Draft for Comment

Skills Development for Economic Growth in Sub-Saharan Africa

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I. Introduction

Sub-Saharan Africa is acknowledged to be the critical development challenge of our time. Average per capita income in 2005 was $477 (excluding South Africa) compared to the developing country average of $583. Among nine countries with the relevant survey data for 2000-2005, poverty rates are as high as around 70% in Sierra Leone and Zambia, and no lower than around 35 percent in the remaining countries[1]. Underlying the low per capita level and high poverty rate are high rates of unemployment or under-employment and low rates of productivity. Across the continent, policy makers feel under pressure to provide productive job opportunities, particularly to the youth. To do this, the economies have to grow faster. Faster economic growth would require a number pre-conditions which are now familiar—a stable macroeconomic environment, good governance, an environment supportive of the private sector, higher capital investment, etc. However, a critical ingredient that does not usually get the attention it deserves is skills development; skills development to increase productivity, make economies competitive, and to provide increased incentives for investors to provide the capital and to engage in the economic activities that will propel growth. Unfortunately, skills development is expensive, and to be able to afford it on a sustained basis, countries have to grow in order to generate the resources and government revenues required. So, in a sense countries, at least in the short term, face a "chicken-and-egg" problem—they need increased skills to help accelerate growth and employment; but they also need growth in order to finance skills development. Furthermore, although African countries are, relative to other parts of the world, deficient in skilled manpower, they are also confronted with the irony that significant numbers of their trained people end up unemployed, working in areas unrelated to their training or emigrating out of their countries—a misallocation and waste of resources that these countries can ill afford.

This paper explores an approach to skills development aimed at helping African countries to address the "chicken-and-egg" problem and also to reduce the waste currently involved in skills development. It entails pursuing two distinct strategies in parallel—one oriented towards results in the short term and the other towards reforms and capacity building that produce results in the medium to long term. The short-term strategy is embedded in an FTI-led industrial development, and relies to a large extent on targeted training of people who already have a certain level of education (e.g. unemployed high school or university graduates or even those already employed) to meet the needs of industries that the country is trying to attract or expand. The medium term strategy involves reforming the educational system, to increase access and quality, and more importantly, to increase its scientific and technical orientation as well as responsiveness to the needs of employers. The two strategies in fact reinforce each other over time and converge in the long term. A key feature of each strategy is a tight linkage with the overall economic development strategy. In effect, skills development is pursued as a central part of a country's investment, growth and export competitiveness and industrialization strategies; it becomes the concern and pursuit of the Ministries of Finance and Planning, of Trade and Industries, and in fact of the whole cabinet rather than just of the Ministries of Education or

[1] Data are from World Bank (2008a).

Labor. Another key feature of the strategies is their responsiveness to the demands of private sector investors and employers.

The paper is organized as follows. Section II outlines the rationale for and approach of a skills-led development strategy. Section III highlights the challenges that African countries face in terms of low levels of skills development and the need to provide productive employment to an increasing youth population. The short term and medium term oriented strategies are discussed in Sections IV and V respectively, followed in Section VI by a discussion of how the two strategies reinforce each other over time and ultimately converge.

II. A Skills-Led Strategy for Economic Development

Africa's multi-faceted development challenges will be difficult to address without an explicit consideration of the issue of skills and human capacity.[2] The weakness of this capacity and its adverse impacts manifests itself in many tangible ways. It constrains the ability of African countries to compete in a global trading environment where competition has intensified with the emergence of Asian economies that have been faster to build their capacities in manufacturing and services. It restricts the potential for diversification into higher return agricultural or industrial products by reducing the ability to integrate into global supply chains and networks and to meet the requirements set by buyers for higher order participation in these markets where profit margins are more lucrative. Africa's weak skills base also hampers countries' attempts to leverage on the unfolding knowledge and technology revolution to enter and compete successfully in the markets for new services and products (e.g., IT-enabled services and biotechnology). In the continent's many natural resource rich countries, the lack of a sufficiently well-qualified workforce narrows the scope for adding value through domestic processing of the resources and through the generation of spillover benefits to the local input-supplying industries. It also means a weaker capacity to negotiate and monitor the kinds of contracts with foreign companies that would maximize the returns to the country and minimize the adverse impacts on the environment.

Besides affecting the performance of firms, skills constraints also hamper African countries' capacity to create and manage the conditions required to foster faster growth. In particular, the capacity to plan, build, operate and maintain physical infrastructures (i.e., transportation networks, power plants, etc.) and other capital assets would be seriously compromised, as would the ability to manage the broader challenges posed by impending climate change and by the pressures of rapid population growth and urbanization. A thin skills base also makes it harder to have a civil service that can create and implement effective regulatory and governance frameworks adapted to the complexities of economic and political transactions, including decentralization, in today's world. Taken together, in both the public and private spheres of economic and social activity, a lack of adequate managerial, organizational and administrative skills and experience, in addition to the dearth of scientific and technological skills, reduces the capacity to support industrialization and to cope with the demands of modern government.

[2] See World Bank (2008b) for a more detailed discussion.

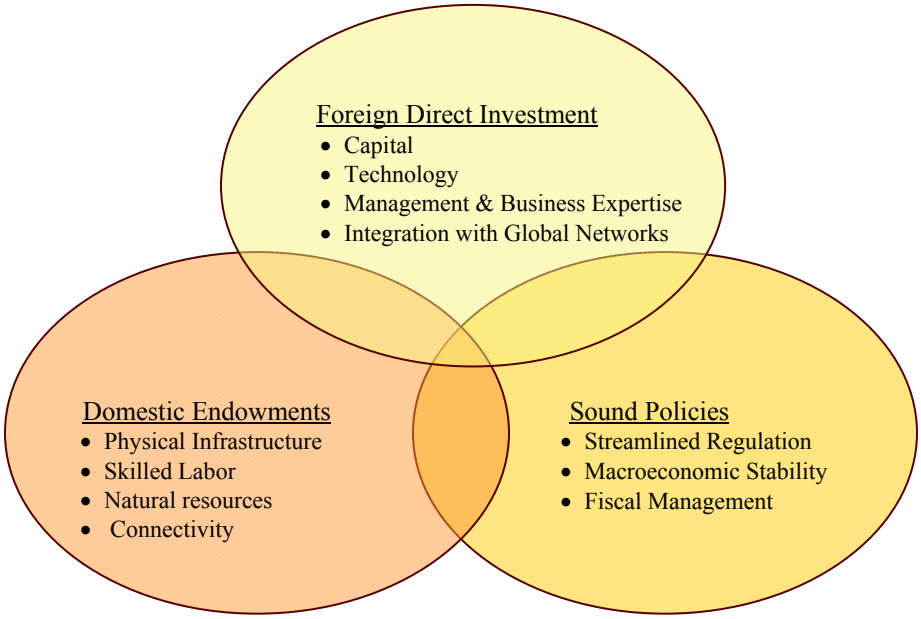
While Africa's skills gaps are very real and deep-seated, solving them will require more than a call to increase investments in skills development. Such investments must deliver results in the short run as well as prepare a reliable and steadily growing supply of trainable (and re-trainable) workers with diverse skills. In countries with mature education and training systems both needs are typically met as a matter of routine, albeit to varying degrees of excellence. Such systems have had more time to experiment with and regularize the management and operational arrangements for all parts of the whole system to work together seamlessly. In the best systems, an integrated qualifications framework exists that provides a roadmap for learners to acquire skills that are recognized by employers and qualifications that are accepted by the admissions officers of more advanced training programs. Such a system offers learners the possibility to acquire and build skills throughout life, thus enhancing their productivity and employability in a context of changing labor market conditions.

In the less well-developed context of African countries, the formal education and training system also aims, at least in rhetoric, to supply the modernizing economy with educated and skilled workers. In reality, however, most systems lack the speed, nimbleness and capacity to provide the just-in-time and ready-to-use skills required for the pressing needs at hand. And the costs associated with training are often prohibitive. As a result, a more strategic evaluation of the short-run opportunities for skills development must be developed while the longer term goal of reforming the whole system is addressed as a parallel, though separate, agenda. The latter will be discussed in more detail later in this paper. The shorter-term goal of investing in skills development to achieve immediate results presents a more novel challenge, in part because it often lacks ownership by a single government ministry or agency and requires a certain capacity for innovation, risk management and networking outside of one's normal sphere of interactions. Below we explore two potential opportunities that can be leveraged for skills development to benefit Africa's growth and competitiveness. The first is embedded in the inflow of foreign direct investment (FDI) while the second, in the inflow of official development aid (ODA).

Every foreign company that sets up operations in a country does so to take advantage of favorable local conditions for its business (see figure 1). These conditions include the policy environment and its impact on the security of investments, on the ease of doing business, on the availability of state incentive packages, and on the company's after-tax profitability. They also pertain to domestic endowments in the form of physical infrastructure, connectivity and human capital. Countries that have successfully pursued FDI-led development strategies, such as the Asian tigers and Ireland, have been persistent in manipulating these conditions to attract the most desirable firms. From the perspective of the host country, desirable firms are those that bring the largest number of well-paying jobs, contribute to government revenue, strengthen the balance of payments position, create the best opportunities for technology transfer, and generate other spillover benefits for the domestic economy. By technology transfer we mean not just knowledge about production methods, but also knowledge about business processes and practices, and ways of behaving, thinking and communicating. The most astute host countries see the foreign firms as a source of learning that can help them step onto and climb the technological ladder. Training workers according to the specifications of the foreign firm using equipment provided by the firm is a common approach. Even if the host country does not start with very highly qualified workers, the arrangement can be developed as the relationship with the foreign company evolves. As the experience of the most successful developing countries

suggest, a skills development strategy embedded in FDI-led industrialization can make a significant contribution to growth, provided it is pursued strategically to build the capability of the indigenous workforce. In Ireland, the process has worked so well that Irish multinational firms have emerged and begun investing overseas, so much so that in 2004, outward FDI exceeded the inward volume.

