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Making Higher-Education the driving force for the Development of Sub-Saharan Africa

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Executive Summary

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1. GDP growth in Sub-Saharan Africa (SSA) has accelerated from an average annual rate of 2.0 percent during the 1990s to over 6.0 percent during 2002-2007. This remarkable economic turnaround is the result of increasing macroeconomic stability, of reforms which have whittled away market imperfections, reduced trade barriers, and most consequentially, of rapidly increasing global demand for the natural resource based commodities exported by sub-Saharan countries. This swelling demand, fuelled by the expansion of the leading Asian economies, has improved the terms of trade for some countries in SSA, and increased substantially the transfer of resources from abroad while stimulating investment in the primary sector, in infrastructure and in urban housing and services. Coming after more than two decades of stagnation, the recent spurt in economic performance is a welcome development.

2. But if this growth surge is to evolve into a virtuous spiral that stimulates even higher and sustained growth rates in a substantial number of African countries, a significant increase of investment in physical and human capital is needed over an extended period. This report argues that there is an urgent need for countries in SSA to acquire the capabilities which will spawn new industries that create more productive jobs, multiple linkages and a wider range of exports. The desired capabilities derive from investment in physical assets – infrastructure and productive facilities –in institutions, and in human capital. We have stressed human capital in this report, because in the context of SSA, it is arguably the stepping stone to a viable and growth-promoting industrial system. Physical investment and institutions are important complements. But as experience has shown, the former cannot be efficiently utilized or maintained where technical and managerial skills are in short supply, and the latter cannot be engineered or implemented when human capital is desperately scarce and of questionable quality. The salience of human capital is increased by the necessity of moving up the technological ladder so as to diversify into higher value, knowledge- and research-intensive activities with good longer term demand prospects, which promise better returns and are less subject to competitive pressures. However, this is not the only reason why human capital is becoming central to SSA's growth strategy. Human capital, effectively harnessed, would enable African economies to increase allocative efficiency and maximize the returns from (initially) limited supplies of physical capital. Moreover, it is only through the application of knowledge that African countries will be able to cope with potentially crippling threats from prevalent diseases, expanding youthful and urbanizing populations, and impending climate change.

3. Africa's stock of human capital with secondary and tertiary level skills is comparatively small.[1] Its quality is highly variable and the accumulation of skills in some countries is dampened by mortality arising from infectious diseases and by emigration of many of the most talented. Only by raising the rate of investment in human capital can the region reach and sustain the level of economic performance it needs to generate an adequate volume of employment for expanding populations, to achieve various MDG targets, and to narrow the economic gap between SSA and other developing regions. The report identifies and analyzes the challenges which countries in SSA are faced with in seeking to achieve these aspirations. It underscores the role of tertiary education in meeting these challenges and, by drawing on African and international experience, it indicates the policy steps which will enable African tertiary institutions to support knowledge intensive growth strategies.

The rising salience of tertiary education

4. A wealth of recent research has convincingly established the relationship running from the accumulation of physical capital and total factor productivity (a commonly used measure of knowledge capabilities) to growth. The two are interrelated. Capital contributes directly to growth through embodied technological change which enhances productivity. Because technological change is increasingly skill biased, human capital complements the creation of productive capacity. Human capital affects growth through multiple channels: by increasing allocative efficiency and the efficiency with which assets are managed, utilized, and maintained; through entrepreneurship; and through innovation which raises productivity, unlocks new investment opportunities, and enhances export competitiveness.

[1] Tertiary level education comprises all post-secondary forms of education, including universities, technical institutes, teaching colleges, open universities, and other programs that lead to the award of academic diplomas or degrees.

The spread of information and communications technologies (ICT) is further strengthening the demand for skills and, in particular, for skills of higher quality.

5. Private and social returns to education have consistently been high. Earlier research found larger returns for primary education than for secondary or tertiary education. However, the picture is changing and the returns to tertiary education have risen appreciably. Private returns to tertiary education in low income countries are now frequently on par with the returns from primary education. Each additional year of education can yield 10 to 15 percent returns in the form of higher wages. Furthermore, micro studies are identifying links between skills and higher productivity at the level of the firm, while research using macro-data is showing that R&D raises productivity, as does the quality of education (measured by middle school test scores). In fact, a one year increase in average tertiary education levels would raise annual GDP growth in SSA by 0.39 percentage points and increase the long-run steady state level of African GDP per capita by 12 percent. This may be a result of the competitive pressures released by the integration of the global economy, the acceleration of technological change, and the skill intensity of newer production methods and services.

