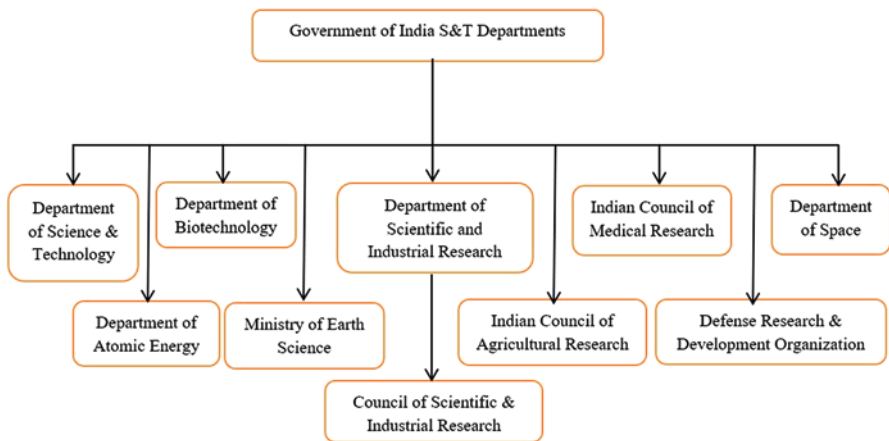


Fig. 2 S&T departments of Government of India. (Source Department of Science and Technology Government of India, 2016 <http://www.dst.gov.in/st-system-india>)

Software and Biotechnology Technology Parks. Government has a vital role in national innovation system, in terms of policy formulation, infrastructure support and R&D spending. In India, government is the largest spender of R&D. Therefore, the government plays a crucial role in the decision-making process relevant to S&T for development (Krishna 2001).

Government of India has six departments that exclusively deal with the matters related to S&T (Fig. 2). Those departments are: *Department of Atomic Energy* (DAE); *Department of Biotechnology* (DBT); *Department of Earth Science* (MoES); *Department of Science and Technology* (DST); *Department of Scientific and Industrial Research* (DSIR) and *Department of Space*. Beside these, there are also

other Government departments which have major R&D operations; for example instance: *Ministry of Defense*, *Department of Agriculture*, and *Department of Chemicals and Petrochemicals* and so on (Herstatt et al. 2008). DST was established in 1971, with the objectives to promote and coordinate S&T activities in the country. DBT was set up in 1986, with a mandate to develop modern biology and biotechnology in India. DSIR has roles in supporting various R&D projects to promote technology development, technology trade, collaborative R&D and so on. Indian Council for Medical research (ICMR) promotes biomedical research in the country through intramural, as well as extramural research. ICMR has developed infrastructure for conducting fundamental and strategic research in the area of medicine and healthcare. Council of Scientific and Industrial Research (CSIR) is an autonomous body works under DSIR. It has a country-wide network of about 38 R&D laboratories, 39 research centres, 3 Innovation Complexes and 5 units. CSIR does research in many areas of basic science, physical, chemical, life science and biotechnology. It plays a very prominent role in overall S&T development in the country. CSIR has started many new initiatives on emerging technologies through targeted consortia research (Dahlman and Utz 2005). Recently, with the changing global context CSIR repositioned itself to meet the present challenges and future demands of Indian people. CSIR@80: Vision & Strategy 2022 document includes roadmap to build a new CSIR for a new India. At the 80th anniversary of its establishment CSIR has prepared this vision with an aspiration to be the global leader in the area of STI (CSIR@80 2011).

South African S&T Policies and Institutions

The role of the state in the evolution of the South African NSI was marked by a strong element of state intervention to shape the structure of most aspects of the South African economy (Scerri 2013). In the post-apartheid era, the newly elected democratic government's priority was to build S&T infrastructure for national development (Kaplan 2004, 2008). Now Department of Science and Technology (DST), South Africa is the major S&T policy and decision making body. The DST's major policy documents are the White Paper on Science and Technology adopted in 1996. After that a number of policy document passed time to time depend upon the pressing need of the country. Among the many, a few important policy documents are, *National Development Research Strategy* (NRDS) adopted in 2002, the *New Strategic Management Model* for South Africa's S&T System was adopted in 2004 and Ten Year Innovation Plan in 2006.

It is mentioned earlier that, the DST is the coordinator for the development of NSI. DST executes its mandate through the implementation of the 1996 White Paper on Science and Technology, the national R&D strategy and the Ten-Year Innovation Plan (TYIP). The plan aims to make S&T a driving force in enhancing productivity, economic growth and socio-economic development. DST's strategic goals are to develop NSI by increasing innovation capacity, knowledge generation,

Table 2 Policy Initiatives towards S&T development in South Africa

Policies	Year adopted	Major goals
The white Paper on Science and Technology	1996	Job creation, quality of life, human resource development, sustainable development, information society
White Paper on higher education	1997	Redress the inequalities in the system of innovation
National Development Research Strategy (NRDS)	2002	This R&D Strategy formulated for human resource development, integrated manufacturing, and strategic plan for agriculture.
Ten-Year Innovation Plan (TYIP) (2008–2018)	2006	Long term goal to drive towards a knowledge-based society and to establish South Africa as a global leader in medicine particularly in traditional medicine, space science, green technology and to achieve minimum development goal by elevating poverty.
National Nanotechnology Strategy	2006	To create an favorable environment to get the possible benefits of nanotechnology for national development
Ministerial review 2012 of S&T system of South Africa	2012	Presented a synopsis of the report on the status of the NSI, and a number of significant recommendations were proposed
National development plan (vision 2013)	2013	Aims to eliminate, poverty and reduce inequality by 2030, develop capabilities, enhancing the capacity of the state, and promoting leadership
White paper for post school education and training 2013	2013	Post-school education and training system to achieve by 2030
National biotechnology Strategy	2014	Promotion of bio-innovation, bio economy, industrial and social development goals.

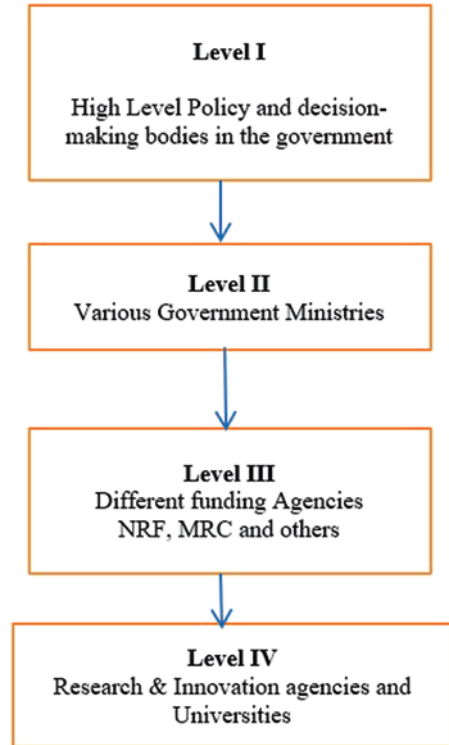
Source: from the various policy documents

and human resource development in S&T. DST also design strategies such as the National Development Research Strategy (NRDS) and the Ten-Year Innovation Plan (TYIP). These strategies are adopted to transform South African economy into a knowledge-based economy, in which the production and dissemination of knowledge will lead to socio-economic benefits and enrich all fields of human endeavor. Table 2 shows South African policy initiative to strengthen the NSI in the country.