Figure 1: Skills Development to Support FDI-led Industrialization

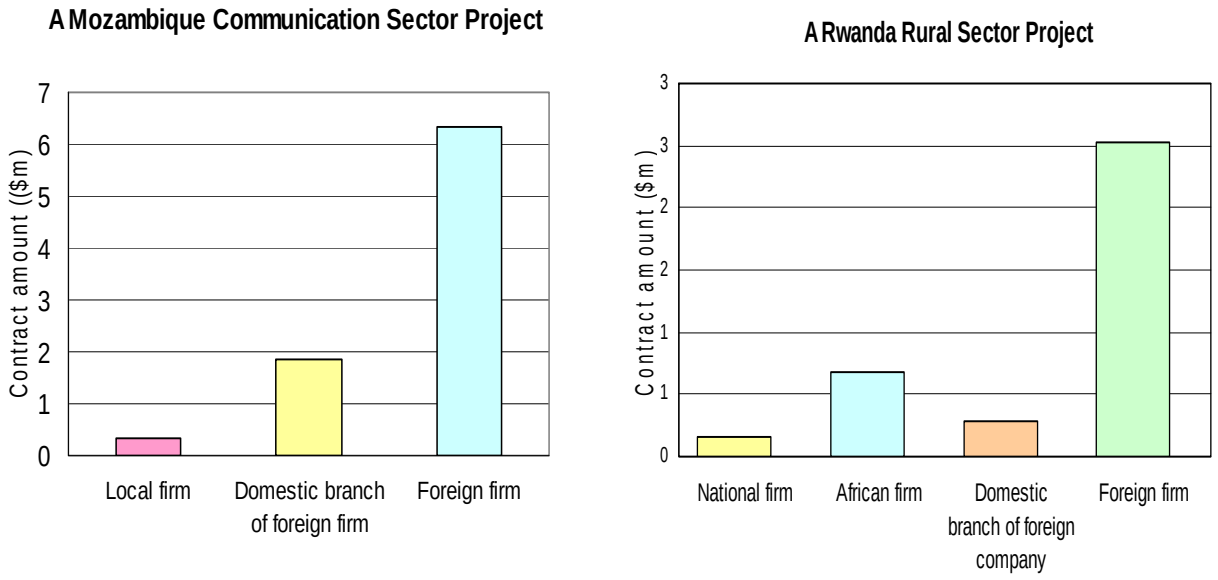


Source: authors' construction.

With regard to ODA, in addition to the direct funding of education, the inflow of funds for projects, particularly in infrastructure, to a recipient country could also be associated more consciously and aggressively with skills development. In an ODA-financed power project, for example, the capacity development component might include training for project staff to oversee the procurement of goods and services for project implementation, to process the use of funds, and to monitor progress. It might also involve training for the staff that will eventually manage the operations of the capital assets and infrastructure created by the project. In a roads or buildings project, it might involve twinning with domestic sub-contractors (and suppliers) that could develop to become lead contractors. A systematic assessment of the extent that ODA-financed investments develop the skills and capacity of recipient countries is beyond the scope of this paper. Suffice it to say that a desirable outcome of such investments would be to facilitate sufficient technology and knowledge transfer so that indigenous capacity is developed to prepare, plan and implement other similar operations. Two examples from the World Bank portfolio of operations are shown in figure 2 below to illustrate the scope for developing indigenous capacity. In both projects national firms lack the capacity to win international bids for services. The presence of foreign firms creates opportunities for skills development,

especially through the domestic branch of the firms, but the extent to which these opportunities in fact materialize depends on the provisions in the contracts. As there is currently little information in this regard, we focus below on the opportunities for skills development embedded in FDI-led industrialization.

Figure 2: Source of Services Procured in Two World Bank-Financed Projects, 2007

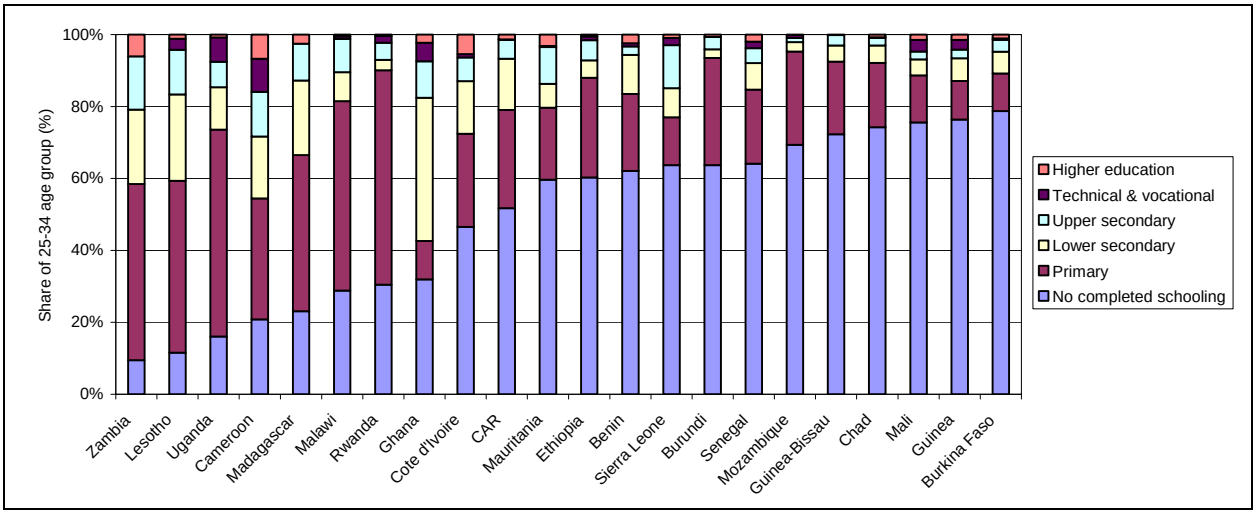


Source: analysis of procurement data for two World Bank-financed projects.

III. The Challenge of Skills Development and Employment in Africa.

A skills-led strategy for growth and competitiveness poses many practical challenges in the context of Sub-Saharan Africa. First, it needs to take into account the sheer size of the population of young Africans that today is estimated at 200 million in the 12-24 age range, roughly four times the number in 1950 and yet only half the projected count in 2050. Of the estimated 7-10 million Africans who enter the labor force each year, many are youth in this age range. Second, the skills profile of the population, even in the younger cohorts who are generally better educated than their parents, is low (see figure 3). On average across SSA countries, less than 7 percent of workers between ages 25 and 34 have an upper secondary education, and only about 2 percent have received either technical/vocational training or have acquired tertiary education. While there is great diversity across countries, the picture is one of a thin skills base. Third, the current economies of SSA provide few opportunities for skills utilization. Averaging across a group of 23 countries for which data are available, subsistence farming or the informal sector provide a livelihood to more than 70 percent of working age adults, while the modern sector offers it to only 8 percent. Of the latter, less than 60 percent are in what might be characterized as a skilled job.

Figure 3: Education Profile of the Non-School Population Ages 25-34, circa 2003



Source: World Bank 2008c.
Note: based on population in the age group 25-34 that are not in school at the time of survey.

Table 1: Distribution of Out of School Population Ages 15-59 by Employment Status, 23 SSA Countries, circa 2003

<table>
<tr><td rowspan="7">Total population 15-59: 100</td><td>Not active: 14.0</td><td colspan="4"></td></tr>
<tr><td rowspan="6">Economically active: 86.0</td><td>Unemployed: 6.9</td><td colspan="3"></td></tr>
<tr><td rowspan="5">Employed: 79.1</td><td rowspan="3">Informal sector: 71.0</td><td>Farming: 51.3</td><td></td></tr>
<tr><td>Non-farm: 19.6</td><td></td></tr>
<tr><td rowspan="2">Modern sector: 8.2</td><td>Private: 4.3</td><td>Skilled: 4.8</td></tr>
<tr><td>Public: 3.9</td><td>Unskilled: 3.4</td></tr>
</table>

Source: World Bank 2008c.

Given the thin skills base, most African businesses, even those in the modern sector, invest little in developing the skills of their workers; and among those that do, there is a strong tendency to favor the more educated among their workers. Paradoxically, with the thin skills base, one might have thought that businesses would be snapping up the available educated labor. Yet the data suggest that the demand for skilled workers is in fact quite weak in Africa today. Sizable shares of educated youth with upper secondary and tertiary education find it difficult to obtain a job when they finish their studies (see table 2). The most able among the graduates find jobs abroad, but many eventually take up jobs that do not take full advantage of their skills, often in the informal sector. The weak demand for skills is consistent with the small industrial bases

of African economies, their scarcity of large-scale enterprises and their limited integration into global markets.

