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***Key messages from the report: Assessing Regional
Integration in Africa VII: Innovation, Competitiveness
and regional integration***

I. Introduction and background

1. The report *Assessing Regional Integration in Africa VII: Innovation, Competitiveness and Regional Integration (ARIA VII)* is the latest publication in the ARIA series. The publication is jointly produced by the Economic Commission for Africa (ECA), the African Development Bank and the African Union Commission. The present paper provides a short summary of key messages from *ARIA VII*.
2. Over the decade from 2000 to 2010, the African continent as a whole registered annual economic growth rates in excess of 4 per cent. Over the long term, however, Africa's growth has been far below that recorded by the Asian developing countries. Moreover, Africa's recent growth spurt has had virtually no impact on the underlying structural configuration of its national economies.
3. Indeed, evidence presented in *ARIA VII* for a sample of 15 African countries for the period between 1995 and 2010 shows that 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. Even South Africa, the continent's most scientifically and technologically advanced country, has been mired in low total factor productivity growth, reporting a mere 0.04 per cent in 2010.
4. Review of the evidence shows that 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 per cent – and sometimes even more – of observed economic growth rates. Africa must therefore implement innovation-friendly policies if it is to achieve sustained economic growth and transformation.

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5. Against this backdrop, *ARIA VII* examines how regional integration, innovation and competitiveness are interlinked and explores how Africa might harness these linkages in the service of its development. In addition, the report provides an overview of regional integration trends in Africa, including an analysis of data from the Africa Regional Integration Index.¹

II. Key messages of the report

A. Status of regional integration in Africa

6. The signing of the Tripartite Free Trade Area Agreement and the launch of the continental free trade area negotiations represent significant steps towards Africa's trade integration. The Tripartite Free Trade Area Agreement, concluded between the Common Market for Eastern and Southern Africa (COMESA), the East African Community (EAC) and the Southern African Development Community (SADC), was signed in June 2015. While much work remains to be done to put the agreement into effect, this is nonetheless a substantial step towards rationalizing Africa's regional trade arrangements. In addition, the negotiations on a continental free trade area were formally launched, also in June 2015, and are expected to continue until the end of 2017.

7. Africa's regional economic communities are continuing to conclude new formal trade agreements among their members. ECOWAS launched its customs union in January 2015; by April 2015, eight of the Community's 15 member States had already begun to implement the common external tariff required under the customs union. In addition, Arab Maghreb Union (AMU) member States have signed three out of the four protocols needed for the Union's own free trade area.

8. While African countries have taken a number of measures to boost trade in goods within the continent, much more remains to be done. Several of the regional economic communities have managed to reduce tariffs on intra-regional imports to a relatively low level: out of those communities with free trade areas, EAC has a zero average applied tariff on imports within the Community, while the Economic Community of Central African States (ECCAS) and COMESA both apply tariffs averaging around 1.9 per cent. The intra-regional tariffs applied by SADC and ECOWAS are higher, at 3.8 and 5.7 per cent respectively. COMESA, EAC, ECOWAS and SADC have all taken significant measures to facilitate transport and lower non-tariff barriers.

9. The rise in intra-regional trade in intermediate and capital goods suggests that regional value chains are starting to form. Africa's intra-regional trade in intermediate and capital goods grew at an average real rate of above 11 per cent annually between 1999 and 2013, greatly outstripping the continent's real growth in gross domestic product (GDP) of 4.4 per cent annually.

10. There appears to be great untapped potential for boosting intra-African trade in services. African countries are currently estimated to import between \$98 billion and \$183 billion in services from outside the continent. The lowering of barriers to trade in services between African countries could enable African firms to capture much of this business. But African countries have high barriers to trade in services: 19 of the 26 countries studied for the *ARIA VII* report fall in the bottom half of the global rankings for ease of trade in services.

