Industrialization in Africa and Least Developed Countries

Boosting growth, creating jobs, promoting inclusiveness and sustainability

A REPORT TO THE G20 DEVELOPMENT WORKING GROUP BY UNIDO



UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

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Executive summary

There are four main reasons for Africa, and least developed countries (LDCs) in particular—34 in Africa, 13 in Asia and the Pacific, and one in Latin America and the Caribbean—to industrialize:

- Without industrializing, it is unlikely that Africa and LDCs can meet the Sustainable Development Goals by 2030, particularly SDG 9 on industry, innovation and infrastructure.
- Inclusive and sustainable industrial development is associated with job creation, sustainable livelihoods, innovation, technology and skills development, food security and equitable growth—some of the key requirements for eliminating poverty by 2030.
- Rarely has a country evolved from poor to rich without sustained structural transformation from an agrarian or resource-based economy towards an industrial or service-based economy. This transformation is important to ensure wealth creation through increased economic integration and productivity.
- Millions of young people enter the labour market in Africa and LDCs every year. Industry, by providing decent jobs and by expanding the fiscal revenues needed for social investments, can boost capacity for the much-needed inclusive development.

This report highlights the important benefits of inclusive and sustainable structural transformation and industrialization—for diversifying the economy, creating jobs and building equitable societies. It also shows the benefits to Africa and LDCs of leveraging trade in intermediate goods, investment, and regional and global value chains. Such chains can be served by micro, small and medium-sized enterprises, using their relative advantages in flexibility, innovativeness, personalized contacts, quality of products and creating new opportunities for the international sourcing of scarce specialized skills. Enterprises from Africa and LDCs may be able to learn from the experience of other developing countries, especially in Asia.

Africa and LDCs should move away from the "generalized" industrial policies that have proved ineffective over the last three decades. They also need to build strong institutions and viable investment climates. And they need to realize the full potential of public–private partnerships (PPPs) and the opportunities for collaboration among industry, governments and other stakeholders. The report offers recommendations for national policy as well as regional and global collective actions to advance industrialization and end poverty and hunger.

1 Further the G20 Development Agenda

The G20 development agenda was launched to narrow the development gap and reduce poverty through the 2009 G20 Framework for Strong, Sustainable and Balanced Growth (the G20 Framework). G20 leaders further strengthened their commitment to the development agenda by creating the Development Working Group (DWG) in 2010. Later that year, in the Saint Petersburg Development Outlook, the G20 refocused the approach to development on five priority areas: infrastructure, food security, financial inclusion, domestic resource mobilization and human resource development. This is consistent with SDG 9—"Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation".

To further its development agenda, the G20 should promote inclusive and sustainable structural transformation and industrialization in Africa and LDCs through various mechanisms such as knowledge-sharing platforms for peer-to-peer learning; the sharing best of practices, policies, measures and guiding tools; and multi-stakeholder discussions. It should establish a platform for in-depth reviews of countries' strategies and policy assessment, and for guiding tools to support Africa and LDCs in reviewing and mainstreaming their industrialization strategies and

instruments in line with Agenda 2030 and the SDGs, especially SDG 9. And it should facilitate and coordinate research involving international organizations, financial development institutions and academia on the best policy instruments for pursuing inclusive and sustainable industrialization for Africa and LDCs.

2 Support agriculture and agribusiness development

Agribusiness has huge potential in Africa and LDCs but productivity is low and inefficient. Stronger linkages between farmers and agro-industry and tighter clusters of small producers can enhance supply-chain efficiencies, improve access to local and global markets and increase real incomes of farmers, farm workers and their families. Linking agribusiness with high value-added tourism can generate social and economic returns such as innovation, diversification and jobs, especially in rural areas.