6. By raising the level of education and its quality, countries in SSA may be able to stimulate innovation, promote the diversification of products and services, and maximize returns from capital assets through more efficient allocation and management. In the face of competition from South and East Asian countries, a more skill intensive route to development could provide both resource rich and resource poor countries an avenue for raising domestic value added.

How the World Bank's approach is changing

7. The World Bank has long championed education and continues to view the MDG goal of universal primary education as a necessary objective for developing countries. However, for all the reasons spelled out above, and in the light of recent trends in technology, neglecting tertiary education could seriously jeopardize longer term growth prospects of countries in SSA while slowing progress towards MDG goals, many of which require tertiary level training to implement. While affirming the continuing importance of primary education and also of secondary education – which condition the overall productivity of the labor force and constitute the stepping stones to higher learning of quality – this study concentrates on the tertiary education sector only, complementing recent World Bank reports which analyze other major components of the education system.[2] The report seeks to inform discussion and policymaking as African countries consider the types of innovations needed to build tertiary education systems equal to the global economic challenges these countries are and will be facing.

8. A more knowledge-intensive approach to development is emerging as an attractive option for many African countries. In fact, it is possibly the only one that could permit sustained outward oriented development. Even though social and political demands press for expansion of enrollment at public tertiary institutions, these must be balanced against the need to raise the relevance of education and research, and by targeting the production of those technical skills and areas of applied research that will promote competitive industries. Too rapid an increase in enrollments, as has happened in the recent past, has eroded quality and is undermining the contribution of tertiary education to growth.

9. Thus, the inability to manage the expansion of enrollments in traditional public sector tertiary institutions in ways that preserve educational quality and provide sustainability in financing is a major obstacle for nations seeking to join the knowledge economy. Arguably, private universities, technical institutes, non-resident community

[2] *Achieving Universal Primary Education by 2015: A Chance for Every Child* (2003); *At the Crossroads: Choices for Secondary Education and Training in Sub-Saharan Africa* (World Bank 2008a); *and Skills Development in Sub-Saharan Africa* (Johanson and Adams 2004).

colleges, and distance learning programs could offer financially viable avenues for continued enrollment expansion, while public institutions go through a period of consolidation that concentrates on boosting quality, reinvigorating research, and solidifying graduate programs. In the long run, traditional delivery systems for tertiary education based on residential campuses and face-to-face teaching may need to be supplemented by or transformed into different delivery models if sustainable expansion of post-secondary enrollments is to take place.

Why tertiary education and its quality both matter

10. There are at least four reasons for prioritizing to educational quality over quantity at the higher levels of education. *First*, it substantially increases the effect of education spending on economic outcomes – quality is more closely correlated with growth. *Second*, there can be little doubt that workers with higher quality cognitive as well as technical, communication, and team skills are better able to assimilate technology, to push the knowledge frontier, to work in groups, and to make efficient decisions. These are the "capacity" skills which SSA badly needs if it is to build the requisite technological capability for competitiveness and to serve as the basis for innovation in applied research in fields such as engineering, and the biosciences. The latter, for example, hold out the promise of more productive, nutritious and better adapted varieties of crops, new food processing technologies, new medicines, new biofuels, and new materials. Such products and processes will enable SSA to transition into a higher growth trajectory that facilitates progress towards MDG goals in poverty reduction, food security, education and health. *Third*, tertiary institutions which are equipped to impart quality education and conduct relevant applied research are also more likely to cultivate multiple linkages with industry and to stimulate knowledge-based development through a variety of proven channels, only a few of which are currently utilized in Africa. Tertiary level institutions in SSA, along with research institutes, have an increasingly vital role to play in helping industry gain access to and leverage advances in domestic and foreign technology and diversify into a broader range of products. *Fourth*, as many countries in Africa and in other regions are finding, simply expanding tertiary education is no panacea. Where its quality is low and there is a mismatch between skills and demand, many graduates have difficulty finding employment. Tertiary institutions need to be better attuned to market demand for both near term needs as well as to provide students with the solid grounding in basic disciplines that will enable them acquire new skills in the future if market demands shift as they are likely to. This will not eliminate frictional unemployment of graduates, but under conditions of macroeconomic stability, they could reduce the waste of public resources and human capital that it entails.

