Building strong workforces to power Africa’s growth.

The future of work in Africa
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This paper is part of a series from GE’s Chief Economist, Marco Annunziata, exploring the next generation of industrial progress. Other papers in this series include:

- The Future of Work (2014)
- The value of interconnectedness (2014)
- The Industrial Internet @ Work (2013)
- Industrial Internet: Pushing the boundaries of men and machines (2012)
- By region:
  - The future of work in Australia: Building the third wave of growth (2014)
  - The future of work in Turkey (2014)
  - The state of European innovation (2014)
  - Industrial Internet: A European Perspective (2013)
Executive Summary

Sub-Saharan Africa (SSA) has recorded robust economic growth over the past decade and a half. The share of population living in poverty has declined, and an emerging middle class is beginning to take hold in many of its rapidly expanding cities.

This strong growth performance could now be propelled further, riding on the wave of Africa’s demographic dividend—a strong projected increase in the size of its labor force as its young population continues to expand at a fast pace. SSA is projected to expand its labor force by more than the rest of the world put together through 2030. SSA is already the youngest region in the world, and by 2025 it will be home to one-quarter of the under-25 global population.

Today, however, Africa’s labor market is unable to absorb this rapidly expanding population. To create sufficient jobs, SSA must continue to diversify its economy beyond commodities, building a broader and competitive manufacturing industry.

Substantially greater investment in infrastructure is a necessary pre-condition. Currently, lack of infrastructure in power generation and distribution, logistics, and urban healthcare are especially high hurdles. Additional effort is also needed in improving the business environment: cutting red tape, streamlining administrative procedures and regulations, and boosting transparency.

Improvements in infrastructure and the business environment should be complemented by greater investment in skills. Today, education systems in many countries across the continent are still weak, with technical schools few and far between. Large parts of Africa’s labor force are relatively unskilled, and elevated unemployment rates for graduates signal a gap between the skills created by the education systems and those needed by industry. This often puts a strain on the growth of established industries like Oil & Gas, and makes it hard to develop a broader manufacturing sector.

Meanwhile, industries worldwide are being transformed by the Future of Work, an accelerating wave of innovation driven by the marriage of digital and physical technologies. It comprises Advanced Manufacturing, the Global Brain, and the Industrial Internet.

Advanced manufacturing in particular can help SSA identify new models for growth. Advanced manufacturing redefines economies of scale. It enables microfactories and distributed production—the “democratization of manufacturing.” This could allow SSA to develop a more modern, diversified and nimble manufacturing sector at the same time as it seeks to build more traditional, large-scale industrial activities.

The Future of Work is poised to transform industry, redefining the competitive landscape for companies and for countries. It is therefore imperative for SSA’s policymakers to build the jobs of today with an eye to the jobs of tomorrow. To lay the basis for faster and sustainable job creation within this context, SSA needs a three-pronged strategy based on:

1. a stronger education system with closer links to industry;
2. more open and flexible labor markets and a broader talent localization strategy pursued in partnership with global companies; and
3. an effort to build the pipeline of skills needed to successfully leverage the technological advances of tomorrow, enabling the Future of Work in Africa.

Governments should encourage and leverage Africa’s entrepreneurial and innovative spirit. In Kenya, the mobile payments system M-Pesa has bypassed the banking system, transforming financial transactions and boosting economic activity. Similar leap-frogging of technology could be brought to bear in other areas where lack of infrastructure is an especially acute problem, notably power generation and distribution, and healthcare. Joint efforts of governments and private companies to invest in infrastructure and invest in skills are the key to unlocking this potential.

Africa is a rich and diverse continent, where national economies have different characteristics, strengths and vulnerabilities. A detailed country-by-country analysis is beyond the scope of this study. Here, we focus on the common challenges and on the main actions that we believe can be fruitfully applied throughout the region. The rest of the paper is structured as follows:

- Section 1 provides an overview of Africa’s growth landscape;
- Section 2 lays out the key features and potential benefits of the Future of Work;
- Section 3 assesses the current skills gap and its main causes;
- Section 4 outlines a three-pronged strategy for building the jobs of today and a pipeline of the skills for tomorrow;
- Section 5 dives into a case study of accelerating the creation of necessary skills in healthcare;
- Section 6 concludes.
Africa’s growth landscape

Sub-Saharan Africa (SSA) has made considerable progress in economic development over the past decade and a half. Thanks to strong economic growth, the share of population living in poverty has fallen below 50 percent, and an emerging middle class—while still in its infancy at less than 10 percent of the total population—is taking hold in many of its rapidly expanding cities.¹

Several important factors—including stronger political stability, fewer violent conflicts, improvement in governance and institutions, and more prudent macroeconomic policies—contributed to this performance. But Africa must urgently strengthen and broaden its industrial base to sustain this progress and to accelerate its economic competitiveness. Building the right pipeline of skills is essential to this strategy.

The demographic dividend

Strong and sustainable job creation is desperately needed to match Africa’s demographic boom: Africa’s share of working-age population (ages 15-64) is set to accelerate over the next several decades, from around 54 percent currently to 62 percent in 2050. At a time when the population size is stabilizing, if not declining, in most other countries, Sub-Saharan Africa’s population will more than double to two billion by 2050.²

An overwhelming majority of this population will be young:

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¹ For additional detail, see Annunziata, Kramer and Johnson (2013) “Growth and Governance in Africa”, GE White Paper

² According to the UN Population Division forecasts (2012 medium-fertility variant)
already today, SSA is the youngest region in the world, with 60-70 percent of the population under the age of 25. By 2025, SSA will be home to around a quarter of the global population aged 24 and younger. SSA is projected to expand the size of its labor force by more than the rest of the world put together through 2030 and by an increasing margin thereafter (see Figure 2).

**Figure 2**
Change in working-age population (additional workers over a 5-year period)


Successfully employing this growing workforce will directly raise per-capita income, due to the resulting decrease in the non-working population. Moreover, since working-age individuals typically save more, greater domestic savings will be available to fund investment, boosting current and future growth. In addition, falling fertility rates are likely to lead to greater female labor force participation, while a lower number of children per family will leave more resources for households to spend on education and healthcare.

In similar transitions in other parts of the developing world, this trend resulted in a “demographic dividend” that boosted economic growth and prompted the transition from low-income to middle-income status. But it also presents a host of challenges. Under these projections, Sub-Saharan Africa will need to create an average of 15-20 million new jobs per year over the next three decades.