Table 2: Employment Status by Age Cohort and Educational Attainment, average for 23 African Countries, circa 2003

	25-34 years		35-49 years		50-59 years	
	Upper secondary	Higher education	Upper secondary	Higher education	Upper secondary	Higher education
Employed:						
Modern sector (%)	36	55	46	76	53	74
Informal sector (%)	46	20	47	19	41	22
Unemployed (%)	**18**	**26**	**7**	**6**	**6**	**4**
Inactive (%)	8	3	5	3	9	9
Total (%)	100	100	100	100	100	100

Source: World Bank 2008c.

The skills and jobs crisis in Africa calls for creative solutions to break out of the vicious cycle revealed by the data above. One such solution is to begin with a new mindset, one that sees the existing pool of educated labor as a resource that can be combined with other assets (e.g., the diaspora of Africans and their networks, natural resources, etc.) to catalyze the growth of new businesses or strengthen existing ones that are particularly suited to a country's comparative advantage and that can benefit from the opportunities created by the global knowledge economy. The potential role of the disapora has received attention in recent years, given the preponderance of the highly educated among the stock of the some 16 million African emigrants in 2005 (Ratha and Xu 2008). In the top 10 emigration countries, for example, the emigration rate among those with tertiary education ranged from around 40 percent in Ghana, Mozambique, Sierra Leone, and Liberia, to as high as 65 percent in The Gambia. While it is beyond the scope of this paper to develop the theme in more detail, the disaspora is clearly a source of skills and entrepreneurial talent that could, if appropriately linked to home country institutions and businesses, make a contribution to a skills-led development in the home country, as exemplified by the experience of Korea and Taiwan (China), and more recently by that of China and India [3].

As indicated above, however, mobilizing existing talent and matching them with a skills developing strategy to support growth requires practical solutions running on two parallel tracks: short-term measures to produce immediate results, and systemic measures to provide a steady supply of skills to meet the economy's evolving needs. Ideas for both tracks are elaborated below.

IV. Skills Development to Produce Results in the Short-Term

[3] See Hsueh, Li-min, Chen-kuo Hsu and Dwight H. Perkins (2001) for the role of diaspora in Hsinchu Science-based Industrial Park in Taiwan (China).

Foreign firms constantly review the location of their operations and have little time to wait for reforms in the whole training system to start producing the workers they seek. Thus, rather than attempting to change the existing system, the countries that have been most successful in leveraging FDI to develop skills typically took a more pragmatic solution which consisted of creating new institutions with explicit industry-linkages, or even *ad hoc* training centers or programs linked to specific employer needs. For a time, the approach may produce what looks like an array of unconnected activities and responses. Yet with the proper strategic vision, the disparate patchwork lends itself to upgrading and consolidation, so that it can, in time, be institutionalized as an integral part of the formal system of education and training. Indeed, the interface with industry would at that point become a routine and natural *modus operandi* of the formal system. The experience of such countries as Ireland, Malaysia, and Singapore among others—all late starters in the 1960s—exemplifies the approach. Other fast-growing Asian economies, such as Hong Kong (China), South Korea and Taiwan (China) also embarked on an early acquisition of skills. Commenting on the sources of high growth in these countries (of around 10-12 percent a year) in the late 1960s, the then finance minister of Singapore noted in his 1971 budget speech that these countries shared an approach that involved "an aggressive importation of foreign know-how and its adaptation to local conditions, frequent cases of the separation of imported know-how from imported capital or management participation." (Hon 2004).

Examples of Successful of Skills Development. Singapore's experience with skills development bears recounting because the details reveal the underlying process of refining and adapting through learning-by-doing to build what is today recognized worldwide as a world class system of technical training. The main agency in Singapore spearheading industrial development was the Economic Development Board (EDB), which was created in 1961 with the purpose of attracting foreign direct investment to the country. By the end of EDB's first decade, some of the key elements of its skills development strategy had been laid, including the establishment of firm-based worker training programs. The effort started off with the establishment by 1968 of six training-cum-production workshops run in parallel to the school system[4] under the Engineering Industry Development Authority (EIDA), with funding from the United Nations Development Program and technical assistance and contribution of machinery from Japan, Britain and France (Chiang 1998). It was an inauspicious beginning, however. The six centers were an administrative headache to the EIDA which underwent three changes in management in as many years; and they were not cost-effective. At the end of four years, the government had spent $12 million on EIDA, but only 86 persons had graduated. This expensive scheme was ended in 1973.

The EDB also experimented with worker retraining schemes, an effort occasioned by Britain's announcement in 1968 of its intention to close its naval base in Singapore by 1971. The implications were ominous, as the 38,000 people who depended on the base for employment suddenly faced the prospect of joblessness. The EDB worked with the Ministry of Education to offer retraining courses in technical subjects on the premises of existing facilities, among them subjects such as Metalwork, Machine Turning and Fitting, Radio Maintenance and Repairs and

[4] These workshops included: the Prototype Production Training Centre, the Metal Industries Development Centre, the Electromechanical Training Centre, the Electrochemical Training Centre, the Woodworking Industries Development Centre, and the Precision Engineering Development Centre.

Plumbing. The intention was to equip the workers who were going to lose their jobs with what was thought to be employable skills. The uptake was limited (1,749 trained in four years), however, and those trained only reached an elementary level of qualification. Clearly, this approach was not going to help Singapore become a technologically advanced nation.

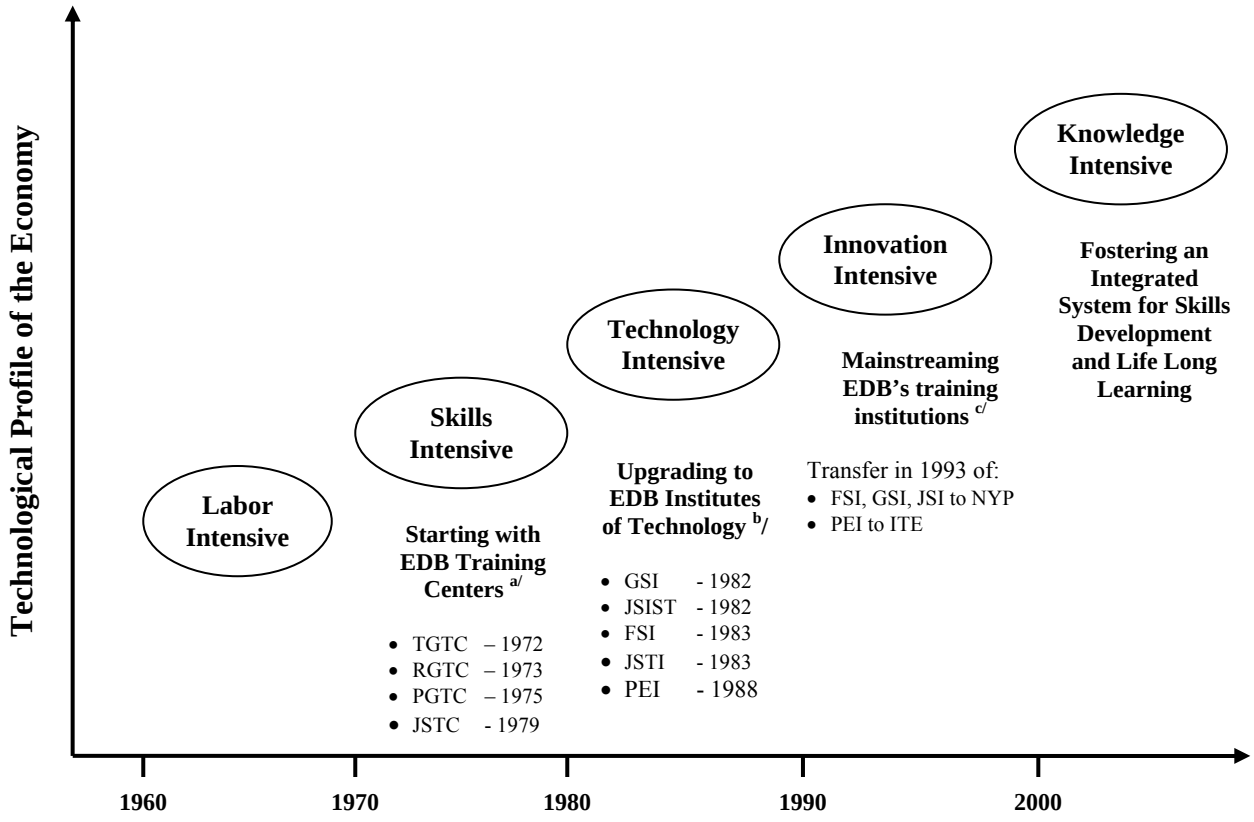
The experience with these early starts convinced EDB's leaders that the kind of training needed to accompany its investment promotion work could not be provided within the regular technical education institutions. The existing schemes seemed "remedial" in that they were seen to be catering to those who did poorly in their studies and they did not produce quickly enough the skilled workers for the kinds of jobs in the foreign firms that the EDB was trying to attract. The agency therefore eschewed tinkering with the formal system of technical and vocational training, and decided instead on a leapfrogging and mission-oriented approach designed to go hand-in-hand with the EDB's investment promotion and industry development effort. The strategy was to partner with leading international industry partners with proven training systems, to learn the training business from them and to adapt and improve the methods to meet local needs. The pattern set by the arrangement with the first company, the Tata Group (India's largest engineering firm at the time that made trucks, excavators, locomotives, machine tools, etc.), is instructive because it provided the prototype for scaling up a successful model of company-affiliated training. Around 1970, the EDB was trying to attract Tata to set up a precision engineering plant in Singapore and offered to partner with the company to set up a training facility that would produce workers trained in the way Tata required (i.e., that would be similar to the training schools that supplied Tata's workers in India). The government provided the land and buildings, contributed 70% of the operating costs of the center, and paid the stipends of the trainees (all of whom signed a bond to serve the EDB or any company as directed by the government, for a period of five years).[5] The training center was opened in 1972 and trained twice as many people as Tata required. Tata hired the cream of the crop of graduating trainees while EDB retained the rest as a marketing asset to attract other engineering firms to Singapore. In hindsight, the strategy was to build a pipeline of skills to grow a whole industry rather than to meet the needs of a single company.