South African NSI

In South Africa, formal innovation system R&D takes place in the 26 universities as well as in public research institutes (PRIs). According to OECD report of 2007, the South African NSI can be categorized in four levels with the Parliamentary committee being at the highest level. Parliamentary Portfolio Committee for S&T (comprising members of Parliament) looks after the DST and other agencies. OECD Report put concerned ministries at level two and research and funding agencies

Fig. 3 Institutional structure of South African NSI. (Source: OECD review of Innovation Policy page 107)



(PRIs) at levels three and four. Research councils receive research grant from the respective ministries. So, the research institutions are generally controlled by their parent ministries (Fig. 3).

The Council of Scientific and Industrial Research (CSIR) is the largest performer of R&D. CSIR carried out multidisciplinary research and technological innovation in their chain of laboratories spread all over the country. CSIR receives about 40% of the government grant and the rest is generated through contract researches, royalties, licenses, and from their intellectual property (Reddy 2011; Maharajh, Motala, & Scerri 2011). The other research organizations in South Africa are listed in Table 3.

However, with all these initiatives, it was observed that, NIS in South Africa is quite developed in some respect, but it is yet to be inclusive. Cohesive framework for innovation and learning for example, linkages between firms particularly the domestic firms and research institutions are still absent (Muchie 2003). OECD report of 2007 and also the Final Report of the Ministerial Review Committee DST 2012 asserted the fact that South African NSI is not as competent as it was expected. Minister of Science and Technology, appointed a Ministerial Review Committee in 2012 made an assessment of South African S&T and innovation setting. The aim of this review was to inform the committee of the need to study and recommend the suitable NIS design to meet the future needs of the country. The study observed that

Table 3 Major R&D institutes in South Africa

Name of the institutes	Year established	Purpose
Academy of Science of South Africa (ASSAf)	1996	Represents South Africa in Science worldwide
Africa Institute of South Africa (AISA)	1960	various issues of African affairs
Council for Scientific and Industrial Research (CSIR)	1940	CSIR involved in creation of basic knowledge and application of knowledge in various fields like life sciences; engineering environment and so on.
Human Sciences Research Council(HSRC)	1968	Social science and humanities research
National Advisory Council on Innovation (NACI)	1997	S&T related advisor to the Minister of S&T
National Research Foundation (NRF)	1999	Promotes and supports research in all fields of knowledge
South African National Space Agency (SANSA)	2010	generation and commercialization of space technology
Technology Innovation Agency (TIA)	2008	Promotion of technological innovations
National Intellectual Property Management Office (NIPMO)	2011	Take a stock of IP and revenues generated from it
Agricultural Research Council (ARC)	1990	Agriculture related innovation
Mintek	1934	R&D in mineral related issues
Medical Research Council (MRC)	1969	Coordinates health and medical research activities
Council for Geoscience (CGS)	1912/1993	R&D facilities and expertise related to geology
South African Bureau of Standards (SABS)	1945	Promotion and maintenance of standards
Eskom	1950	Firms industrial laboratory
Sasol	1950	R&D related to fuels, lubricants, road-binding material, new product formulation and testing
ArcelorMittal	1928	Multinational firm's R&D centre related to iron metal and mineral
National Health Laboratory Service (NHLS)	2001	Diagnostic laboratory services
Bureau for Economic Research (BER)	1944	Economic research
National Institute of Communicable Diseases	2001	Assessment of malaria-control program carried out by various authorities in South Africa.
Institute for Economic Research on Innovation (IERI)		Research, capacity-building, analysis of systems of innovation

(continued)

Table 3 (continued)

Name of the institutes	Year established	Purpose
Institute for Security Studies (ISS)	1991	Sustainable development, human rights, law, democracy, security and gender issues.
South Africa's National Energy Development Institute (SANEDI)		R&D on energy related issues
Safety in Mines Research Advisory Committee (SIMRAC)	1996	Health and safety issues of workers at mines in mining industries
National Agricultural Research Forum (NARF)	2002	Agricultural research and development
Water Research Commission (WRC)	1971	R&D and the transfer of technology in water related issues.
Institute for Water Research		Sustainable water-resource management
South African National Biodiversity Institute (SANBI)	2004	Promote and catalyze knowledge about biodiversity
South African Network of Coastal and Oceanic Research		Marine and coastal research
South African Astronomical Observatory (SAAO)	1820	National research centre for Astronomy and astrophysics research
Hartebeesthoek Radio Astronomy Observatory (HartRAO)	1961	National research facilities for Astronomy observatory and research.
South African Institute for Aquatic Bio- diversity (SAIAB)	1938	NRF sponsored research centre to study biodiversity in marine and freshwater water bodies.
South African Environmental Observation Network (SAEON)	2002	Studies of Southern Africa's landscape, indigenous biodiversity, oceans ecosystems and climate change
National Zoological Gardens (NZG)	1899	Conservation research on wildlife related issues
iThemba Laboratory for Accelerator-Based Sciences		National research facilities for R&D and training in subatomic particle accelerator-based technology

Source: Pocket guide to South Africa 2014/15, Science and Technology South Africa, Department of Science and Technology

there are lots of voids in the overall performance of NSI to make a shift from resource based to more knowledge intensive economy. The Committee observed these weakness and come up with policy recommendations (Final Report of the Ministerial Review Committee DST 2012).

R&D Expenditure

Expenditure and personnel for R&D are the first indicators for measuring S&T activities (Sirilli 1997; Frascati Manual 2002). The World Bank data defines R&D expenditure as “expenditures for R&D are current and capital expenditures (both public and private) on creative work undertaken systematically to increase knowledge, including knowledge of humanity, culture, and society, and the use of knowledge for new applications. R&D covers basic research, applied research, and experimental development” (World Bank).

R&D expenditure data for India is available from 1997 in World Bank database and from South Africa the continuous R&D expenditure data is available from 2003 onwards. The figure shows that both India and South Africa spend less than 1% of their Gross Domestic Product (GDP) on S&T. South Africa spent more than India’s R&D expenditure from 2003–2009. However there is a sharp decline in afterwards and South Africa spent about 0.73% of GDP in the last couple of years (Fig. 4). Although Indian government in its latest Science Policy document aimed to spend 2% of GDP is not achieved yet.

Both India and South Africa are well behind the developed countries. The following countries are at the top in terms of spending in R&D in proportion to their GDP. The global top spender in R&D are as follows Israel 4.2, South Korea 4.1, Japan 3.4, Finland 3.3, Sweden 3.3, Denmark 3.05,. The worlds average in R&D expenditure in porportion of GDP in 2012 was 2.1. Both India and South Africa spend bellow this average and should take initiative to increasae their expenditure in proportion to GDP.