This cannot be achieved in a labor market that today already has a low absorption rate into formal employment. According to the International Labor Organization, nearly 80 percent of workers in Sub-Saharan Africa are in vulnerable forms of employment (defined as self-employment or unpaid family work). Many of these jobs are in the informal sector, where productivity tends to be low.

Creating stability through opportunity for Africa’s growing youth

Advancements in skills and productivity are an essential bulwark against potential social instability. In sub-Saharan Africa, with many of its cities growing at eye-popping rates, creating opportunities and jobs for the subcontinent’s youth will be critical to build sustainable, inclusive, and stable growth.

Forecasts of SSA’s urbanization are telling:

- **Growth in SSA’s urban areas is 3.6 percent annually, double the world average.**
- **200 million Africans currently live in slums, making up 70 percent of urban inhabitants; 175 million do not have access to basic sanitation.**
- **Urban growth is expected to be most pronounced in cities with already overstretched infrastructure. Kinshasa currently has around 11 million people. Estimates are that this could grow to around 19 million by 2030. Luanda’s population is currently just over 5 million; it will more than double in size over the next 15 years.**
- **Kinshasa will be the city with the largest number of children in the world in 2025. Lagos will have the sixth largest population of children, and Luanda the 17th largest.**

This massive expansion in urban residents – coupled with continued outsized growth in the absolute population size in SSA – presents an opportunity for a demographic dividend, whereby African countries could rapidly expand their economies and boost their position in the global marketplace.

However, if these urban areas are allowed to expand without the requisite investments in skills development – along with infrastructure and services – a growing proportion of youth could be left unemployed and with little hope for socioeconomic advancement. This could increase social tensions, undermining cohesion and stability.

The African urbanization story makes it even more important for national governments and their partners to invest in skills development—this will require strong commitments from political leaders, the private sector, and society at large.

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*See the IMF’s Regional Economic Outlook: Sub-Saharan Africa (April 2015) for more details on the region’s demographic transition and a comparison to the historical experiences of East Asia and Latin America.*
Today, SSA’s economies are failing to adequately provide jobs and prospects to their young and growing populations. In fact, unemployment disproportionately affects young Africans: they comprise around 60 percent of Africa’s unemployed, compared with a global average of about 44 percent. This needs to change, not just because it condemns large numbers of young people to low living standards and represents a terrible waste of human capital that undermines future economic growth, but also because it poses a risk to social and economic stability.

**Beyond commodities**

To provide jobs for its growing population, SSA must make further progress in diversifying its industries and boosting its manufacturing base. Commodities have been an important driver of growth. An extended period of elevated commodity prices boosted export revenues and attracted international investment and technological expertise to develop Africa’s abundant supply of natural resources. Foreign direct investment continues to sustain growth in the extraction industries.

But the commodities extraction industry by itself cannot provide the rapid increase in jobs that Africa needs. The sector is exposed to the volatile fluctuations of commodity prices: prices of metals have generally been on a declining path since reaching their peaks in mid-2011, and most prices of individual commodities have fallen in at least two of the past three years.

The most dramatic price drop took place in the oil market in the second half of 2014 (see Figure 4). Two of the main regional casualties were Nigeria and Angola, the first and third largest African economies, respectively. These countries depend on hydrocarbons for more than 90 percent of their exports and more than 70 percent of their fiscal revenues. Together, they accounted for almost 50 percent of Sub-Saharan Africa’s total GDP growth over the last fifteen years, but their growth prospects, at least in the short term, have weakened. The region’s other economic giant, South Africa, will also continue to experience disappointing growth.

**Excessive reliance on commodities extraction also drives relatively low employment.**

Angola’s oil and gas sector accounts for almost half the country’s GDP (45 percent), but employs only 770,000 (about three percent of the population). Similarly, Ghana’s $2.3 billion mining sector employs just over 1.2 percent of the population while the nascent oil and gas industry, which is already worth $1.8 billion, currently employs only about 7,000 people. Meanwhile, there is anecdotal evidence that skills shortages are slowing the development of the commodities industry.

To be sure, Africa’s growth is no longer just about commodities. Relatively high fixed-asset investment—especially in mining and infrastructure—generous public spending, and rising household incomes have remained strong drivers of growth. Moreover, the share of capital flowing to service sectors, such as construction, utilities, business services, and telecommunications, is gradually rising.

Developing a broader, competitive manufacturing industry is a key priority. Manufacturing can be a powerful engine of growth and diversification, and can accelerate the transition to higher value-added and higher productivity activities. Expanding the role of the services sector will also contribute.
The infrastructure imperative

In most African countries, industrial activity has been largely confined to the processing of natural resources and customization of end-consumer products, whereas, for the region as a whole, manufacturing’s value-added share of total GDP has been declining.

But in order to boost the productive capacity of its expanding labor supply and harness the power of its demographic dividend, Africa needs to boost its manufacturing base and further develop its services sector to create a larger number of good jobs as rapidly as possible.

Manufacturing has been the main job creation engine for all countries that have progressed beyond SSA’s current stage of development. Creating labor-intensive and higher-productivity industries is a tested way to significantly upgrade the quality of the workforce. To date, however, the region has made limited progress in building a competitive manufacturing sector and attracting workers to light-manufacturing industries in large numbers.

Substantially greater investment in infrastructure is a necessary pre-condition for a stronger manufacturing sector. According to the WEF Global Competitiveness Report and the World Bank’s World Development Indicators database, SSA lags behind other developed regions in most measures of infrastructure coverage, with particularly large gaps in road transport, electricity supply and access to water.

Some of the infrastructure gaps pose an especially high hurdle to the development of manufacturing:

- Lack of reliable electrical power is a major impediment to economic growth—the World Bank estimates that power shortages reduce Africa’s GDP growth by two percentage points a year. Almost 45 percent of Africans lack basic access to electricity, and 70 percent of businesses cite the lack of reliable power as a major constraint. Nigeria, which has a per capita output comparable to India’s, has only one-fifth of the generation capacity. Manufacturing cannot be viable in the absence of a reliable source of electricity.

- Logistics is currently another bottleneck for growth. The region’s rail network is especially underdeveloped: some countries have no rail network at all, and cross-country connections are extremely rare. This has contributed to holding back regional trade and economic integration. Road transport also needs investment. Ports suffer from limited infrastructure and poor management. Logistics bottlenecks limit the ability to transport products across Africa and to ship them to foreign markets, curbing the development potential of manufacturing.

- Urbanization goes hand in hand with industrialization, and it requires an additional set of infrastructure: urban transport, better access to power and water, and healthcare.

