

Playing to Strength

Growth Strategy for Small Agrarian Economies in Africa

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WORLD BANK GROUP

Macroeconomics, Trade and Investment Global Practice

August 2018

Abstract

With urban industrialization on the scale achieved by East Asian economies looking increasingly less plausible, small economies in Africa need an alternative strategic approach to long-term growth. The purpose of this paper is to identify a growth strategy with the greatest potential for small, land-locked economies in East Africa. The paper uses Malawi, Rwanda, and Uganda as case studies to explore the potential for growth in agriculture, manufacturing, and tourism in these countries. The paper marshals extensive reasoning that while the manufacturing sector and exports of light labor or resource intensive manufactures could contribute a fraction of aggregate growth, it is agriculture, agribusiness,

and services that will contribute the lion's share because of an unprecedented convergence of technologies. Industrialized agriculture and agri-business could enable these countries to sustain rapid growth even in the face of climate change. Malawi, Rwanda, and Uganda, with some trying, can accelerate their convergence to the technological frontier to take full advantage of this promise. Undoubtedly, there are obstacles to transferring the advanced technologies wholesale to East Africa, but their eventual assimilation is a must and the removal of hurdles needs to be addressed. Extracting the maximum growth mileage will require policy action on multiple fronts.

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Playing to Strength: Growth Strategy for Small Agrarian Economies in Africa*

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Keywords: Precision agriculture, landlocked, growth strategy, Sub-saharan Africa
JEL Codes: N50, N60, O13, O14, O57

* This paper was prepared as a background document for the Malawi Country Economic Memorandum, 2017, which received financial support from UKAID and USAID besides World Bank resources.

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1. Growth in SSA and Structural Change

Small, landlocked developing economies have struggled to match the performance of countries with a coastline, and those in Sub-Saharan Africa (SSA) face the sternest challenge. Of the fifteen African landlocked countries, thirteen are clustered near the bottom of the United Nations Human Development Index in 2014.¹ Geographical distance from ports is partly to blame for the relatively slower and divergent pace of development and low per capita incomes. This is compounded by the reliance on good cross-border relations with neighbors, on the availability of secure transport infrastructure and electric power, and on the political stability of neighboring countries. In some instances, resource scarcity, high rates of population growth and shortcomings of trade and exchange rate policies, add to the burdens of landlockedness (Hallaert et al 2011, Sachs 2012).

After two “lost decades” the fortunes of the landlocked countries along with other SSA countries began reviving around the turn of the century. Between 2004 and 2008, GDP in the SSA’s frontier and emerging market economies grew annually by 6.6 percent. The increasing tempo of global demand was largely responsible for accelerating growth in SSA. It raised the prices of natural resource based commodities exported by African countries. Real prices of oil and minerals increased more than twofold between 2003 and 2008, which benefitted the resource rich economies. At the same time, debt relief eased burdens on some of the poorest countries. The SSA region more broadly, profited from the emergence of democratic forms of government that were less predatory, extractive and urban-biased - a change that was advantageous for agriculture.² This also helped usher in better macroeconomic management combined with structural reforms impinging upon trade and domestic pricing policies especially for agricultural commodities. From about 2008 onwards, some African countries could lower their international borrowing costs courtesy of monetary easing in advanced and middle-income countries and improved balance sheets; and capital inflows lured by the promise of higher returns in SSA than elsewhere, provided a welcome injection of resources.

During 2009 through 2015 growth in SSA slowed to an average rate of 4.9 percent and to just 2 percent during 2016-2017.³ For many countries, growth of per capita incomes entered negative territory during 2016-2017. The commodity super cycle ended with weakening demand from China and the industrialized economies drastically lowering the prices of Africa’s key exports. This was paralleled by the sluggishness of economic recovery in developed economies and the slowing of trade to under 3 percent per annum between 2012 and 2017.

The medium-term prospects for SSA have improved somewhat with the revival of OECD growth rates but to avoid sliding back into the old normal of slow growth or

¹ <http://hdr.undp.org/sites/default/files/ranking.pdf>

² Bates et al 2012 <http://journals.sagepub.com/doi/abs/10.1177/2233865912462373>

³ IMF (2017) <https://www.imf.org/en/Publications/REO/SSA/Issues/2017/10/19/sreo1017>

worse, stagnation with increasing indebtedness, the landlocked economies need to redirect their development strategies.⁴ To realize a higher growth rate, small economies will need the demand-pull for their tradables from the international economy. So long as global growth and trade remain sluggish, supply-push could raise growth somewhat and create the potential for higher growth once external demand picks up.

A revival of African growth rates calls for a new round of policy initiatives, to enhance the productive potential of key sectors, particularly by the landlocked countries. In capsule, the long-term, supply-side growth potential of SSA economies will depend upon; (i) augmenting factor inputs – i.e. physical and human capital - and improving the quality of both the natural capital and human resources; (ii) channeling resources into tradable activities rural or urban with sound long-term prospects and steadily growing exports⁵; (iii) raising total factor productivity through human capital deepening and the assimilation of new technologies; and (iv) investing in infrastructure, logistics and other services so as to enlarge the portfolio of tradable activities, strengthen connectivity and facilitate greater integration with the regional and global economies.

A prominent developmental stylized fact is that in developed countries structural change transferred labor from slow-growing and less productive agricultural activities to more rapidly expanding and productive urban industrial ones. In those economies that steadily increased factor productivity and moved up the income ladder, the share of agriculture in GDP fell away from 30 percent in low income ones to 7 percent in the upper middle-income countries and to as little as 1 percent in high income ones (it was 5 percent in East Asian economies in 2016).⁶

However, structural change of the productivity-augmenting sort has been slow in coming to SSA. Compared to their counterparts in East and Southeast Asia, economies in SSA remain highly dependent on primary sectors i.e. agriculture and mining rather than on manufacturing, the share of which has slipped from 19 percent of GDP in 1975 to 11 percent in 2014 and from 3 percent of global manufacturing in 1970 to 2 percent in 2013 (Newman et al 2016). In trade, primary commodities have maintained a steady share; they accounted for 72 percent of SSA's merchandise exports in 2014 as against 74 percent in 2000 (World Bank 2016, WDI, Table 4.4).

SSA is gradually converging towards the urbanization levels of more developed countries but the labor transferring to the urban sector is frequently being absorbed into low value adding informal services rather than manufacturing. McMillan and Rodrik (2014) show that during the decade of the 1990s, structural change

⁴ The indebtedness of countries in SSA is on the rise. According to the Jubilee Debt Campaign, at the end of 2017, 28 countries were rated as in debt distress or at high risk of debt distress, as against 22 at the end of 2016, and 15 in 2013. The number of countries classified as low risk has more than halved – from 24 in 2013 to 11 in 2017.

⁵ Daruich, Easterly and Reshef (2016) point to the tight correlation between exports and per capita incomes. <http://www.nber.org/papers/w22869>

⁶ <http://wdi.worldbank.org/table/4.2>

negatively affected productivity. Between 2000 and 2008, the gains from structural change turned positive but the Great Recession, by slowing the growth of more productive activities, has erased the benefits from the transfer of workers to the urban sector.

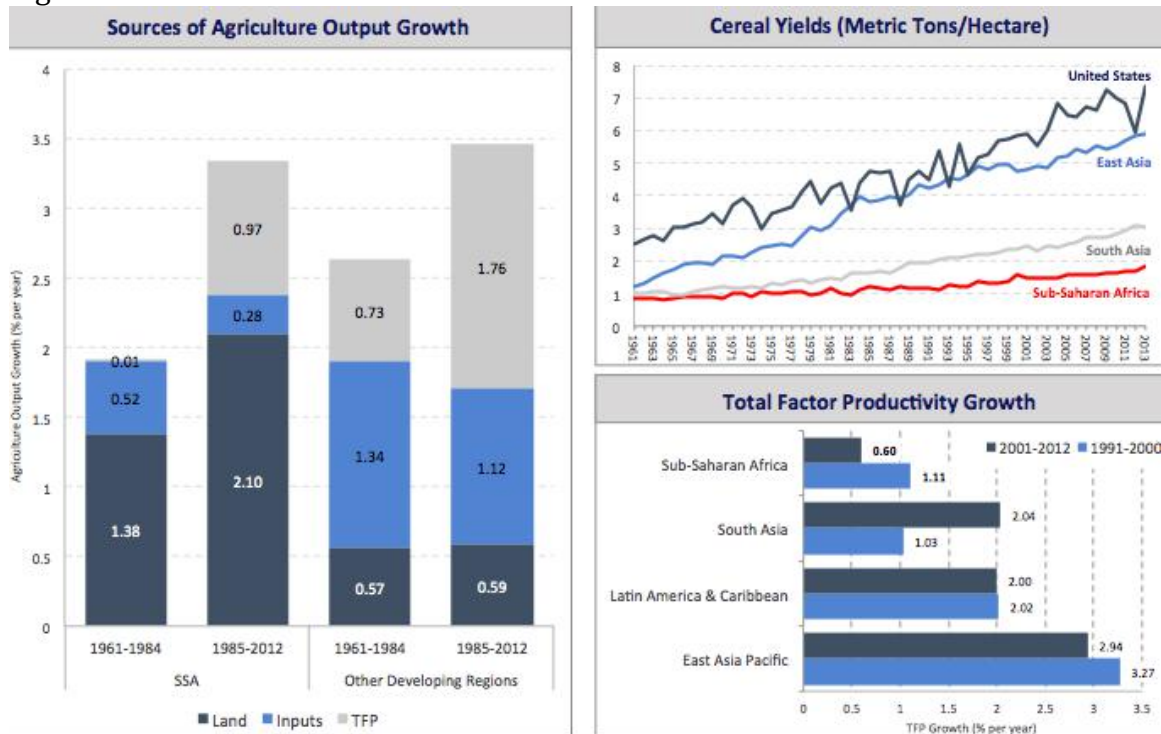
As a first approximation, SSA is not competitive in any sectors that are not based on natural resources. Exports classified as industrial comprise less than 20 percent of total exports (as against 60 percent for fuel, ores and minerals) and not infrequently, such exports are little more than “modestly processed primary products” (Gelb 2010). And Gelb (2010) goes on to add that “barely one quarter of industrial exports are true manufactures and the two major categories, automotive products from South Africa and clothing exports from low income countries, are both supported by special incentive programs”. Besides, most of the exports of manufactures are being traded intra-regionally (Balchin et al 2016).⁷

With growth sourced from industry being low and trending downward, African countries may need to increase the contribution of agriculture by moving it closer to the production frontier, which would raise factor productivity, and increasing domestic value added in downstream activities. Achieving a turnaround of agricultural productivity is urgent because yields per hectare in SSA have barely improved between 1961 and 2010; the 2.6 percent average annual increase in agricultural output during this period was largely because more land was brought under cultivation – nearly 800,000 sq. km of land has been added to the 1.5 million sq. km that were farmed in the 1950s (Figure 1). However, because the agricultural workforce also expanded, per capita agricultural output inched downwards by 0.17 percent annually between 1961 and 2011 (Alston and Pardey 2014).⁸

⁷ Approximately a third of African manufactured exports are to other African nations. Exports of manufactures from countries in SSA doubled between 2005 and 2014 to \$100 billion and intra-regional trade rose from 20 percent to 34 percent.

⁸ Agricultural productivity in SSA is analyzed by Fuglie and Rada (2011) whose findings point to slow growth in productivity with most of the additional output coming from an expansion in the cropped acreage. Block (2014) and Nin-Pratt and Yu (2011) show that agricultural TFP accelerated from the mid-1980s through the early 2000s.

Figure 1.



2. The Agrarian Economies of Landlocked Malawi, Rwanda and Uganda

The economies of Malawi, Rwanda and Uganda are largely rural, even compared with the SSA average. Rwanda is the most urbanized with 28 percent of its population living in cities in 2014, while only 16 percent of the populations of Uganda and Malawi are city dwellers – well short of the 37 percent urbanization rate for Africa. Furthermore, they derive between 25 percent (Uganda) and 33 percent (Rwanda) of their GDP from agriculture as against the SSA average of 17 percent. Like most of SSA, the share of agriculture has been declining though. It declined most rapidly in Malawi from 40 percent in 2000 to 31 percent in 2014; in Uganda and Rwanda, agriculture’s share has fallen by a modest 4 percent of GDP during the same period.

The economic center of gravity in these economies is in services whether rural or urban, formal or informal. Between 52 percent (Malawi) and 55 percent (Uganda) of GDP is sourced from services, which is close to the SSA average (56 percent). The disquieting development in all three countries, like Africa overall, is the trend decline in the salience of industry and manufacturing.⁹ Industry’s share in SSA fell by an astonishing 10 percentage points from 36 percent in 2000 to 26 percent in 2014. It slid downwards in Malawi and Uganda: from 18 percent to 16 percent in Malawi and from 23 percent to 20 percent in Uganda; it remained constant at 14 percent in Rwanda. Manufacturing also dipped below the already low SSA average

⁹ This is the so-called *premature deindustrialization* identified by Rodrik (2015).

of 11 percent to just 5 percent in Rwanda and to 10 percent and 8 percent in Malawi and Uganda respectively (World Bank 2016, Tables 4.2 and 3.12).

Indicators of growth potential (e.g. the share of investment, savings, and exports in GDP, the gains in total factor productivity) convey mixed signals. Gross investment rates in 2016 were moderate in both Uganda (24 percent) and Rwanda (26 percent) but low in Malawi (15 percent). In the first two they have risen sharply since 2000 thanks in large part to the generosity of aid donors. In Malawi, investment has declined from an already suboptimal 17 percent in 2005. Gross domestic savings in 2016 were a meager 12 percent of GDP in Malawi and 10 percent in Rwanda; they were somewhat higher (16 percent) in Uganda; in comparison, the rate for lower middle-income countries was 27 percent i.e. savings in the three countries need to rise a lot if they are to transition to and stay on a high growth path (World Bank 2017, Table 4.8).

Both Rwanda and Uganda have low export ratios – a little over 18 percent in 2017. Malawi's is higher, but with exports of goods and services amounting to just 29 percent of GDP it falls far short of other low-income countries such as Cambodia with a ratio of 61 percent and Lao PDR with 34 percent¹⁰. Net exports are substantially negative in all three countries, which diminishes their contribution to growth. For example, in 2012, the share of net exports in Rwanda's GDP was -20.4 percent and that of Uganda was -15.6 percent (Diao and McMillan, 2014, Table 2.5).