11. Economic Partnership Agreements with the European Union and so-called "mega-regional" trade agreements make it more important than ever for Africa to conclude the continental free trade area and trade facilitation reforms, and to do so quickly. The economic partnership agreements and mega-regional trade

¹ The Africa Regional Integration Index is a joint project of the African Development Bank, the African Union Commission and ECA to monitor African countries' progress in implementing their commitments under the various dimensions of the pan-African integration frameworks.

agreements, once concluded and put into effect, would be likely to undermine Africa's regional integration and – in the case of the economic partnership agreements – result in revenue losses for a number of countries, or – in that of mega-regional trade agreements – undermine the continent's overall trade performance, including through preference erosion, unless the continental free trade area comes into effect first. Making sure that this happens would prevent the aforementioned negative side-effects, particularly if combined with trade facilitation reforms, and indeed result in significant benefits for Africa.

12. Macroeconomic performance remains mostly sound, though the economic slowdown in China could pose difficulties for some countries. In addition, a number of African banks are opening operations across the continent. Some regional economic communities, notably EAC and ECOWAS, have taken steps to facilitate movement of their nationals between the member countries of their respective community. Progress in other communities is much more limited, however. The average ratification rate for community protocols on the free movement of persons remains at 60 per cent.

13. Africa is successfully employing innovative methods to raise infrastructure finance and to drive forward the realization of strategic infrastructure projects. The continent is also working on a number of energy projects that have the potential to provide energy not only to the countries in which they are being constructed, but also to their neighbours, such as the Grand Ethiopian Renaissance Dam, which is expected to produce an annual electricity output equal to Ethiopia's current annual electricity consumption.

14. EAC, ECOWAS and SADC have all taken steps to harmonize their mining policies and standards. In that context, the African Mining Vision provides a blueprint for harmonized mining policies throughout the continent.

15. African countries are demonstrating a strong commitment to peace and security cooperation. At the last count, over 45,000 African personnel were committed to United Nations peacekeeping missions within Africa. African leaders successfully negotiated swift returns to civilian rule following coups d'état in Burkina Faso and Mali. Lastly, African forces from multiple countries have made substantial progress in combating the terrorism waged by Boko Haram in West Africa and by Al-Shabaab in Somalia.

B. Regional integration, innovation and competitiveness: theoretical and empirical insights

16. Regional integration is both a driver and beneficiary of innovation. 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.

17. In addition to contributing to the creation of new ideas, and to facilitating their transmission across borders, regional integration can also enhance incentives for innovation. For instance, in order to encourage innovation, one of the major aims of modern free trade agreements is to strengthen laws and regulations concerning the ownership of intellectual property rights. At the same time, anticompetitive and efficiency-reducing regulations and practices that allow firms to extract excessive benefits from their intellectual property and other areas of comparative advantage are targeted for reform. The negotiations on Africa's continental free trade area include the areas of intellectual property and competition policy, with a view to establishing common rules and approaches among African countries.

18. The larger consumer markets provided by the regional economy mean more demand and ultimately greater returns on any investment made in innovation, providing further incentives in this direction. Deep regional integration between States also enables innovators to cluster in more effective ways, as may be seen from the growth and spread of the electronics industry among the member countries of the Association of South-East Asian Nations (ASEAN).

19. In an already integrated market, an innovation resulting in a competitive good or service in one country may lead to increases in trade and cross-border investment between countries in the region. In addition, from the standpoint of political economy, where a market is not integrated, innovation in one country may increase the gains through specialization to be secured from trade and thus strengthen the political imperative to integrate. This, in turn, is likely to generate more integration. Furthermore, the deeper the degree of integration and the larger the economic community being created, the greater the potential benefits for innovation.

20. For countries that are focused on institution-building and technological and economic catch-up, integration with more developed partners can help to facilitate convergence through enhanced technology diffusion. Innovation drives growth and structural transformation through increased productivity. The most obvious manifestation of structural transformation is sectoral allocation, characterized by movement towards higher levels of the value chain (i.e., towards higher value downstream economic activities). Empirical evidence shows that innovation, in various forms, encourages growth. The impact of innovation accounts for a substantial share of economic growth: around 50 per cent – and even higher – of observed economic growth rates. The actual figure depends on such factors as the country's level of economic development, and the phase in the economic cycle.