African governments are aware of the pressing need to develop their countries’ infrastructures: several countries in the region have set ambitious targets for their power generation capacities (including South Africa, Ethiopia, Kenya and Nigeria).

Bolstering Africa’s infrastructure requires a substantial qualified workforce: this provides a tremendous opportunity for countries to develop cadres of engineers, architects, and public servants versed in building and maintaining infrastructure. Currently, much of this work is done by third-country professionals brought in for multi-year projects. While this is necessary to bring projects online quickly, governments should work to ensure that foreign firms are partnering with local companies intent on long-term skills development, thus guaranteeing that the skills needed to maintain these mega-projects, networks, and city skylines will remain in place.

Developing infrastructure and developing skills can—and should—form a virtuous cycle fueling Africa’s economic development.

*See for example The Economist, “Lighting a Dark Continent,” September 2014.*
The Future of Work

While SSA faces the challenge of industrialization, the pace of industrial innovation is accelerating globally, driven by a convergence of physical and digital technologies. Bringing together the physical and the digital worlds is the next generation of industrial progress. Harnessing reams of data, the collective intelligence of human beings across the globe, and advanced manufacturing materials and processes—the Future of Work—is delivering transformative progress for people and businesses worldwide.

We have called this the Future of Work because it is redefining the way that work will be performed in the decades ahead: the technologies that will be used, the advanced tools that will augment workers’ capabilities, the new skills required, the greater intensity and different forms of collaboration, the organization of the production process, and the coordination of supply chains and distribution channels.

This is happening just as Africa seeks a growth model that enables it to unleash new possibilities in industrial development—generating labor-intensive and high-value industries that will contribute to stable economic growth and job creation for decades to come.

Given this rapid pace of innovation, Africa must build the industry of today with an to the industry of the future. Investment in human capital must aim not just to quickly develop the skills needed today, but also to build a pipeline of the right skills for tomorrow. Moreover, SSA should look for selected opportunities where the most recent innovations can already be implemented and used to leapfrog existing practices and immediately pursue new opportunities. This is already a familiar strategy for Africa: a mobile payments system like M-Pesa has allowed Kenya to bypass the development of traditional banking, moving immediately to a faster and more efficient financial model that can more effectively address the needs and constraints of consumers and businesses.

The Future of Work is driven by three interrelated and mutually reinforcing trends:

1. **Advanced Manufacturing**, which weaves together design, product engineering, manufacturing, supply chain, distribution and servicing into one cohesive intelligent system, delivering greater speed and flexibility at lower costs;

2. **The Global Brain**, the collective intelligence of human beings across the globe integrated by digital communication, resulting in crowdsourcing, open collaboration, and a much faster pace of innovation;

3. **The Industrial Internet**, which merges big data with big iron, integrating cloud-based analytics with industrial machinery, resulting in greater efficiency and reduced down time.

The innovations of the Future of Work are turning traditional industrial assets into interconnected devices, full-rights members of the Internet of Everything. They are also changing the nature of economies of scale, and blurring the lines between manufacturing and services. Industrial companies that learn how to combine the digital and the physical can unlock new value for both customers and shareholders.\(^3\)

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In 2012 we estimated that just a one percent efficiency improvement would yield some $90 billion savings in the Oil and Gas industry over a fifteen-year period, over $60 billion each in the power industry and the healthcare industry, and about $30 billion each in aviation and in rail transport. These sectors and others will benefit from the higher speed, reduced unplanned downtime, and lower fuel burn that the industrial internet can bring—ultimately resulting in higher profitability.\footnote{Ibid.}

Industrial innovations are blurring the lines separating industry and services, extending their efficiency gains well beyond the boundaries of the industrial sector as traditionally defined.

Our estimates of one-percent efficiency gains show the benefits that even marginal performance improvements can bring to industry. But in practice, GE’s industrial internet applications across a range of sectors deliver gains that are much larger: in power generation, GE’s Wind PowerUp technology delivers a four to five percent increase in annual output, resulting in even greater improvements in profitability for wind farms. In aviation, industrial internet solutions are yielding important reductions in fuel consumption, as well as in flight delays and cancellations.

Leveraging the full potential of this wave of innovation is not easy, however, in any region. **For both companies and countries, it represents as much of a challenge as an opportunity.** It requires significant investments. It requires the development of new capabilities, concentrated in the areas of data science, software and cloud computing, user interfaces and cybersecurity. These new capabilities in turn need to be melded with traditional scientific and engineering capabilities.

**Fast adoption of these innovations could deliver substantial economic benefits for Africa.** In some areas, these innovations will be a necessity for Africa, not a luxury: Raising the living standards of Africa’s large and fast-growing population, with the attendant absorption of power and healthcare services, simply cannot be done with the same models and technologies adopted by advanced economies—the pressure on resources and the environment would be unsustainable.

Just like China, SSA needs to pursue a different and more sustainable development model, and the efficiency-enhancing innovations of the Future of Work hold the key. In this regard, Africa’s low levels of installed capital are an advantage, as stronger investment can more quickly put in place the newer generation of industrial equipment—provided the right skills to operate it are available.

For companies and individuals alike, **the Future of Work brings tremendous opportunity for Africa.** It can allow the region to build a range of manufacturing and services activities that will remain competitive for decades to come, fueling stronger growth in jobs and incomes on a sustainable basis.

**The key to realizing this is investing in people.**
Mind the gap

“Government has noted the skill gaps in the economy and has observed that most of the youths are unemployable. This is a major challenge in the national transformation process that requires creation of jobs massively for the relevant sectors of the economy.”

– Nnamadi Sambo, Nigeria’s immediate past Vice President

“Let us not allow the lack of skills development to define why as a continent we are in a vicious cycle of poverty and global marginalization.”

– South Africa’s former Deputy President Phumzile Mlambo-Ngcuka.

In order for Africa to fulfill its economic potential and realize the Future of Work, it needs a strong skills base across a range of industries. The continent needs to develop, build and maintain critical infrastructure, tackle public health challenges, increase connectivity, and improve access to energy and power. All of these industries – aviation, telecommunications, sanitation, civil engineering, industrial technology, medical research – require critical skills at postgraduate, graduate and technician level.

But while Africa’s labor force is large and growing, large parts of the workforce remain relatively unskilled: there are insufficient colleges and technical schools to generate the needed skilled labor force. Ghana, for example, produces just 99,000 skilled professionals annually from all public and private tertiary institutions in the country.

Graduate unemployment rates are often high. In Nigeria, the graduate unemployment rate is 23.1 percent (British Council). In Kenya, while specific figures on graduate unemployment are not available, it has been estimated that it can take up to five years for a graduate to secure relevant employment.