Malawi, Rwanda, and Uganda's exports and revealed comparative advantage (RCA) are indicative of countries at the foot of the development ladder. Ores and concentrates, coffee and tea were Rwanda's top exports in 2014 and its overall RCA was in these commodities. Its fastest growing exports albeit from low bases, were metallic compounds and garments. Malawi's six principal exports were tobacco, tea, uranium oxide, sugar, beans and cotton and expectedly its RCA is predominantly in the production of tobacco, tea and groundnuts. During 2010-2014, exports of fresh and frozen vegetables rose most rapidly as did exports of construction materials and some electronic parts and components. Uganda's export performance in 2014, largely depended upon the export of coffee, sesame seeds, cement, tobacco, fish fillet, and cocoa beans. Its RCA was strongest in wood products, oilseeds, fish, and coffee. Between 2007 and 2014, Uganda benefitted from the rapid increase in exports of sugar, tobacco products, wheat flour and items such as paint and pigments.

The increase in total factor productivity, which is the primary determinant of growth over the longer term, has been negative in most African countries since 2009. In Uganda's case, it was positive from 2000 through 2006, the average being 1.5 percent; it has been negative since, declining by 2.0 percent per annum between 2009 and 2014 and by 1.6 percent per annum in 2015-2016. In Malawi, the increase in TFP was close to zero between 1999 and 2006; it rose to 2.2 percent per annum

¹⁰ <https://data.worldbank.org/indicator/NE.EXP.GNFS.ZS>

between 2007 and 2014 before turning negative in 2016 (-1.3 percent) (Conference Board 2017).¹¹

With manufacturing contributing so little to GDP and to exports, growth – and the supporting productivity gains – in the medium-term, will need to be sourced mainly from the production and export of services and of foodstuffs; the latter account for the bulk of exports from Malawi (69 percent) and Uganda (65.5 percent). Rwanda is less reliant on exports of food (37 percent) principally tea and coffee, as against 46 percent derived from minerals (e.g. tin, niobium, tantalum) but they still loom large and given the country's resource endowment, food production will remain a comparative advantage well into the future.

Smallholders dominate agriculture in Malawi, Rwanda and Uganda. The majority is engaged in subsistence farming on less than 2 hectares and as populations have grown, pressure on the land has mounted and farming has spread to marginal lands.¹² Although the availability of cultivable land in Uganda has doubled since the 1960s, high fertility and the reluctance of people to migrate to cities means that overcrowding has worsened with more than four people per hectare of arable land (Hausmann et al 2014).

In Malawi, the principal staple grown by small farmers for domestic consumption is maize, which is also the preferred staple throughout SSA. This is supplemented by cassava and sweet potatoes and by the raising of livestock on a small scale mostly for local consumption. Malawi also produces cash crops mainly on estates encompassing about a fifth of the cultivated area.¹³ The leading cash crop and export is air-dried burley tobacco. Other estate-grown crops are tea, sugarcane, tung oil, and macadamia nuts. The cultivation of sugarcane deserves special mention because it is well-suited to Malawi's climatic conditions, is ranked by the authorities as one of the core products and employs thousands of workers.¹⁴ Since 1982, it has been used as the feedstock to produce ethanol biofuel on an industrial scale.

Farming on the volcanic soils of hilly and densely populated Rwanda is also smallholder-based. A variety of staples are produced for domestic consumption including white maize, bananas, plantains, cassava, sweet potatoes, wheat, rice, and sorghum. Horticulture (avocados, beans, tomatoes, leeks) and pastoral farming are squeezed in alongside the staples. For export, Rwanda produces tea, coffee and pyrethrum.

¹¹ https://www.conference-board.org/retrievefile.cfm?filename=TED_SummaryTables_Charts_may20171.pdf&type=subsite

¹² The fertility rate in all three countries remains high; the total fertility rate is 5 in Rwanda and 6 in Malawi and Uganda.

¹³ Some sugar is grown by smallholders. The estates have a long and checkered history. Once owned by English settlers, they are now mostly in the hands of local elites or the public sector and farmed on freehold or leasehold bases.

¹⁴ The acreage under sugarcane is 23,000 hectares, its cultivation employs 10,000 workers and about 30 percent of the sugar produced is exported (Herman and Grote 2015), <https://academic.oup.com/jae/article-abstract/24/5/645/2357582?redirectedFrom=fulltext>

Ugandans grow a mix of crops like what is produced in Rwanda albeit on a larger scale. Production for domestic use is comparable with millet substituting for wheat and groundnuts an additional item. Coffee is the major agricultural export followed by tobacco (as in Malawi), tea, cocoa beans, rice, raw sugar, cut flowers and legumes. Uganda also exports fish (e.g. Nile perch and tilapia fillets) obtained from the country's five major lakes. This is the second largest export item after coffee although overfishing particularly in Lake Victoria, imperils the future of exports.

3. Achieving Agriculture's Potential through Modernization, Adoption of New Technological Advances and Enhanced Resilience to Climate Change

The Green Revolution in South Asia is frequently referred to as an example for Africa to emulate.¹⁵ Are there lessons for the three East African countries and how do these need to be updated to take account of technological developments and learning since? As described in Box 1, the Green Revolution in South Asia was enabled by the availability and adoption of high-yielding varieties of seeds, intensification of inputs including fertilizer and water, mechanization, and extension services. There is some good news on the availability of high-yielding varieties for East Africa, but there are considerable other bottlenecks to emulating the Green Revolution in East Africa that need to be resolved. In all three countries, the insufficient application of modern inputs – fertilizers, improved seeds, pesticides, and farm machinery – results in low yields.

Box 1. Green Revolution in South Asia

Hybrid strains of wheat and rice, the two dominant staples were introduced in the mid-1960s in response to a looming food crisis and widely adopted resulting in a major surge in yields. These new dwarf varieties were bred by researchers working at IRRI and CIMMYT and disseminated with the help of in-country demonstration plots that reinforced the information and guidance provided by extension agents. The spread of the new technology was supported by measures that made available the supply of seeds and the fertilizer needed to assure superior yields. In addition, farmers were helped by government initiatives to increase access to credit enabling them to purchase key inputs. The Green Revolution was facilitated by investment in the canal irrigation network of the Punjab and Northern India and by the spread of tube wells used to tap the region's then abundant ground water. The crowding in of investment in farm machinery, rural roads, in rural electrification and the distribution infrastructure accommodated higher grain output and year-round production.

The further improved dwarf rice strains that have delivered good results in South Asia and Latin America are suitable for Rwanda and Uganda where rice is one of the staples. Hybrid strains of maize and sorghum have also been developed that are adapted to African conditions and the brightly colored seeds are becoming widely available. The issue for Africa is that consumption includes multiple staples and

¹⁵ Gollin, Hansen and Wingender (2018) examine how the Green Revolution affected productivity, per capita GDP growth and fertility between 1960 and 2000 in 84 countries. Rosenberg (2014) describes how the Green Revolution succeeded and what Africa can learn from this experience. <http://opinionator.blogs.nytimes.com/2014/04/09/a-green-revolution-this-time-for-africa/>

other crops. There is nothing comparable to the stranglehold that wheat and rice have on diets in South Asia. Hence, the research needed to improve yields must be more extensive in its coverage of crops and microclimates. This crop diversity poses a challenge; at the same time, it mitigates risks and opens multiple pathways to increasing production and exports.

Higher yielding varieties of maize have been available for some time but their diffusion has fallen short of expectations. Hybrid seeds need to be purchased anew prior to each planting season because maize is an open pollinating species, and hybrids deliver the sought after yields only if they are adequately fertilized. Because agriculture is almost exclusively rain-fed and drought poses an omnipresent risk, borrowing to finance the cultivation of hybrids, even when subsidized credit is available, remains unattractive to many. Only 7 percent of the cultivated acreage in Africa is under hybrid varieties.¹⁶

Superior strains of food crops are a necessary but by no means a sufficient condition for an eventual transition to modern agriculture. In the three countries, farmers use remarkably little mechanical equipment partly because labor is cheap, and partly also because capital costs and the expenses incurred on fuel discourage the use of machinery that would ease the workload and circumvent seasonal labor shortages. Furthermore, the incentive to upgrade agricultural practices is inhibited by difficulties encountered in processing, storing, transporting, and marketing surplus output.

Infrastructure constraints to modernization are several. First and foremost are the transport and energy infrastructures. All three East African countries are deficient in these. The lack of easily accessible all-weather feeder roads, maintained in good condition, greatly increases the ton/km cost of transporting agricultural produce and discourages yield-enhancing improvements and production for the market (e.g. the availability of fertilizer at affordable prices).¹⁷ In fact, only a third of Uganda's agricultural output reaches the market and many farmers have been discouraged from growing the high yielding NERICA rice for just this reason (GII 2017, p.153). Rural transport bottlenecks hamper the processing and marketing of food grains, dairy products and cash crops such as coffee and cut flowers. Gollin and Rogerson (2010)¹⁸ blame the poor quality of Ugandan roads for much of the agricultural productivity deficit. A crippling shortage of electric power compounds the problem caused by transport constraints because –and this is looking ahead – an increasingly industrialized agriculture that harnesses digital technologies to raise yields and enlarge rural value adding activities, cannot gain traction without an adequate supply of power. As McKinsey Global (2015, Brighter Africa) note, there is potential

¹⁶ The uneven quality of fertilizer and hybrid seeds also discourages use. A study by Bold et al (2017) found that fertilizer purchased by African farmers had only 70 percent of the nutrient advertised and less than half of the hybrid maize seeds were authentic.

¹⁷ According to the AfDB, surface transportation costs in East Africa are the highest in the world and access to electrical power is the lowest. Also see WEF (2015).

http://www.afdb.org/fileadmin/uploads/afdb/Documents/Publications/Economic_Brief_-_State_of_Infrastructure_in_East_Africa.pdf;

¹⁸ <http://www.nber.org/papers/w15863>

for developing both fossil-based and renewable sources of power such as solar powered micro grids but until governments step up their efforts to mobilize resources and deepen the capacity to plan and implement, the power supply will increase in small doses when a Big Push is the need of the day.

Rainfed agriculture is hostage to the vagaries of nature and with climate change likely to magnify the variability of precipitation, conserving and efficiently allocating water will require investment in irrigation, the creation of institutions and the use of pricing policies. In addition, farmers would benefit from improved weather forecasting now feasible with the help of advanced computing technologies and models as well as the data provided by satellites and ground-based sensors.¹⁹ These initiatives will need to be combined with other measures such as greater mechanization aimed at industrializing agriculture. As observed by Fuglie and Rada (2013), irrigation can close to double crop yields, however, the best and most cost-effective results come from providing plants with the exact amount of water needed at each stage of the growing cycle regarding soil and environmental conditions. To do that calls for the kind of water distribution and application technologies (e.g. drip irrigation using polyethylene tubing and micro spray heads²⁰) that delivers a metered amount of water to the root system with the minimum losses from evaporation and overwatering. How much water is needed at any time depends on the information collected by the imaging and sensing techniques that are diffusing in advanced countries.

Water management would go hand in hand with the optimal application of fertilizer using the appropriate mix. Too much is not only wasteful, it pollutes watercourses as well. One promising approach is the so-called deep placement technique that inserts a briquette of fertilizer some centimeters under the soil to slow the release of nitrogen, loss through leaching (if excess water is applied) and surface volatilization as nitrous oxide or ammonia gas.²¹ East Africa can also potentially

¹⁹ Accurate forecasts can help farmers decide when to sow and harvest crops, when to apply fertilizer and of what type, when application of weedicide is desirable and how to prepare for a prolonged dry spell. <https://www.ametsoc.org/ams/index.cfm/about-ams/ams-statements/statements-of-the-ams-in-force/weather-analysis-and-forecasting/>; <http://web1.adas.co.uk/cranfield/Documents/Weather%20forecasting.pdf>; Access to remote sensing data from online US government portals and other commercial sources is a major advance. <https://www.nature.com/articles/d41586-018-03924-9>.

Low earth orbit (LEO: 240-400 mile high) small satellites with frequent revisit times, high spatial resolution and the multi-spectral sensors can provide daily coverage at an affordable cost and help farmers track pest infestation, nitrogen sufficiency, crop yields and other indicators of farm conditions. <http://observer.com/2017/05/small-satellite-technology-capabilities-space/>. Flocks of such satellites are already in operation.

https://www.nasa.gov/mission_pages/station/research/news/flock_1;
<http://www.xyht.com/enviroag/satellite-imagery-precision-agriculture/>

²⁰ The initial higher material and installation costs are more than offset by the saving in water and reduced soil erosion and expenditure on weedicides. See Seth Seigel, (2016). *Let There Be Water*. Thomas Dunne Books.

²¹ Farmers in Burkina Faso and Niger are using deep placement, for example. It can increase yields of rice by as much as 30 percent.

benefit from the advances in digital and imaging technologies, in the crop sciences and in genetic recombination in modernizing its agriculture.

The technology to increase yields and the quality of production in the medium term and in the more distant and climatically less favorable environment (see discussion on climate resilient agriculture later) is available for the three countries to adapt. These technologies are systematizing and making agricultural production more akin to manufacturing. If the industrializing of agriculture and the switch to precision farming are followed through, a sustained increase in supply would be assured.

Is adoption of high-tech for industrialization of agriculture too much of a stretch for landlocked East Africa? There are many obstacles to transferring these technologies wholesale to East Africa but their eventual assimilation is a must and it is the removal of the hurdles that needs to be addressed. To do this the countries will need to invest in RD&E capabilities and in the hard infrastructures that will provide essential services to farmers – principally transport, energy and water. If more of the growth is to be derived from an industrialized precision agriculture, then this is the time to begin planning for the transformation of the agricultural economy because the building of the soft and hard infrastructures and the skills that will make agriculture a sustainable success far into the future will not be accomplished overnight.

Foremost is the need to shift the current focus of development away from growth that is driven by urban industrialization. Upgrading agriculture technologically can generate higher returns for many more people and ease the burden of migration on urban centers. The development of urban manufacturing and services will still be a necessity to support agriculture. However, a strategy that assigns more weight to agriculture in the medium term could be superior (because it builds on current comparative advantage) while at the same time generating the spillovers that spur activity in other sectors of the economy.

Growing Livestock and Agribusiness

Livestock. In addition to food crops, enlarging the role of livestock could be a profitable move because there is more growth and value in meat products for which demand is being pulled by rising incomes. Alston and Pardey (2014) observe that of the 4.9 billion cropped hectares worldwide, less than 32 percent were under crops (in 2012); the remainder were devoted to the raising of animals.

Both Malawi and Uganda could derive more growth from the production and export of livestock products given that the herding of native (zebu) cattle is of long standing and milk consumption is an integral part of the diet. Farm animals are a substantial economic asset and generate income from sale of meat, milk, hides, and other by-products and services in Uganda. The livestock subsector contributes as much as 3 percent of GDP, and close to 9 percent of agricultural output; it is however, of lesser importance in Malawi. While attempts have been made to improve the quality of the livestock through the import of foreign breeds of cattle

and cross breeding, progress has been limited – productivity remains exceedingly low.²² The yield from livestock can be improved through the development of suitable crossbreeds and the payoff increased with the help of advanced feeding systems that provide animals with the mix of needed nutrients, and attention to animal health.