Such support entails ensuring linkages with other sectors, in line with the Voluntary Guidelines on Responsible Governance of Tenure and the Principles for Responsible Investment in Agriculture and Food Systems adopted by the Committee on World Food Security; facilitating technology exchange in areas such as irrigation systems, water-harvesting techniques and agro-ecological technologies; and increasing training and skill upgrading for smallholders, especially women and young people, on sustainable production and resource management. Further, the G20 should encourage support for Africa and LDCs in developing and harmonizing technical and food standards, and in strengthening capacity for compliance and enforcement of norms and standards. The market access of agri-exports from Africa and LDCs to G20 markets should be facilitated through a comprehensive package of technical support.

3 Deepen, broaden and update the local knowledge base

Labour skills in Africa and LDCs serve largely the needs of low-skilled, traditional industries. Only around one third of LDCs have achieved gender parity at primary education level, only two countries at secondary level and none at tertiary level. Strengthening primary and secondary education and women's education in particular is therefore fundamental. Similarly, vocational education and training systems need to be brought closer to labour markets' current needs, including those of the predominant informal sector. Countries should thus identify "common building blocks"—desirable capabilities of skills development systems. Support from donor countries in the form of funding, access to technical equipment and capital, and linkages between school-based vocational education and regional/international employers would help to raise local industrial human capital.

The G20 should support initiatives led by the United Nations (UN) such as the Inter-Agency Network on Youth Development and its UN System Wide Action Plan on Youth. It should encourage dissemination of best practices policies and programmes of international organizations on the provision of vocational training. It should promote comprehensive programmes for skill upgrading to comply with international markets' requirements for technical and food safety standards and certification, and for cleaner production, including energy and resource efficiency and effectiveness. Finally, it should investigate the funding and filling of specialized academic chairs within key manufacturing systems related to higher education institutions as the most effective manner to embed the transfer of technical know-how between developed and developing countries.

4 Invest in energy and resource efficiency and promote green and clean technologies and industries

The renewable energy industry presents opportunities to improve energy access by lowering the cost of bringing power to rural areas. It can also generate new value in "whole production" value chains, by focusing on energy efficiency of the final product and processes. Concerns over the amount of investment required should be overcome by the long-term economic benefits from higher productivity of green and clean

technologies, greater markets for green and clean technologies, and the economic incentives for further skill upgrading, innovation and job creation. Resource-efficiency and renewable-energy promotion needs to be preceded by (or at least paced by) a comprehensive programme for strengthening institutional and enterprise capacities.

The G20 should support collaboration on bold joint initiatives to help African countries to address renewable energy supply, such as the New Deal for Energy in Africa. It should support Africa and LDCs at the upstream level of policy and institutional frameworks and to mobilize greater investment and increased transparency in management for energy infrastructure. It should support the operationalization of the Green Climate Fund and the dedicated allocations of resources to African and other LDCs for their adaptation to climate change. It should support cleaner production methodologies and investments in green and clean industries. And more generally, it should help countries and communities predict and prepare for the risks posed by climate change.

5 Industrialize through trade and deeper regional integration

The fragmentation of the African market is very costly for all African countries. Industrial agglomerations and other growth benefits could be realized from development of transport, logistics and industrial corridors, and hub development around transport nodes and important urban centres. Preferential liberalization of service trade now features in many regional trading arrangements, and the LDC service waiver of the World Trade Organization (WTO) opens the possibility of making them more widely available on a non-reciprocal basis.

The G20 should identify infrastructure gaps, needs and funding requirements in regional and rural infrastructure; domestic spatial frictions (travel, transport, communication costs) and domestic transaction costs that hinder competitiveness of local value chains; and opportunities to promote PPPs. It should facilitate the leveraging of multi-stakeholder resources for investment in trade, transport and industrial corridors. It should develop mechanisms to improve the financial and technical support for feasibility and project preparation work to support infrastructural and industrial projects to attain bankability. And it should encourage international organizations to work with Africa and LDCs to assess the impacts of trade facilitation reforms and to propose mechanisms that will make trade preferences commercially meaningful for them.