Flight of human capital

11. The mismatch between skills and demand, starting salaries that are below the expectations of graduates, few job opportunities and unsettled political conditions, are also responsible for the emigration of tertiary graduates from African countries and the reluctance of students who study overseas to return to their home countries. The brain drain continually subtracts some of the more highly qualified individuals from the domestic pools of human capital. Net emigration from SSA was 0.57 million in 1995; it fell to 0.29 million in 2000; and then rose to 1.07 million in 2005. An estimated one-third of these were university graduates. Moreover, while their remittances bolster household consumption and are a valuable lifeline for poorer families, in some instances, they exert upward pressure on exchange rates, making it harder for producers in the affected countries to enter export markets for low-end manufactures and tradable services. While acknowledging the cost imposed by the brain drain, we underscore the longer view. The option to migrate provides incentives to acquire specialized education; the expanding diasporas of knowledge workers from Africa are a potential reservoir of talent and entrepreneurship that some countries are beginning to tap into through internet-based collaboration, for example. They are also a source of $22 billion in remittances for SSA. Moreover, if countries are able to maintain their performance and attractive job opportunities multiply, talent has a tendency to flow back.

Regional solutions

12. Some difficulties in equilibrating the market for tertiary level skills might be most effectively dealt with through regionally coordinated interventions which shape the supply of graduates and the demand for skills. In view of the small size of many of the countries and the limited resources at their disposal, regional partnerships among groups of countries would be both cost-effective and more likely to help build institutions which have the scale and the finances to provide specialized training and conduct strategic research. In many cases, the best route to establishing a regional center of excellence may be through the development of a strong national institution that progressively creates a regional sphere of attraction as its reputation grows. As economic liberalism and competitiveness spread around the globe, regional trade and development pacts among African countries, such as the Southern African Development Community (SADC), the Preferential Trade Area (PTA) and the Economic Community of West African States (ECOWAS), have been gaining political support and institutional capacity. They could provide a basis for coordinating regional approaches to the strengthening of tertiary education systems. But for regional initiatives to have their desired impact, procedures and institutional capacities that enable student mobility within the region and ascertain the equivalence of degrees among countries will be required.

Shortcomings of tertiary institutions and past policies

13. Efforts to reform tertiary education systems to enhance quality and increase the supply of S&E graduates in particular have been ongoing in most African countries since the 1990s and heartening evidence of progress is visible in some countries and within numerous tertiary institutions. Still, no country can convincingly claim to have put its tertiary education on a sound long-term footing and no university from SSA is represented in the ranks of the top 200 universities in the world. The nature of the reforms required has been frequently rehearsed and cases of successful individual institutional reforms have been documented. But system-wide reform efforts have fallen short in three important respects.

14. First, very few countries have adequately recognized the increasing skill intensity of development and viewed the reform of tertiary education as integral to their economic growth strategies. The connection of national economic development strategies with the type, quality and number of tertiary graduates needed to implement them has yet to be made. For this reason, there has been insufficient headway towards defining development objectives for tertiary education, identifying the policy actions sufficient to achieve these, imposing a time frame for their implementation, and monitoring progress

15. Second, with technology absorption and technological capabilities becoming the keys to industrial competitiveness and to gains in factor productivity, the flagship universities in each country have yet to nurture problem-oriented research that would interact with and contribute to the leading economic sub-sectors. This research should be framed to provide the basis for technological catch-up and the foundation of a national innovation system. East Asian economies are all committed to knowledge-based development because they now see advances in technological capabilities as inseparable from rising economies. SSA cannot afford inaction on this front, and time is increasingly of the essence in a globally competitive economy.

16. Third, complementary organizational structures in SSA countries are still not in place to strengthen technological capabilities. Various countries have adopted different forms to suit their needs. For instance, India created the Council of Scientific Industrial Research which is an independent body under the Prime Minister tasked with promoting research in areas with commercial promise, building R&D capabilities, and disseminating research findings (World Bank Institute 2007). The Fundacion Chile has achieved fame in Latin America through its successful efforts to start-up innovative enterprises in association with the private sector, assist them in accessing and adapting technologies, and more broadly has helped to create an infrastructure for the acquisition and transfer of

technologies. Other examples include the Malaysian Agricultural Research and Development Institute which works with the Malaysian Palm Oil Board and the universities to develop new products based on Malaysia's major tree crops (Rasiah 2006). Finland has set up TEKES – the Finnish Funding Agency for Technology and Innovation, a public funding body specifically for R&D conducted by tertiary education institutions, firms, and research institutes. Through its funding of linked strategic priorities, it steers and coordinates R&D activities conducted by various entities.