The reasons for low productivity are manifold. One is the prevalence of diseases (East Coast Fever, bovine TB, brucellosis, animal trypanosomiasis) and the shortage both of veterinary services and of vaccines (with their supporting cold chains). The shortfall in veterinary services and technicians also affects the use and efficacy of artificial insemination (AI). The cost of fodder relative to the price that milk fetches is another consideration for small farmers, as is the unreliable and unhygienic nature of the collection and distribution process. Post milking losses and those caused by the shortage of cooling facilities, are high. In short, there are problems along the entire value chain including with the transport infrastructure that adds to the woes. Reliable dairying hubs and the more widespread use of cooperative arrangements that would connect farmers to processors and to retail outlets have yet to evolve.

Agribusinesses. Could the three countries build on their current comparative advantage in agricultural products and encompass much more of the value chain by developing complementary services and some manufacturing as well? The answer is that they need to redouble current efforts because the alternative possibilities, while they deserve to be explored fully – see below – might take longer to achieve their full potential and begin contributing materially to productivity, growth and poverty reduction. For agricultural growth to feed through into rapid GDP growth supported by exports, Uganda, Malawi and Rwanda will need to stimulate agribusinesses that can spearhead the processing of farm products and increase domestic value creation through product development, manufacturing, and the marketing to urban consumers demanding a higher quality diet richer in micronutrients and to international buyers through integration with GVCs.²³

The World Bank projects that agribusiness could become a \$1 trillion industry in Africa by 2030 but that will require a considerable surge in entrepreneurial activity supported by state policies that reverse the current trend decline in Africa's share of global trade in agricultural products. There are plenty of agribusinesses in all three countries and they contribute as much as 20 percent of GDP via their activities across the value chain, but the majority is small. The Africa Agribusiness Incubator Network (AAIN) is actively sponsoring more but 90 percent of start-ups fail and the

²² SSA is home to 180 different breeds of cattle, which provide a rich stock of genetic material that is adapted to local ecosystems. Cross breeding with foreign cattle needs to be done with caution to avoid losing valuable indigenous genetic material and creating hybrids poorly adapted to local conditions.

²³ Traditional Food Value Chains also have the potential to grow because they can flexibly provide fresh produce to urban consumers. Farmers supplying produce to supermarkets are induced to improve quality and can also make higher returns. (GII 2017). Municipal authorities can drive agricultural policy change and stimulate agricultural innovation as the Kampala government has done. Gore (2018).

ones that do survive are not growing into the large sized firms that stand a good chance of achieving scale and becoming successful exporters.²⁴

Two recent reports by the World Bank list several recommendations with broad applicability. The World Bank's *Enabling the Business of Agriculture* Report 2016 focuses on the regulatory environment and how it impinges upon various segments of the value chain.²⁵ The other report, *Growing Africa: Unlocking the Potential of Agribusiness*,²⁶ starts with a call for regional integration that lowers barriers to the mobility of goods and services in East Africa, highlights the role of IT in disseminating market information and the potential inherent in value adding activities that stretch from the farm gate to the supermarket from cleaning and sorting to packaging and branding.²⁷

The *Growing Africa* report draws attention to the problems created by fuzzy land tenure rights that are generally rooted in communities and neither written nor legally recognized. They are even fuzzier and insecure for women. Fuzzy rights prevent farmers from using land as a collateral for loans and lead to mining of the soil. Land reform in Rwanda introduced in 2004, have systematized ownership right and tenurial arrangements and provide them with the requisite legal footing.²⁸ In Uganda and Malawi, customary and other forms of ownership remain in effect and the scope for reform remains. Ownership related issues have hampered the financing of agribusiness from banks but these can be overcome and both banks and private financiers – domestic and foreign can help bridge the financing gaps.

Even if all these constraints can be eased, Uganda and the other two countries will still need the transformational entrepreneurs who create thriving businesses by exploiting opportunities, building organizational capital, innovating and breaking out of the confines imposed by the domestic market. Each of the three countries can increase the potential supply of entrepreneurs through skill development and by incrementally improving the business environment and assisting entrepreneurs to access GVCs.

Building resilience to climate change

East Africa has begun experiencing the onset of global warming with both temperatures and rainfall being affected. Looking ahead, the severity of climate change is likely to increase and agricultural production will bear the brunt of more inclement weather. Rising temperatures, diminishing precipitation and declining moisture will most seriously impact the yields of wheat but to a lesser extent all the crops grown in the three countries will suffer a decline in yields. Some like rice,

²⁴ <http://africaain.org/about-us/core-investment-areas/>

²⁵ <http://eba.worldbank.org/~media/WBG/AgriBusiness/Documents/Reports/2016/EBA16-Full-Report.pdf>

²⁶ <http://siteresources.worldbank.org/INTAFRICA/Resources/africa-agribusiness-report-2013.pdf>

²⁷ Blockchain technology that is being experimented with by the trading company Louis Dreyfus, could reduce the cost of supply chain management and the tracking of products from farmgate to retailer.

²⁸ http://www.landdivided2013.org.za/sites/default/files/rurangwa%20Land%20Tenure%20Reform_Rwanda%20Case.pdf

bananas and cassava will be constrained by water scarcity or erratic rainfall; others such as maize, millet, potatoes, and sorghum are more sensitive to heat stress with the latter two the least susceptible. The production of tea and coffee flourishes in cooler weather, hence the likelihood is that these will move to higher altitudes and the area under cultivation will shrink. Warmer temperatures create a more hospitable environment for plant diseases and pests. To take just one example, bananas one of the most important food crops in Uganda and Rwanda are under severe threat from the *Xanthomonas* wilt disease (BXW). And although many varieties of bananas are grown in the region, all are susceptible to this disease.

An increase in temperatures will erode the productivity of dairying. Furthermore, climate change will reduce the fish catch by lowering water levels in lakes and because of the warming of the surface water layers, which depletes oxygen in the lower strata and nutrients in the mid layers (because of reduced mixing of surface and lower strata).²⁹

In short, the prognosis on climate makes it more urgent to enhance the productivity and resilience of agriculture in the interests of growth, food security and the welfare of the rural population.

As the climate warms, farmers must increase the acreage devoted to hardier crops such as sorghum, millet and potatoes and planting and harvesting schedules must change along with dietary habits. Even with these changes, it will be essential to raise the drought and heat tolerance of crops, their yields, disease and pest resistance and possibly, nutritional content, as has been done with Vitamin A fortified “golden rice.”³⁰ Developing hybrids will not suffice; only genetic modification using the latest technologies for deciphering genomes and inserting or removing genes that confer desired attributes will be able to create varieties that deliver on all or most of the above counts.³¹ Moreover, as noted earlier, the heterogeneity of African soils means that maximizing productivity will entail targeted application of fertilizers in suitable combinations (WEF 2015).³²

Considering the threat posed by global warming, agricultural R&D deserves high priority. However, budgetary resources for agricultural R&D have increased slowly in a few countries, including Uganda and have stagnated or declined in many others

²⁹ This is the finding of a study on the declining fish production from Lake Tanganyika. <http://phys.org/news/2016-08-lake-tanganyika-fisheries-declining-global.html>; Ugandan fishery which contributes 12.5 percent to agricultural GDP is in a downward spiral because of overfishing and shrinking lake areas. <http://www.ipsnews.net/2015/08/climate-change-shrinking-ugandas-lakes-and-fish/>

³⁰ The New Rice for Africa (NERICA) pest and drought resistant strains released in 1999 did raise yields. In addition, research is making available hardier and more nutritious varieties of beans and sweet potatoes.

³¹ The CRISPR CAS 9 technique now provides researchers with an effective way of editing genomes. The Rapid Trait Development is another way for inserting or removing single nucleotides.

³² Adamopoulos and Restuccia (2018) maintain that land heterogeneity notwithstanding, if developing countries could manage to attain potential yields, the gap in agricultural productivity between rich and poor countries would be eliminated.

(Bientema and Stads 2011).³³ In 2008, Uganda was only one of eight countries out of a total of 31 that spent a little more than 1 percent of agricultural GDP on research – the average was 0.5 percent although returns are high (Pardey et al 2016).³⁴ As of 2014, Uganda's outlay on R&D as a percent of GDP was 0.48 percent; it was negligible in the other two countries. Inevitably, researchers are few: as low as 12 per million inhabitants in Rwanda, 38 per million in Uganda and 50 per million in Malawi. In South Asia, there were 156 researchers per million and 1,606 in East Asia (WDI, 2016, Table 5.13). As research capabilities and a functioning S&T system take time to mature and the testing and diffusion of innovations can easily exceed a decade or more, there is little time to lose. Governments in East Africa must note that the longer-term return from R&D can be as high as 30 percent (Piesse and Thirtle 2010).³⁵ Pardey et al (2016) report that the average IRR on R&D was 42.3 percent in SSA while the median rate was 35 percent. CGIAR has obtained returns equal to \$6 for each \$1 invested in agricultural technologies and a \$1 invested by SSA governments in R&D returned \$3 (Fuglie and Rada 2013).

Moreover, the opposition to GMOs needs to be reconsidered. There is now a wealth of evidence showing that they are both safe and economically and environmentally beneficial.³⁶ Equally relevant is that there is no alternative way of achieving sustainable agricultural growth. Expertise in the technology – and in the regulatory and testing capacity – that can deliver the goods is being neglected and Africa is not grooming the firms that can play the role of a Monsanto or a Syngenta in the region.³⁷ Currently three African countries cultivate GMOs – South Africa, Sudan and Burkina Faso and the latter is intending to abandon BT cotton. Absent intensified local research on genetically enhancing crops that are grown in East Africa, it is unlikely that the few large MNCs – e.g. Syngenta, Monsanto, BASF, Bayer, ChemChina, Dow and DuPont – will give these crops the attention they deserve.

An Agricultural Renaissance

³³ <http://www.ifpri.org/publication/african-agricultural-rd-new-millennium>

³⁴ Investment by SSA countries in agricultural R&D was just 3.9 percent of the global total in 2011. Serious attention to R&D is only in Botswana, South Africa, Namibia and Mauritius.

<http://www.worldpoliticsreview.com/articles/13828/development-benchmarks-for-african-agriculture>

³⁵ <https://www.ncbi.nlm.nih.gov/pubmed/20713401>

³⁶ Brody (2018) Are GMO Foods safe? <https://www.nytimes.com/2018/04/23/well/eat/are-gmo-foods-safe.html>. GM crops take many forms among which the most common are crops that are insect resistant (Bt) or herbicide tolerant (Ht) or have stacked traits.

³⁷ Chinese companies are investing in African farming although not thus far in Uganda, Malawi and Rwanda. Technology transfer is at an early stage because Chinese farming techniques are not necessarily suited for African conditions (Buckley 2013) [https://opendocs.ids.ac.uk/opendocs/bitstream/handle/123456789/2607/IDSB44.4%20Buckley%20China%20\(April%203\).pdf?sequence=3](https://opendocs.ids.ac.uk/opendocs/bitstream/handle/123456789/2607/IDSB44.4%20Buckley%20China%20(April%203).pdf?sequence=3). However, Chinese firms have captured the African market for glyphosate herbicides and the Beijing Genomic Institute is working with the Gates Foundation to develop a new hybrid rice variety. Brazilian interest in transferring technology to Africa via the Brazilian Agricultural Research Corporation (EMBRAPA) has yielded few tangible results thus far. <http://ecdpm.org/great-insights/emerging-economies-and-africa/china-brazil-international-agribusiness/>

There are three reasons why an agricultural renaissance is becoming more feasible and deserves to be explored more determinedly by East African nations notwithstanding the technological and other challenges that they undoubtedly pose. First is the industrialization of agriculture, which is increasing the efficiency of resource use and of value added downstream as raw materials are transformed into the variegated items that urban consumers want. By expanding their reach across the value chain, food-producing countries can raise their growth potential.

Second, advances in biotechnology, mechanization, IT, the capacity to accumulate and analyze data with the help of cloud computing and advanced data analytics -- the building block of smart, precision farming,³⁸ the food sciences, GPS guidance systems and geo-marking/geo-referencing, satellite imaging, and use of UAVs for purposes of crop and weed assessment using multi-spectral cameras, to name a few, are augmenting agricultural productivity and making it easier to diversify production and enter profitable niches.³⁹ Modern precision agriculture⁴⁰ can increase yields while at the same time reducing inputs of water (using sensors to measure soil moisture), nutrients, weedicides and insecticides, and conserving soil quality.⁴¹ In fact, there are grounds for believing that the gradual worldwide decline in the growth of yields that commenced in the 1990s could be halted and possibly reversed. Big Data could be a key factor in bringing this about. Wolfert et al (2017, p.73) claim that it will change the way farms are operated with the help of “real time forecasting, tracking of physical items, and reinventing business processes... Big Data applications in agriculture include benchmarking, sensor deployment, and analytics, predictive modelling and using better models to manage crop failure risk and to boost the feed efficiency of livestock...[Together they] can improve the efficiency of the entire supply chain”.

The scope for technology diffusion is considerable and narrowing the technology gap must be an essential element of any growth strategy. These technologies have been diffusing in the advanced economies for over a decade and IT related ones are gaining momentum. Although at first glance they might appear unsuited to the agricultures in East Africa, with trying they can be tailored and made user friendly to fit the requirements and technical capacity of farmers many of whom have taken

³⁸ Tractors can now be equipped to gather information on soil and crop conditions and seed performance, which can be analyzed and farming practices adjusted accordingly.

³⁹ Sonka (2016), Sonka and Cheng (2015) and Wolfert et al (2017) assess the contribution that Big Data and other tools can make to the agricultural system. If they so want, farmers can entrust all major farm operations such as sowing, watering, fertilizing, and harvesting to computers equipped with smart algorithms that access and store data from multiple sources. <https://www.sciencedirect.com/science/article/pii/S0308521X16303754>; https://www.researchgate.net/publication/302432602_Big_Data_Fueling_the_Next_Evolution_of_Agricultural_Innovation; <http://farmdocdaily.illinois.edu/2015/11/precision-agriculture-not-the-same-as-big-data.html>

⁴⁰ Precision agriculture relies upon data from multiple sources to inform and improve decision-making. See <http://earthobservatory.nasa.gov/Features/PrecisionFarming/>

⁴¹ Information on productivity and other data in http://www.slideshare.net/resakss/strategic-policy-analysis-24-06?next_slideshow=1 ; CGIAR <http://impact.cgiar.org/impact-agricultural-research-productivity-and-poverty-sub-saharan-africa>.

readily to the use of mobile telephony and e-banking (e.g. M-Pesa in Kenya). ICT also provides an avenue for extending crop insurance to farmers thereby mitigating risks. For example, the Syngenta Foundation's Kilimo Salama weather index "mobile technology-based insurance on purchased inputs (certified seed, fertilizer, and crop protection products) protects farmers against bad weather shocks. Mobile phones are used to scan the barcode of products purchased by farmers and M-PESA is used for payout at the end of the growing season in case of bad weather" (WEF 2015). The insurance is available to thousands of farmers in Rwanda and Kenya.