6 Leverage domestic and external finance

Domestic and external finance is important for Africa and LDCs. As reliance on official development assistance decreases, governments' financial constraints must be resolved. Some indicators are good: over the last two decades or so, domestic tax revenue as a share of GDP has almost doubled in Africa; domestic savings has improved; and private capital (mainly to middle-income countries) has expanded. But much of Africa's growing financial sector is positioning itself to lend to large companies and foreign investors, neglecting agriculture and local (especially rural) small and medium-sized enterprises. Thus "smart incentives" should be used, such as technical assistance from development agencies and partial risk guarantees, so as to reduce risk, improve project returns and provide security to investors, rather than simply increase guarantee uptake generally.

The G20 should focus on capacity-building efforts for mobilizing domestic resources through PPPs. It should support the piloting, further development and scaling up of value-chain financing schemes and the setting up of proper legal frameworks, policies and institutional capacity. It should also improve the domestic infrastructure investment climate, and work with Africa and LDCs to assess and diagnose investment bottlenecks and to develop action plans.

7 Promote the New Industrial Revolution

The New Industrial Revolution (NIR)—including the Internet of things, big data, cloud computing,

artificial intelligence, robotics, 3D printing, new materials, augmented reality, nanotechnology and biotechnology—has the potential to improve productivity, reduce energy and resource consumption, and thus protect the environment and increase resource efficiency and effectiveness.

The G20 should support Africa and LDCs to better understand the NIR and its impact on inclusive and sustainable industrial development, and formulate industrial development strategies and programmes in line with the NIR. It should support partnerships between companies and research institutes from G20 members and other developing countries on NIR technologies. It should support the participation of public and private sector representatives from developing countries in the activities of the G20's NIR working group. It should support partnerships between companies and research institutes from G20 members and other developing countries on NIR technologies, higher education systems and related NIR clusters. It should promote science, NIR technologies and innovation for industrialization in Africa and LDCs by building the capacity of science and technology personnel, strengthening innovation systems and nurturing innovative entrepreneurship and technological and social ventures. Finally, it should support the implementation of the NIR through promoting the uptake of green and clean—and smart—technologies in Africa and LDCs.

Introduction

In an evolving international landscape and an increasingly interdependent world, the 48 Least Developed Countries (LDCs), of which 34 are in Africa, have assumed greater importance to principal global governance mechanisms, such as the G20. This shift is seen in the 2010 G20 Multi-Year Action Plan on Development, which refers to duty-free and quota-free access to support LDCs in increasing their share of global trade, Aid for Trade, trade facilitation, trade finance and regional integration, with a focus on enhancing intraregional trade in Africa.

The subsequent approach of the G20's St. Petersburg Development Outlook refocused on infrastructure, food security, financial inclusion, domestic resource mobilization and human resource development—all important areas for structural transformation (or structural change) in low-income and developing countries.[1] The focus of the Turkish presidency in 2015 on decent jobs and low-income developing countries, as well as the Group's commitment to support the implementation of the 2030 Agenda for Sustainable Development established in Antalya, are also emblematic of this collective effort by G20 members.[2]

The adoption of the 2030 Agenda for Sustainable Development and the Sustainable Development Goals (SDGs), the 2015 Addis Ababa Action Agenda on Financing for Development,[3] the African Union Commission's 2063 Agenda: The Africa We Want, and the Paris Agreement on climate change in 2015, all give new impetus. These agendas recognize that the world is more interdependent than ever and that Africa and LDCs remain the weakest link in global economic development. The coherent implementation of all these agreements is now needed to foster structural changes, boost growth, create jobs and achieve inclusiveness and poverty eradication in Africa and LDCs.

The 2030 Agenda recognizes the role of industry as a pathway and enabler for Sustainable Development—in particular SDG 9 with its call to "Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation" through inclusive and sustainable industrialization—has strong ramifications for most of the SDGs.