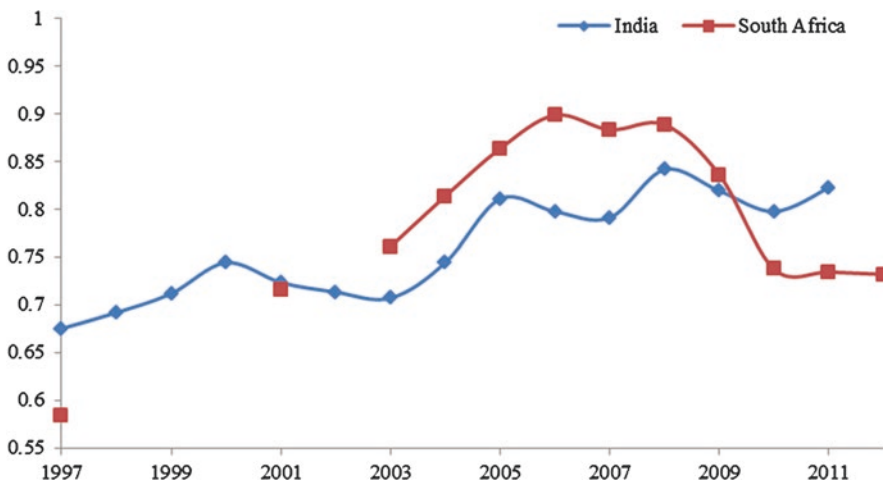


Fig. 4 R&D expenditures as a percentage of GDP. Source: World Bank Data

R&D Personal

Human resources employed in R&D are good indicator of technological capabilities of a country. The S&T personals are the key and an important component in generation and dissemination of knowledge. According to Frascati Manual, Scientific and technical personnel contribute much more than generally assumed in every sphere of knowledge generation through their participation in production, operations, quality control, administration, training and dissemination (Frascati Manual 2002).

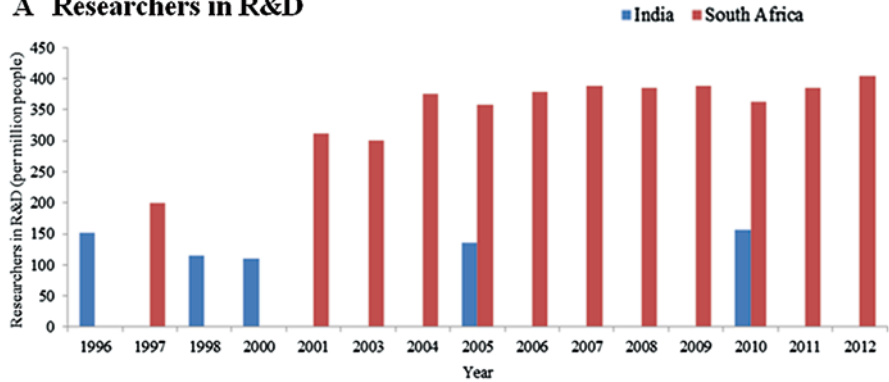
Science and technology indicators include information about S&T personal for a knowledge-based society. The World Bank database considered researcher in R&D personal to the professionals who are involved in the design or generation of new knowledge, products, processes, methods, or systems and in the management of the projects concerned. The statistics also include postgraduate and PhD students. Technicians are the human resources considered to be participants in R&D by performing scientific and technical tasks involving the application of concepts and operational methods. However they generally works under the supervision of principal researchers.

The R&D personal data shows that researchers in R&D (per million people) in South Africa is much more in comparison to India. In 1996 there was about 156 R&D scientists people per million in India where as in 2010 it was about 156 people per million. So, there is not much growth observed and the growth of R&D personal is stagnant. In case of South Africa the number is significantly higher. In 1997 the number was 198 and in 2010 it was about 404 persons per million population. So there is certainly a growth of R&D personal in the last two decades (Fig. 5a).

The technical persons data for both the countries shows that in 1996 India had 152 persons per million of population and in 1997 there was 199 persons per million population in South Africa. In 2010 there was 156 technicians per million population in India. In 2012 there was 405 persons permillion population in South Africa (Fig. 5b). India is second largest populated country in the world so, India may have more number of technical person but in terms of technician per million population South Africa is ahead of India.

In 2013 the number of researchers per million people the top countries around the globe are in the following order Denmark (7264), Finland (7187), Sweden (6472), South Korea (6456), Norway (5575), Japan (5201) Luxembourg (4799), Austria (4703), Germany (4472), Netherlands (4, 302), Slovenia (4, 216), France (4, 153), Portugal (4141), United Kingdom (4055), Belgium (4, 003). In 2010 the world average of researchers for per million people was 1, 268. So, it can be said that both India and South Africa is well below form the world's top performers in R&D and even below the global average.

A Researchers in R&D



B Technical persons in R&D

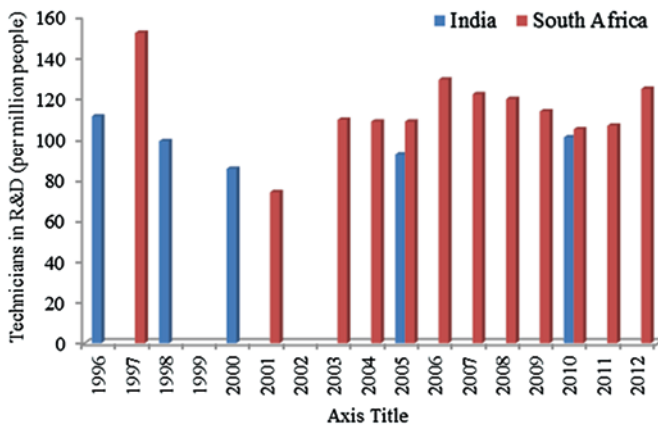


Fig. 5 Number of R&D and Technical Personal. (a) Researchers in R&D. (b) Technical persons in R&D. Source: World Bank Data

High-Technology Export

Some industries are considered as High-technology which has high R&D expenses in comparison to its sales (Chakrabarti 1991). The high R&D intensity industries are biotechnology, Nano technology, aerospace, ICT, pharmaceuticals, electrical & electronics equipment and scientific instruments. A number of studies consider high technology exports as an indicator of technological capability of a country (Lall 2000; Archibugi and Coco 2004 Srholec 2007).

High technology export data shows that from 1990 to 2000, Indian high technology export was almost same with of South Africa. However, after the year 2000, the high technology exports from India significantly increased. In percentage term, the high technology export from India was about 4% in 1992 and in 2014 it was



Fig. 6 High-technology exports. Source: World Bank Data

increased significantly and became almost double (8.5%). In case of South Africa, the high technology export was \$443 million in 1990 and it increased to \$2488 million (a five times increase). However in percentage term the high technology export was 7% of total manufacturing export, but in the year 2014 the export is about 5.8%. So, certainly there is a decline in the export of high technology product in terms of total export (Fig. 6).

Technological Balance of Payment

The technological balance of payments (TBP) is the revenue paid or earned from the transactions of intellectual property rights generated by means of products or processes. This may include technology licensing, patents, trademarks, know-how or even technical assistance. It even includes invisible businesses regarding the purchase and sale of ‘disembodied’ technology in the form of intellectual and industrial property rights. This is considered as an indicator of technology transfer among various countries (Sirilli 1997).

The TBP data from the World Bank database shows that TBP till 2000, both the countries are in similar trajectory. However after 2000 India made more payment where as in case of South Africa after 2011 it is in declining trend. In case of India receipt increased after 2010. However both countries pay more than receipt for the use of technology (Fig. 7).