21. Evidence presented in this report for a sample of 15 African countries shows that growth in most of the sample countries has been through factor accumulation and not through significant improvements with input combinations of the kind associated with innovation. Even South Africa, one of the countries in the sample and the continent's most scientifically and technologically advanced country, has had low total factor productivity growth.

22. However, empirical evidence suggests a positive correlation between innovation and competitiveness in Africa. Only 4 per cent of new innovations are based on research and development, while the rest are the product of practical experience, or the process known as "learning by doing".

23. Countries that are late developers in science and technology can use innovation to seize opportunities, not only in emerging industries, but also in mature industries. Moreover, latecomers benefit from entering mature industries without having to bear the burden of the initial research and development costs. Countries that are late developers can adopt the most up-to-date products and services, processes (e.g. energy revolution, fusion of technologies in search of new solutions), organizational methods, and marketing tools as part of their catch-up and leapfrogging strategies.

24. In particular, like other world regions, Africa has evidently benefited from innovations made possible by information technology. As a consequence, the promotion of better take-up and use of information technology is imperative as such technologies are inherently innovation enablers. Africa should strengthen regional integration to boost innovation and competitiveness. These processes further enhance innovation capacities if they are supported by appropriate science, technology and innovation policies and strategies.

25. Based on these theoretical and empirical insights, the report makes the following recommendations as to how further regional integration boost Africa's capacity for innovation and competitiveness:

- Through regional cooperation, African countries may be equipped with research infrastructure either for country-specific research or region-specific research. This will reduce duplication and cost; ensure that the research interests of smaller and poorer States are not ignored; and enable the exploitation of economies of scale and technology transfer among member States. Currently, many African, countries do not have adequate and modern research infrastructure. Modern research is expensive, with very high fixed and marginal costs, posing a particular challenge to the least developed countries. The Desert Locust Organization of Eastern Africa (DLCO-EA) and the Pan-African Rinderpest Campaign provide examples of research collaboration that can be scaled up in other sectors. In particular, Africa's regional economic communities should set up regional research areas, as the building block of an African research area, together with regional science, technology and innovation programmes which will pool the scientific and technological resources of their member States. Such an arrangement would enable the transfer of technology and skills and the more efficient use of scarce resources. It would also enhance the competitiveness of the region's research institutions, and improve their attractiveness to external collaborators.
- Regional economic communities should also seek funding for these initiatives within their regions. They should reduce dependence on external sources for the financing of their policy choices. It is critical for these communities to identify science, technology and innovation programmes that may not only be designated as community programmes and funded from community budgets but could alternatively be executed by some of their member States on a cooperative basis. This will reduce transaction and search costs for researchers in the member States.
- African Governments should promote private sector, regional and international collaboration and partnerships. While national interests must remain central to policy, governments should nonetheless align their science, technology and innovation policies as far as possible with the corresponding policies and frameworks of the regional economic communities to which they belong and to the African Union's Science, Technology and Innovation Strategy for Africa 2024. They should also expand partnerships in the area of science, technology and innovation through South-South cooperation, while maintaining and strengthening traditional relationships with countries of the North. In pursuing partnerships with non-African entities, African governments should minimize their dependence on technical assistance, including from international consultants, for the development, formulation and articulation of their science, technology and innovation policies.

C. Innovation and the global intellectual property regime

26. The advanced countries of today applied the protection of their intellectual property in a very selective manner to meet their industrial development and other policy objectives. It is clear from historical record that the design of intellectual property rules and policies should be adaptable to the development and changing needs of societies.