By the end of the 1970s, the EDB had set up three company-affiliated training centers (besides Tata, the other companies were Rollei-Werke and Philips; see figure 2). A good start had been made but EDB felt that the centers were not yet producing the higher levels of technical skills to put the country on a path to technology-intensive development. The agency's next move was to enlist the help of foreign governments to upgrade the various training centers. Its efforts paid off, so that by end of the 1980s, five EDB Institutes of Technology were established, one of them by consolidating and upgrading three of the centers set up in the 1970s (see figure 4 and footnotes). At the same time, the EDB won commitment from leading foreign companies to participate in joint training programs through a "transnational" partnership. The arrangement avoided the proliferation of new institutions—each tied to a particular company—and introduced the idea of pooling training resources to serve companies in an industry cluster. The new approach contained key ingredients for Singapore to acquire the advanced skills for growing its

[5] The principles underlying this approach to meeting the skills needs of companies that invested in Singapore was not limited to the higher level technical skills. As retold in personal encounter with P.Y. Huang, chairman of the EDB during 1982-85, the provision of a job-ready pipeline of workers also formed part of the package of incentives to attract the labor-intensive garment companies that were attracted in the 1960s to help create jobs.

new technology-intensive industries: the secondment of experts on request, the training of EDB lecturers and technical staff at the participating firms' overseas locations, assistance with curriculum and program development, donation or loan of equipment, commitment to upgrade equipment and software, and commitment to participate for three years (Chiang 1998).

Figure 4: Evolution of Singapore's Industrial Phases and Skills Development, 1960-2000



Source: authors' construction based on Chiang 1998; and Chan 2008.
a/ The acronyms refer to the Economic Development Board (EDB), the Tata-Government Training Center (TGTC), the Rollei-Government Training Center (RGTC), the Philips-Government Training Center (PGTC), the Japan-Singapore Training Center (JSTC). The TGTC, the RGTC and the PGTC centers produced between 100 and 140 trainees a year after the initial settling in period; while the JSTC produced about 200 a year.
b/ The acronyms refer to the German-Singapore Institute (GSI), the Japan-Singapore Institute of Software Technology (JSIST), the Japan-Singapore Technical Institute (JSTI, later upgraded to Japan-Singapore Institute, JSI), the French-Singapore Institute (FSI), the Precision Engineering Institute (PEI, an amalgamation of the TGTC, the Brown-Boveri-Government Training Center (which replaced the RGTC), and the PGTC.
c/ The acronyms refer to the Nanyang Polytechnic (NYP, established in 1992 as Singapore's fourth polytechnic) and the Institute of Technical Education (ITE, established in 1992 as the result of the restructuring and upgrading of the Vocational and Industrial Training Board).

Given the success of the EDB institutions, it would have been tempting to continue using them to assure a steady supply of skilled workers. Yet a decision was taken in 1993 to bring the various EDB institutes into the mainstream by integrating them into the formal education and training system which by this time had been rationalized through consolidation and made more efficient. In this way, many of EDB's innovative concepts and practices in industry-responsive skills development found their way into the mainstream, thus benefiting the whole system. Today, the country has 5 polytechnics with a combined enrollment of 60,000 students in 2006

and a three-college Institute of Technical Education with 25,000 full-time students and 30,000 working adults in part-time courses in 2007. The structure of the system is such that close to two-thirds of secondary school graduates pursue job-related training, most of them in engineering and technology fields. About 30 percent of the cohort enter junior colleges which prepare them for a university education. Nearly 60 percent of the first degrees awarded by the universities in the early 2000s were in science and engineering (National Science Board 2008). The system provides for permeability across institutions, so that the best ITE students can compete for places in the polytechnics, and the best among the polytechnics students, for places at the universities.

In Singapore, skills development should be seen as part of a package used to attract FDI to help drive the country's industrialization and employment growth. Other elements of the package include using an industrial park—Jurong Town Corporation—to provide first rate infrastructure to meet the requirements of foreign firms.

Ireland is another country that attracted FDI firms and used them to develop indigenous skills—technical and managerial—as part of the national strategy to achieve high rates of economic growth. The Irish equivalent of Singapore's EDB was the Irish Development Authority (IDA) which was established in 1949 and given the job of attracting foreign investment in 1952. That it has played a crucial role in transforming Ireland from what was considered a "basket case" in 1980s to economic miracle from the early 1990s onward is widely acknowledged (see Sweeney 2008). IDA targeted key sectors—ICTs, pharmaceuticals, chemicals, financial services, chemicals, among others—and developed incentive packages to attract leading foreign firms to the country. A key selling point was Ireland's educated population, but IDA's portfolio of incentives also encouraged a greater output of skilled apprentices and technicians through the creation, beginning in the early 1970s, of new regional technical colleges (RTCs; eventually numbering 13).

These colleges greatly supplemented the modest capacity of four existing institutions to train mid-level technicians in science, engineering, business, and art and design. Perhaps more important was the change they brought about in the way educational institutions related to the business sector (O'Hare 2008). Created to serve as sources of innovation and responsiveness to the needs of firms, the RTCs offered courses with an applied orientation and they developed close ties to businesses from the outset. Their first presidents were all appointed at a young age (28-34 years old) and were chosen for their dynamism, creativity, experience in foreign countries, and freedom from the culture and ethos of the traditional institutions. They were embedded in IDA's strategy to convince foreign companies that the Irish education system was responsive to their needs to a greater degree than in other countries. Their presidents, professors, and staff participated regularly and actively in IDA's promotional functions to support the claims made by the agency to foreign firms. Because of these interactions, the new institutions were able to offer new and innovative programs in response to emerging market trends, for example, software engineering (with computer science), communications (combining business studies with linguistics), biotechnology (not biological sciences), and so on.

IDA's successful efforts to attract leading foreign companies produced a virtuous cycle of skills upgrading. The cutting-edge nature of these companies' businesses meant that they

functioned, knowingly or otherwise, as educational institutions transferring knowledge—about manufacturing techniques, organization of production, management practices, marketing strategies, etc.—to national institutions (e.g., local firms, universities, colleges, and research centers). The story of Ericsson, the Swedish telecoms company, in Ireland is illustrative in this regard.[6] The company initially set up a plant to build a modern telecoms infrastructure for the state and had planned to leave when the job was done, leaving a skeleton staff of only ten people. Yet five years later, it was employing 1,000 people. The company's Irish managers had the foresight to learn "everything about the Ericsson business model" during their initial association with the company and (aided by the lure of state grants) succeeded in persuading the company to remain in Ireland, with a new business model directed at servicing the markets that were less attractive to the Swedes. Ericsson Ireland had the pick of the crop each year from the technical colleges and used the skilled workforce to move methodically up the value chain. It progressed from assembling and wiring electronic boards to programming and then to electronics.

Malaysia offers yet another example where skills development was organized in response to short-term industry needs, the earliest effort being in the state of Penang which hosts the country's first skills development center. Home to 1.5 million people and the country's second largest airport and its third largest seaport, Penang has undergone a dramatic economic transformation over the past few decades, as reflected in the increase in manufacturing's share of output from 12.7 percent in 1970 to 42.9 percent by 2005 (Somchit 2008). To supply the skills required to expand and upgrade the manufacturing sector, the Penang Skills Development Center (PSDC) was set up in 1989 as a tripartite collaboration between the government, industry and academia. The government's contribution was to provide the authorizing environment (e.g., recognition of the training qualifications), to offer tax incentives for participating firms, and to contribute modest block grants for equipment and facilities (which amounted to less than $2 million in the 6th Malaysia plan, $2.8 million in the 7th plan, and $7.2 million in the 8th plan). The center's industry partners supplied the trainees, generated ideas and content for the training programs, identified training needs, provided equipment, and paid the fees for the trainees they send to the center. Academia completes the tripartite collaboration by supplying the trainers and academic advisors and by developing and delivering the training programs. Since inception PSDC has trained more than 100,000 individuals, and is a financially self-sustaining operation with a portfolio of more than 500 courses. Its main mission continues to center on proactive human development initiatives to help the manufacturing and service industries based in Malaysia become more competitive globally. Its industry partners now comprise 142 companies, among them internationally recognized brands such as Agilent, Bosch, Braun, Dell, Fairchild, Grundig, Motorola, etc., many of which are represented on the PSDC's decision-making management council. The PSDC has progressed from a small operation in the early years offering only basic training (e.g. radio repair, basic machining, basic electronics) through several phases of maturation and it is now able to provide graduate level engineering courses. The Malaysian government sees the PSDC as a successful model of job-oriented training and has replicated it in other states in the country.