The Present in Perspective

17. Tertiary education in Africa has come a long way in the past two decades. Enrollments have expanded at 8.7 percent annually, compared to 5.1 percent for the world as a whole, and have tripled since 1990 to almost 4 million students. The number of tertiary institutions now surpasses 650 (some 200 public and 450 private). The private sector has established itself as an important part of the tertiary system, accounting for 18 percent of enrollments in the region. Women's access to tertiary education has improved markedly, from one out of six students in 1990 to roughly one out of three today. More diversified tertiary systems have been put in place through the creation of specialized institutions dedicated to agriculture, teacher training, science and technology, and women's education. Capacities for distance education have been developed within existing institutions as well as through wholly dedicated open universities. One-third of African nations have now introduced quality assurance agencies and ten countries have also established oversight agencies or "buffer bodies" to manage tertiary system development. As a result, maturing tertiary education systems now characterize numerous African countries.

18. But these achievements have come at a high price. On average, SSA countries now spend 18.2 percent of government budgets on education, a share that approaches the upper limits of what is generally considered to be feasible. The nations of the region also allocate 20 percent of their education budgets to tertiary education, an amount that borders on the high end of what is accepted as good practice. At the same time, household surveys indicate that families spend a significant amount of their income on education, and currently rising food and fuel prices may squeeze these possibilities in the future.

19. In spite of this effort, enrollment growth has outpaced financing capabilities and in many cases resulted in deteriorating educational quality. Public expenditure per tertiary student has fallen from US$ 6,800 in 1980 to US$ 1,200 in 2002, and recently averaged just US$ 981 in 33 low income SSA countries. The ratio of academic staff to students has fallen significantly, producing over-crowded classrooms and unrelenting workloads for teaching staff. This has contributed to a severe crisis in staffing, compounded by retirements (with many more to come), brain drain, AIDS attrition, poor working conditions, and insufficient output from post-graduate programs. These dynamics have forced some institutions to begin hiring BA degree-holders to teach undergraduates, and have generally hobbled research output across the continent. However, in spite of the expansion in enrollment, only five percent of the relevant age cohort is receiving tertiary education.

20. The future therefore, promises no immediate relief from these pressures as a rising tide of graduates from basic education, testament to the success of a decade of Education for All efforts, is now jostling for entry into secondary education and will soon be banging on the doors of tertiary institutions. Left unchecked, a continuation of current trends will produce a further tripling of tertiary enrollments by 2020. Enrollments will be fuelled by record numbers of youth as a demographic "bulge" works its way through the SSA education system in the decade ahead. The interplay of these two factors will generate intense social pressure for access to higher levels of education that most elected politicians within Africa's relatively new democracies will find impossible to ignore. As noted above, both the state and households are already at or near the limits of what they can reasonably contribute to the financing of tertiary education. Thus, the formidable policy challenge is that of balancing educational quality against rising enrollments, which could triple by 2020, and how to pay for both of them.

21. The ideal solution lies in a well-managed macroeconomic environment that produces sufficient growth to expand the pool of government revenue so all economic and social sectors might benefit. A complementary option is for government to encourage further expansion of private provision – in various Asian and Latin American countries private tertiary enrollments account for 60 percent or more of the total – along with appropriate quality assurance guarantees. An as yet untested solution is the possibility of developing different and more cost-efficient modes of educational delivery than the traditional model of residential campus face-to-face instruction. However, the private sector institutions are unlikely to produce the S&E graduates to meet SSA's needs.

22. Ultimately, the range of policy choices lies between the easy path of *laissez faire* expansionism and the more difficult road of strategic quality management. Unfettered expansion is really no solution. It will lead to further declines in educational quality, an over-production of graduates in relation to the absorptive capacity of the labor market, consequent high graduate unemployment, and associated risks of political instability that will increase the difficulties of generating economic growth. Strategically managed expansion will require committed and visionary political leadership capable of coalescing stakeholder agreement concerning key disciplinary areas for expansion and investment that will provide human resources of the quality required for implementing the national economic development strategy. It will also depend on institutional capacities to forge links with the labor market and to mount productive public-private partnerships around applied research in identified areas of strategic importance. This would need to be complemented by incentives for private provision of education in areas not favored with priority in government funding, and by longer term efforts to put in place lower cost delivery models for tertiary education based on combinations of short-cycle courses, non-residential campuses, computer assisted instruction, self-paced learning, and distance education. This latter pathway of strategic management seeks to recast tertiary education as an instrument for economic growth instead of viewing it as a general social entitlement.