27. All African countries – both least developed and others – can adopt strategies to maximize policy space in key sectors such as agriculture, manufacturing, public health and more broadly in access to knowledge. Although the Agreement on the Trade-Related Aspects of Intellectual Property Rights (TRIPS Agreement) under the World Trade Organization (WTO) took away some of the policy space that was previously available to developing countries under the treaties adopted in the framework of the World Intellectual Property Organization (WIPO), flexibilities, including that referred to as the “freedom to operate” (i.e., to adapt patented technologies to create a new innovation without violating the TRIPS Agreement) remain.

28. In general, African countries need to establish intellectual property policies and laws that are appropriate to their development challenges in various sectors and should therefore consider adopting differential standards of intellectual property protection within the flexibilities available under the TRIPS Agreement. Least developed countries in particular have an extendable transition period and therefore the possibility of making maximum use of TRIPS flexibilities to design nationally appropriate intellectual property policies. African countries should endeavour to make full use of the policy space provided by global intellectual property regimes.

29. In Geneva, African countries have been actively pursuing rule-making initiatives on intellectual property in policy areas of interest to the continent. This is a commendable initiative and the Doha Declaration on the TRIPS Agreement and Public Health is a rare example of success in this endeavour. On the other hand, initiatives on global intellectual property rules for the protection of genetic resources, traditional knowledge and folklore, and the extension of geographical indications,² which can help to counter the real problem of bio-piracy, are yet to bear fruit. The African Group in Geneva should therefore continue to engage with the WIPO Intergovernmental Committee on Intellectual Property and Genetic Resources, Traditional Knowledge and Folklore for text-based negotiations for an international legal instrument. At WTO, the African group should continue to engage with the TRIPS Council and related bodies on various issues of interest to the continent, including extension of the register on geographical indications and technology transfer.

30. At the national, subregional and continental levels, African countries need to be more strategic in harnessing intellectual property to enhance innovation and competitiveness as important levers for structural change and the regional integration agenda. Africa’s intellectual property organizations, the African Regional Intellectual Property Organization (ARIPO) and the African Intellectual Property Organization (AIPO) have in recent years made efforts to collaborate but these efforts are insufficient and linkages to the regional economic communities and broader regional integration objectives are still weak. In addition, connections between these organizations and science, technology and innovation policy frameworks at national, regional and continental levels are tenuous. The mandates of ARIPO and AIPO are mostly limited to examining, granting and registering patents. These organizations generally do not work on issues relating to the exercise of patent rights and on countering intellectual property mercantilism

² A geographical indication is a sign used to identify the geographical origin of products that possess particular qualities (or a particular reputation) due to that origin. Further information on geographical indications may be found at the website http://www.wipo.int/geo_indications/en/.

(i.e., support for excessive protection of intellectual property owned by nationals or companies of one's own country). This limits the extent to which these organizations can help States to identify and use intellectual property flexibilities. Moreover, ARIPO and AIPO are disconnected from free trade and bilateral investment agreements with external partners, although intellectual property rights are included within the definition of investments protected under these agreements.

31. The negotiations on a continental free trade area and the effort to establish a pan-African intellectual property organization provide an opportunity to systematize Africa's approach to regional cooperation on intellectual property policy. These two initiatives must employ mechanisms to safeguard TRIPS flexibilities to address development needs. A continental free trade area agreement on intellectual property could provide the basis for establishing a common approach to the negotiation of intellectual property rules in trade and investment agreements with external partners. A strategic approach to intellectual property policy at the continental level could further provide the basis for cooperation and pooling resources among African countries and regional economic communities, with a view to building the capacities required for intellectual property governance, administration and adjudication.

32. The Sustainable Development Goals that were adopted by the United Nations in September 2015 include two targets, 17.6 and 17.7, that concern technology transfer through a balanced approach to intellectual property rights. African countries should remain active on this issue and work to facilitate the operationalization of the targets.