Emerging Examples from Africa. In Africa, some public-private partnerships are now underway to introduce job-related training designed to meet the short-term needs of employers. One example is the Ghana Industrial Skills Development Center (GISDC) which was launched

[6] See Sweeney (2008, chapter 3) for additional details on the story of Ericsson in Ireland.

in 2005 to provide training in mechanical, electrical and process engineering. The seeds for this initiative were sown when TexStyles Ghana Limited, a local subsidiary of an international firm, Vlisco Helmond B.V., found that other factories shared its chronic problem of being unable to find and retain employees who could service their machines. As a result, many of the factories often had to fly in troubleshooters from abroad, which add to their operating costs. To overcome the problem, the governments of Ghana and the Netherlands joined forces with the Association of Ghana Industries to set up the GISDC in 2005. Located on the premises of Tema Technical Institute (an existing government facility) the GISDC is now operational with a governance arrangement that includes industry representatives on its decision-making board and an impressive list of firms among its partners.

Mozambique is another country that is attempting to set up industry-responsive training. One example is an ICT technicians training program which again features a tripartite arrangement involving the government, an existing public training center and industry representatives on the institution's decision-making body. As in Ghana, the program is being set up in response to a felt need by industry, in this case computer technicians to install and service the electronic equipment used in a modern industrial facility.

In Nigeria, concern with equipping youth with employable skills has also motivated recent efforts to augment opportunities for skills development (Yakuba 2008). Policy makers realize that many of the country's youth are leaving primary and lower secondary school without adequate skills for employment and that the country's tertiary level institutions can absorb only about 30 percent of the 1 million candidates that each year seek entrance to the universities, polytechnics or other tertiary level institutions. To provide more options the government has started to process the certification and accreditation of private providers that meet certain criteria (including a governance structure that included industry representation) to qualify as Vocational Enterprise Institutions (VEIs targeting those with 9 years of schooling) or Innovation Enterprise Institutions (IEIs targeting those with 12 years of schooling). These institutions provide practical training in target areas, among them ICT, telecommunications, computer hardware engineering, refrigeration and air-conditioning, welding and fabrication, petroleum geosciences, building technology, film and TV production, paralegal studies, fashion design, hospitality and tourism, etc. So far, 75 institutions have been licensed to operation, with more in the pipeline to be certified and accredited.

The foregoing examples reflect renewed interest among African countries and attempts to provide market-responsive options for technical and vocational training. In all three countries, these initiatives are still very new and will require a period of experimentation to adapt their operations to local conditions and to develop the kinds of collaboration with employers that have helped other countries engage successfully in skills-led industrialization.

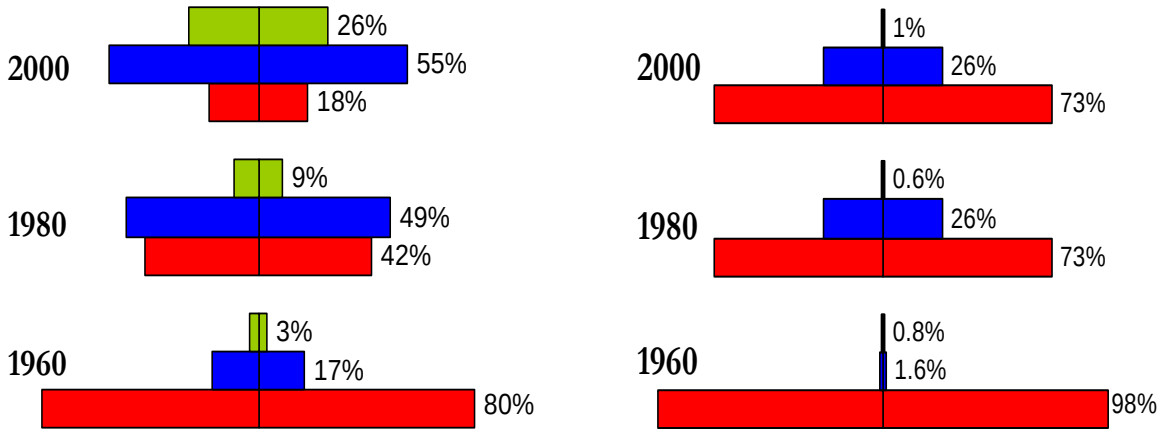
V. Reforming and Aligning the Educational System to Skills Development for Growth

With the benefit for a 40 year perspective, it is easy to see that developing countries that gained a foothold on the technological ladder did so because they responded to employer's needs, particularly those of industry leaders, while at the same time improving the entire education system, both by expanding enrolments and by raising the quality and relevance of

learning. In other words, the policy makers in these countries attended to immediate needs even as they kept a constant eye on the longer term goals. As a result of this integration of multiple time perspectives in policy development and implementation, they were able to "climb the technology ladder while raising the floor" (IDB 2006). Below we take stock of Africa's current situation and identify some of the key challenges facing countries in the region.

Overcoming a Flawed Legacy. African countries that seek a skills-intensive path out of poverty struggle with a legacy of inadequate investment in education in the past. A comparison of South Korea and Ghana, for example, exemplifies the big gaps that now separate these countries after decades of divergent paths in the education sector (figure 5). South Korea pursued a policy of sustained investment to universalize primary education, while progressively expanding secondary and tertiary education. As a result, the share of the Korean population 15 and older with secondary education rose from 17 percent in 1960, to 49 percent in 1980 and 55 percent in 2000, while the corresponding shares for tertiary education were 3 percent, 9 percent and 26 percent. In Ghana, the educational profile of the population 15 and older also improved, but mostly between 1960 and 1980; thus, while the share with secondary education rose from less than 2% in 1960 to 26% by 1980, the increase was followed by two dismal decades of stagnation. As a result, 40 years after starting from 1960 with a slight disadvantage vis-à-vis Korea, Ghana had fallen far behind by 2000. The data for other leading African countries paint a similar picture of serious lags in the educational profile of the population.

Figure 5: Education Profiles of the Working Population in Korea and Ghana, 1960-2000



Note: the working population refers to the population aged 15 and over; for each year, the top block refers to the share with tertiary education, the middle block to the share with secondary schooling, and the bottom block, to the share with primary or no schooling.
Source: World Bank 2005.

Expanding Educational Coverage. In recent years, the situation has improved as African countries make progress in expanding coverage. A key turning point was the 2000 World Education Forum in Dakar, Senegal, at which 164 governments worldwide, among them those of African countries, joined with partner organizations to make a collective commitment to

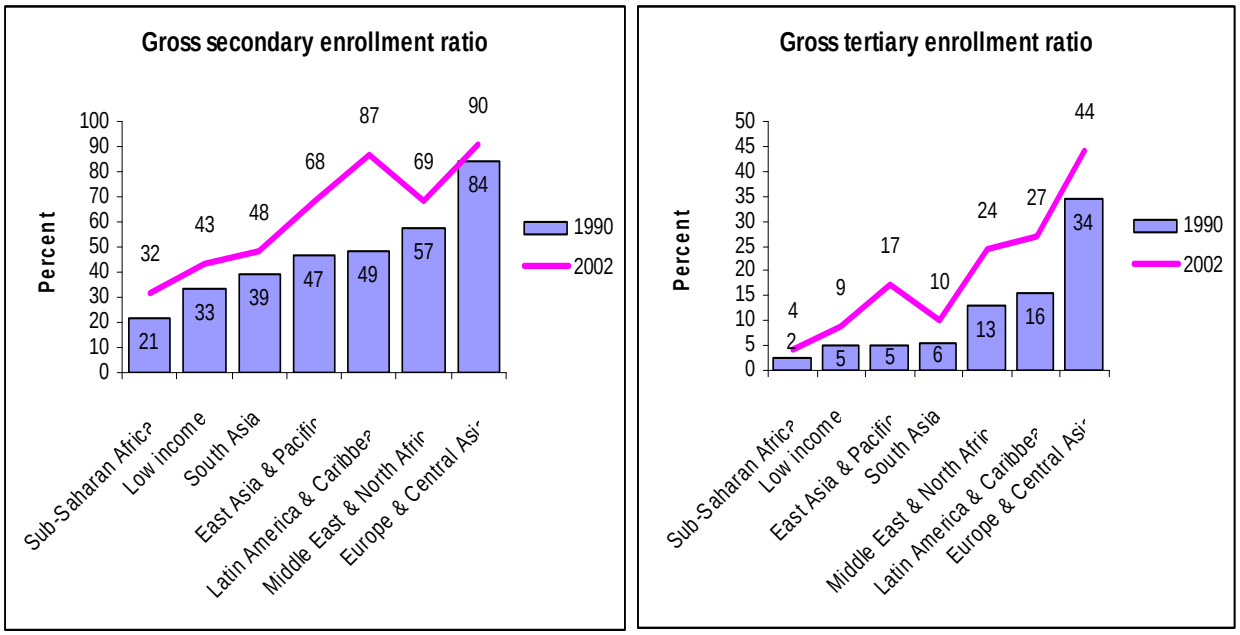
dramatically expand educational opportunities for children, youth and adults. That African countries acted on this commitment is evident from the data on enrolment (table 3). In primary education, the gross enrolment ratio for a group of 33 low-income Sub-Saharan countries grew at an average rate of 2.8 percentage points a year between 1999 and 2005, compared with a rate of 0.9 points a year between 1990 and 1999. More tellingly, while the primary school completion rate was practically unchanged between 1990 and 1999, it gained an average of 1.9 points a year between 1999 and 2005. The pace of increase was even faster in secondary and higher education. Even with the rapid pace of increase, however, Africa continues to lag behind other world regions (see figure 6). An important part of Africa's challenge is therefore to continue expansion of educational opportunities, so that Africa's youth may acquire the educational profile for tomorrow's jobs.