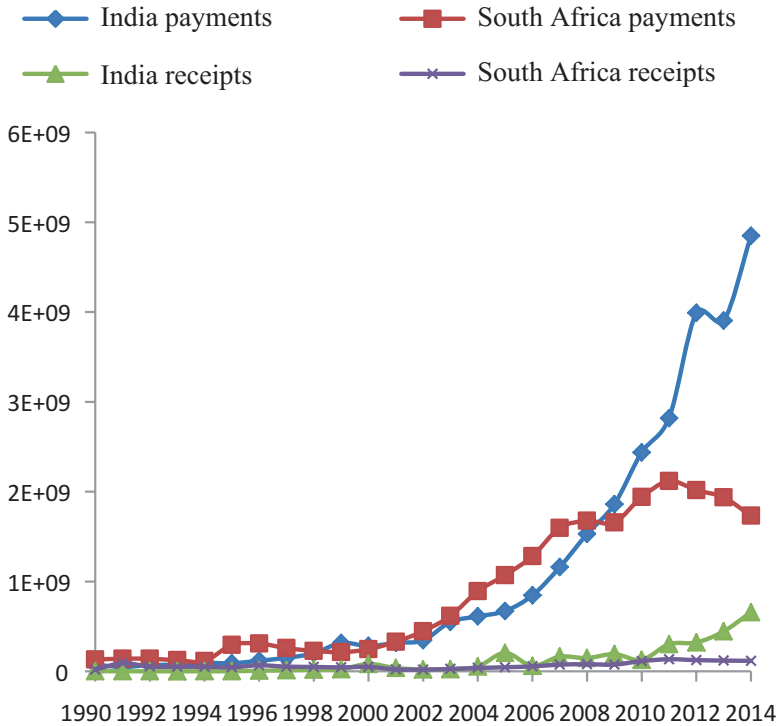


Fig. 7 Charges for use of Intellectual Property (current U.S. dollars). Source: World Bank Data

Bibliometric Assessments

Scientometrics or Bibliometrics (the names are used interchangeably) is now increasingly used as an indicator for mapping science. The assessment of the nature of scientific productivity is the topic of study in Scientometrics. Generally Scientometrics indicators rely on publication counts, citation statistics and also on other bibliometric techniques (Glänzel 2003). With the invention of the Science Citation Index by Eugene Garfield, statistical analyses of the scientific literature came up in a very large scale. It marks the rise of Bibliometrics as a powerful research field within science policy studies (Raan 2005). All significant compilations of science policy studies heavily depend on indicators based on publication and citation statistics (Glänzel 2003). By considering all the documents published in any given field it is possible to determine how they are distributed according to different variables (Andrés 2009a). Although a bibliometric analysis can be applied to define general productivity in a given research field, it can also be used to assess the individual scholar’s productivity, the core journals which publish the majority of the articles are published in a given field, the productive institutions, regions, countries and so on (Andrés 2009b).

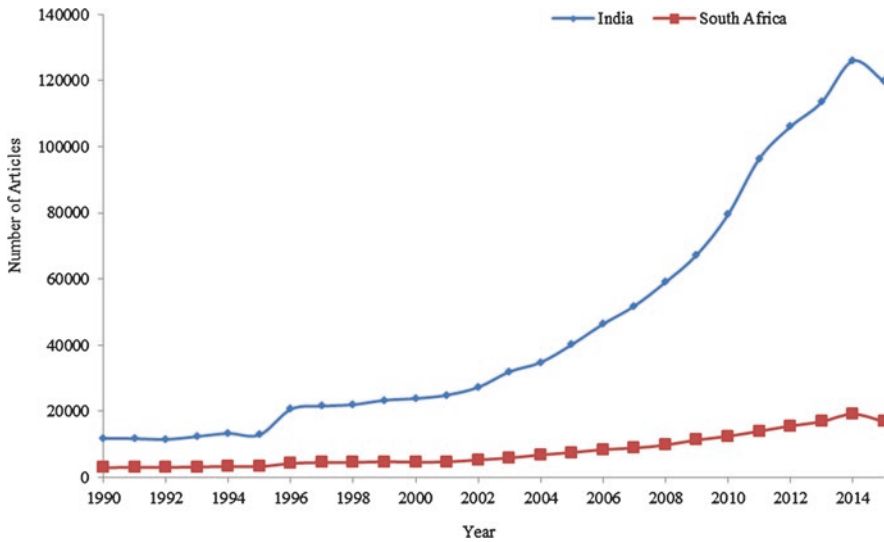


Fig. 8 Growth of scholarly publications from India and South Africa

Scholarly Publication Patterns

Scientific publication patterns as reflected from the scholarly literature indexed in Scopus database shows that Indian publications are well ahead with respect to South African publications. In the initial years both the South African and Indian publications grew at the same pace. In 1990 there was about 11,887 articles from India. Meanwhile, in the year 2015 India produced about 119,696 articles. It is more than 10 times increase with that of 1990. Indian publication got a momentum after 1995 and maintained its growth till 2014. However there is a marginal decline in the year 2015 (Fig. 8).

In 1990 there were 3,012 articles and in 2015, about 16,943 publications by South African scholars. The growth is about five times than that of 1990. In 1990 India produced about 3 times of South Africa and in 2015 it is 7 times than South Africa. The important point to be noted here that, during the study period, South African publication pattern shows a linear growth with no sharp increase.

Subject Categories

Many Bibliometrics studies deal with the distribution of articles across various subject categories. The categorization of articles based on different and previously established *subject categories*. Subject wise distribution of articles shows the strength and activities of an entity (Andrés 2009b). Scopus has categorized all its content into 28 fixed subject areas. The subject wise distribution of articles shows

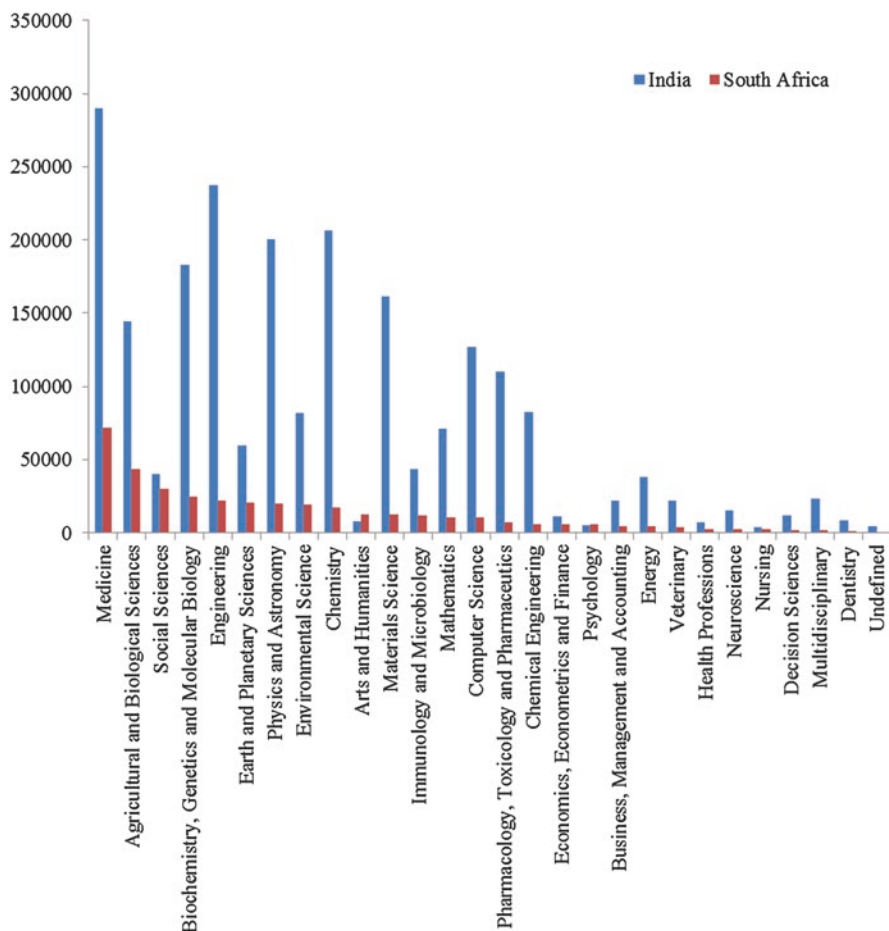


Fig. 9 Subjectwise distribution of articles in India and South Africa

that in India, maximum numbers of articles are published in the medicine followed by engineering subject areas. The publication activities in the top 10 subject areas are in the following order, Medicine, Engineering, Chemistry, Physics and Astronomy, Biochemistry, Genetics and Molecular Biology, Materials Science, Agricultural and Biological Sciences, Computer Science, Pharmacology, Toxicology and Pharmaceutics and Chemical Engineering (Fig. 9).