The international community also recognizes the importance of socially inclusive and environmentally sustainable industrialization for sustainable development, including the pursuit of low-emission industries and climate-resilient pathways, which falls under SDG 13: "Take urgent action to combat climate change and its impacts". Both the December 2015 Paris agreement and the Addis Ababa Action Agenda highlight the fundamental role of inclusive and environmentally sustainable industrialization in economic growth.

The nature of the growth process of the last 15 years and the demographic trends of the next half-century call for a renewed focus on job creation in Africa and LDCs. Pressing environmental challenges, both globally (such as climate change) and locally (such as waste, land degradation and poor water management), coupled with technological changes, make it imperative for all developing countries to pursue patterns of inclusive and sustainable industrialization and economic development.

The process of economic convergence of the first decade of the 2000s, when many developing countries grew much faster than developed ones, brought about major gains in poverty reduction.[4] Still, unemployment and precarious employment are widespread, especially among youth and women. Africa's workforce is expected to double to almost 2 billion by 2050. At the same time, Africa and most LDCs have ample scope to undergo structural transformation, reallocating resources from less to more productive sectors and use. This process will allow Africa and most LDCs to draw from a growing human resource pool and reap the "demographic dividend".[5]

Africa and LDCs together had a population of more than 1.5 billion in 2015, or more than 20 per

cent of the world's population (annex table 1.1). According to United Nations (UN) projections, this figure will double by 2050—or nearly one third of the world's population. Between 2015 and 2100, the populations of 33 countries, most of them LDCs, have a high probability of at least tripling.[6] Ignoring Africa and LDCs means ignoring a huge slice of humanity.

The African and LDC population growth will make it harder for governments to eradicate poverty and inequality, and to implement other elements of a sustainable and inclusive development agenda without fostering sustained structural transformation from a low-productive agrarian or resource-based economy towards an industrial or service-based economy. Sustained growth and economic prosperity require the shift of resources out of traditional agriculture and other low-productivity primary activities into higher value added agrifood industries, other manufacturing as well as services, in urban and rural areas.[7]

Against this background, the Chinese Presidency of the G20, for the first time, has put supporting industrialization in Africa and LDCs on the G20 agenda in 2016, a move that will also benefit advanced countries.

1
Diversity of Africa and LDCs

Africa and LDCs are highly diverse in their economic, social and political structures, as well as natural-resource and environmental issues. They differ in industry and technology, skills, infrastructure, employment, social inclusion and environmental protection. But they also share common characteristics and face similar challenges such as low levels of socio-economic development, weak human and institutional capacities and wide inequalities. In some, poor governance, political instability and internal and external conflicts hamper development. Geography compounds these challenges, and landlocked developing countries (LLDCs) and small island developing states (SIDSs) are recognized as groupings with specific needs (box 1).

The diverse physical features of Africa and LDCs present opportunities and constraints for development. These countries are endowed with a wealth of material

Box 1
Facts and figures on Africa and LDCs

Of Africa's 54 countries, 48 are in Sub-Saharan Africa and six in North Africa; 26 are middle-income countries (MICs), 34 LDCs, one is a high-income country (HIC), 16 are landlocked developing countries (LLDCs), and six are small island developing states (SIDSs) (annex 3).

The world has 48 LDCs: 34 in Africa, 13 in Asia and the Pacific and one in Latin America. With more than 880 million people (12 per cent of the world's population), they account for less than 2 per cent of global GDP and about 1 per cent of global trade in goods.[9]

Of 32 LLDCs in the world, 16 are LDCs. LLDCs face their own challenges of unfavourable geographical locations such as the lack of sea access, very long distances from global centres of commercial activity, difficult geography and poor infrastructure. LLDCs suffer from weak growth rates, and often depend on very few commodities for their export earnings. To exacerbate this geographical and economic remoteness, LLDCs are typically surrounded by developing countries, further diminishing access to developed transit infrastructure. The economic and development challenges faced by LLDCs can be met only with the participation of business; because of limited public-sector funds, the role of the private sector will have to be proportionally greater. Foreign direct investment (FDI) is particularly important for LLDCs. It is also an important channel for knowledge and technology transfer.