Third is the scope for a fruitful intersection – cemented by the exchange of data - between a growing, modern services sector that supports GVCs and a dynamic agricultural economy (WEF 2015). Whether agriculture can serve as a leading sector depends upon the quality of services including R&D, other intermediary services and extension promoting the assimilation of technologies⁴² that will nudge agriculture closer to the production frontier. Research on the manipulation of plant genes and on the exactly tailored application of water and nutrients for example, will be key to higher yields, nutrient content of foods and resource conservation. Other skill intensive services such as consulting, storage, finance, insurance, marketing, logistics, branding, and (sensor based) tracking of food products as they move through the supply chain⁴³ will determine agricultural diversification, and post-harvest losses (PHL)⁴⁴ and help maximize value capture, food safety, and exports.

4. Scope for Trade Assisted by Integration into Global Value Chains

What explains the importance of global value chains (GVCs)? And how promising is the scope for trade assisted by integration into GVCs? GVCs serve as vehicles for 70 percent of global trade in intermediate goods, services and capital goods, hence integration in chains is almost a necessity for developing countries that have set their sights on export-led growth. GVCs also are an important conduit for technology transfer and can stimulate FDI, which countries in SSA urgently need.

⁴² For example, the National Agro Foundation in India provides a variety of services to villagers in Tamil Nadu to improve farm productivity including through the education of farmers. See Govindrajan (2014) <https://hbr.org/2014/02/transforming-rural-india-through-agricultural-innovation>

⁴³ Tracking can now be done with the help of tablet or laptop based apps. Blockchain will improve tracking capacity. Hjort and Poulsen (2017) find that the access to fast Internet is increasing the demand for and employment of more skilled workers in Africa.

⁴⁴ The FAO estimates that PHL in SSA is in the region of 37 percent. FAO (2011) <http://www.fao.org/docrep/014/mb060e/mb060e.pdf>. This might be too high. Other estimates arrive at a lower rate of about 20 percent for grains such as maize with most of the losses occurring in post-harvest handling and storage. Those of fresh produce, meat and fish occur during handling, packaging and distribution. Loss prevention measures can reduce losses of grain to less than 5 percent. Sheahan and Barrett (2016); http://barrett.dyson.cornell.edu/files/papers/Sheahan%20Barrett_post-harvest%20losses_FULL%20TEXT.pdf; Affognon et al 2015 <http://www.sciencedirect.com/science/article/pii/S0305750X14002307>

SSA has become more open to trade and the shares of exports and imports to GDP (28 percent and 31 percent in 2014) are very close to global averages. The two of the three landlocked East African countries deviate somewhat from the SSA average: Malawi that is the closest has export and import ratios to GDP of 34 percent and 39 percent respectively. Both Rwanda and Uganda have much lower export shares – 15 percent and 18 percent respectively -- although their import share is close to the SSA average of 30 percent. Trade with China and intra-regional trade drove the growth in trade in SSA; intraregional trade almost doubled between 1995 and 2013, and amounted to 3.5 percent of GDP in 2013. Still its share is much smaller than that of regional trade in South and East Asia – almost 85 percent lower (IMF 2016).⁴⁵

Africa's participation in global trade and more specifically in GVCs has been less encouraging. As of 2014, Africa's share in global exports was 2.4 percent and that of SSA was 1.7 percent with a preponderance of commodities and relatively small shares of manufactures and services.⁴⁶ In services trade alone, SSA's share was 2.2 percent with 70 percent of the earnings accruing from travel and transport. SSA's centrality to the global trade network, which is a measure of connectedness that factors in size of trade, trade partners, and the weight of the partners in global trade, is also lower than that of other regions (IMF 2016).

SSA's integration in GVCs has been increasing since 1995 and it is now the third most integrated region in the world. Because of the weight of commodities in exports from SSA, forward integration accounts for 85 percent of the participation in GVCs- forward integration being a measure of the degree to which SSA's exports are inputs into the exports of other countries. The balance of 15 percent, which is backward integration, measures SSA's imports that serve as inputs for its own exports. Foster- McGregor et al (2015, pp.68-69) conclude their detailed study of African participation in GVCs with the observation that integration while significant and growing is of a forward nature, associated with low value-added primary production, where possibilities for learning and upgrading are likely to be more limited. Generally, countries that are engaged in processing and assembly as in East Asia, are likely to have a higher degree of backward integration. It remains the case that Africa as a whole trades relatively little compared with other regions, with trade in intermediate goods in particular being low relative to other regions. The implication of this is that the ratios of GVC participation may overstate the importance of GVCs for Africa.

Forward integration is the norm for Malawi, Uganda and Rwanda as they export mainly agricultural commodities and some minerals (Foster-McGregor et al 2015). Taking Africa as a whole, 75 percent of the integration is explained by South Africa

⁴⁵ IMF (2016, pp. 7-8) "The Region's integration in global trade—its centrality in the global trade network—paints a similar picture. This measure takes into account not only the size of exports for a given country but also the number of its trade partners, as well as the relative weight of these trade partners in global trade...By that measure, sub-Saharan Africa remains the least integrated region in the world, with an average centrality of only about half of that observed in other emerging and developing economies."

⁴⁶ In 2012, Africa accounted for 2.2 percent of the global trade in services and declining in recent years. (WEF 2015)

and North Africa alone with East Africa contributing 5 percent. In other words, East Africa's participation whether backward or forward is minimal. A cross-country analysis of forward integration, which is the stronger of the two, concludes that Rwanda and Uganda fall below predicted levels (WEF 2015). Furthermore, there is a downward trend in the complexity of items produced,⁴⁷ which is the reverse of what is happening in fast growing low income and middle-income countries that are both better integrated in GVCs and increasing their shares of value added (Page 2013).⁴⁸ Levels of export sophistication and product discovery that are intended to capture the extent of upgrading within GVCs tend to be lower for Africa than for other developing regions, suggesting that the performance of African countries in terms of upgrading has been weaker than in other regions.

The smallness of the manufacturing sector – just 11 percent of GDP – is the reason why integration shares for SSA are so lopsided. Backward integration by low-income countries rises when they engage in light, labor-intensive manufacturing activities involving the processing of imported inputs and the export of partially or fully assembled products. Usually the first rung of the GVC ladder involves the assembly of garments, or footwear or leather goods that tend to have long and complex value chains with intermediate inputs and partially assembled products crossing borders multiple times on their journey to retail stores in advanced countries. Given the circuitous nature of the process, tariff levels, logistics and transport charges, behind the border trade impediments and other transaction costs (bribes), problems in obtaining visas for visiting technicians and factory monitors, amplify costs and negate the advantages conferred by low wages and policy incentives. All this weighs heavily on East African countries.

Besides, each of the three landlocked countries is severely disadvantaged by transport infrastructure bottlenecks.⁴⁹ Importing intermediate and semi-finished goods through Mombasa or Dar-es-Salaam ports⁵⁰ and trucking them inland involves major expenses, which are magnified by delays and fees extorted at numerous checkpoints and by the relatively high tariffs imposed by these countries.

⁴⁷ The economic complexity of the Ugandan economy has improved somewhat since 1982 when Uganda was ranked 93rd. In 2015, it was in 83rd place just a little behind Rwanda ranked 81st.

<http://atlas.media.mit.edu/en/profile/country/uga/>;

<http://atlas.media.mit.edu/en/profile/country/rwa/>

⁴⁸ <http://www.theigc.org/wp-content/uploads/2014/08/John-Page-Industry-AGF2013.pdf>; A few countries have improved their standing in the export sophistication index e.g. Madagascar and Mauritius but it has gone down in others e.g. Mauritania and Sudan. Overall, African countries garnered the lowest values in the sophistication index. Foster-McGregor et al (2015)

⁴⁹ The lack of competition in trucking and logistics services raises costs and affects the quality of service. The logistics rankings for the three economies are among the lowest.

⁵⁰ Congestion at Dar es Salaam Port will be eased once Bagamoyo Port 47 miles north of Dar becomes operational. The construction of the \$10 billion port is being supported by China and Oman.

<http://thediplomat.com/2015/12/the-port-of-bagamoyo-a-test-for-chinas-new-maritime-silk-road-in-africa/>

The return journey for exports involves a second round of costs compounded by the infrequency of outbound shipping services from East African ports.⁵¹

These are not the only factors constraining growth of light manufacturing and participation in GVCs. The business environment is discouraging for local and foreign investors alike in Uganda and Malawi (ranked 122nd and 110st by the Doing Business report for 2018).⁵² It is substantially better in Rwanda (ranked 41st), which is also has 58th place in the WEF's competitiveness ratings for 2017⁵³ however, given locational⁵⁴ and other handicaps, further improvement would be helpful. Uganda (114th) and Malawi (132nd) lag far behind with respect to competitiveness and have a lot more catching up to do.

A more business-friendly environment could stimulate private entrepreneurial investment in tradables, which is low in all three countries.⁵⁵ The studies conducted by John Sutton and his collaborators for several African countries⁵⁶ showed that the dearth of mid-sized and large firms affects both growth and trade because bigger enterprises are frequently more productive and have the resources to engage in exporting. Sutton et al (2013) found that only 51 of the 200 leading firms in the four African countries, which they studied, started out as domestic, privately owned enterprises. More critically, as John Page (2016)⁵⁷ has noted, start-up activity is not resulting in an increase in the number of bigger firms – in fact the average firm size appears to be declining. The quality of management could be partly to blame as management scores for African countries are below the average for developing countries.⁵⁸ But it is only one of several factors – policy related, institutional and infrastructural - that are holding back development.

Can the three countries enlarge the benefits from participation in GVCs? Increasing the returns from participation requires some form of upgrading be it process, (increased productivity in existing activities), functional (more activities and steps including various pre-and post-production services), product (increasing variety) or

⁵¹ Cargo ships outbound from Dar to Europe transit via Salalah Port in Oman that increases the duration of the journey.

⁵² <http://www.doingbusiness.org/rankings>

⁵³ WEF (2017) <http://www3.weforum.org/docs/GCR2017-2018/04Backmatter/TheGlobalCompetitivenessReport2017-2018AppendixB.pdf>

⁵⁴ The LPI rankings for Uganda and Rwanda were 58th and 62nd respectively in 2016. World Bank (2016) <http://lpi.worldbank.org/international/global>

⁵⁵ Page (2012) shows that private investment in low-income African countries falls well short of investment in low-income East Asian countries – 11.8 percent of GDP vs. 15.4 percent.

<https://www.brookings.edu/wp-content/uploads/2016/06/10-africa-strategy-page.pdf>

⁵⁶ <http://personal.lse.ac.uk/sutton/>

⁵⁷ <http://set.odi.org/wp-content/uploads/2016/01/John-Page-slides-140116.pdf>

⁵⁸ Page (2013) <http://www.theigc.org/wp-content/uploads/2014/08/John-Page-Industry-AGF2013.pdf>; See Newman et al (2016); Bloom et al (2016) present scores for two African countries Tanzania and Zambia. http://www.hbs.edu/faculty/Publication%20Files/16-133_57bdc522-5c6f-4f26-8155-0f67b4de4f76.pdf; van Reenen (2016) <https://www.fbe.hku.hk/file/upload/72822/Management-and-the-Wealth-of-Nations-HKUFBE-KElecture.pdf>

chain related (participate in other chains).⁵⁹ With cash crops (and minerals) of the sort exported by Malawi, Uganda and Rwanda e.g. coffee, tobacco, tea, cocoa, sugar, tantalum and uranium, the scope for functional upgrading is narrower because the chains are producer driven with few large foreign buyers calling the shots and much of the specialized processing done overseas. There is more room for upgrading with cut flowers as producers can add value by bunching, making bouquets, wrapping, and sleeving.

The garments industry can also add value when there is scope for backward integration with spinning and weaving mills drawing on local production of cotton as is possible to a limited extent in Tanzania. However, garment value chains tend to be buyer driven and subject to their designs, exacting specifications and schedules. Some buyers such as H&M, encourage innovation and value enhancement by suppliers. Where this is infeasible because of GVC governance, producers can be locked into low value assembly operations with little chance of raising growth prospects. Uganda is arguably the best placed to create an integrated cotton garments sector based on domestically grown cotton – as it was the largest producer of cotton in SSA in the 1960s⁶⁰ – but as Tanzania is discovering,⁶¹ scaling up the production of fabrics and garments is a considerable challenge, but it need not be an insurmountable one. Currently much of Uganda's cotton crop is exported in raw form by ginneries. Processing into yarn, fabrics and the manufacture of garments are on a very limited scale for example by a vertically integrated producer Nytil.⁶² This could change with the domestic market as a partial springboard with GVCs providing an increasing outlet for domestic production. But the ups and downs experienced since the introduction of the National Textile Policy in 2008, suggests that it will take a mix of pricing and other policies and several years before the sector can gain traction – if cotton textiles are singled out as a future growth driver.

Malawi, Rwanda and Uganda must continue to explore and exploit opportunities in manufacturing -- the traditional driver of growth and these are examined further in section 5 below. Other lucrative opportunities with longer term potential might lie in the petrochemicals sector for Uganda given its substantial petroleum resources.⁶³

⁵⁹ Malawi for example has a degree of export diversification that is about average for a country at its income level however, an increase that raised the income from exports and enhanced the degree of complexity, would be definitely advantageous. Malawi ranked 114th out of 130 countries with respect to the complexity of exports in 2016. CID (2017).

<http://atlas.cid.harvard.edu/rankings?country=malawi>

⁶⁰ Baffes (2009) http://www.worldbank.org/afr/wps/WPS_123_Uganda_Cotton_Case_Study.pdf

⁶¹ See review of Tanzania's textile industry in *Textile International*, September 2016.