In South Africa, the maximum activities are observed in the medical fields followed by Agricultural and Biological Sciences. The subject wise publication activities in top 10 subject areas are in the following order Medicine, Agricultural and Biological Sciences, Social Sciences, Biochemistry, Genetics and Molecular Biology, Engineering, Earth and Planetary Sciences, Physics and Astronomy, Environmental Science, Chemistry, Arts and Humanities (Fig. 9).

Journals Ranks

One of the major unit of analysis in a bibliometric study concerns the journals in which the articles are published. By identifying the journals, it is possible to rank journals where most of the articles are published. Journal productivity includes ranking the journals according to the number of documents are published in that journal (Andrés 2009c). By ranking the journals in the order of decreasing productivity it is quite easy to find the important journals where most of the publications of a country occurs. Table 4 list the journals from where most of the South African and Indian scientists publish their articles. In case of India *Current Science* is the top ranked journal. It is a multidisciplinary journals publish articles in various subject areas including sciences, social science and humanities. The top 20 journals and their ranking are shown in Table 4.

The top ranked journal from South Africa is South African Medical Journal followed by South African Journal of Science, Mediterranean Journal of Social Sciences and PLoS One. The ranking of South African journals are shown in Table 4. It is interesting to observe that most of the top ranking journals of India are printed from India. The details of journal productivity are beyond the scope of this chapter. However it can be established that Indian scientist select Indian journals as their preferable mode of publication than international journals. South African publications are not restricted to South Africa but beyond the country and their publication happened in internationally diverse set of journals. However, this evidence is inconclusive and requires further investigation.

Productive Institutes

To rank the productive institutions, the institutional data were sorted accordingly. Table 5 shows the top 20 productive institutes from both India and South Africa. From (Table 5) the top 20 productive institutes, it is observed that universities are the most productive and contribute the major share of publication portfolios for both the countries.

In India, research output of universities and higher educational institute shows that the universities accounts for about 70% of total India's research output. Also, as per the publication pattern, major portion of the research output is concentrated only in a few universities. Although, university publication constitutes the major share of Indian publication profile, universities got less than 5% of Gross Expenditure on Research and Development (GERD). Most of the GERD (about 95%) are spent on PRIs (Krishna and Patra 2015).

In South Africa also universities are the major actor in scientific publication. South African universities altogether produce about 90% of the total South African publication profile. Table 5 shows the top 20 institutes in term of productivity. The top ten universities in terms of productivity are as follows; University of Cape Town,

Table 4 Top 20 most productive journals from India and South Africa

India			South Africa		
Name of the Journal	No of Articles	Country of Publication	Name of the Journal	No of Articles	Country of Publication
Current Science	10,525	India	South African Medical Journal	13,169	RSA
International Journal of Applied Engineering Research	8872	India	South African Journal of Science	2164	RSA
Indian Journal of Medical Research	6410	India	Mediterranean Journal of Social Sciences	1601	Italy
Indian Veterinary Journal	6347	India	PLoS One	1502	US
Lecture Notes in Computer Science	6281	Germany	South African Journal of Botany	1449	RSA
Tetrahedron Letters	6262	UK	Water SA	1425	RSA
Indian Journal of Animal Sciences	6254	India	Lancet	1328	UK
Indian Journal of Experimental Biology	6165	India	South African Family Practice	1237	RSA
Asian Journal of Chemistry	5882	India	Ostrich	1207	UK
Indian Pediatrics	5793	India	South African Journal of Plant and Soil	1195	RSA
AIP Conference Proceedings	5747	US	South African Journal of Surgery	1164	RSA
Journal of the Indian Chemical Society	5532	India	HTS Theologiese Studies Theological Studies	1070	RSA
Indian Journal of Pediatrics	5259	India	South African Forestry Journal	1036	RSA
Journal of Clinical and Diagnostic Research	4602	India	IEEE AFRICON Conference	991	USA
Acta Crystallographica Section E Structure Reports Online	4560	UK	Monthly Notices of the Royal Astronomical Society	969	USA
RSC Advances	4535	UK	Journal of the South African Veterinary Association	914	RSA
Journal of Association of Physicians of India	4525	India	Nature	859	UK
International Journal of Pharmacy and Pharmaceutical Sciences	4387	India	Agrekon	833	RSA

(continued)

Table 4 (continued)

India			South Africa		
Name of the Journal	No of Articles	Country of Publication	Name of the Journal	No of Articles	Country of Publication
International Journal of Pharma and Bio Sciences	4307	India	Acta Crystallographica Section E Structure Reports Online	794	UK
Journal of Applied Physics	4240	US	Transactions of the Royal Society of South Africa	747	RSA

University of Witwatersrand, University of Pretoria, Stellenbosch University, University of KwaZulu-Natal, University of Johannesburg, University of the Free State, North-West University and Rhodes University. However among the total 26 universities only a few are productive. Government research institutes are comparatively less productive in both the countries. Perhaps CSIR and medical research council are geared more towards the commercialization of technology in terms of patents and licensing than publications.

Citation Analysis

Citation analysis is a tool to map the relations between authors or journals. It is based on the reference practices of researchers (Raaijmakers 2005). Although, there are many criticism of citation analysis, it is a fairly good indicator of scientific work with international impact or influence. So, citation analysis enables international comparisons to be more objective (Garfield 1979). It is considered as an important aspect of scientific quality, and thus a “proxy” for quality as observed in bibliometrics literatures (Moed 2005; Confraria et al. 2016).

For a general comparison of papers, the citation data was downloaded from The SCImago Journal & Country Rank website. The web portal ranks scientific publications in various aspects using data from Scopus® database (Elsevier B.V.). The web page based on Scopus database and their analysis considered for this study was from 1996 to 2014. This database studies all citations which a paper receives within 4 years after its publication. It defines citations as “*It is computed considering the number of citations received by a journal in the current year to the documents published in the four previous years, --i.e. citations received in year X to documents published in years X-1, X-2, X-3 and X-4*” (SCImago 2007) (Fig. 10).

The citation analysis shows that average citations of South African papers are more than the Indian papers. In 1996, per paper citation for Indian articles was 11.3. Whereas per paper citation of South African papers were 15.8. This shows more relevance of South African research in global scenario. However further analysis of factors such as self-citation; citations within country will perhaps give a better picture of citation trends in both these countries.