D. Africa's science and technology policies

33. Human capital investments, complemented by initiatives to extend the reach and build the capacities of the tertiary education sector, will provide the foundation for effective policies on science, technology and innovation in Africa. The provision of quality tertiary education is still a major challenge in African countries. During the 1960s and 1970s, African governments expanded the higher education sector by establishing new universities and dedicated scientific and technological research institutes to undertake research on priority development challenges. This was later followed by efforts to create appropriate governance institutions to oversee the national STI effort. However, these efforts were generally poorly coordinated, the institutions were inadequately funded and the outcomes often inadequate.

34. During the 1980s and 1990s, the economic stress associated with structural adjustment programmes resulted in significant cuts in higher education financing and the outmigration of qualified scientists and technologists from African universities to the domestic private sector or to foreign – mostly Western – countries. The tertiary education and research sector in Africa has yet to recover fully from this crisis. Graduates are not well prepared for the work force and laboratories are poorly equipped to produce a top-notch work force in science and technology; the number of African students enrolled in the so-called "STEM" disciplines (science, technology, engineering and mathematics) at the graduate level is low by comparison with other regions of the world. Yet, the needs are very high. Accordingly, more effective policies and resources are required at national, regional and continental levels to develop the tertiary education and research sector. This reform must include governance changes (greater autonomy and independence in government-owned higher education institutions), greater differentiation between higher education institutions in the public and private sectors and some cost recovery. It must also include greater alignment between education policy, science, technology and innovation policy and industrial policy to ensure national relevance of the output from the education system and the development of capacities in science, technology, engineering and mathematics.

35. Since the science, technology and innovation policies of different African countries have tended to be quite similar in content, there is no strong evidence that they are properly adapted to country particularities. Indeed, to be successful, science, technology and innovation policies should take into account the particular environment in which the interventions are undertaken, which would usually differ from country to country. The preparation of detailed country profiles as a precursor to the actual enactment of a science, technology and innovation policy will contribute greatly to the improvement of the quality of the policy. It is with this in view that ECA has developed a framework for preparing country profiles in science, technology and innovation. Furthermore, African countries should conduct regular reviews of such policies, because the pace of technological change is rapid. It is recommended that countries should review their science, technology and innovation policy regularly, at least once every three years.

36. The continent should follow a mixed approach to policies on science, technology and innovation, blending sectoral and horizontal policies, governmental and non-governmental policies, and private sector initiatives. Sectoral policies can result in the creation of new sectors, in such areas as chemicals, pharmaceuticals, green technology, etc., either through technology transfer or through endogenous scientific and technological efforts. Sectoral policies can also focus on improving the efficiency and competitiveness of existing sectors, such as agriculture and manufacturing. Horizontal science, technology and innovation policies are of a general nature and include education and human resources development policies, local content policies and market incentives (taxes and subsidies) that do not target specific sectors. Though important, these seldom provide impetus for the creation of new sectors.

37. Fiscal constraints mean that African governments are currently unable to mobilize and deploy sufficient resources – both financial and human – to develop their science, technology and innovation capacities to competitive levels. The resource paucity typically faced by African domestic business sectors exacerbates the situation. International collaboration in the development of these capacities is helpful and desirable but there is no evidence of a country being able to develop a science, technology and innovation capacity through development assistance alone. Accordingly, contrary to the current situation, where African countries rely to an excessive degree on support from development partners for the development of science, technology and innovation capacities at all levels (national, regional, and continental), domestic funding should play the key role in these endeavours.

38. This should also apply to national, regional and continental institutions and agencies concerned with the governance of science, technology and innovation, including the relevant organs of the African Union Commission and the New Partnership for Africa's Development (NEPAD) Planning and Coordination Agency, which should be better funded and with a larger contribution by African governments and the African private sector. Governments should evaluate these institutions on a regular basis, invest in them and professionalize them. African countries will first need, however, to take measures to raise the level of domestic funding available for such activities and to bring to an adequate level. For its part, the leadership of the African Union Commission should seek to mobilize funds for science, technology and innovation from Africa's emerging multinational corporations, building, for example, on the example of the campaign against Ebola, and philanthropies.