High graduate unemployment rates signal that the education system is often focused on the wrong priorities. Graduate education that does not provide employable skills is a tremendous waste of resources: both of the capital and expense invested in providing the education, and of the time and expense invested by students in acquiring it. It raises the expectations of graduates, exacerbating the risk that high unemployment rates could fuel social unrest.

High graduate unemployment rates underscore that Africa needs a closer dialogue between schools and industry, to better align the demand and supply of skills.

An analysis of this skills gap quickly reveals that there is a corresponding and equally limiting data gap. There is a severe paucity of basic data on the number of existing jobs and of newly created jobs in specific sectors. Similarly there is virtually no reliable hard data on the number of unfilled vacancies in specific sectors. This lack of reliable data makes it very hard to assess in a systematic way the shortage of skills in different sectors of SSA’s economies. This makes it very hard to identi-
fy targeted measures to address the skills gap, undermining efforts to develop Africa's skills base.

There is, however, abundant anecdotal evidence that companies operating in sectors such as oil and gas, transportation and others are unable to find the necessary number of local skilled workers for the desired scale of their operations. This can be partially mitigated by bringing in foreign workers. This strategy, however, is costlier for the companies and can at times collide with local content requirements. Most importantly, relying heavily on expat workers runs against the need to bolster the skills and job prospects of African workers, which in turn is crucial to accelerate the growth of the middle class and ensure strong and sustainable economic development across the region—a shared priority for both policymakers and the business sector. Overall, we believe that these skills shortages are limiting the expansion of existing manufacturing sectors, and impeding the birth of new manufacturing industries at higher value added.
“Accelerating the creation of productive jobs through private sector growth and improvements in education (skills) remains the major medium-term challenge.”

Africa needs a strategy to address these weaknesses, and make the right investments to build the jobs of today with an eye to the jobs of tomorrow. This strategy should rest on three tenets:

1. **Education**: Strengthen the education system with greater investment; steer more students towards STEM education by providing better information about employment prospects; invest in technical and vocational colleges and strengthen the ties between the education system and industry to ensure better match of skills demand and supply.

2. **Openness and talent localization**: support infrastructure and skills building with labor market openness and flexibility to attract regional and global talent, as well as stronger FDIs; embrace a broader talent localization strategy in partnership with global companies; and develop work placement services and specialized job training centers.

3. **Enabling the Future of Work**: start building a pipeline of the skills that will be needed to successfully leverage the technological advances of tomorrow; leverage new digital technologies to advance education at a faster pace on a broader basis; and encourage innovation, launching entrepreneurial schemes, including provision of finance for micro and small businesses—with particular focus on women and the youth.

**Education**

Building skills starts at home and in the schools.

**In terms of enrollment numbers, higher education is on the rise in Africa.** According to the World Bank, in the decade from 2000 to 2010, the number of students enrolling in African universities more than doubled from 2,344,000 to 5,228,000. There remains a great deal of scope for this to increase further: the continent’s enrollment rate is just seven percent (compared to a global average of 29 percent). Moreover, just 38 percent of students enrolling are female. Tertiary education enrollment rates vary from four percent in Kenya to 12 percent in Ghana and 18 percent in Nigeria and South Africa.

The quality of university teaching across Africa is also frequently limited by constraints on budget and difficulty in attracting and retaining staff. According to the British Council, there are on average 50 percent more students per lecturer in sub-Saharan African as compared to the global average. In Kenya, for example, there can be up to 64 students for each member of academic staff. Completion rates are low: in South Africa, for example, 40 percent of students drop out within the first year and just 15 percent of students complete their courses within the allotted time.
While more Africans are going to college, many are not pursuing the subjects that can open the doors of jobs in today’s manufacturing—or tomorrow’s.

In Africa, 70 percent of graduates have qualifications in the social sciences and humanities – the highest share in the world. By contrast, in Asia just 53 percent of graduates study the social sciences or humanities. In order for Africa to be able to train sufficient skilled workers to run its oil & gas, mining, agribusiness and other manufacturing sectors, the continent must significantly increase the number of students of STEM subjects (Science, Technology, Engineering and Mathematics).

According to the UNDP, just one African college student in six will graduate with a science or engineering degree—a mere one percent of the continent’s university-age cohort. This varies between countries however. In Kenya, 29 percent of students were enrolled in science, technology and engineering degrees between 2010 and 2012, while in Ghana the figure was 25 percent.

According to a report from the World Bank, in order for Africa to meet the Millennium Development Goal of delivering improved access to clean water and sanitation, the continent needs an additional 2.5 million engineers and technicians. Across the continent, education systems face a variety of challenges.

- Even though per capita spending on education is among the highest in emerging markets, graduation rates and performance in core areas such as math and science are low. The system also suffers from an insufficient number of colleges and technical schools, needed to provide applied skills for manufacturing. The powerful role of the teachers’ trade unions is an additional obstacle to reform.

- Mozambique’s public education system is very uneven: outside of Maputo and a few other major cities, schools and universities are underfunded. Like South Africa, Mozambique also suffers a lack of technical and vocational schools.

- Kenya spends about 6 percent of GDP in education, but this spending effort is blunted by administrative inefficiencies. These in turn have led to significant teachers’ dissatisfaction, resulting in strikes and school closures. Security concerns in some of the more remote regions, where al-Shabaab has targeted teachers (bus shooting) and learning centers (Garissa University), cause a shortage of teachers in these areas, making it even harder to extend the reach of the education system.

- Education in Nigeria has historically been underfunded. Only about 9 percent of the 2015 budget (about $2.1 billion) is allocated to education, compared to a UNESCO recommended share of 26 percent. Nearly 90 percent of the budget allocation is for recurrent expenditures, leaving little for building and upgrading infrastructure. The system suffers from low quality teaching, strikes, low graduation rates, and a stark regional disparity: the Northeast has a literacy of just over 15 percent compared to over 78 percent in the Southwest. As in other countries in the region, technical and vocational schools play an undersized role: they suffer from a severe shortfall of teachers, and are seen as a second choice by the vast majority of students and parents. In 2010 only 3 percent of students took the vocational placement exams.

Some countries in the region have begun to take steps to bolster their education system.

In 2012 Nigeria’s SURE-P, the Subsidy Reinvestment and Empowerment Programme, used a partially removed fuel subsidy to fund a scheme to help tertiary graduates find jobs. The most successful program under this umbrella was an intern scheme where 50,000 students were accepted. The 293 firms chosen received tax breaks and free labor (the graduates were paid a stipend by the government). The program was seen as a success by both sides, and expanded to 100,000 graduates in 2014/15.