Table 5 Top 20 most productive institutes

India		South Africa	
Name of the Institute	Number of Article	Name of the Institutes	Number of Articles
Indian Institute of Science	38,678	University of Cape Town ^a	43,433
Bhabha Atomic Research Centre	26,706	University of Witwatersrand ^b	32,733
Indian Institute of Technology Delhi	25,425	University of Pretoria	25,939
Indian Institute of Technology, Kharagpur	24,846	Stellenbosch University ^c	25,523
All India Institute of Medical Sciences	22,335	University of KwaZulu-Natal ^d	23,136
Indian Institute of Technology, Madras	22,316	University of Johannesburg	9521
Indian Institute of Technology, Bombay	20,031	University of the Free State	8826
Indian Institute of Technology, Kanpur	19,796	North-West University	7308
University of Delhi	19,614	Rhodes University	7283
Jadavpur University	18,642	The Council for Scientific and Industrial Research	6725
Banaras Hindu University	16,502	University of the Western Cape	5553
Postgraduate Institute of Medical Education and Research	16,220	University of South Africa	4568
Tata Institute of Fundamental Research	16,123	Nelson Mandela Metropolitan University	4447
Anna University	15,533	South African Medical Research Council	4426
Indian Institute of Technology Roorkee	14,110	Tshwane University of Technology	3112
University of Calcutta	13,207	University of Fort Hare	2051
Panjab University	11,135	University of Limpopo	1985
Aligarh Muslim University	11,064	National Health Laboratory Services	1913
National Chemical Laboratory India	10,675	Cape Peninsula University of Technology	1835
Indian Institute of Chemical Technology	10,487	Medical University of Southern Africa MEDUNSA, Faculty of Medicine#	1618

^aIncludes publications from Groote Schuur Hospital & University of Cape Town, Faculty of Health Sciences

^bIncludes publications from Baragwanath Hospital, part of medical school of University of the Witwatersrand

^cIncludes publications from Tygerberg Hospital which is part of Stellenbosch University's Health Science department

^dIncludes publications from The Nelson R. Mandela Medical School # Presently known as Sefako Makgatho Health Sciences University

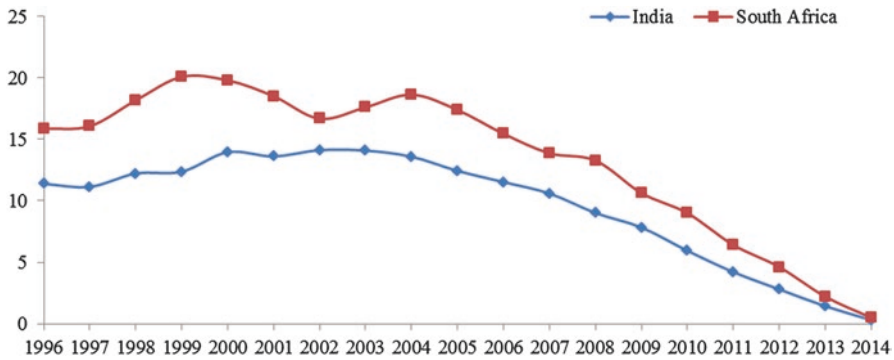


Fig. 10 Citation Pattern

Growth of Patents

A patent is a legal document which gives a temporary monopoly to an inventor. Patent information is used by scholars, business houses and policy analysts to analyze the growth and developments in technology (Nesta and Patel 2005). With the advances in ICT particularly the Internet and Web Technologies the patent data from different patent offices are quite easily available. Hence the publicly available patent data from different patent office is the basis for many researchers (Narin et al. 2005). There are many criticism of patents as a technological indicator. For example all invention is not patentable and there are sectoral differences in patenting (Nagaoka et al. 2011). According to (Nesta and Patel 2005) comparisons using patent data are consistent if data from international patenting are used for comparison purpose. Hence this study use WIPO and US patent database. These databases are quite easily available and contains rich source of information. Moreover, USPTO also use stringent criteria for granting patents and above all US is the world's largest market. So, it is quite obvious that inventors want to protect their invention in the largest market (Nesta and Patel 2005).

For this study patents were searched using respective nationality of inventors. The granted patent data from the USPTO records shows that in 1990 there were only about 35 patents granted to Indian inventors and about 126 patents granted to South African inventors. With the span of time, patents granted to Indian inventors increased considerably. The growth of patenting by Indian inventors increased significantly after the year 2000. In the 2015, about 4667 patents granted to Indian inventors. On the other hand, patents granted to South African inventors show a linear growth. In the year 2015 there are only 244 patents granted to South African inventors. This is almost double in number than the patents granted in 1990 (Fig. 11). So, it can be concluded that South African research is not translated to applied research.

The similar trends has also been observed in patents filed in WIPO patentscope database. The patent records from both the countries were search using the respective countries name in the 'Address Country' or 'Applicant's address country' search field. From 1990 to 2015, there are altogether 7013 patents available in patentscope

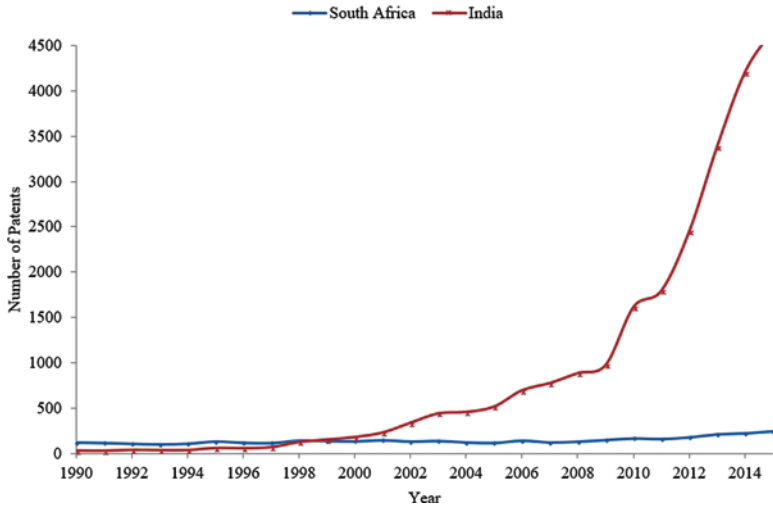


Fig. 11 Growth of patents from India and South Africa as reflected in USPTO

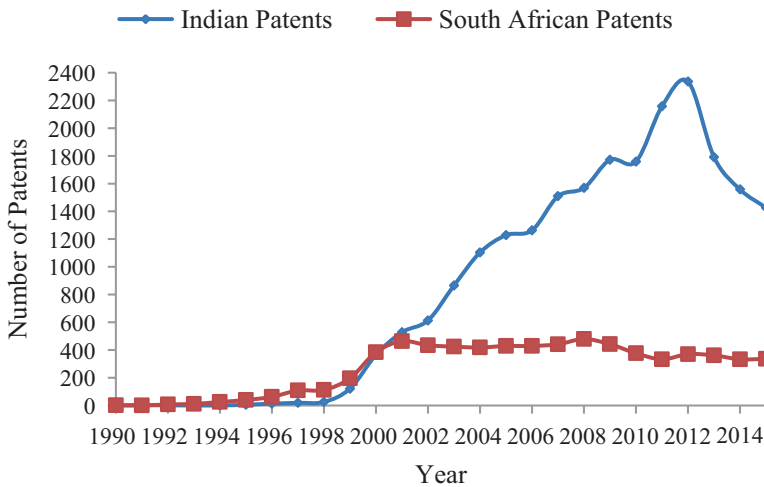


Fig. 12 Growth of patents in India and South Africa as reflected in WIPO

database for South Africa and 22,030 patents from India. The growth of patents filing in patentscope was increased particularly after 2000 in both USPTO and WIPO databases. While in Indian case the growth was exponential with marginal decline in the last two years. In case of South Africa it is a linear growth with only an increase in 2000 and thereafter the growth is maintained in linear fashion (Fig. 12).