Table 3: Indicators of Educational Coverage in Sub-Saharan Africa, 1990, 1999 and 2005

	1990	1999	2005
Primary education			
Gross enrollment ratio (%)	67.8	75.7	92.5
Grade 1 gross intake rate (%)	74.0	80.9	105.4
Completion rate (%)	42.4	43.0	54.6
Secondary education			
Lower secondary gross enrollment ratio (%)	18.8	25.4	35.5
Upper secondary gross enrollment ratio (%)	8.3	11.3	15.4
Higher education			
Gross enrollment ratio (%)	2.2	3.1	4.0
Students per 100,000 inhabitants	160	245	291

Source World Bank 2008c, based mostly on UNESCO Institute of Statistics data.
Note: data reflect the simple averages of indicators for 33 low-income countries in Sub-Saharan Africa.

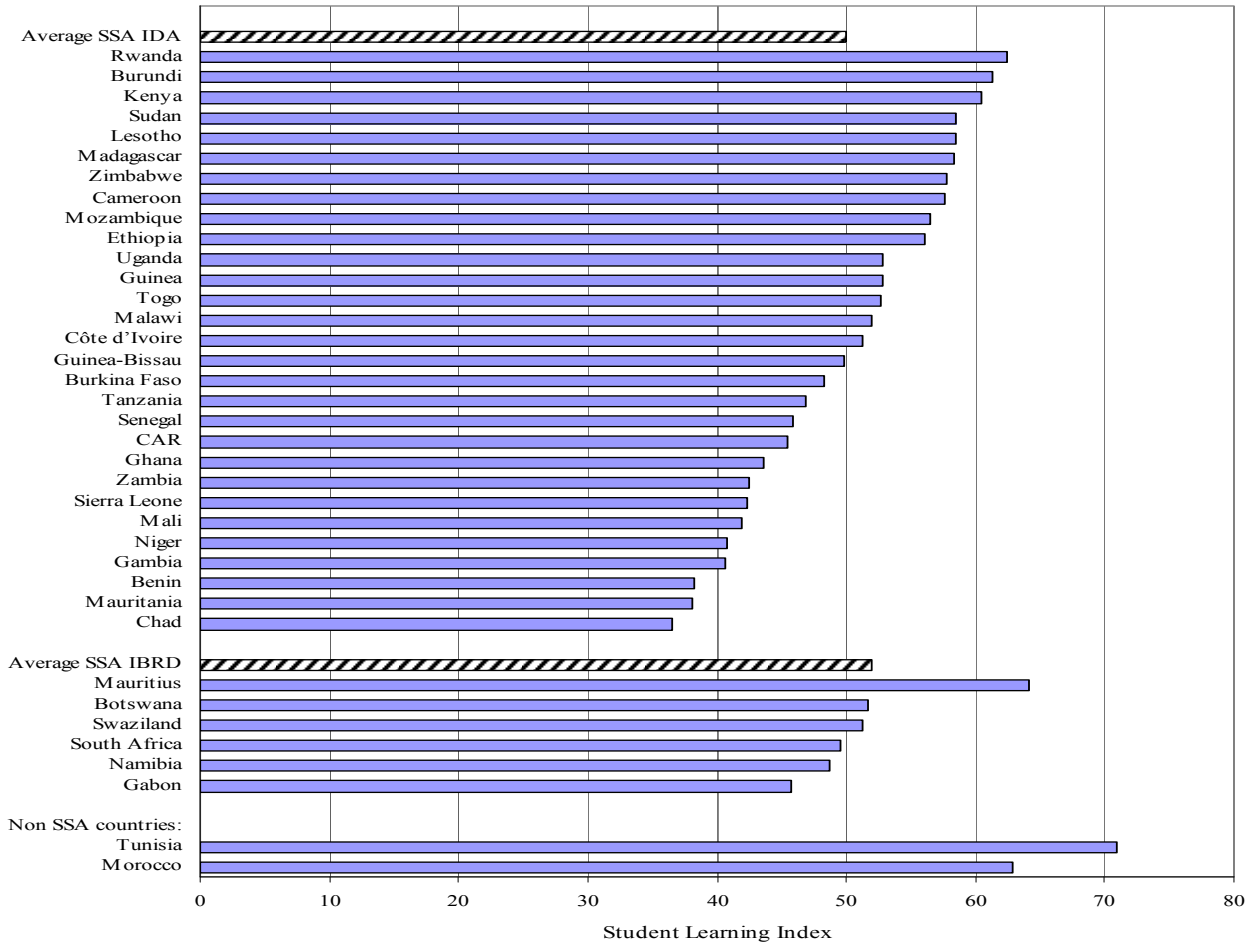
Figure 6: Coverage in Secondary and Tertiary Education in Sub-Saharan Africa and other World Regions, 1990 and 2002



Source: based on UIS data.

Improving Learning Outcomes. Hanushek and Wößmann (2007) demonstrated in their analysis of cross country data that economic growth depends much more on the quality of learning than on the extent of educational coverage. What this implies is that expansion of coverage is only part (perhaps not even the most important part) of the challenge that African countries face. If tomorrow's workers are to perform jobs that are more skills-intensive than the jobs of their parents, and if they are to do their jobs well, today's students will need a strong foundation of basic competencies in literacy and numeracy, and many of them must be able to build on this foundation to acquire higher order skills, particularly in mathematics, science and technology. Piecing together the available comparative data reveals a worrisome picture indeed (see figure 7): on average, the primary or lower secondary student in low income Sub-Saharan Africa countries has mastered only half of what he or she is expected to know at the time of testing; and their peers in the middle-income countries in Sub-Saharan Africa did not fare much better.

Figure 7: Student Learning Outcomes in Primary Education in Africa, 1996-2005



Source: World Bank 2008c.
Note: the student learning index is a composite measure of the percentage of the curriculum that students have mastered at the time of testing. It ranges from 1-100 and is based on a consolidation of the results of regional or international assessments tests administered between 1996 and 2003 to students at various grades in primary school (in some instances in lower secondary grades). These tests include UNESCO's Monitoring Learning Achievement (MLA), the *Programme d'Analyse des Systemès Educatifs de la Confemen* (PASEC), the Southern African Consortium for Monitoring Educational Quality (SACMEQ). See World Bank 2008c for additional details on the index.

The results of the 2003 Trends in International Mathematics and Science Study (TIMSS) in which three African countries—Botswana, Ghana and South Africa—participated along with 42 other typically more developed countries confirms the scale of the challenge (table 4). They show that these countries' education systems are not yet producing future workforces with the level of skills required to compete successfully in the global marketplace.

Table 4: International Test Scores of Eighth Graders in African and Other Countries, 2003

	Mathematics	Science	Average	% scoring below 400
Korea	589	558	574	<5%
Malaysia	508	510	509	<15
International Average	**466**	**473**	**470**	-
Jordan	424	475	450	-
Indonesia	411	420	416	<55

Egypt	406	421	414	<45
Chile	387	413	400	<40
Botswana	366	365	366	63
Ghana	276	255	266	60
South Africa	264	244	254	65

Source: National Center for Education Statistics (2004); Hanushek and Wößmann (2007).
Note: four international benchmarks are defined, these being 625 for advanced, 550 for high, 475 for intermediate, and 400 for low levels of achievement. A student who scores below 400 is considered functionally illiterate in a modern economy. The figures for the non-African countries (except Korea) in the table are read off figure 8 in the source document, while those for the African countries and Korea are reported in the text.

Building a Pipeline of Technical and Scientific Personnel. Given the weak foundations in primary and secondary education, many African countries find it difficult to boost tertiary level enrolments in science and technology disciples (table 5). These fields of studies are deemed to be particularly important to enable Africa to climb out of their low-skill trap. In 2003-04, the share of students in these disciples averaged only 31 percent, similar to the shares in the 1980s and 1990s. The weak pipeline of scientific, engineering and technological skills is consistent with Africa's meager contribution to the world's science and engineering publications (about 1.37% for all of Africa in 2005/6, of which South Africa's contribution alone was 0.37%), and with the small number of patent applications filed by residents in Africa (UNESCO Science Report 2005). Many African governments see the scarcity of scientists, engineers, technologists as an obstacle that frustrates their country's access to the world's storehouse of scientific and technical knowledge, reduces the ability of their public agencies and private enterprises to apply this knowledge to raise productivity, and impedes their country's success in seeking a competitive edge in the global economy. A momentum is being build up under the aegis of the African Union's NEPAD initiative to rectify the situation and countries are also beginning to make their own efforts in this regard.

Clearly, building a pipeline is not the same as producing the skilled workers that employers seek. An important challenge is therefore to ensure that those who graduate from the system leave equipped with employable skills. Experience in many countries suggests that training institutions which develop close ties with prospective employers and which regularly seek employers' input to develop the curriculum enjoy the best results. In the most developed countries, such as Sweden, employers' input is sought even for decisions about the content of what is taught in high schools.