In Kenya, the African Development Bank authorized a $62 million loan to finance the second phase of the Support to Technical Vocational Education and Training (TVET) project. The African Development Bank has a current portfolio of $221 million for higher education, science and technology, TVET, entrepreneurship and skills development in Kenya.

Reversing the brain drain

According to recent research, there are over 10,000 doctors born or trained in Sub-Saharan Africa who are currently practicing medicine in the United States—more than the total number of practicing doctors in Ethiopia, Ghana, Liberia, Tanzania, Uganda, Zambia and Zimbabwe. In 2010, a study revealed that around 70 percent of Angolan doctors lived and worked abroad – and that there were more Angolan doctors working in Portugal than in Angola. Beyond medicine, the OECD has reported that, of all Africans holding a tertiary education qualification, one in nine is working outside of the continent.

An estimated 17 million Nigerians live outside of their country of birth, as do approximately 3 million Kenyans. The OECD reports that the emigration rates of highly skilled workers are more than 20 times the overall emigration rate in African countries, including Mozambique, Tanzania and Zambia. In South Africa, the overall emigration rate is 1.6 percent, while, for highly educated workers, it is 11.6 percent. It is a similar story in Kenya (1.1 percent / 12.8 percent...
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percent) and Ghana (2.2 percent / 14.3 percent). This is not surprising; highly skilled individuals have more opportunities abroad. But this brain drain makes it that much harder for Africa to build the necessary skills base. This highly skilled African diaspora should act as a further incentive for governments to put in place the right conditions for stronger entrepreneurship and economic activity. Once efforts to broaden the manufacturing base begin to pay off, creating new opportunities, they will attract part of the highly skilled diaspora back to their countries of origin, and this will accelerate the process, with a virtuous circle of stronger human capital and stronger economic activity.

Openness and talent localization

Creating jobs is a top priority for all governments—and is all the more important in SSA, given also the demographic trends we highlighted earlier in the paper. SSA policymakers rightly aspire to create not just more jobs, but also better jobs, with stronger skills, higher remunerations and better career prospects. Achieving this requires action on two fronts: (i) equipping Africa’s students and workers with the right skills—as we discussed above; and (ii) providing the right conditions for domestic and international companies to invest at scale and remain competitive in global markets.

Improving infrastructure is essential to foster the growth of a broader manufacturing sector. Priorities here should include ensuring reliable access to electricity across the continent, and improving logistics, from rail and road networks to ports infrastructure and management. Improvements in these areas would reduce costs and raise predictability for industry.

Together with stronger infrastructure, Africa’s industry would benefit immensely from further improvement in the business environment. Meaningful progress has already been made over the past decade, but more is needed. Africa’s policymakers should focus on creating a level playing field, removing regulatory burdens and red tape, simplifying and streamlining administrative procedures, and further improving transparency.

Stronger infrastructure, a better business environment and a more skilled workforce would spark a substantial acceleration in FDI s, given the already strong interest in Africa’s markets. They would allow global companies to more rapidly scale up their operations, and to localize in Africa productions at higher value added, accelerating the transfer of technology and skills. This strategy would also drastically reduce the need to resort to local content laws, which can very often create inefficiencies, undermining the competitiveness of local operations and slowing investment and job creation.

Multinational corporations should act as a crucial partner in pursuing this strategy. At GE, we view localization as a multidimensional strategy to be pursued in partnership with customers, suppliers, governments and other local stakeholders. Localization focuses on capacity-building – in human capital growth, supply chain development and partnership with local organizations and businesses for talent and infrastructure development and support. Localization enables growth in the communities in which we work, while increasing the productivity of our local operations and of our suppliers and partners—making us all more competitive in the long term.

Labor market openness

Investment in infrastructure, as well as skills and improvements in the business environment, should be complemented by greater openness in labor markets. Allowing the free movement of skilled foreign workers both within SSA and from outside the region can make it easier for companies—both domestic and foreign—to set up activities and scale up rapidly to pursue market opportunities.

Openness and flexibility in the labor market also make companies more confident that, as technology and market conditions evolve, they will have a greater ability to upgrade their workforce as necessary by tapping a larger pool of labor. This also helps attract greater levels of investment. Moreover, a policy of openness creates a larger number of qualified workers who can interact on the workplace with domestic workers, accelerating the process of training and skills transfer.

It is not by chance that some of the most successful economies in the world have immigration policies that favor the influx of qualified foreign workers—the U.S., Canada, the U.K. and Australia, to name a few. African countries should therefore support labor mobility.

As they scale up their operations, companies will have a strong incentive to rely more and more on the African workforce rather than on expats, for at least two reasons: it would reduce their overall labor costs (at equal wages, expats are considerably more expensive to the employer) and it would provide greater stability by lowering employee turnover.

Companies, however, need to do more to demonstrate their commitment to developing Africa’s labor force, particularly at mid and high skills levels. During the past two-three decades, strong FDI s concentrated in the extractive industries have too often relied primarily on expat talent, with limited progress in developing local skills.

Africa’s governments need to do their part, as we discussed above, but it is equally incumbent upon foreign companies to do more to help develop the local workforce, both by setting up stronger programs for training and skills transfer, and by gradually entrusting more managerial responsibilities to local hires. Companies and policymakers share a common interest in building a more skilled and experienced local workforce, but the goal can be achieved only if both parties work together and demonstrate equal commitment through their actions.
Enabling the Future of Work

In our discussion above, we have highlighted the efforts that SSA needs to make in order to mitigate the existing skills gap. This is urgently needed in order to (1) accelerate the growth of industries that already play a preeminent role in the economy of many African countries, such as Oil & Gas; and (2) allow the development of new manufacturing industries, so as to broaden and diversify the region’s industrial base.

We believe, however, that Africa’s policymakers must look to the future at the same time as they address the urgent problems of today. As we highlighted in the section on the Future of Work, the pace of innovation in industry is accelerating and will bring a profound transformation in the manufacturing sector in the years and decade ahead. The conditions for competitiveness and success across industrial sectors will be very different, as digitally driven technologies provide new and powerful ways to increase productivity. And the skills needed to succeed in this new environment will change—in fact, they are already changing.

African governments, therefore, should ensure that changes to the education and training systems are also geared to shaping the workforce of tomorrow, so that the pipeline of local skills can quickly adapt to the changing demands of the industrial system. This is essential to ensure that progress in building a broader manufacturing sector and boosting skilled employment levels can be sustained in the decades to come.