To investigate the growth of patents for these countries, the patent data is further analyzed based on the assignees. Among the total records from the individual inventors the patents are categories based on their assignees (It is important to mention here that assignees are the owners of the patents and inventors are creators, scientists, technicians etc.) The patents were further categorized into two groups. In the first group there are “Indian or South African entity assigned patents” in the second group there are “Foreign or individually assigned patents” (Bhattacharya 2004). The first group patents represents the patents granted to Indian or South African entities, for example Indian universities, research institutes or may be individuals. The second group constitutes firms or individual entities patenting from these countries.

In Indian case it is observed that since 1990s the patenting of non-indian assignees overweight the Indian assignees (Fig. 13). In the year 1990 among the total 35 Indian patents granted to Indian inventors, 9 assigned to Indian entities and 26 patents were assigned to non-Indian (foreign or individual assignees). From the years 2000 onwards this trends significantly increased and recently in the year 2015 among the total 4677 patents granted to Indian inventors 784 (about 17%) patents are granted to Indian assignees and 3883 patents(83%) granted to foreign and individual assignees (Fig. 13). The increase in non Indian assignees are because of growing foreign R&D by Multinational firms (MNEs) in India in recent years. Since the last two decades,

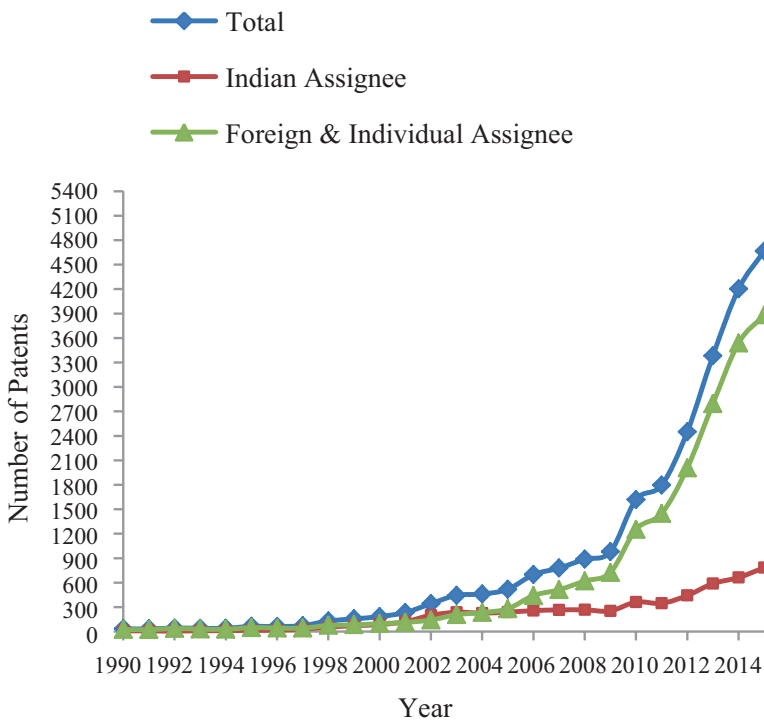


Fig. 13 Patent portfolio of India from USPTO

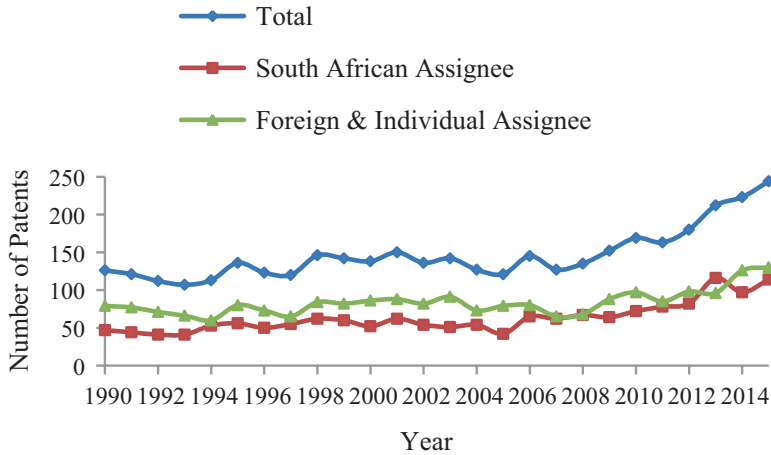


Fig. 14 Patent portfolio of South Africa from USPTO

among the developing countries, India and China have emerged as important destinations for many big MNCs to do their research in these two countries. Many foreign R&D units are developing their products from India for their global product mandate (Krishna et al. 2012; Patra and Krishna 2015). India has become a major destination for many global MNEs to conduct their R&D because India has a huge pool of high skilled manpower available at comparatively lower cost.

In case of South African patent collection, South African entity and non-South African entities are almost in the similar path. Among the total 3810 patents, 1641 patents (about 43%) may be attributed to South African entity and 2169 patents are from non South African entity (foreign firms or individual assignee). It is also observed that the number of individual assignees is more in South African context. Perhaps due to the absence of proper institutionalization, many inventors prefer to file their patents in the patent office individually (Fig. 14).

Discussion

Economic success of a country is highly linked with scientific and technological capability. However, many scholarly literatures observed that TC building is a long term process. It requires different phases of learning and government support in institution building. Although, it is difficult to measure TC precisely in quantitative terms, there are some proxy measures available in terms of input and output indicators. So this chapter is an attempt to measure S&T capability of two developing economies viz. India and South Africa. While analyzing TC, this study reviewed S&T systems and the relevant policies accountable for growth and development of Indian and South African System of Innovation. The performance of the system measured from

the input side (as per the R&D investment, scientific and technical manpower) and in the output side (patent, publication, high technology export and so on). This study tried to benchmark Indian performance for South African performance.

Both the government have realized the role of S&T in national development and adopted policies with the span of time. The revision of policy documents taken place with the pressing need of the time. However, with all these initiatives, it is observed that many a times the promises are not fulfilled. For example Indian government's science policy document of 2003 assured that 2% of GDP will be spent on R&D. However the next policy documents also came without fulfillment of earlier assurances and the same promises was repeated in 2013 policy documents.

While evaluating the TC, India is doing well in terms of high technology export, publication and patents. It is observed that India is well above to South Africa in these respects. However, South Africa is doing well in some other aspects. For example, in terms of per million populations of R&D manpower and technician South Africa is ahead with that of India. However both the countries are far less than the world average of 1268 people per million researchers. The scientific and technical manpower in these countries are need to be increased with more institutes of higher learning, technical colleges and vocational trainings. High technology export constitutes about 8–9% of total manufacturing export. However both India and South Africa is far below the world average (18.4%).

NSI in these countries, quite developed in some respect, but it is yet to be inclusive. Among the few constrains the number of skilled R&D professionals is perhaps the limitation. There are periodic reviews on NSI in South African case. However this kind of reviews in Indian case is comparatively rare. According to the OECD report of 2007 on South African NSI and the Final Report of the Ministerial Review Committee of DST in 2012, have asserted the fact that South African NSI is underperforming. South Africa's Intellectual Property Right (IPR) system is comparatively forward-looking in many aspects. Legislative provision is strong as it can be seen from its IP law (Kaplan 2009). However, South Africa's NSI has generally not been as strong as it might be desired, in terms of innovation outputs (such as publications, patents, high-technology exports and royalty income) when compared with the increases in resources committed. Kaplan (2009) noted that it is quite possible that a time-lag may occur until policy changes begin to have an effect on outputs.