⁶² <http://www.monitor.co.ug/Business/Prosper/Behind-free-fall-Uganda-s-cotton-production/688616-3145468-aqfojz/index.html>; <http://www.textiletribune.com/2015/02/textile-industry-of-uganda-overview.html>

⁶³ Reserves are estimated at 6.5 billion barrels. Recoverable oil is in the region of 1.8 billion and 2.2 billion barrels and the field could produce 230,000 bpd (Patey 2015)

<https://www.oxfordenergy.org/wpcms/wp-content/uploads/2015/10/WPM-601.pdf> . Oil

production is off to a slow start. Okuku (2015)

<https://misr.mak.ac.ug/sites/default/files/events/UGANDA%20OIL-LED%20DEVELOPMENT.pdf>

Tullow Oil, Total Oil and CNOOC are the companies actively engaged in exploration and production especially in the Lake Albert Rift Basin region <http://www.tulloil.com/operations/east->

Upstream activities can include participation with foreign oil companies in exploration, development and production; downstream activities encompass transportation, refining, storage, production of feedstock, marketing and distribution.⁶⁴ The foreign companies are required to source 48 percent of the services used by the industry locally and the expectation is that direct and indirect employment (e.g. 15,000 jobs directly created in transport, catering and security) will exceed 150,000. All three countries will benefit from various services activities and in deeper integration with their GVCs – tourism is a prime example and others are emerging thanks to ICT. These are discussed in section 6. However, 70 percent of currently imported services are of an intermediate nature and linked to the production and import of goods. Before East African countries can make the leap into tradable services, they must engage in production of goods (of the agro-processing variety) and build the infrastructures that undergirds services such as logistics, telecommunications and research.⁶⁵

5. Industrial Development: Analysis and Options

Malawi, Rwanda and Uganda are searching for the growth escalator provided by manufacturing under quite different circumstances from those confronting resource poor East Asian economies in the 1960s and 1970s. In those earlier decades, entering labor-intensive light-manufacturing activities was a less daunting process and Japan provided other East Asian economies with a model to emulate. Newly codified technologies advantaged countries with low wage costs, western markets were opening to imports from developing countries as a lowering of barriers to trade ushered in a second era of globalization, Western multinationals were transferring their labor and resource intensive operations overseas, and competition was less fierce. More recently, the role of manufacturing as a driver of growth has weakened (Rodrik 2015, Dadush 2015⁶⁶): labor abundance is less of an asset given the evolving capital and skill intensity of most manufacturing technologies and the automation of many manual operations – the World Bank (2016) estimates that between 65 percent and 85 percent of formal sector jobs in East African economies are susceptible to automation over the next two decades⁶⁷; trade in manufactures is increasing more slowly⁶⁸; late starters face formidable

[africa/Uganda](#). Chemicals supply chains in advanced countries have a relatively high share of domestic value added.

⁶⁴ A 1,445 km electrically heated pipeline will transport the oil to a Tanzanian port. A small refinery – if it is constructed – will meet domestic requirements.

⁶⁵ Cattaneo (2015) <http://ycsg.yale.edu/sites/default/files/files/africa.pdf>

⁶⁶ <http://voxeu.org/article/deindustrialisation-and-development; One development that has contributed to this weakening is that manufacturing is becoming concentrated in fewer countries many in East Asia>.

⁶⁷ Automation bolstered by machine learning and the diffusion of digital technologies could lead to the reshoring of some manufacturing back to the advanced countries and result in further telescoping of GVCs. <http://www.worldbank.org/en/publication/wdr2016>. Some of the more recent projections strike a cautious note regarding the degree of job displacement in currently labor-intensive activities.

⁶⁸ Constantinescu et al (2105) <https://www.imf.org/external/pubs/ft/wp/2015/wp1506.pdf>

competition from East and South Asian firms that have a long head start and learning advantages in producing manufactured exports and integrating with GVCs; logistics costs and the quality of trade facilitation both areas in which East Africa lags, strongly impinge on competitiveness; and mid and large sized firms of which there are few in Africa, have a better chance of linking with GVCs and penetrating foreign markets.⁶⁹ There are other concerns on the horizon once climate change becomes a larger issue but that is a few decades into the future.⁷⁰

There are chinks of light also. FDI especially from China and India is transferring services, light industry and agricultural technology to East African countries, developing the region's natural resources and upgrading the associated transport facilities.⁷¹ This is being complemented by ODA, FDI and domestically mobilized capital that is helping build badly needed infrastructure, which is integrating the regional economy and allowing the landlocked economies to reduce the costs of shipping goods via coastal outlets. Some observers are of the view that as many as 85 million manufacturing jobs could be transferred to Africa from China by 2030 via FDI thereby enabling the more enterprising African countries to more fully harness the growth potential of manufacturing industries.⁷²

As noted earlier, the share of manufacturing in GDP in SSA has declined from 19 percent in 1975 to just 10 percent in 2017.⁷³ It has grown, however, in absolute amounts. Merchandise exports also fell from \$364 billion in 2010 to \$307 billion in 2017 with exports of manufactures amounting to a fifth of the total.⁷⁴ A third of the exports of manufactures are to other African countries,⁷⁵ a welcome sign of increasing connectivity and falling costs of facilitation. Such connectivity would be tightened if the fragmentation of African market were to be reduced by making all

⁶⁹ Not only are there few such firms in Africa but also their numbers are not multiplying since the turn of the century (Newman et al 2016). Most started out as trading firms many owned by immigrant entrepreneurs that then diversified into manufacturing. Sutton (2013-4) <http://personal.lse.ac.uk/sutton>; IGC (2013) <http://www.theigc.org/project/understanding-rwandas-agribusiness-and-manufacturing-sectors/>

⁷⁰ The Economist (2015, p.41) rightly observes that successful industrialization by African countries that take the long view and persist will be “more a marathon than a sprint”.

⁷¹ UNCTAD (2015) <http://unctad.org/en/pages/PressRelease.aspx?OriginalVersionID=250>

⁷² John Page at Brookings (2016) <http://www.brookings.edu/research/podcasts/2016/01/made-in-africa>. Between 1991 and 2009, Uganda attracted substantial FDI, a third of which found its way into industry – almost \$3 billion. Obwona et al (2016) https://www.brookings.edu/wp-content/uploads/2016/07/L2C_WP9_Obwona-et-al.pdf. Whether millions of jobs are transferred will depend on the pace and the depth of automation as well as the growth of world GDP.

⁷³ <http://wdi.worldbank.org/table/4.2>

⁷⁴ WDI (2018) <http://wdi.worldbank.org/table/4.4> The ever optimistic WEF estimates that Africa's manufacturing output could rise to \$1 trillion by 2025 and McKinsey Global projects expenditures of \$5.6 trillion by African businesses and consumers by 2025 providing an ample market for production and intra African exports of manufactures. WEF (2016); Balchin et al (2016) <http://set.odi.org/developing-export-based-manufacturing-in-sub-saharan-africa/>

⁷⁵ Some of this is entrepot trade with goods imported from overseas being re-exported to other African countries. Most of Rwanda's exports are to Burundi and the DRC. Gathani, Stoevinga and Savini (2015) <http://www.theigc.org/wp-content/uploads/2015/03/Gathani-Et-Al-Policy-Brief.pdf>

or most of SSA part of a single trade zone rather than eight non-overlapping zones each of which includes less than half of all African countries.

Undoubtedly, African countries must aggressively pursue industrial opportunities as they materialize – even those of a niche variety - because manufacturing is the established driver of growth and productivity and a fertile source of innovations. However, it is unlikely, even in the best of circumstances, that manufacturing will account for much more than a fifth of GDP and in most African economies; it will likely have a much smaller share. Moreover, if these countries are slow to move up the value chain from processing and assembly type activities into more value adding ones, the contribution of manufacturing would be further attenuated.

The manufacturing sector in the three countries, which are the focus of our study, shares six characteristics (some noted above): (a) already noted is the slow pace of increase in production (e.g. manufacturing output remains below pre-crisis levels in Rwanda as of 2014⁷⁶), and the role and composition of manufacturing and agribusinesses in the production structure has been shaped by policies followed during colonial times (IGC 2013)⁷⁷; (b) industry accounts for a minor share of GDP, there is a preponderance of informal activity and a paucity of large firms⁷⁸; (c) what industry there is tends to specialize in downstream processing and assembly activities and consequently, domestic value added is low; (d) virtually all manufacturing activities are saddled with excess capacity, and capacity utilization frequently averages less than 50 percent⁷⁹ in large part because of low levels of working capital, delays in obtaining inputs (few of the raw materials and intermediate inputs required are produced domestically) that are sourced from European countries, China, India, and the Republic of Korea and because a fraction of the installed capacity is comprised of equipment that is obsolete and expensive to operate; (e) most of the production is for the small domestic market that is subject to seasonal fluctuations and any trade is with neighboring countries that also tend to produce similar products; and (f) although African countries have an abundance of labor, adjusted for country effects and firm characteristics, African firms pay a 50 percent wage premium (and unit labor costs are high for small firms also) raising

⁷⁶ The Rwandan manufacturing sector had to be largely rebuilt following the destruction wrought by genocide that swept the country in 1994.

⁷⁷ <http://www.theigc.org/project/understanding-rwandas-agribusiness-and-manufacturing-sectors/>. For example, the production of coffee and pyrethrum in Rwanda was introduced by the Belgians in the 1930s and that of tea in the mid-1950s.

⁷⁸ African firms in every age quintile tend to be smaller than firms in other regions. The vast majority are microenterprises. Iacovone, Ramachandran and Schmidt (2014) <https://openknowledge.worldbank.org/handle/10986/16943>; Mckenzie (2011) <http://siteresources.worldbank.org/DEC/Resources/OxfordPaperDraftv3.pdf>. Spreading leftward from a small number of large firms is a long tail of small firms. Many of the larger domestically owned firms are individual or family owned and the owners were originally traders by profession. Large groups and foreign businesses also have a sizable industrial stake especially in Rwanda. (2013) <http://www.theigc.org/project/understanding-rwandas-agribusiness-and-manufacturing-sectors/>

⁷⁹ Half of all Rwandan firms interviewed by IGC were operating at below 50 percent capacity. (IGC 2013, p.61) <http://www.theigc.org/project/understanding-rwandas-agribusiness-and-manufacturing-sectors/>

the cost of industrial labor in African countries well above that of Bangladesh and India. The relatively small size of firms and an inward orientation also exacerbate the productivity differentials between African firms and their foreign competitors.⁸⁰ To take one example, per worker output of the median Malawian firm is \$5,100. In comparison, the median Indian firm produces 30 percent more per worker and that of the median Chinese firm is almost three times higher (World Bank 2016).

The growth of manufacturing output since the turn of the century largely tracked the boom in the construction sector and in consumption as the number of middle class consumers multiplied. Throughout East Africa, the firms that benefitted were ones producing construction materials, metal and food products, furniture, a variety of paper and chemical products (for home and farm use), and household goods many made of plastics.⁸¹ In fact, three-quarters of all firms in SSA are producers of food products, garments, furniture and fabricated metal products (Gelb, Mayer and Ramachandran 2013).

Aside from the disadvantages imposed by geography and smallness, the growth of manufacturing in the three countries has been hampered by many equally shared factors. The one significant difference is that of the three, Rwanda clearly has a lead in the quality of the business environment that is frequently singled out as a major constraint throughout SSA. Whether it could boost Rwanda's industrial prospects over the longer term, remains to be seen. Gelb et al (2014) observe that "intra country variation in business conditions can be larger than inter country differences" and these can compound the uncertainty that derives from uncertainty regarding national policies. Because manufacturing relative to non-tradable activities is more dependent on imported inputs including agricultural ones when the quality of the local produce falls below the desired specifications, it is more likely to be affected by restrictions on imports and transaction costs incurred in clearing goods through customs.⁸² In both Uganda and Malawi, manufacturing is "Locked in a low-level business climate equilibrium sustained by incentives faced by key participants. On the side of firms, small markets and monopoly rents confer an additional advantage on the big players with bargaining power reinforcing the asymmetry of the business climate. Larger firms also have rents to share between owners, employees and public officials. Even apparently profitable larger firms will not grow rapidly in small markets and they might find it hard to surmount the export productivity hurdle." (Gelb et al 2014, p.10)

⁸⁰ Gelb, Meyer and Ramachandran (2013, p.16) estimate that "Bangladesh and India – have annual industrial labor costs roughly in line with GDP per capita (with a ratio of labor cost to GDP per capita at 0.98 and 1.41, respectively). At a similar income level, Kenya has a ratio of labor cost to GDP per capita of about 4.37". <http://www.cgdev.org/sites/default/files/does-poor-mean-cheap.pdf>

⁸¹ Larger group owned firms tend to be diversified with producers of furniture for example diversifying into the production of paints, glue and varnishes. Urwibutso of Rwanda an agro-business produces juices, wines, flour, and chili pepper as well as bricks. (IGC 2013, p.58)

<http://www.theigc.org/project/understanding-rwandas-agribusiness-and-manufacturing-sectors/>

⁸² The construction industry is almost equally dependent on imported machinery, spare parts and raw material although the extent of dependence varies among the three countries – being greatest in Malawi.

Depending upon when a survey was conducted and the nature of the sample, each set of firms ranks the most bothersome constraints differently. Malawian firms for example, rank tax rates the highest followed by the access to finance – a hardy perennial – followed by corruption, availability of land, shortage of electricity, trade regulations, and so forth (World Bank 2018). Smaller firms owned by individuals or families have a harder time raising capital compared to the large groups with deeper pockets and more diversified operations. In all three countries, industrialists complain about the inadequacy and unreliability of the energy and transport infrastructures that undermines their competitiveness. The shortage of managerial and technical skills is another serious problem and Rwandan firms controlled by large groups – and those in other countries as well – have had to import high priced expatriate managers and skilled workers from elsewhere in Africa and from Asia to run their firms, help to assimilate imported technology and do the necessary trouble shooting especially in the earlier start-up stage of production.

It barely deserves repeating that infrastructure gaps weigh heavily on manufacturing. Although plants can generate some or all their electric power and develop in-house logistics services complete with a small fleet of trucks, these add to overheads. Ugandan factory owners must cope with erratic power supplies and with relatively high tariffs and cost of fuel.⁸³ The cost of electricity in Rwanda at 20 cents per KWh is among the highest in the world as are transport costs (Hausmann and Chauvin 2015). Prolonged underinvestment has resulted in “serious inadequacies in the domestic transportation and logistics infrastructure (road system, storage, and ancillary facilities), which slow down the movement of high volume products” (Obwona et al 2016, pp. 25).