This is not just a defensive play. The innovations of the Future of Work will disrupt the competitive landscape for companies and countries alike. By playing its cards well, SSA could therefore leap ahead of the global competition in some sectors, achieving a major acceleration in economic growth.

The Future of Work is characterized by the coming together of digital and physical technologies. Industrial internet applications are data driven. The digital thread that is the heart of advanced manufacturing is based on data. This will create an increasing demand for workers who combine traditional expertise in mechanical engineering, management and marketing with a deep familiarity with data-driven processes and analytics.

We will see the rise of new professional figures, such as digital-mechanical engineers, who can blend expertise in traditional engineering with information and computing competencies; and business operations data analysts, who combine a deep knowledge of their industry with an intimate familiarity of the latest analytical tools, and can extract the maximum value from data and leverage the corresponding insights by quickly adopting business strategies. There will be more demand for user interface experts and for data scientists, who can facilitate the dialogue between man and machine.

To start preparing this pipeline of future skills, as they strengthen their education systems, African governments should place more emphasis on science, technology, engineering and math (STEM). Not everyone needs to become an engineer or a data scientist, but the bar on STEM education needs to be raised.

In a world where technology and data are going to play an increasingly important and pervasive role, we should see basic scientific literacy as important as traditional literacy.

Schools and universities should encourage critical thinking, flexibility and adaptability, as opposed to rote learning. With faster technological innovation ahead, workers will need to be able to change the way they work as new technologies become available.

With faster-moving innovation, more of the learning will need to happen in the workplace. Companies should therefore provide lifelong learning opportunities to their workers, and collaborate more closely with schools and universities in the design of curricula.

Leveraging digital technology in the schools can help, and some African countries have already started to move in that direction. In South Africa, a partnership between a publisher (Via Afrika) and an NGO (Breadline Africa) has begun to establish digital education centers in rural communities: the centers are equipped with tablets on which students can access electronic textbooks, apps and other educational content. Also in South Africa, the social online platform Obami has expanded into providing learning content. In Kenya, the eLimu project brings tablets into schools, and develops learning programs tailored to the local context to get children more engaged faster. CyberSmart Africa has developed an integrated solution that combines digital learning devices and solar power generation into a single mobile unit that can bring digital learning to rural areas that lack access to electricity.

These are powerful examples of how in education itself, new technologies can help bypass the lack of infrastructure and even the paucity of teachers to accelerate learning while at the same time ensuring that African schoolchildren become familiar and comfortable with digital technologies that will make them more productive as workers.

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"Building strong workforces to power Africa’s growth." The future of work in Africa

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The innovations that are beginning to widen education opportunities in Africa leverage the strong entrepreneurial spirit that has already manifested itself across a number of countries in the region. Perhaps the most well-known and powerful example is M-Pesa, a mobile payment technology that has quickly transformed Kenya’s payments system, bypassing the existing banking infrastructure.

Similar creative approaches could be launched in other areas where the lack of traditional infrastructure currently impedes progress: healthcare, access to electricity and access to water are probably the most pressing priorities.

Advanced Manufacturing can play a powerful role in helping Africa grow its industrial system, bypassing traditional models of industrialization. Advanced manufacturing redefines economies of scale, enabling microfactories and new artisanal activities. SSA should foster the creation of makers movements and Fab Labs, where relatively moderate investments can provide young people the tools and the know how to engage in entrepreneurial manufacturing activities.

Improved access to financing will be necessary—and crowdfunding could play an important role. With a moderate improvement in access to financing, the technologies of advanced manufacturing could fuel the creation of new artisanal activities and of small-scale manufacturing activities that could cater to some of the largest and most established industries—like Oil & Gas. This can lead to more cohesive national and regional supply chains able to benefit from lower transportation costs, lower inventories, and the acceleration of innovation through an ever closer relationship between suppliers and manufacturers.
Closing the skills gap: A study in healthcare

Even with all the obstacles that we have described, and before the strategy we have recommended in the previous section is implemented and gains traction, the joint effort of policymakers, domestic companies and global players can make important inroads in bridging the skills gap. In this section we highlight examples of success in the healthcare sector.

Healthcare education and training are critical to achieving better health outcomes, increased healthcare access, and lower unit costs. But national health systems in the African Region have limited infrastructure that has led to insufficient coverage of essential health services.

Africa needs—and lacks—at least 800,000 doctors, nurses and midwives. When all categories of health workers are included, the shortfall is estimated at 1.4 million. The Lancet,\textsuperscript{10} describing targets for delivering safe surgery, noted in 2015 that an additional 2.3 million specialist surgical, anesthetic, and obstetric providers are needed worldwide. Rural areas are especially underserved: over 90 percent of pharmacists and dentists practice in urban areas, while 86 percent of medical specialists, 63 percent of general physicians and 51 percent of nurses and midwives serve primarily in urban areas.

According to the World Health Organization (WHO), human resources for health (HRH) are constrained by inadequate institutional capacity for human resources management, low levels in HRH production, slow progress in educational reforms, skewed distribution of health workers, lack of incentives and ineffective HRH retention strategies.\textsuperscript{11} Education represents a critical lever to close known labor gaps and achieve better productivity from existing expenditures. Labor costs typically represent 50-80 percent of total Ministry of Health budgetary outlays,\textsuperscript{12} yet continuing training programs are often spotty and poorly funded. Local training centers lack access to high quality curricula, accredited instructors, and basic infrastructure and equipment. The key to quality, accessible, and affordable healthcare lies in the breadth and depth of education and training opportunities made available to physicians, nurses, midwives and healthcare technicians.

Today’s skills gap in healthcare in Africa are particularly acute in the areas of leadership and management skills, clinical skills, technical skills (including equipment maintenance and engineering), and IT and e-health skills.

While no one denies the need to invest more in human capital, addressing the problem has proved difficult. Yet there are examples of success achieved by government and private sector partnerships with a shared focus on sustainable solutions:

**Clinical Education and Training**

Approximately 60 million births each year occur in settings other than health facilities, and 52 million of these births take place without the support of a skilled birth attendant. GE Healthcare has addressed this issue by providing V-scan (handheld ultrasound) training for midwives. The V-scan is a portable, handheld ultrasound that allows the user to quickly transmit relevant imaging data, regardless of the remoteness of the location.


\textsuperscript{11} WHO “Road Map for Scaling Up the Human Resources in Health 2012-2025.”