39. Effective management of development processes necessitates the design and implementation of results-based monitoring and evaluation frameworks. To date, however, most African policies on science, technology and innovation lack such an important management instrument. There is an urgent need to remedy this weakness.

40. The African Union should maintain and strengthen its efforts to raise awareness of the importance of science and technology on the continent. The Science, Technology and Innovation Strategy for Africa 2024 is deepening the conversation on the importance of science and technology on the continent,

identifying additional sectors where the continent must engage science, technology and innovation to achieve its development and transformation aspirations. It is also developing indicators to enable countries to improve their policymaking in this area. In addition, the African Union science awards at the annual sessions of its Assembly of Heads of State and Government are helping to raise awareness and popularize science on the continent.

41. The other regional economic communities should emulate the East African Community by setting up a regional anchor institution for science, technology and innovation (as building blocks for a future such institution at the African Union level) to drive the regional agenda at the subregional level. For its part, the future pan-African anchor institution could be modelled after the science, technology and innovation arm of the United Nations Educational, Scientific and Cultural Organization (UNESCO). Working in collaboration with the NEPAD Office for Science, Technology and Innovation, it would develop joint programmes and manage Africa's pan-African centres of excellence in science, technology and innovation, such as the proposed pan-African university of science and technology and pan-African institute of technology.

42. The institution would be financed solely by member States' assessed contributions and would be responsible for managing the African science and technology innovation fund. Together with the future pan-African intellectual property organization and the Department of Human Resources, Science and Technology of the African Union Commission, this anchor institution would be responsible for setting the continent's agenda and priorities in the area of science, technology and innovation.

43. To encourage and facilitate progress in scientific research, the African regional economic communities should consider:

(a) Establishing prizes and awards to recognize excellence in science, technology and innovation, as some communities have already done. These efforts should be expanded to include private sector firms whose research and development and innovation activities have regional dimensions and contribute to improved competitiveness;

(b) Adopting English as their universal language for scientific purposes. Across the world, including the most advanced and industrialized countries, much of today's scientific research is conducted in English. Even if the original publication is not in English, an English translation often follows.

44. It is imperative to cost investments into science, technology and innovation. While African governments all aspire to reach the African Union's target of 1 per cent of gross domestic product for investment in science, technology and innovation, none of the sectoral or horizontal policies was costed to determine their feasibility and consistency with absorptive capacity. Governments should in future conduct such detailed costing and use it to inform their policies on science, technology and innovation. Doing so will enable them to make the difficult choices and trade-offs critical to successful policymaking.

45. African countries should remove barriers to involvement of more women in science, technology and innovation. It is striking that, according to estimates, women make up less than 20 per cent of the science, technology, engineering and mathematics workforce in Africa. Progress is being made in a number of countries, however. A number of the national science, technology and innovation policies set a goal of providing more incentives for women's participation in science, technology and innovation. Across the continent, increased enrolment in all three tiers of the education system has resulted in an increase in the enrolment rate of women in STEM disciplines, and also in their graduation rate.

46. At the same time, very few women return to pursue postgraduate courses in STEM disciplines. Governments should take proactive measures to tackle the factors hindering the full participation of women in the science and technology workforce, including cultural biases and attitudes towards women in science and

technology, gender discrimination, and a working environment that fails to take account of the needs of young mothers. In addition, special scholarship programmes and other measures should be established to encourage graduate studies in STEM disciplines by women.

E. Lessons from India

47. This section of the report provides an examination of India's experience in the implementation of a proactive human capital policy designed to build a strong educational infrastructure and to increase skills and learning competencies with the ultimate goal of boosting innovation.

48. Quality public-funded colleges and universities of higher and technical education are essential for the overall development of the higher education sector. It is therefore important that the State plays a critical role in providing good quality public education, with access for the poorer sections of the society. In India, the Indian Institutes of Technology, Indian Institutes of Science, and other such institutes which are funded by the central Government are the best examples of a public education system. The drawbacks stemming from the large-scale privatization of higher education must be taken into account in the formulation of holistic policies in higher education.