A Framework for Reform

23. Africa's recent spurt in economic performance potentially enlarges the resources available for crafting the kinds of tertiary education systems that countries in SSA now require. The danger that growth could slide back to earlier levels if SSA countries do not take measures to sustain it by diversifying and upgrading their industrial bases creates incentives for African policymakers to be far more aggressive in transforming their tertiary education and research systems into one of the principal drivers of national growth. But for tertiary education to contribute to growth, it must itself become more competitive. Given the long lead time it takes to achieve substantial improvements in tertiary system relevance and quality, as well as to build fruitful research institutions, the current window of opportunity is a temporary one. The world will not wait for Africa to catch up.

24. Specifying the sufficient conditions is one hurdle, but the lesser of two. Translating them into practice will be the harder task to tackle, although examples of relevant successful initiatives can be found in Africa and elsewhere. We divide the sufficient conditions into two task sets which would need to be pursued in tandem. One set addresses the demand for skills and the traversal to a knowledge environment. The other seeks to relieve constraints within tertiary education pertaining to the supply of services and their quality and to the dissemination of knowledge.

Demand-side Reforms

25. Demand-side policies seek to maximize the absorption of skilled workers into adequately paid jobs. In addition to interventions contributing to macroeconomic stability and a favorable business climate, productivity-led growth supported by the development of knowledge and skills would be advanced through three types of demand-side interventions.

- Incentives for knowledge intensive industries, domestic and foreign, and the creation of science parks in the vicinity of leading universities. Regional coordination would help to achieve a critical mass of skills and a desirable scale of market opportunities.
- Seed capital for high-tech start-ups. This could be coupled with financial incentives for R&D by public and private firms, institutional and fiscal measures which encourage the provision of such financing, and stronger support for research by public and private research entities. Again, regional coordination and a pooling of resources can make it easier to achieve an optimal scale for research institutes, specialization in research and a division of labor among countries.
- Public-private mechanisms for internships to place tertiary education graduates in firms so as to encourage skill absorption and the transfer of knowledge, particularly to SMEs. This could be combined with incentive schemes inducing tertiary institutions and firms to enter into collaborative research, design, testing or product development.

26. In other words, a tertiary education supported growth strategy which seeks to raise the quality and volume of skills and knowledge must be buttressed by policies acting on demand. These policies would ensure an adequate return to skills and induce firms to climb the technology value chain. They can also moderate the brain drain and even create the conditions for a brain gain.

Supply-side Reforms

27. To fulfill the supply-side conditions, governments need to pursue seven tasks:

- Encourage a diverse mix of institutions – private, public, and specialized ones catering to specific segments of industrial needs or the student population;
- Strengthen the governance and autonomy of tertiary institutions and stimulate competition among them on a national and even regional basis;
- Subject all tertiary institutions to quality-based accreditation requirements, monitoring and performance assessment;
- Take urgent measures to offset the impeding retirement of a large fraction of faculty members in public institutions? and to simultaneously begin augmenting the supply of instructors as well as their caliber through better pay scales and other professional incentives. This needs to be complement with an overhaul of pedagogic practices, curricula, and access to libraries, laboratories and IT facilities;
- Foster applied research in a few strategic areas within flagship universities. Provide incentives for tertiary institutions and firms to collaborate in garnering technological capability, and setting up institutions for disseminating and commercializing the fruits of research;
- Ensure that reforms, which will be costly to introduce and will need years to reach fruition, are consistently supported by funding from public budgetary sources. But public funding alone will not be sufficient, and consequently must be supplemented from other sources, e.g. tuition fees, income producing activities, private donations, competitive grants, royalties etc. In other words, a comprehensive financing plan with strong incentives for reform is always the cornerstone of a transformed tertiary education system.

28. The name of the game now is knowledge intensive development. It calls for a new outlook – more strategic and nationally integrated – on the nature of the contribution that education can make to industrialization, to exports, to the building of a more resilient economy, and to confronting the 21st century challenges posed by climate change, AIDS, food security, energy supply, and more. It calls also for a reappraisal of past empirical findings on the relationship between education and growth in response to changed circumstances. In particular, it points to a

rebalancing of the relative attention given to primary, secondary and tertiary education in light of where countries are with respect to their primary education goals, the state of tertiary education, and the anticipated role that knowledge and skills are expected to have in their future growth. And all of this must be incorporated into a new understanding of the role and mission of tertiary education within a global knowledge economy. This new outlook, together with the policy interventions it implies, comprise a pathway to the vital skills and increased knowledge that African economies are certain to require if they are to increase their competitiveness and thereby prolong their recent growth.