Although manufacturing may be a small part of the economy in all three countries, it still has a valuable role to play in creating jobs, generating exports and inducing the emergence of formal services. This is because some of the most productive services are intermediate inputs e.g. insurance, trade financing, engineering, consulting, logistics, R&D, design etc. Many of those support industries in the middle and upper income countries. In the absence of manufacturing development, business services have a harder time gaining traction. Hence, a deepening of the

⁸³ Among African economies Uganda is one of a tiny number that levies electricity tariffs that cover the operational and capital expenditures. Rwanda and Malawi are among the majority that incurs quasi-fiscal deficits – amounting to 2.5 percent of GDP for the former and 1.0 percent of GDP for the latter (“the quasi-fiscal deficit is the difference between the net revenue of an efficient electricity sector covering operational and capital costs and the net cash collected by the utilities”). Kojima and Trimble (2016, pp. 7, 2) ascribe these to shortcomings that are widespread in Africa, “in operational efficiency, [coupled with] high costs of small-scale operation, and overreliance on expensive oil-based electricity generation [that] have increased costs of power supply, while the inability of many customers to pay for electricity services and underpricing have reduced utility revenues. One consequence of high costs and low revenues is the inability of utilities to meet demand and deliver reliable electricity—a deficiency exacerbated by years of under spending on maintenance and expansion” .

<https://openknowledge.worldbank.org/bitstream/handle/10986/25091/108555.pdf?sequence=10&isAllowed=y>

manufacturing base that capitalizes on linkages emanating from agribusinesses, the real estate sector, and tourism for example, would deserve priority.

An analysis of the product space,⁸⁴ of the changing composition, complexity and quality of exports, and an analysis of agricultural, tourism and petrochemicals (for Uganda) value chains⁸⁵ can offer some qualified guidance⁸⁶ as to activities that Rwanda et al could enter and that the respective governments might support. One tool that is frequently employed is the Hausmann-Hidalgo technique⁸⁷ (including measures of export complexity) and show with the help of industrial and employment census data on entry of firms and enterprise surveys the subsectors where economic activity is intensifying.⁸⁸ Rwandan manufactured products with the highest revealed comparative advantage are mainly ones made of paper, but they also include iron and steel containers and material for cleaning shoes and clothing. Similar calculations for Uganda identify leather products and products made with iron or steel plus detergents.

The Hausmann-Hidalgo product space analysis for Rwanda, shows not surprisingly that resource products have the most potential e.g. processed agricultural products but also specialized textiles, construction materials plus items such as fans, gas pumps, metal working machinery tools, and nickel alloys. Most of these products are also appropriate for Uganda although Balchin et al include uranium concentrates, sesame seeds, cocoa waste, leather, and parts for machinery (Balchin et al 2016).

In their analysis of Rwanda, Hausmann and Chauvin (2015) include many agricultural and other more complex products such as: “coffee extracts, sugars, syrups, and fermented beverages, various vegetable oils, preserved fruits and jellies, concentrated and preserved milk and cheese products, live poultry and eggs, preserved meats, as well as herbicides, pesticides, and fertilizers. The 30 frontier products in this category account for more than US\$ 145 billion of world trade and

⁸⁴ Hidalgo et al (2007) <https://arxiv.org/pdf/0708.2090.pdf>; A description of the H-H technique and its application to SSA can be found in Abdon and Felipe (2011) http://www.levyinstitute.org/pubs/wp_670.pdf

⁸⁵ IMF (2016) <https://www.imf.org/external/pubs/ft/dp/2016/afr1602.pdf>; UNIDO (2015) http://www.unido.org/fileadmin/user_media/Services/PSD/WP_2015_04_v2.pdf; Foster-McGregor et al (2015) <http://www.merit.unu.edu/publications/working-papers/abstract/?id=5759>; Conde et al (2015) http://www3.weforum.org/docs/WEF_ACR_2015/ACR_Chapter2.3_2015.pdf; Christian et al (2011) http://www.cggc.duke.edu/pdfs/2011-11-11_CGGC_Tourism-Global-Value-Chain.pdf; Agribusiness value chains <http://www.cggc.duke.edu/gvc/project.php?proj=175>; <http://www.hydrocarbonprocessing.com/magazine/2016/april-2016/special-report-petrochemical-developments/petrochemical-value-chain-analysis-reveals-downstream-opportunities-for-qatar>

⁸⁶ For reasons explained towards the end of this section.

⁸⁷ A study of Rwanda’s export prospects by Hausmann and Chauvin (2015) identified 100 products that “lie at Rwanda’s knowledge frontier, are not intensive in Rwanda’s scarce resource and economize on transportation costs”. http://growthlab.cid.harvard.edu/files/growthlab/files/hausmann_chauvin_rwanda_294.pdf

⁸⁸ Industrial census data are another source of information on entry and growth of manufacturing activity. Bloom et al (2013) provide some data on firms in Uganda; Gathani and Stoelinga (2013 on Rwanda. <http://www.ucl.ac.uk/~uctpimr/research/IGC%20Evidence%20Paper%20-%20Firms%20131231%20Final.pdf>

have seen high growth rates in the last decade. Specialized Textiles and Garments, includes silk, lace, yarn, synthetic fibers, carpets, rugs, mats as well as footwear, of which Rwanda already exports some US\$ 100k in value. The 12 frontier products in this category account for more than \$100 billion of world trade, with moderate growth rates. The third major group, construction materials, metal and wood products, includes items like iron bars, wood, railway parts, electric wire, wood pulp, and lightly processed metals. The 14 frontier products in this category account for more than \$200 billion of world trade, with very high growth rates.”

Hausmann et al.’s (2014)⁸⁹ near term recommendations for Uganda emphasize food and beverages shown in Figure 29. They also list several stretch possibilities of a more complex nature listed in Figure 30. “They represent mostly construction and industrial materials such as plastics, metal and paper products that are bulky and thus expensive to transport for a landlocked country.”

Figure 29: Products for parsimonious industrial policy

Product	Distance
Food processing	
Margarine etc.	0.86
Confectionery, non-chocolate	0.86
Jams, jellies, marmalades, etc.	0.86
Edible products and preparations, nes	0.87
Fruit, temporarily preserved	0.87
Other materials of vegetable origin, nes	0.87
Tobacco, manufactured	0.87
Bakery products	0.87
Plastic packing containers and closures	0.87
Fixed vegetable oils, nes	0.88
Cigarettes	0.88
Packing containers of paper	0.88
Beer made from malt	0.88
Bottles etc of glass	0.88
Flour and meals of fruit and vegetables	0.88
Vegetables, frozen or in preservative	0.88
Non-alcoholic beverages, nes	0.88
Insecticides	0.87
Fertilizers, nes	0.87
Propellant powders and other explosives	0.87

⁸⁹ <http://www.effective-states.org/working-paper-how-should-uganda-grow/>

Figure 30: Strategic bets

Product	Distance
Construction and industrial materials	
Printed matter, nes	0.91
Varnishes and lacquers; distempers etc	0.90
Miscellaneous articles of base metal	0.91
Paper and paperboard cut to size or shape, nes	0.90
Wadding, wicks and textiles fabrics for machine use	0.91
Aluminum and alloys, worked	0.90
Structures and parts of, of aluminum;	0.91
Wood packing cases, boxes, cases, crates, etc	0.90
Metal casks or drums for packing goods	0.90
Trailers and transports containers	0.91
Articles of paper pulp, paper, paperboard, nes	0.90
Polyvinyl chloride	0.91
Polyethylene	0.90
Structures and parts of, of iron, steel	0.90
Builders' carpentry and joinery	0.90
Printed books, pamphlets, maps and globes	0.91
Gauze, cloth, grill, netting, reinforced fabric, etc	0.91
Plastic packing containers and lids	0.87
Fibre building board of wood or vegetable material	0.89
Paper and paperboard, creped, crinkled, etc	0.89
Other sheet and plates, of iron or steel, worked	0.91
Polypropylene	0.90
Packing containers, box files, etc, of paper	0.88
Construction materials of cement	0.89

Applying the product space analysis to Malawi reveals not surprisingly that its comparative advantage is almost exclusively in resource-based products: the only item with a degree of complexity is bags and sacks for packing. A comparison of the product space for 1994-96 with the space for 2012-14 shows that a dozen items of clothing (underwear, dresses etc.) that were competitively exported in the first period were no longer present in the most recent period – a disappointing development as these were among the most complex products exported by Malawi (Battaile 2016).⁹⁰ Among the so-called emerging champions – i.e. products that could be produced for export are a number of garments such as knitted cardigans and jerseys, plastic packing, leather, and uranium oxide.⁹¹ Fiber building board of wood and worked wood are a couple of other manufactured items with potential.

Product space analysis and the experience of fast developers can offer clues as to the general direction industrial evolution in East African countries could follow but backward looking analysis is unable to factor in chance developments that lead to big hits, the waxing and waning of comparative advantage in specific activities,

⁹⁰ One consequence is that Malawi's share of intraregional exports of clothing fell from 6.7 percent in 2009 to 0 percent in 2015. Battaile (2016).

⁹¹ A decline in the prices of uranium led to a tapering of production in 2014. The principal open cast Kayelekera mine is currently in a maintenance mode.

technological changes, competition from rival producers that like China or Vietnam have a considerable head start over African late starters, and the vagaries of global demand. Any or all of these coming together can undo a strategy that is focused on the rear-view mirror. In an earlier paper, Easterly, Reshef and Schwenkenberg (2009) showed that the exports of manufactures from most countries are dominated by a small number of “big hits” and the dominance increases with export volume. Interestingly, a single destination is likely to absorb most the big hit export. Furthermore, big hits are difficult to anticipate *ex ante* and hence are difficult to grow by dint of policy.⁹²

In a more recent paper Easterly and Reshef (2016, p.42)⁹³ show that big hits generally do not last – that the ranking among the leading exports changes over time i.e. the correlation between export ranks in 1998 and 2010 was just 0.3 with developing country exports proving to be less stable than those of developed countries. They conclude that “the role of comparative advantage is smaller than we expected. This suggests that theories of export success that focus only on comparative advantage (and the policies motivated by such stories) maybe missing much of the origin of export success. A lot of the action in exports is not driven by source country factors alone – as opposed to demand effects coming from outside the source country. This is the reason that specializations are so unstable.”

These findings in addition to what we gather from the research on global value chains suggest that “horizontal” industrial policies that strengthen capabilities (human capital infrastructure, institutions) can promote the growth of landlocked

⁹² Easterly et al (2009, p.4) maintain “that success (in both the product and destination dimensions) closely follows a power law. Hence, *ex ante* picking a winning export category (or discoverer) would be very hard indeed. A traditional argument for private entrepreneurship against the government “picking winners” is that private entrepreneurship is a decentralized search process characterized by many independent trials by agents who have many different kinds of specialized knowledge about sectors, markets, and technologies. This *a priori* seems more likely to find a “big hit” than a process relying on centralized knowledge of the state”. Quality and technological upgrading and other measures can enlarge the contribution of big hits but finding them is beyond the reach of policy.

<http://documents.worldbank.org/curated/en/921211468330933530/pdf/WPS5081.pdf>. The experience of African countries appears to support the big hit theory. See Easterly and Reshef (2010). Their findings both with regard to the significance of big hits and the difficulty of nurturing them are supported by Cadot et al (2014). <http://www.theigc.org/wp-content/uploads/2014/09/Cadot-Et-Al-2014-Working-Paper.pdf>

⁹³ <http://www.nber.org/papers/w22869>

countries in SSA,⁹⁴ but more targeted (vertical) policies⁹⁵ that seek to identify activities using Hausmann- Hidalgo or other techniques may fail to groom the tradable products that will lead to big hits. In that spirit, the following section examines the scope for further developing services that have an established track record but where local capabilities are still lagging.

6. Tourism and Natural Capital

Among the services with the most medium-term potential for the landlocked East African countries, tourism heads the list. Faber and Gaubert (2016, p.1)⁹⁶ observe that “Tourism is a particular form of market integration. Rather than shipping goods, tourism involves the export of otherwise non-traded local services and amenities by temporarily moving consumers across space. These tourism exports have become an important channel of global integration especially in developing countries. Over the past decade, tourism exports have exceeded manufacturing exports for 40 percent of developing countries and exceeded agricultural exports for half of them.” Mexican regions benefitting from tourism registered higher rates of employment, wage increase and GDP growth.

Global tourism is an unusually robust industry that has grown by close to 4 percent per annum since 2010 and in 2015, generated over \$1.23 trillion in revenues (not including \$210 billion in exports from non-resident passenger transport services). International tourist arrivals climbed by 4.4 percent to reach 1,184 billion in 2015 up from 278 million in 1980. Tourism accounts for 30 percent of worldwide services exports and 7 percent of total trade in goods and services, the third largest item after fuel and chemicals.⁹⁷ The average contribution of tourism to global GDP is about 5 percent and it creates (direct and indirect) employment for 6-7 percent of the global workforce,⁹⁸ however, depending on the country, the contribution of tourism can range from 2 percent of GDP to 20 percent or more and in the case of small island economies. The UNWTO projects a 3.3 percent per annum growth in international tourist arrivals through 2030.⁹⁹

⁹⁴ Looking ahead, automation could lead to a shrinking of value chains that are based on immobile and low-cost labor that is a major input into the sewing of garments and the assembly of footwear. Both activities are being automated with Adidas for example opening an automated shoe factory in Germany and Nike also exploring the possibility.
<https://www.theguardian.com/world/2016/may/25/adidas-to-sell-robot-made-shoes-from-2017>;
Economist (2015) <http://www.economist.com/news/technology-quarterly/21651925-robotic-sewing-machine-could-throw-garment-workers-low-cost-countries-out>;
<http://www.bizjournals.com/portland/blog/threads-and-laces/2015/05/5-nike-patents-that-show-how-u-s-manufacturing.html>

⁹⁵ Industrial policy dichotomies – hard vs. soft; horizontal vs. vertical – are reviewed by Harrison and Rodriguez Clare (2009) <http://www.nber.org/papers/w15261.pdf>

⁹⁶ <http://voxeu.org/article/tourism-and-economic-development-evidence-mexico-s-coastline>

⁹⁷ World Tourism Organization (2016) <http://media.unwto.org/press-release/2016-05-03/exports-international-tourism-rise-4-2015>

⁹⁸ Direct employment is estimated at 3.3 percent. World Bank, The State of Tourism in Africa (September 2011).

⁹⁹ UNWTO (2016) <http://www.e-unwto.org/doi/pdf/10.18111/9789284418145>

Sub-Saharan Africa (SSA) has considerable untapped potential. Its share of global tourist arrivals in 2015 was a mere 3 percent (although the total number of visitors more than doubled to 35 million in 2015 from the 16 million in 2000). Revenues amounted to \$24.5 billion (1.9 percent) and these have grown at an almost 5 percent annual rate during 2011-2015 as against the 8.0 percent rate for Southeast Asia. Each arrival in 2015 spent \$690 in SSA as compared with \$1,170 and \$1,030 in the Caribbean and South Asia respectively. Among the SSA destinations in 2014, South Africa topped the list with 9.5 million arrivals, followed by Botswana (1.9 million), and Zimbabwe (1.8 million). Among the three East African inland economies, Uganda led the pack with 1.26 million visitors with Rwanda receiving 926,000 and Malawi about 800,000. The receipts from tourism for the three countries were \$791 million, \$304 million and \$31 million respectively.