Table 5: Share of Tertiary Students Enrolled in Science and Technology Disciplines, Africa, 1980-2003/4

	1980	**1986–89**	**2003–04**
Angola	54	64	38
Benin	27	21	30
Botswana	22	9	23
Burkina Faso	20	32	32
Burundi	31	30	26
Cameroon	29	32	33
Central African Rep	17	27	36
Chad	*na*	12	17
Congo, Republic of	18	13	16

Ethiopia	57	40	31
Ghana	46	42	35
Kenya	44	32	47
Lesotho	12	10	13
Madagascar	40	43	35
Malawi	34	17	59
Mali	24	42	33
Mozambique	47	61	37
Niger	44	31	29
Nigeria	41	39	58
Rwanda	34	26	34
Senegal	33	39	26
Togo	33	24	12
Uganda	46	22	18
Average	34	31	31

Source: Brossard and Foko 2006; Saint 1992, Teferra and Altbach 2003.

Key Policy Challenges. We have argued that for the education systems in Africa to effectively support economic growth, their coverage has to be expanded, their quality improved and their orientation made more scientific and technical as well as more practical (i.e. linked closer to the economy). This agenda will not be easy to carry out; it will pose many challenges. We list a few of the key ones. First is financial. In fact, given that most African countries face an unfinished business of providing adequately in terms of access and quality for basic and secondary education, an increased focus on scientific and technical education, which would require more resources for tertiary education, would present funding challenges. Another challenge is creating a quality technical and vocational training sub-system within the educational system. In many countries, this sub-system is the weakest. There are many difficulties that countries have to face in overcoming this weakness. For example, clear choices have to be made regarding the relationship between the technical and vocational system on the one hand and the secondary and tertiary systems on the other. Will the technical and vocational system be pre-secondary, integrated with secondary education, run parallel with the secondary education system, or be a post-secondary system. If a post-secondary system, how does it relate to the universities; will they be degree granting? Another difficulty is the often-times negative image of technical and vocational education which makes it difficult to attract the bright and ambitious students. A third challenge is enabling, the university system to develop greater capabilities for applied research and greater linkages with the economy—industry, agriculture and services.

With education expenditures of 4 to 5 percent of GDP and around 20 percent of budget expenditures, many governments in Africa are already spending on par, if not more, than those in East Asia and elsewhere (UNESCO 2007). Certainly they should make additional efforts to contribute more, but realistically (particularly for the countries that already devote substantial resources to the sector) the scope for such efforts is not that wide. Where will the needed extra resources come from? First, through reforms to promote efficiency, governments could try to achieve more with what they spend. Second, students in the tertiary stream could be asked to contribute more to their education. This will not be easy, but it would be more manageable if students face enhanced prospects of securing well-paying jobs after graduation. This is one area where the strategy aimed at generating FDI investment, economic growth and employment

growth in the short term could facilitate the medium term strategy of systemic change. This strategy, if successful, can powerfully change expectations of students and their parents. Seeing the expansion of well-paying jobs in the economy, they are more likely to dip into their own resources or go into debt (through a well-designed student loan scheme) to invest in education. Another way in which the short term strategy could ease the funding constraint and facilitate medium term strategic change is that the private firms that have been attracted to the country or have found it attractive to expand operations in the country could be enlisted to become partners and contributors to funding the system improvement. As has been the case elsewhere, they could be a source of equipment, expertise as well as finance. Furthermore, a growing economy, spurred by the short term strategy, could increase government revenue making available more resources, even at the same GDP or budget shares, to the education sector.

Regarding the positioning of the technical education system, countries have successfully applied different options. However, one option that seems not to work well is the one that introduces additional technical or vocational oriented courses into a secondary school curriculum; it leads to neither a good secondary school system nor a good technical/vocational system. For one thing, a technical and vocational education system done well is expensive—up to three times as costly as general secondary education and in the industrial training programs, about as costly as academic university course in the social sciences (Mingat, Ledoux and Rakotomalala 2008). This is mainly because high quality programs require skilled teachers with industry experience and up-to-date equipment used in industry to ensure students are getting the relevant training. In addition, students need internships or apprenticeships in industry. Fro many countries, it is simply not possible to afford the cost of quality technical education or find meaningful internships to all secondary school students. It therefore makes sense to focus on a sub-set of the student population, train them to high standards and ensure that other requisite government economic growth and industrialization policies are in place so they can get jobs when they graduate.

Relatedly, the prospects of well-paying jobs upon graduation, combined with a sustained promotional campaign involving the high leadership, not only the Minister responsible for Technical and Vocational Education or for Labor, could be used to change the public's image of technical and vocational education for the better. It is important to emphasize that promotional campaigns and exhortations not backed by demonstrated job prospects of technical and vocational school graduates is unlikely to be successful. Another way to address the challenge is to build "bridges and ladders" into the educational system to enable movement, both ways, between the technical and vocational part of the system and the general/academic part.

Strengthening the capabilities of universities for applied research and linking them closer to the economy is also a vital component of a skills-led strategy for growth in Africa.[7] To achieve these goals would present difficult reform challenges as well, both to improve the performance of tertiary institutions and to stimulate the demand for graduates by firms and businesses. On the supply side, governments need to focus on several tasks, among them the following: strengthen the governance of these institutions by granting them more autonomy and fostering greater competition among them; encourage a more diverse mix of institutions, particularly self-financing private ones; subject all institutions to quality assurance mechanisms;

[7] See World Bank 2008b.

improve the qualifications of the academic staff; provide incentives for collaborative research between tertiary institutions and firms in key strategic areas relevant to the growth agenda; foster collaboration across institutions; and introduce measures to put tertiary institutions on a path to sustainable financing, including the mobilization of other sources of funding to supplement government budgetary allocations. At the same time, demand side policies will be needed to forge stronger links between tertiary education and industry, so as to foster productivity-led growth and development of the leading sectors of the economy. Promising actions by the government include: the provision of incentives for knowledge intensive industries and the creation science parks in the vicinity of leading universities; the offer of seed capital for high-tech start ups, coupled with funding for R&D by public and private firms and other entities; and support for public-private mechanisms to facilitate student and faculty involvement in collaboration with firms on research, design, testing or product development.

VI. Lessons from Successful Reformers

African countries must naturally find their own paths for building and reforming their education and training system to support a skills-led development strategy. Yet the experience of countries that have achieved some measure of success in this regard yields some useful lessons for consideration. Three mutually reinforcing ingredients seem essential: (i) the exercise of strategic and visionary leadership by top level policy makers, including those outside the education sector; (ii) the use of longer time horizons for policy development and implementation, and (iii) systematic and persistent effort to create and maintain backward and forward linkages within the education sector as well as between the sector and the economy. The experience of East Asian countries in particular demonstrate how these elements have worked together to foster sustained development of the education system, which in turn contributed to the dramatic transformation of their economies since the 1960s. Even in developed countries, these elements continue to influence the ability to remain economically competitive and to sustain high standards of living. Below we elaborate briefly on each of them.

Exercising strategic and visionary leadership. In many cases, reforming the education and training system will be difficult politically and will call for courage and skill in communicating and convincing the population to rally around a vision of shared economic growth and employment growth that is motivating the reforms. Fredriksen and Tan (2008) observed, for example, that in East Asian countries, education policy issues often benefit from close attention by the highest office holder and that the Minister of Education is typically one of the stronger ministers in the cabinet. The leaders set clear expectations for the sector: to shape future citizens by teaching civic values, to foster national cohesion among groups of diverse backgrounds, to build a national identify, and most critically, to equip students with the knowledge and skills for personal and national progress.

These goals are strategic insofar as they are indispensable for building a capable and resilient society whose members can, individually and collectively, take full advantage of opportunities in the global economy. Conviction about the critical importance of raising the standards of living for everyone explains why East Asian leaders have so assiduously cultivated the political consensus needed to implement the difficult choices and tradeoffs required to achieve them. The education sector typically receives a solid share of public expenditures,

averaging around 4-5 percent of the total budget and expenditures are prioritized first to enroll all children in primary school and to progressively to universalize 8-10 years of basic education.[8] The approach is consistent with the larger principle of shared growth, but its implementation called for visionary and indeed, inspirational, leadership to overcome the complex challenges of coordination and communication, to convince the elites of the advantage of shared growth and their self-interest in sharing the gains from growth with the middle class and the poor; and simultaneously to win the cooperation of the middle class and the poor (World Bank 1993).

In practice, prioritizing primary education meant that other levels of education (where society's elites are typically over-represented) had to rely heavily on fees as a source of financing.[9] It also meant that access to post primary levels was managed carefully to avoid expanding the system beyond its capacity to provide services of reasonable quality. At the same time, prioritization of primary education did not eliminate careful deployment of the resources and hard choices within the sub-sector. Korea decided initially to concentrate subsidies on rural schools and tolerated, for a time, huge class sizes (sometimes exceeding 90 pupils per class) in order to stretch the budget; Singapore operated almost all its schools on double shift well into the late 1990s; Vietnam prioritized support to lagging schools, to create a system where all schools met a national minimum standard of quality for inputs. In all these countries, the strategic value of textbooks (with content adapted to local contexts and teacher capability) received early recognition and policies were implemented to ensure that the large majority of families could afford them.