After more than 50 months of global research and partnership building with the United Nations, the Bill & Melinda Gates Foundation, and others, GE Healthcare concluded the following:

- Properly trained midwives can competently perform obstetric ultrasound, with greater than 80 percent concordance with obstetricians and gynecologists;

- Ultrasound functions well in remote primary care clinics; and

- Ultrasound mobilizes mothers to seek care early in their pregnancy.

The program has already delivered some remarkable achievements. In Tanzania, the percentage of women seeking four or more antenatal care visits increased from 27 percent to 60 percent.

In 2013, the GE Foundation’s Developing Health Globally program partnered with Vanderbilt University to address the gap in anesthesia care in Africa. The ImPACT Africa program (Improving Perioperative & Anesthesia Care Training), unites the Kenya Ministry of Health, Vanderbilt University, Kijabe Hospital, CPHDev, and Assist International in developing a training program to lower surgical and obstetric deaths, and build the pipeline of anesthesia providers in the region.

The program leverages a new policy in Kenya, allowing nurses to administer anesthesia, largely based on the evidence drawn from the Kijabe Hospital experience. While the Kenyan government lacks the capacity to train nurse anesthetists, ImPACT Africa is working to grow the number of local healthcare workers trained in anesthesiology skills. The goal is to create a sustainable model of safe anesthesia services that can be expanded throughout Kenya and other parts of sub-Saharan Africa, directly saving lives and dramatically improving healthcare.

**Capacity Building: Technical Skills for Field Service Engineers**

In 2010, The GE Foundation, Duke University, and Engineering World Health (“EWH”) formed a collaboration to offer Biomedical Equipment technician training in underserved regions. The results of the study showed that training for one year had a dramatic impact on healthcare in the hospitals. Hospitals with technicians without training had 74.5 percent more out-of-service equipment than hospitals with EWH-trained technicians.

Trained technicians were more efficient in repairing equipment and contributed significantly to the hospitals’ efficiency and productivity. In this regard, the study found that non-equipment-specific training was valuable in resource-scarce locations like Rwanda. Hospitals without a trained technician had nearly twice as much out-of-service equipment, and trained technicians were more than twice as productive.

GE’s Field Service Engineers in Africa are trained through an intensive program designed to address the following needs:

- Tiered approach to skill level mastery and service delivery

- Flexible and adaptable approach to training delivery and skills mastery

- Introduction of new workforce members

- Introduction of new products and technology updates

- Management and refreshment of base line content

Regional training centers in Kenya, Nigeria, and South Africa support localization of talent and easier access to continuing education.

**Leadership, Innovation and Strategy Skills**

Training healthcare leadership is a high priority for governments and private enterprises alike. In a survey of over 110 Africa and Middle East leaders, 77 percent of respondents rated “education and training to improve skills and increase capacity” as the single most important investment to improve national healthcare.13

Since 2013, GE Healthcare has led over 25 Ministry of Health and regional leadership teams through its Leadership, Innovation, and Strategy (LIS) program. This program is designed to help teams tackle tough strategic challenges in an action learning environment. Healthcare industry curricula have focused on improving the patient experience, designing strategy in uncertain times, innovation, and healthcare leadership development, drawing content from leading universities and healthcare institutions as well as GE Crotonville.14

The event participants are entire teams, not just the leaders. As a result of LIS programs, Sub-Saharan Africa healthcare teams from Nigeria, Ghana, Ethiopia, Kenya, and Tanzania have been able to catalyze key innovations within their organizations. As an example, one MOH used LIS as a catalyst to accelerate progress on an innovative national health insurance program.

GE Foundation’s Harvard Ministerial Leadership Program is another example of how GE is developing future leaders. In partnership with Harvard University, the program engages currently serving health and finance ministers in an intensive leadership program that combines problem analysis with practical tools and approaches, informed by international experience. The goal is to enhance the ministerial effectiveness and political leadership of ministers while increasing national investment in health and improving socio-economic development.

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14 GE Crotonville is GE’s learning and training center.
GE helps build human capital in Africa

Localization is one of GE’s biggest growth enablers. GE grows through local development and infrastructure support, builds productive partnerships, and deepens its local presence. One of our major priorities is to foster the development of human capital through partnerships with local education stakeholders and governments.

As GE partners with local companies, we help to support and grow local innovations and entrepreneurship by (1) improving manufacturing processes through technology transfers, (2) providing on-the-job training, and (3) constant engagement on the part of our local and global management. Here are a few more examples of how GE is investing in local workforces in Africa:

**In Nigeria**, GE is building a multi-modal facility in Calabar. This plant is expected to generate 2,300 new jobs in Nigeria, 300 directly and around 2,000 across the supply chain. Management and staff of that facility will be 90 percent Nigerian. Investments like this lay the foundation for knowledge and technology transfer to Nigerian sub-suppliers, academic institutions and the local workforce at large, which leads to greater development of in-country capabilities.

This new facility illustrates GE's willingness to double down on investment in the country. Training the next generation of workers and growing local enterprises is critical to our continued success. GE is also collaborating with the Cross River state Government to upgrade the Government Technical college by establishing a mechanical/electrical workshop with modern training facilities, upgrading its curriculum and training lecturers.

**In Mozambique**, GE has taken key steps towards localization. In the oil & gas segment, GE hired 20 recent graduate engineers in late 2014, way ahead of any announced contract award, enrolling them to engage projects from 2017 onwards. In the transportation sector, GE hired five engineers with the same purpose. The training preparation is done part in country and most of it outside Mozambique, in order to expedite practical experience.

In parallel, GE has engaged the collaboration of two universities to provide in-country scholarships, supply of oil & gas equipment for university laboratories, and respective courses on how to operate them; enhancement of engineering courses curriculum; specialized courses to university teachers; and training of GE employees. GE has been delivering localized agnostic oil & gas industry courses to nationals from different government sectors of industry. GE is now working to form a local joint venture. Total staff in Mozambique is made up of approximately 50 people, with three expats in total.

**In South Africa**, GE is aligning its efforts to the country’s National Development Plan 2030 by contributing to skills creation, SMEs development, industrialization, technology transfer and regional integration. GE is developing a cadre of global leaders in South Africa: over 10 percent of GE’s employees in South Africa have graduated from or are currently enrolled in GE leadership development programs in engineering, finance, sales and marketing and other areas. GE scholarships worth up to $5 million at Johannesburg’s African Leadership Academy help identify, develop and connect young leaders.