The small share of SSA in global tourism is partly attributable to tour costs that are 25-35 percent higher than for comparable tours elsewhere. Issues of security, business environment, governance, access, service standards, and brand image also inhibit visitors. Costs are less of a factor for high-end tourists who come to Africa to view big game, but they do discourage the budget/package tourist.

From among the 136 countries in the WEF’s Travel and Tourism Index for 2017, Rwanda was ranked 97th, Uganda was in 106th place and Malawi trailed the others in the 123th slot. Health and hygiene are issues for all three countries as is ICT readiness. The business environment and safety and security are at acceptable levels in Rwanda and Malawi, about equal on the latter count, but not so in Uganda. But all three countries are below par with respect to human resources and the labor market.¹⁰⁰

Clearly, the priority is to reduce the health and security related hazards for visitors. An upgrading of the hotel and tour operator segments with local operators (as in Mauritius) complementing foreign ones, can follow. An analysis of the tourism value chain can serve to identify economic flows and the distribution of benefits. Typically, the value chain comprises tour organization, accommodation, catering entertainment, transport and shopping and involves participants from both formal and informal sectors.



Source: Vignati and Laumans (2011) <http://www.hitt-initiative.org/wp/wp-content/uploads/2011/10/Value-Chain-Analysis-as-a-Kick-for-Tourism-Destination-Development-final.pdf>

Value chain interventions can take many forms, among them being:

¹⁰⁰ WEF (2017) http://www3.weforum.org/docs/WEF_TTCR_2017_web_0401.pdf

- “Volume Increase: More demand, more sales of tourism packages, food & beverages, crafts, etc.
- Upgrade processes: Better coordination and communication within, and between stakeholders (e.g. artisans, farmers)
- Upgrade products: Providing better quality service, products related to market demand
- Add value: through the diversification of product and service offers, sustainable development, reduction of transaction costs through technology and clusters development.
- Reduce barriers to entry: Through micro-credit, entrepreneurship development and facilitating access to technology.
- Strengthen Innovation: Through public-private partnerships, private cooperation and investments in research.
- Increase Local Linkages: By fiscal stimulus packages to enhance private sector buy from local suppliers and invest in local work force.” (From Vignati and Laumans 2011, p.5)¹⁰¹

As with virtually all tradable services, better air transport and Internet connectivity is vital. Moving up the value chain and attracting more of the high spending, tourist requires attention to human resources through training in hotel management, hospitality services, English language, communication and customer service skills, and improving the quality of the experience provided by tour operators.¹⁰² Diverse attractions – in addition to the safari/ecotourism¹⁰³ - can be a significant plus. For example, sprucing up downtown city infrastructure and enriching recreational facilities leaves a lasting favorable impression. In addition, festivals, sports events, and varied excursions can pull in large numbers of visitors and induce them to extend their stay (Dubai, Rio, Singapore, and several of the Caribbean Islands are among the exemplars). Likewise, locally produced items demonstrating the quality – and uniqueness - of production and craft skills can augment earnings from tourism (and serve as employment multipliers) and attract the attention of overseas buyers.

The importance of tourism for the three countries, especially of eco-tourism,¹⁰⁴ makes it imperative to safeguard and augment “natural capital” i.e. environmental

¹⁰¹ http://www.hitt-initiative.org/wp/wp-content/uploads/2011/10/Value-Chain-Analysis-as-a-Kick-for-Tourism-Destination-Development_final.pdf

¹⁰² Cuba, which is now opening up to tourists, is beginning to focus on staff training and the quality of facilities. Its privately-owned bed and breakfast accommodation is expanding and already accounts for a quarter of total rooms. See Feinberg and Newfarmer (2016) <https://www.brookings.edu/research/tourism-in-cuba/>

¹⁰³ East African countries have relied excessively on the attractions of wildlife in the game reserves – in particular the big five and mountain gorillas. Boosting tourist arrivals will require diversification. Okello and Novelli (2014) <http://journals.sagepub.com/doi/pdf/10.1177/1467358414529580>; Okello <https://www.omicsgroup.org/journals/economic-contribution-challenges-and-way-forward-for-wildlifebased-tourism-industry-in-eastern-african-countries-2167-0269.1000122.pdf>

¹⁰⁴ A number of countries are offering eco-tourism e.g. Costa Rica. Others offer opportunities for MICE tourism, cultural, religious and medical tourism.

resources, the flora and fauna.¹⁰⁵ Natural capital is a vital asset for African countries. The forest, hydrologic, soil, flora and fauna¹⁰⁶ are major sources of livelihood and significant development opportunity. The UNEP estimates that 70 percent of the population of SSA depends for at least some of their livelihood on forests and woodlands. Forests contribute about 4 per cent of GDP in Uganda – or as much as \$136 million annually.¹⁰⁷ However, as the East African population grows and the economies develop, the natural capital is being imperiled by urbanization and poorly designed land development. This is degrading land and pushing many species to the point of extinction (Karanja 2016).¹⁰⁸ Animal populations are also threatened by the depredations of poachers; and the whole region will be affected by ongoing climate change.¹⁰⁹ In addition, rising tourist numbers can take a toll on natural capital and only careful management will allow East Africa to preserve its assets.

The prospects of the sector will be determined by economic conditions in East Africa's major tourist catchment areas in Europe and the success in attracting more tourists from other regions, particularly East Asia. If the current trend rates of increase in tourist arrivals persist or grow,¹¹⁰ the landlocked East African countries could aim to increase local spending by each visitor and take advantage of spillovers that incentivize domestic manufacturing and services. This would require a three-pronged effort starting with an intensification of marketing in Europe and other potential markets that enhances, differentiates and repositions the brand image of the likes of Uganda. A second prong would comprise investment in local transport

¹⁰⁵ On the role and importance of natural capital, see: Helm (2014) <http://oxrep.oxfordjournals.org/content/30/1/109.short>; HSBC Global Research, Natural Capital (2013). www.hsbc.com/~media/hsbc-com/about-hsbc/in.../0301214-natural-capital; World Bank (2015) <http://www.worldbank.org/en/topic/environment/brief/environmental-economics-natural-capital-accounting>; Atkinson (2015) https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/516948/ncc-discussion-paper-economic-growth-natural-capital.pdf

¹⁰⁶ Elephants are a tourist attraction par excellence. Big game is what draws the high-end tourist. Were their numbers to dwindle, a significant segment of the tourist market would be lost. Karanja (2016) writes that "In just over 20 years, Africa's lion population has declined by half, and today only 20,000 lions are left on the continent. Africa's elephants, which numbered 1.3 million in the 1970s, have also declined by more than half. Giraffe numbers are also falling, dropping from 140,000 giraffes in 1999 to fewer than 80,000 individuals today". <https://www.weforum.org/agenda/2016/02/can-africa-strike-a-balance-between-conservation-and-economic-growth/>. In Uganda and Rwanda, small and remotely located mountain gorilla populations are a magnet for tourists of an intrepid sort.

¹⁰⁷ UNEP (2015) <http://web.unep.org/sites/all/themes/Amcen6/AMCEN15Docs/AMCEN-15-3%20-%20e-pdf.pdf>

¹⁰⁸ <https://www.weforum.org/agenda/2016/02/can-africa-strike-a-balance-between-conservation-and-economic-growth/>

¹⁰⁹ <http://www.climatecentral.org/news/climate-change-threatens-east-africas-food-security-16947>; Adhikari et al (2015) <http://onlinelibrary.wiley.com/doi/10.1002/fes3.61/full>

¹¹⁰ Hard times induce tourists to travel shorter distances and to go by road rather than fly to distant resort areas.

infrastructure and alternative tourist eco-destinations – other than animal sightings - to provide visitors with richer and more varied experience. And a third prong would seek to improve institutional capabilities, the business climate, transport (including airport)¹¹¹ infrastructure, telecommunications, human capital and entrepreneurial skills so to enable local urban and rural businesses to multiply and to take advantage of linkages from the tourism sector most of which currently leak abroad.¹¹²

Even if such a strategy could be speedily and seamlessly implemented, the benefits in the form of higher growth rates and employment opportunities are likely to accrue gradually. The tourism business is highly competitive, the options for upgrading are limited and many of the jobs (housekeeping, groundskeepers, trackers, food preparation, guides, security, laundry, etc.) are of the low-end variety. Tanzanian experience indicates that the overall job multiplier is low: a trebling of the tourism sector between 2000 and 2012 only resulted in a doubling of the number of jobs (World Bank 2015).¹¹³ Moreover, the experience of some of the smaller, resource poor islands in the Caribbean suggests, that even where a country can attract high spending, long haul tourists by offering them a unique upscale experience with excellent service to boot, there are limits to which the tourist sector alone can drive growth and push per capita GDP. This increases the urgency of developing other tradable services, many of a niche variety that are linked with tourism (e.g. environmental or water resource management; techniques for revitalizing depleted soils¹¹⁴ or regenerating forests) that will be in big demand and could collectively contribute substantially to future export earnings.

Raising the quality (and volume) of human capital is the key to upgrading and diversifying tradable services and raising productivity. It is inevitably a slow process subject to continuing dilution through out-migration of the most talented and enterprising if local opportunities are scarce.¹¹⁵ Thus, supply push must be

¹¹¹ Public spending on transport infrastructure was identified by Giap, Gopalan and Ye (2016) as a driver of tourism in Malaysia. www.mdpi.com/2227-7099/4/1/3/pdf. In the African context see the AfDB Tourism Monitor (2016)

https://www.afdb.org/fileadmin/uploads/afdb/Documents/Publications/Africa_Tourism_Monitor_-_Unlocking_Africa's_Tourism_Potential_-_Vol_3_-_Issue_1.pdf

¹¹² The ILO attaches a lot of significance to capturing the linkages that emanate from tourism and using them to achieve sustainable and inclusive growth. http://www.ilo.org/global/about-the-ilo/newsroom/news/WCMS_480824/lang--en/index.htm

¹¹³ <http://documents.worldbank.org/curated/en/716911468305677763/Tanzania-economic-update-the-elephant-in-the-room-unlocking-the-potential-of-the-tourism-industry-for-Tanzanians>; nevertheless, for increasingly services intensive economies, tourism is likely to be a more fertile source of jobs than many other industries including business services where employment opportunities are going to be whittled away by automation and the advances in AI. See Turner and Sears (2013) for an optimistic take.

http://www3.weforum.org/docs/TTCR/2013/TTCR_Chapter1.5_2013.pdf

¹¹⁴ Reganold and Glover (2016)

<http://www.nature.com/scientificamerican/journal/v314/n5/full/scientificamerican0516-66.html>

¹¹⁵ The study by Christian et al (2011) of the tourism value chain underscores workforce training with attention to soft skills; hence the need for local training institutions and skilled trainers, local or foreign. http://www.cggc.duke.edu/pdfs/2011-11-11_CGGC_Tourism-Global-Value-Chain.pdf

complemented by demand-pull for newly minted skills with policy being conducted on both registers.

For small, peripheral, resource poor, inland economies the possibility of climbing up the income ladder from lower middle to higher middle-income levels, remains a challenge – not an insurmountable one but a challenge nevertheless.¹¹⁶

7. Regional and Global Developments

Domestic policy actions and institution building can facilitate growth up to a point, but as recent experience has shown, small economies are at the mercy of regional and global developments; landlocked economies especially so because of their intraregional trade links and because much of their trade transits through neighboring countries. When external demand is weak, supply side efforts to increase growth potential can quickly run out of steam. Uganda and Rwanda are especially dependent upon trade with Central and East African countries (George 2013).

The cost and inconvenience of shipping goods through adjacent countries depends upon the adequacy and quality of the transport infrastructure as well as on tariff and non-tariff barriers to the movement of goods. The latter are being whittled down but remain a serious problem for landlocked East African countries (Malawi, Rwanda and Uganda are among the countries that are most disadvantaged by trade costs, George (2013)); the former is also improving thanks to the investment that has poured into Africa during the past decade, but the efficiency of ports (e.g. in Tanzania) and railways remains low.¹¹⁷ There is room for improvement on both fronts.

A revival of global economic growth if sustained, could improve the growth prospects of the East African Region, however, maintaining and possibly increasing the flow of FDI will be a key to future development. Among the East African nations, Uganda was the second largest recipient of FDI in 2014 - \$1.146 billion – with Rwanda that received \$268 million ranked third.¹¹⁸ FDI to SSA fell in 2015 because

¹¹⁶ Package tours organized by foreign tour agencies subtract from the amount spent by each tourist that is captured by the East African economies. A positive take on East Africa's growth potential is provided by the American Chamber of Commerce (2016)

https://www.uschamber.com/sites/default/files/documents/files/building_the_future_report_10_14_2016.pdf

¹¹⁷ According to the Economist (2016), SSA's railway system carried 158 billion-ton kilometers of freight in 2014 (84 percent was in South Africa), this was only one-half of the freight carried by the Australian railway system. Although both Rwanda and Uganda are contemplating the building of new railway lines to the coast (through Tanzania and Sudan respectively), the Kenyan experience with building a new line from Nairobi to Mombasa recommends caution. The new line (financed by the Chinese and being built by a Chinese company) will be expensive to build and maintain, will not permit high-speed traffic, will be partially single tracked and will have lower standards of load bearing than is normal. Whether it will be cost effective relative to road transport is uncertain.

<http://www.economist.com/news/middle-east-and-africa/21699919-africas-new-railways-risk-going-way-old-ones-puffed-out>

¹¹⁸ <http://www.theeastafrican.co.ke/business/Region-s-FDI-hits--7b--boosted-by-flows-into-Kenya--Burundi-/2560-2808310-a6mdgwz/index.html>

of the slump in oil and commodity prices and the near-term outlook especially for investment in energy projects (e.g. in Uganda), is less encouraging.¹¹⁹ Nevertheless, attracting foreign investors should be a priority to accelerate the development of local capabilities, to move up value chains and to build energy and transport infrastructures.¹²⁰ The Logistics Performance Index for 2016 ranks Uganda and Rwanda 58th and 62nd respectively ahead of Indonesia, Vietnam and the Philippines, which is a plus.¹²¹ Further progress up the Index would lessen the handicap imposed by the inland location as would improved scores on the Doing Business Index especially by Uganda and Malawi.¹²²

8. Cross-Cutting Development Initiatives

Development capability in the three countries will be a function of several factors noted above e.g. investment (in infrastructure, natural capital etc.), the business environment, logistics and macroeconomic policies and governance. However, maximizing growth derived from these through increments in productivity will be closely tied to the quality of the workforce, the capacity to assimilate technology, and to grass roots, incremental innovativeness across the leading subsectors.