Concluding remarks

This study is an attempt to map the TC of two countries from the Global South. It compares Indian and South African NSI in terms of input and output indicators. Although, it is quite difficult to measure capabilities precisely in quantitative terms, but it can give a fairly good idea of TC. In terms of TC India is quite ahead than South Africa in some respect but South Africa is also doing quite well in some aspects. However, in global landscape both countries are lagging behind in terms of R&D expenditure, people per million researchers and technicians. The study

observed many issues; for example in terms of high skilled manpower and investment on R&D require attention in both the cases. In terms of output indicators, universities are good at basic research in both India and South Africa, but the university research is not translated into applied aspects. Universities may be incentivized to get their IP protected in terms of patents. Also, industry –university linkages require particular attention. South Africa may open and develop conducive environment for firms particularly the foreign firms to do their R&D in South Africa. The local institutes may develop linkage with foreign firms and increasing linkages among universities and firms may perhaps help to move up into the value chain.

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Part IV
Conclusion: Setting Research Agenda for
Innovation and Integrated African
Development

Conclusion: Setting Research Agenda for Innovation and Integrated African Development



Samuel Ojo Oloruntoba and Mammo Muchie

The book has shown that socio-economic development in Africa is inextricably tied to innovation that is anchored on an integrated policy at the national, regional and continental levels. As various contributors have demonstrated in this volume, there is an acute limited capacity for innovation at the national level in many African countries. The limitations at the state level is particularly informed by the structural disarticulation of the economies of the various African countries. As scholars have shown, dependence on export of raw materials and unprocessed minerals cannot foster sustainable development in Africa (Page 2016). According to UNECA (2016) there are new momentum in boosting innovation and regional integration in Africa both at national, regional and continental levels. From Kenya and Ethiopia in East Africa to South Africa in Southern Africa as well as Nigeria and Ghana in West Africa innovation hubs are being established where new products are manufactured.

The dynamism of African economies requires that innovation transcends the traditional approach, by combining national systems of innovation with social innovation, indigenous innovation and regional systems of innovation. Within the context of the imperative of decolonization of knowledge, it becomes pertinent for research institutions and universities to set a research agenda on issues of social innovation and indigenous innovation in Africa. Concerning the latter for instance, precolonial African societies developed innovation systems that helped in the preservation of foods, monitoring of weather conditions and general agricultural planning which ensured food security. In the healthcare sector, systems of innovation were also developed for healing of sicknesses and diseases. To a very significant

S. O. Oloruntoba (✉)

Thabo Mbeki African Leadership Institute, University of South Africa, Pretoria, South Africa
e-mail: oloruso@unisa.ac.za

M. Muchie

Tshwane University of Technology, Pretoria, South Africa

extent, colonialism led to the abandonment of these systems of innovation, through deliberate relegation of indigenous systems of knowledge production. Compared to China, India and other postcolonial societies, where indigenous knowledge system still plays important roles in production of knowledge in governance, economy, health and other sectors, Africa has fared badly. Although people in the rural areas still engage with nature in finding solution to their various challenges, the official attitude of government officials has been that of scorn and neglect. In instances where government formulate policies on these issues, lack of adequate funding has always affected the sustainability.

Beyond the need for a comprehensive research agenda on innovation, is the imperative of carrying out more exploratory studies on how to build regional institutions that can better manage innovation in Africa. To a great extent, the weak capacity of the state in Africa has continued to affect the extent to which regional institutions can function. Apart from lack of enough capacity to mobilise capital to finance regional institutions, it has also been observed that corrupt bureaucrats at the national level, who think that their base of accumulation is threatened by a more functional regional governance architecture, always undermine regional institutions (Kaplan 2006). This argument is further reinforced by the low level at which regional agreements are mainstreamed into national development strategies in Africa. Scholars have argued that lack of political will hinder effective implementation of regional agreements (Adedeji 2012, 2002). In the same vein, bureaucrats at the national levels lack incentive to support regional institutions because of the limited access that they have to extract rents. It is therefore pertinent to carry out further research on how to ensure that bureaucrats are sufficiently motivated to support regional and continental initiatives geared toward building regional systems of innovations. Indeed, given the pervasiveness of corruption at the national level, in which bureaucrat's forge alliance with elected officials to steal public resources, regional governance can enhance transparency through institutionalisation of policies and procedures. The argument for this is in two-fold. First, politicians could have lower leverage of extracting rents from regional institutions than the ones at the national level. Two, bureaucrats at the regional level of governance can maintain higher degree of independence than their counterparts at the national level.

Although the historical context might be different, examples from South East Asia and Europe show the extent to which regional integration can foster socio-economic development. Each of these blocs have, through experiences build regional systems of innovations, as well as regional supply and value chains that have contributed to the dynamism and sophistication of their economies. Despite the challenges affecting regional integration in these regions, there are certainly a lot of things that African countries can learn in the current drive towards building regional systems of innovation.

In the context of the AU's Agenda 2063, it is pertinent to build required human capital to engage on issues of innovation for development. As UNECA (2016) notes, Science, Technology and Innovation Strategy for Africa 2024 sets out a means to follow through on the Agenda 2063, feeding into the recognition of

technology and innovation as mechanisms to implement the recently adopted Sustainable Development Goals.

The limitations of the neo-classical approach to regional integration and national systems of innovation, which focus essentially on creation of market access and flow of investment necessitate the need to move beyond this conventional approach. Tang, Baskaran, Yan and Muchie (2015) provide an alternative approach to the dominance of neo-classical approach to regional integration and innovation. In their estimation, the neo-classical approach to regional integration has been informed by trade promotion and flow of investment. They consider this approach to be too narrow as it is mainly concerned with gain and loss. These authors proposed what they call Neighbourhood System of Innovation, which goes beyond consideration for trade and investment to include non-economic variables such as knowledge, learning, innovation and competence (KLIC). They note that Neighbourhood System of Innovation captures the reciprocal interactions between national innovation systems (NSI) of larger regional economic poles (REP) or smaller economies (or among NSIs of the smaller economies) in the Neighbourhood region.

The importance of regional economic poles, what Olorunfoba and Gumede (2017) calls regional hegemony cannot be overemphasized. Given the disparities in the domestic capability of states in a given subregion, it has always been the case that relatively developed countries take on the responsibilities of taking leadership positions in underwriting the costs of integration. Examples from Europe and Asia show the leadership role of Germany and China in this respect. In Africa, Nigeria, South Africa and Kenya have been playing similar roles in the process of integration in Economic Community of West African States, Southern Africa Development Community and East Africa Economic Community, respectively. Another important contribution of the Neighbourhood System of Innovation is the emphasis on non-economic gain that countries in such regional community can receive. In this respect, Knowledge, Learning, Innovation and Competence can be derived through cooperation among member countries. The authors provide a detail component of the dimensions of the KLIC as follows:

The process of KLIC involves various factors such as firms, universities, public research institutions, government and non-government agencies, other educational and financial institutions and linkages between them through varieties of science, technology, and innovation (STI) mechanisms both at government and non-government levels. These include joint research projects (JRPs), joint training programmes, joint publications, cooperation in Intellectual Property Rights (IPR) issues, exchange of researchers and students, entrepreneurship development, and technology transfers in non-business areas, p213

As Africa countries continue to grapple with the task of leveraging on regional integration to advance socio-economic development, more research is needed on the Neighbourhood System of Innovation in ensuring that the objectives of integration should not be limited to trade and investment flows. Rather, sharing of knowledge, leveraging of competencies, especially those of the regional economic poles, reconstruction of identities from national to regional as well social interactions, should be part of the objectives.

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