Using longer time horizons. The main consideration is practical: it takes time to transform the entire system and gear it to prepare today's students for tomorrow's job market. In the 1960s, no-one could have foreseen that poor countries in East Asia would one day join the ranks of developed nations and become, in certain fields, industry leaders themselves. Yet their leaders took the long view, envisioned where the country could be in 10-20 years' time, and concluded that the education system must equip all students with a good foundation in mathematics, science and language skills, in order for the students and the country to prosper in tomorrow's labor market and global economy. Details of the vision may differ across countries, but the leaders invariably appreciated the strong influence of science, technology and ICTs on economic competitiveness, realized that technical skills were essential for productive engagement in the emerging landscape of foreign direct investment, exports, transnational business partnerships, global supply chains, niche markets, lean manufacturing, etc.

Once a broad consensus emerged on the need for technically-competent workers with good communications skills, East Asian policy makers adopted a suitably long horizon to align the education system accordingly. This approach provides stability for the system, allows time to assemble ideas and technical resources to guide the reforms, encourages learning by doing, and offers a framework to plan a proper sequencing of implementation steps. In Singapore, for

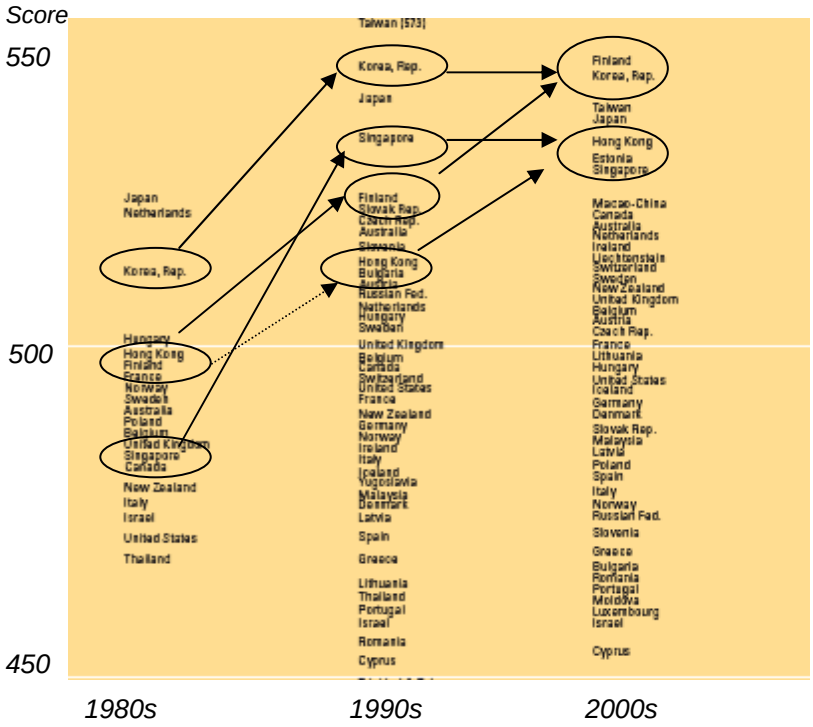
[8] It is to be noted that African countries also devote sizable shares of the budget to education, but the stagnant economic conditions in the 1980s and 1990s reduced the real value of the expenditures and made it very difficult to manage the tradeoffs.

[9] In Korea in 1989, for example, the share of total expenditures paid by families was 2 percent for primary education, 42 percent for junior secondary education, and more than 70 percent for senior secondary and college and university education (Fredriksen and Tan 2008).

example, when policy makers realized that moving production up the technology ladder would be frustrated by insufficient numbers of students with the relevant technical skills, they revamped the system to give all children a basic education of 10 years with an emphasis on mathematics and science, so that even the weakest students in each cohort could keep up with the courses in the technical and vocational training institutes that trained technicians for the country's emerging industrial sectors during the late 1980s and early 1990s (Law 2008).

Strengthening the foundational skills takes time because investments in curriculum and textbook development, teacher training and school leadership programs produce results only with a lag. Many of the reforming Asian countries, such as Singapore, Korea and Hong Kong (China) nonetheless improved their standing in international tests over a period of 10-20 years, as did some of the developed countries, such as Finland, Sweden and Ireland (figure 8). Common elements across these countries were the ideas from elsewhere that inspired learning from others and the external validation and benchmarking that motivated reform. The experience of the Asian countries is particularly noteworthy because test scores improved in systems that were less mature and often still trying to strike a good balance between quantity and quality. It suggests that it never is too early to expect education systems to improve learning outcomes, even if results show up only after a lag.

Figure 8: Country Rankings on International Tests in Mathematics a Science, 1980s, 1990s and 2000s



Source: adapted from Hanushek and Wöβmann (2007)

Fostering backward and forward linkages. This is the third ingredient essential for sustained development of the whole education system. The underlying idea is simple: if the goal is to prepare students for tomorrow's jobs, it makes obvious sense to establish close collaboration between educators, employers and economic policy makers and others whose job is to scan the horizon for future trends and evaluate their implications for the economy. In the upper levels of the education system where the majority of students may be just one or two years away from entering the labor market, this collaboration in the most successful countries takes such forms as having industry representatives help define and shape the curricula, promoting student participation in industry projects as a routine part of their studies, encouraging student internships with employers, and so on. Graduating students thus leave the system with ready-to-use skills and even job offers in hand.

For the system as a whole, however, alignment with the growth agenda requires a deeper collaboration between educators and employers and economic policy makers, one that extends farther into the system where students are possibly still many years away from entering the labor force. A recent study that compared several Latin American countries (Costa Rica, El Salvador, and Recife, Brazil) with Sweden illustrates what it means for an education system to prepare students for jobs of the future (IDB 2006). In Sweden, policy makers expect nearly all 19-year-olds to have learnt mathematics, science and technology up to a specific level, so that the economy can count on having a critical mass of youth with the technical preparation to succeed

in further studies or in challenging jobs. The researchers found that Swedish youth are taught mathematics and science as disciplines for problem solving (for applied purposes), not as ends in themselves. These subjects are thus not academic studies for the elite few but essential skills that expand options in life for all students. By contrast, in Latin America, the education system values abstract and theoretical learning at all levels, including the university. Mathematics and science are taught as free-standing subjects with little appeal and relevance to the majority of students. Many students drop out early and among those who stay, very few choose mathematics and science for further studies. As a result the school system is failing to produce the critical mass of people with core skills to help the economy become more technologically sophisticated.

VII. Conclusion

"Skills for competitiveness" is a theme that resonates across the world today. In advanced countries policy makers, the business community, and schools realize that sustaining high standards of living depends on staying at the forefront of knowledge, technology and innovation. Correspondingly, preparing a workforce for tomorrow's jobs, one that is capable of producing high value added services and products in the future, is an accepted priority for schools. Policy makers encourage active dialogue, interactions and partnerships between educational institutions and businesses, to help ensure that a pipeline of future workers is being prepared to perpetuate the economy's competitive edge. In less developed countries, particularly those in Africa, the concept of "skills for competitiveness" presents many challenges, not the least among them a tendency, until recently, for policy discussion to dwell much more on the goal of "Education for All" and its impact on the rest of the system, than on the question of "Education for What?" The two topics are not mutually exclusive, but starting with the latter changes the dynamic of policy discussion by putting the onus on the education system to rise to the challenge of equipping today's youth to compete for good jobs tomorrow.

Fortunately, the context for policy discussion is changing, in Africa as elsewhere. Many African economies, fueled in part by the current commodity boom, have been growing at a decent pace for the past 10 years, in sharp contrast to the pattern of decline and stagnation in previous decades. African governments are keen to sustain the recent performance and avoid falling victim once again to the boom-and-bust cycles of the past. Increasing numbers among them recognize the need to develop a skilled workforce to take advantage of global advances in scientific knowledge and technical know-how, catch up to the technology frontier, and benefit from the information and communications revolution, so as to make their economies more resilient and competitive, by increasing their productivity and innovation in agriculture, industry and services, and by adding value to their natural resources. Policy makers are also aware that a technologically capable population is vital to manage the potential threats posed by climate change, disease, the growing scarcity of key resources, and the social pressures of population growth, urbanization and migration.

As the discussion in this paper has documented, skills development is a daunting task. Past neglect of the education and training system has left a flawed legacy of poorly-qualified workers and weak educational institutions through which too many young people have been passing without acquiring the skills they need to earn decent livelihoods. For this and other reasons, youth unemployment is becoming a major issue in many African countries, and it is

affecting even those who manage to reach the upper levels of the system. In this context, the "skills for competitiveness" agenda in Africa has both a short and a longer-run perspective. The immediate task is to provide opportunities for as many youth as possible to gain a foothold in the job market. On demand, ad hoc skills training, typically of short-duration, may be appropriate, particularly as part of the package to attract foreign direct investments, but such programs are always best designed in close collaboration with prospective employers. The challenge for the longer term is similar, in that schools must learn to see students' prospective employers, even 10-20 years down the road, as customers and plan their work accordingly. Equally, the business sector needs to see the education and training system as part of the chain that supplies a key input (skilled workers) into their operations and thus become more involved in the process of workforce preparation. Fostering a dynamic relationship between the supply of and demand for skills is a major challenge, but as the policy makers and educators of other fast developing countries have shown, it can be attained with the exercise of visionary and strategic leadership coupled with a learning-by-doing approach to implementation in order to achieve results in both the short and long run.

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