The scarcity of managerial and technical (STEM) skills¹²³ and the overall mediocre performance of the workforce have been frequently noted.¹²⁴ The slow diffusion of technology¹²⁵ and the weakness – or absence – of innovation systems has also received considerable attention. That those have implications for SSA's growth has not gone unnoticed.¹²⁶ For example, the characteristics and the weaknesses of

¹¹⁹ UNCTAD (2016) http://unctad.org/en/PublicationsLibrary/webdiaeia2016d1_en.pdf

¹²⁰ Kenya has successfully attracted FDI in geothermal and renewable energy and in transport projects. The three landlocked countries would also benefit greatly from such investment. Off-grid electrification using solar PV panels will be the most cost efficient way of supplying power to the vast and dispersed rural population. <http://www.nation.co.ke/business/Kenya-posts-fastest-rise-in-foreign-direct-investments/-/996/3194256/-/5po944/-/index.html>

¹²¹ World Bank (2016) <http://lpi.worldbank.org/international/global>

¹²² World Bank (2018)

<http://www.doingbusiness.org/~media/WBG/DoingBusiness/Documents/Annual-Reports/English/DB2018-Full-Report.pdf>

¹²³ A World Bank report (2014) assessed the development of STEM skills.

<http://documents.worldbank.org/curated/en/237371468204551128/A-decade-of-development-in-sub-Saharan-African-science-technology-engineering-and-mathematics-research;jsessionid=11E2N0wqqYXHAvTa0vLtC2T7>

¹²⁴ See the Deloitte survey of workforce capability (2014).

<http://www2.deloitte.com/content/dam/Deloitte/global/Documents/HumanCapital/dttl-human-capital-trends-africa.pdf>. In addition to workforce capability, other challenges identified for selected African countries – including Uganda – were leadership, retention and engagement, and learning and development.

¹²⁵ Mobile telephony being the exception.

¹²⁶ See for example World Bank (2008) *Accelerating Catch-up*

http://siteresources.worldbank.org/INTAFRICA/Resources/e-book_ACU.pdf; AfDB (2011)

[http://www.afdb.org/fileadmin/uploads/afdb/Documents/Policy-Documents/FINAL%20human%20capital%20development%20strategy%20\(2012-2016\).pdf](http://www.afdb.org/fileadmin/uploads/afdb/Documents/Policy-Documents/FINAL%20human%20capital%20development%20strategy%20(2012-2016).pdf);

Eric Hanushek (2013) has shown how the quality of education influences growth in developing countries.

African innovation systems as seen through the lens of agriculture and agribusiness – including in Uganda – were scrutinized in a recent World Bank publication (2009).¹²⁷ Building research capabilities will take years and requires investment in the entire innovation value chain, starting with the (i) education system and extending to research facilities in universities and dedicated institutes; (ii) their staffing with competent well-paid personnel; (iii) increased budgetary allocations for research and incentives for greater cross country collaboration; (iv) the strengthening of extension services to deliver the findings of research; (v) financing to encourage the utilization of agricultural inputs; and (vi) investment in the infrastructures needed to support increased production of products as well as their storage and marketing.

If the assimilation of new technologies is one of the keys to the growth, then the scarcity and overall poor quality of technical skills is a bottleneck deserving the most attention because this is the one resource that will determine the future performance of the three landlocked economies and because upgrading the workforce could easily take a decade and more. The need to loosen this bottleneck is becoming increasingly urgent because the ‘fourth industrial revolution’ is both intensifying the skill intensity of production and eroding the opportunities for late starters to pursue export-oriented industrialization aided by GVCs.

According to the WEF’s Human Capital Report (2016), Malawi, Rwanda and Uganda are among the lowest ranked countries. Uganda that heads the list is ranked 99th; Rwanda 110th; and Malawi 114th. This is mirrored in the Human Development Index: Rwanda 151st; Uganda 164th; and Malawi 174th.¹²⁸ The correlation between a country’s human capital ranking and its GNI is apparent from figure 31. Clearly the three countries need to make haste. The path ahead has been signposted by numerous studies that have analyzed the weaknesses of education, training and research systems in SSA and proposed remedies. Public expenditure on education is generally not the principal constraint – Malawi invests 5.8 percent of GDP, Rwanda 3.8 percent, only Uganda lags allocating only 2.2 percent (2015)¹²⁹ – it is the way they are spent that results in poor outcomes. A focus on enrollment numbers rather

<http://hanushek.stanford.edu/sites/default/files/publications/Hanushek%202013%20EER%2037.pdf>

¹²⁷ Larsen, Kim and Theus (2009) *Agribusiness and Innovation Systems in Africa*.

<http://elibrary.worldbank.org/doi/abs/10.1596/978-0-8213-7944-8>; cluster formation and the emergence of innovation systems in Africa is examined by the contributors to Banji Oyelaran-Oyeyinka and

Dorothy McCormick eds. *Industrial Clusters and Innovation Systems in Africa* (2007)

<http://archive.unu.edu/unupress/sample-chapters/1137-IndustrialClustersAndInnovationSystemsInAfrica.pdf> ; Juma et al (2010) examine how health related

innovation systems are faring

http://belfercenter.hks.harvard.edu/publication/20654/african_health_innovation_systems.html?breadcrumb=%2Fpublication%2F24479%2Fafrika_ebola_outbreak

¹²⁸ UNDP (2016) <http://hdr.undp.org/en/content/expenditure-education-public-gdp>

¹²⁹ WDI (2017) <http://wdi.worldbank.org/table/2.7>

than on learning,¹³⁰ retention rates and the quality of education imparted is a serious flaw and it is quality that has been a source of GDP growth in the past and it is the quality and depth of skills that will determine whether East Africa benefits from the latest round of technological advances. E-learning could help improve literacy and numeracy but improving the quality and motivation of teachers, an upgrading of the curriculum with an eye to evolving employment opportunities, and the instilling of analytic as well as soft skills, may deserve priority. The State of Education Report for Africa 2015¹³¹ concluded. “More students than ever before in history are enrolled in schools throughout Africa. That’s good reason to cheer, but the pipeline of trained teachers, instructional materials, and infrastructure development have not kept pace with the heavy demand. Rising enrollment rates have drastically outpaced an increase in education funding, resulting in shortages of instructional materials and supplies, poorly stocked libraries and overuse of school facilities. Indeed, while more students are in school classrooms, there is a deeper learning crisis at play: many students are not gaining basic skills while attending school. In fact, some students in school are not much better off than those who missed school. Consequently, the quality of education in Africa is in a perilous state.”

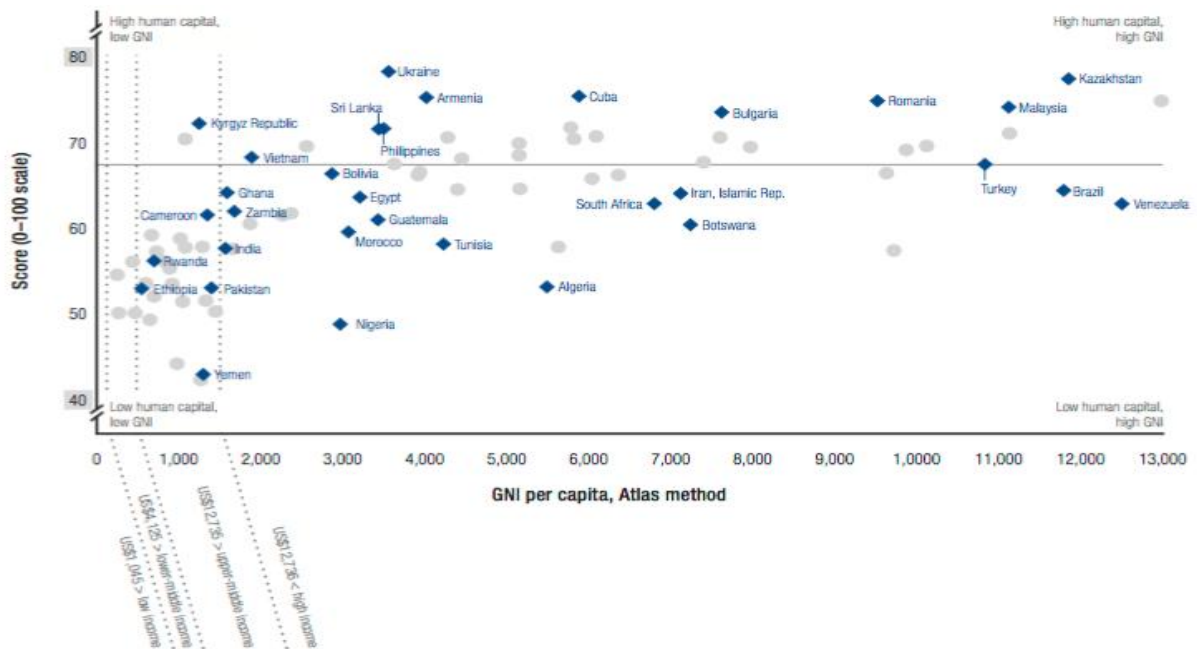
A lack of vocational skills means that many jobs remain unfilled. The situation with higher education is equally dismal. Although only between 4 and 8 percent of the relevant age cohort is enrolled in tertiary education (Malawi is at the lower end, Rwanda is close to 8 percent),¹³² high demand and few places has resulted in overcrowding of lectures, declining quality of instruction and insufficient emphasis on STEM subjects.

Figure 2: The relationship between GNI and the Human Capital Index 2016 for low and middle-income countries

¹³⁰ As the WDR (2017) has noted with an abundance of supporting facts, years of schooling are uncorrelated with learning. Primary and secondary schooling all too frequently does not impart functional literacy and numeracy. <http://www.worldbank.org/en/news/press-release/2017/09/26/world-bank-warns-of-learning-crisis-in-global-education>

¹³¹ <http://www.aionline.org/wp-content/uploads/2015/09/AAI-SOE-report-2015-final.pdf>

¹³² <http://wdi.worldbank.org/table/2.8>



Source: Human Capital Index 2016 and World Bank.

Assuming that the shortcomings of the training research systems can be whittled away and that development efforts are focused on modernizing agribusinesses and the most promising formal sector activities, how might the three countries tap export opportunities so as to bolster their growth prospects? As noted earlier and in numerous reports, progress will be slow so long as the physical infrastructure is inadequate, trade facilitation and the business environment deters exporters and investors, and barriers to trade hinder backward integration with GVCs. Policies that address these constraints will improve growth prospects but success is far from guaranteed because integration with GVCs depends upon a variety of factors many of which are not within the control of the landlocked economies distant from the markets of developed countries. A deepening participation in regional value chains might be the more feasible medium-term objective. Given the signs that the “GVC engine may be stalling, especially with growing calls for protectionism in richer markets and emerging signs of reshoring, and with automation on the horizon” (World Bank 2016, p.89)¹³³ increases the pressure on East Africa countries to be innovative and possibly leapfrog if they can the earlier stages of industrialization. Strengthening core capabilities in agriculture, agribusinesses and niche areas of manufacturing will be a necessary condition. However, Cattaneo (2015, p. 298)¹³⁴ rightly maintains that African countries “need to undertake a double leap: A value added leap into services within the sectors of traditional exports, and a technological leap developing the infrastructure necessary for such services.” Much will depend upon indigenous entrepreneurial activity, in particular, the entry and growth of SMEs with an orientation towards trade. Currently, African SMEs export

¹³³ <https://www.brookings.edu/research/measuring-and-analyzing-the-impact-of-gvcs-on-economic-development/>

¹³⁴ <http://ycsg.yale.edu/sites/default/files/files/africa.pdf>

just 3 percent of their output (SMEs from developing Asia export 8.7 percent of their output),¹³⁵ the lowest in the world and providers of services barely participate in trade at all. This must change if landlocked African countries want to improve their lot in a sustained manner.

9. Concluding Observations on Policy Directions

The development strategy of Malawi, Rwanda and Uganda is currently focused on urban industrialization. However, for the reasons presented above, this is unlikely to deliver the desired growth rates. The manufacturing sector and exports of light labor or resource intensive manufactures could contribute a fraction of aggregate growth but it is agriculture, agribusiness and services that will contribute the lion's share. The comparative advantage of Malawi, Rwanda and Uganda now and in the future, lies in these activities. Extracting the maximum growth mileage will require policy action on multiple fronts.

It scarcely bears repeating that improving the quality of human capital, investment in hard and soft infrastructures, institutional upgrading that results in a more business friendly environment, increased access to financial, crop insurance and other services and greater state capabilities deserve the attention of policy makers. A reduction in the barriers to intra African trade would be advantageous. An increase in the number of African gazelle firms would help to spur growth. And as numerous commentators have pointed out, African countries need to devote far more resources to R&D particularly in agriculture not so much for the purposes of breakthrough inventions but to assimilate relevant research being done elsewhere and customize innovations for the African context. As this paper argues and is emphasized by the Global Innovation Index (2017, p.9), "An unprecedented convergence of biology, agronomy, plant and animal science, digitization and robotics is transforming the agri-food value chain. Big Data are reshaping the world of agriculture: digital agriculture has started to spread worldwide helped by developments of innovation in IT as well as data generation and analytics enabled by remote sensing and geographic innovation systems." The opportunities are there for landlocked African countries to seize and to exploit. Effectively harnessed, these technologies promise rapid and sustainable growth even in the face of climate change. Malawi, Rwanda and Uganda with some trying can accelerate their convergence to the technological frontier and take full advantage of industrialized agriculture and agri-business.

Undoubtedly there are obstacles to transferring these advanced technologies wholesale to East Africa but their eventual assimilation is a must and it is the removal of hurdles that needs to be addressed. Success will depend upon skillful adaptation and tailoring of technologies with close attention to agro-climatic conditions, the capabilities of the farming community and the institutional realities. Many East Asian countries starting out with equally limited stocks of physical and human capital have demonstrated that new technologies can be assimilated quickly. Advances in ICT are in fact facilitating technology diffusion and its assimilation.

¹³⁵ WTO (2016, p.5) https://www.wto.org/english/res_e/booksp_e/world_trade_report16_e.pdf

Building a modern industrial and digitized agricultural system need not call for large up-front investments in a highly skilled workforce or the creation of a full-fledged agricultural innovation system. Many East African countries already have enough human and research capital to get started and can leverage research from elsewhere. The many needed investments and policy changes can follow. The important thing is to acquire momentum, to demonstrate results and to initiate a virtuous spiral.

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