GE has worked with over 55 black suppliers in South Africa in 2014, placing orders worth more than 27.8 million rand (about $2.78 million). In 2009, GE South Africa Technologies (GESAT)—a GE joint venture with South Africa’s 100 percent black-owned Mineworkers Investment Co. (MIC) to produce locomotives—entered an agreement with Transnet (TE), South Africa’s state-owned rail and logistics company, to assemble 100 C30ACi locomotives in the country. They rolled out with 30 percent local content.
Case Study: Strengthening supply chain partnerships

GESAT assembles locomotives in South Africa for the first time in the continent’s history, promoting South Africa’s exports, revitalizing the rail sector and enabling regional integration. Between 2009-2014 it received orders for 450+ locomotives (including 16 exported and 10 leased to Mozambique) and created 5,000 new jobs, preserved 9,000 manufacturing jobs, and delivered 150,000+ training hours on assembling locomotives, worth more than 480 million rand (about $48 million). GESAT will deliver a further 130,000 hours of training with the assembly of 293 Evolution Series locomotives.

To form a sustainable partnership, rather than a one-contract supplier relationship, the teams committed to transfer skills and knowledge through the establishment of technologies, processes, quality, and management systems:

- Specialists provided TE teams with in-country technology transfer and helped establish a compliant manufacturing and assembly capability to ensure successful execution.
- TE developed the required infrastructure to supply an extensive scope of components through its own facilities and local supplier network.
- GE further localized the supply chain manufacturing resource planning required to fulfill the sourcing, planning and purchasing of material from local suppliers, and assembly with Transnet.

When the first locomotives came off the assembly line, TE alone created over 300 direct jobs at various skill levels—and thousands more are estimated to have been created throughout the supply chain.

GESAT had, at the same time, established a comprehensive local base that ensured an efficient logistical supply chain, project management structures, quality system management, technical support skills, service capability and in-country parts availability to provide fleet support, as well as the vast array of supporting functions that goes with the establishment of a company that is serious about its long term commitment and footprint in the country.

Locomotive #100 came off the line on January 2013, two months ahead of schedule, and not one single month’s delivery target was missed throughout the contract—an achievement that speaks volumes about the success of this partnership with the local supplier. Transnet Freight Rail as a client gave the strongest approval by awarding a follow-on contract for an additional 43 locomotives.

And this fleet of locomotives has performed exceptionally well; moving millions of tons of freight for TFR’s customers, the GE Class 43 locomotive fleet has exceeded the availability and reliability metrics by a margin that now sets industry standards. The success has been underpinned by a substantial training effort:

- **Lean Training:** GE’s success owes in part to the culture of Lean and Six Sigma principles that exists throughout the organization. To date, over the three contracts, we have trained and mentored an estimated 250 TE/TFR candidates. Training was conducted in South Africa and Erie, USA.

- **Service Shop Skills:** 5 Transnet maintenance engineers were qualified as experts and “go-to” representatives, supporting the GE locomotives in South Africa by attending a six-week training in our North America Erie plant.

- **Tech Transfer:** As part of skills transfer and training, GE has dedicated 4400 man hours from GE technical advisors to work with TE/TFR maintenance engineers. Upon completion of these sessions, the candidates were skilled with management of locomotives troubleshooting, maintenance, emergency servicing and planned servicing.

- **Candidate Engineering Program:** This is an operation management leadership program (OMLP) offered by GE to TE/TFR candidate engineers for a duration of one year, based in Erie. To date, three TE/TFR candidates have completed the program.

GESAT was further awarded contracts for an additional 60 class 43 locomotives and 233 new Evolution series locomotives in March 2014. To ensure continued success:

- GE and TE established a comprehensive, integrated project team to ensure they met all the milestones to deliver the locally built locomotives on time.
- TE sent some 80 employees to Erie and other plants for complex welding fabrication, electronics subsystems assembly, locomotive assembly, and testing training.
- GE sends Tech Transfer Assistants to the TE plant to continue training TE’s in-country workforce.
- For the TFR223 contract, GESAT is transferring specific new locomotive technologies to TE to help extend TE’s scope of capabilities.
- GE and TE LEAN teams have worked together to improve warehouse and assembly process efficiencies at the TE plant, increasing capacity from eight to 12 locomotives per month with minimum additional resource requirements.

Through GE’s insistence on delivering a quality product to our customers, backed by training of our suppliers in best quality management systems & control practices, we set high standards, upskill the workforce and embed this approach as a workplace culture.

To date, GE has spent 1.8 billion rand (about $0.18 billion) in procurement from South African black SMES on Transnet contracts for locomotives. In 2014, GE announced a 200 million rand (about $20 million) investment in a supplier development initiative that helps black SMES expand production facilities, improve operational efficiency, and invest in training and skills. And it has invested 500 million rand (about $50 million) in a customer innovation center in South Africa that will be a center of excellence for innovation and technology transfer, and create employment opportunities for up to 100 engineers and technicians in order to localize GE solutions for the African continent.

Across the continent, GE has partnered with the African Leadership Academy to give out scholarships and provide professional development opportunities to African students. To develop a pipeline of future GE leaders, GE has established programs such as the ECDP (Early Career Development Program) and its global leadership programs in human resources, finance, communications, commercial and technical functions across supporting and growing local supply chains, with special focus on developing local partners — especially small- and medium-sized enterprises — also will have a multiplying effect on investments across Africa.

The results of our localization efforts are encouraging. GE has tripled its revenues in Africa since 2011, and we now have more than 2,300 employees in 25 countries. We are seeing a positive impact in communities and we continue to forge productive partnerships with local organizations.
Conclusions

Africa’s growth performance over the last decade and a half has been remarkable, and a major demographic dividend provides a tremendous opportunity for future growth, but also a challenge: the region’s economies need to provide good jobs for a numerous, growing and young population. Otherwise, precious human capital will be wasted, growth opportunities will be missed, and the risk of social and political instability will rise.

All stakeholders—governments, schools, domestic companies and multinational corporations—have a shared interest and a shared responsibility in Africa’s success. All have a lot of work to do. In this paper, we have proposed a three-pronged strategy that can help Africa not only build the skills for the jobs of today, but also develop a pipeline for the jobs of tomorrow.

African countries should improve education and skill-building, invest more in infrastructure, improve the business environment further, and embrace broader talent localization strategies in partnership with global companies. The private sector needs to do its part, and multinational companies in particular need to do more to show their commitment to help building Africa’s human capital.

Digital technologies are beginning to permeate the industrial world, triggering a new industrial revolution that will transform the way we work and redefine the competitive environment for companies and countries. These new innovations are profoundly disruptive. They provide a huge opportunity for Africa, because they can allow the region to leap-frog existing industrialization models, and quickly improve its competitive position in the global economy.