49. Tertiary education should produce skills conducive to the conduct of location-specific research, in particular in agricultural and other areas. It is important to establish a vocational education and training system which interacts with industries. This system needs to be aligned with market needs, and this alignment can be achieved through private participation, curriculum development, the upgrading of infrastructure, the introduction of performance incentives for educational institutes and the relevant regulatory authorities, and greater autonomy to respond to market skill requirements.

50. India's experience suggests that Africa should encourage a bottom-up, location-specific approach to innovation, where the policy framework encourages innovations to meet local needs and local development priorities, while making the most of local resources and capacities. India did not have any consistent policy framework on innovation until the introduction of the country's comprehensive science, technology and innovation policy in 2013. The need for innovation helped India to embark on what may be termed its programme of "frugal innovation", made possible by a few pioneering individuals but not by the government at large.

51. An African regional innovation fund, along the lines of India's National Innovation Foundation, could pool financial and human resources to work on areas of innovation which are important for the continent and its countries. It is equally important to establish regional institutes of excellence for higher education in science and technology, which must attract the best talent from across all countries in Africa, with affordable fees for students. In addition, institutes of vocational education and training must be established at the regional level.

52. Africa should tap the immense potential offered by its diaspora. India has put in place 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. An Africa-wide initiative could draw suitable lessons from the Indian experience by tapping its diaspora in industrialized countries. In particular, appropriate policies and the means to implement them must be put in place by governments to ensure that initiatives and innovations in science and technology benefit from this potential "brain gain". 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.

F. Lessons from the Association of Southeast Asian Nations

53. A case study of the Association of Southeast Asian Nations (ASEAN) examines the Association's experience in supporting innovation and competitiveness as part of the remarkable transformation that has been seen in this region. The findings of the study are summarized below.

54. A soft and minimalist approach to regional integration can be effective. Commensurate with its soft and minimalist approach to regional integration, ASEAN provides freedom for its member countries to implement regional policies, action plans and other measures in their own way, unlike other regional frameworks that are highly prescriptive. The ASEAN model of cooperation is driven by realistic and achievable goals with implementation related to country specificities. Where regional frameworks are in place, they reflect the level of development and requirements of the countries. Considering that the majority of ASEAN members are in a catch-up stage of development and lack the capacity to innovate, emphasis appears to have been placed on facilitating such catching-up through the inflow and diffusion of technological innovations, rather than by promoting home-grown technological innovations.

55. An emphasis on trade, investment, integration of supply chains and labour mobility has worked well for ASEAN. Within a regional integration context, innovation can also be facilitated through collaboration in such diverse areas as: capital mobility, trade, education (e.g. exchanges, research networks, etc.), and labour mobility (including skilled labour). These ties and linkages have been emphasized in the evolution of the ASEAN economic community through various trade and cooperation agreements.

56. ASEAN countries have not established strong joint intellectual property frameworks or harmonized intellectual property institutions. At the same time, the Association has proved that an approach based on dialogue and consensus-building, without necessarily engaging in harmonized arrangements, can also provide a regional framework for innovation. Focused collaboration through such projects as ASEAN IP Portal are proof of the ways in which regional integration, even among countries at different levels of development, can foster innovation.

57. The Association's agreements with external partners generally do not go beyond internationally established norms or obligations for intellectual property protection as provided by the global intellectual property regime. The potential of intellectual property to transform the ASEAN region into one that is innovative and competitive is acknowledged. It is envisaged that intellectual property will not only stimulate cultural, intellectual and artistic creativity and its commercialization, but also promote the efficient adoption and adaptation of more advanced technologies and continuous learning to meet the ever-rising performance thresholds. In this way, intellectual property is considered to foster regional dynamism, synergy and growth.