SIDSs' particular social, economic and vulnerabilities to climate change (including persistent drought, extreme weather events, sea-level rise, coastal erosion and ocean acidification) relate to their remoteness and limited access to major markets; reliance on a narrow resource base; high costs for energy, infrastructure, transport; and vulnerability to climate change and environmental degradation.

In Sub-Saharan Africa, MICs—countries with a gross domestic income (GDI) per capita between US$1,026 and US$12,475 in 2015[10]—can be divided into upper-middle-income countries (Angola, Botswana, Equatorial Guinea, Gabon, Mauritius, Namibia and South Africa) with a GDI of at least US$4,036; and lower-middle-income countries (Cabo Verde, Cameroon, Republic of Congo, Côte d'Ivoire, Djibouti, Ghana, Kenya, Lesotho, Mauritania, Nigeria, São Tomé and Príncipe, Swaziland and Zambia). African MICs are highly diverse. They face common MIC challenges, which can vary substantially from those faced by LDCs, although some countries in Africa fall into both categories. MICs generally risk being unable to compete with either low-income, low-wage producers in labour-intensive products or with high-skilled innovators in high value added products—the so-called middle-income trap—and that threat has increased, compounded by the rising productive capabilities of other MICs, notably in Asia.

Small MICs in Sub-Saharan Africa have generally been successful, but growth drivers change as economies develop, and many now face development and structural constraints, such as declining competitiveness, unsustainable consumption and production patterns, shallow integration into the global economy, high ratios of increase in carbon dioxide (CO_2) emissions, high levels of income inequalities, a falling share of ODA and higher reliance on remittances than on FDI.[11] Most African MICs further face environmental challenges—freshwater management is particularly important. MICs relying on mineral or oil extraction have high pollution of water sources, which endangers their agricultural base and biodiversity.[12]

and biological natural resources. Nevertheless, this natural wealth is unevenly distributed, largely unexploited and has sometimes been a source of conflict. Dependence on agriculture—excessively on primary commodity exports—has made Africa and LDCs vulnerable to external trade shocks.

Beyond pervasive poverty, serious structural impediments to growth, low levels of human development and high exposure to shocks and disasters,[8] Africa and most LDCs have faced the headwinds of the global economic slowdown, including reduced official development assistance (ODA) and increased fluctuations in commodity prices, therefore putting at risk hard-won gains and the ability to expand these gains to Africa and all LDCs.

The lack of access to modern forms of energy exacerbates the vulnerability of the chronically poor and is a major impediment to sustainable development. As of 2007 (based on latest data), 79 per cent of people in LDCs lacked access to electricity (annex 5.3), and 91 per cent had no access to modern fuels. The rural–urban divide in access to energy was even more pronounced: while 27 per cent of urban dwellers had access to modern fuels, only 3 per cent of rural dwellers did. Making renewable energy available to Africa and LDCs could have far-reaching impacts, including improvements in health, equity and empowerment for women, better opportunities for livelihoods and greater environmental sustainability. LDCs have a low share of manufacturing in economic output (less than 10 per cent in LDCs versus 21 per cent in all developing countries), a narrow private sector and too few development opportunities for small and medium-sized enterprises (SMEs).

Insufficient trade and low participation in worldwide exports (LDCs account for only around 1 per cent of worldwide exports) also hamper growth. Although trade can play a powerful role in development, its potential may not be fully realized as long as Africa and LDCs rely on commodities as their primary export products.

Other strains on African and LDC economies are persistent gender inequalities and the disempowerment of women, in part due to weak enforcement of laws protecting women, underinvestment in women's health and enduring prejudice.

2

Slow structural transformation and industrialization

Behind the manufacturing curve

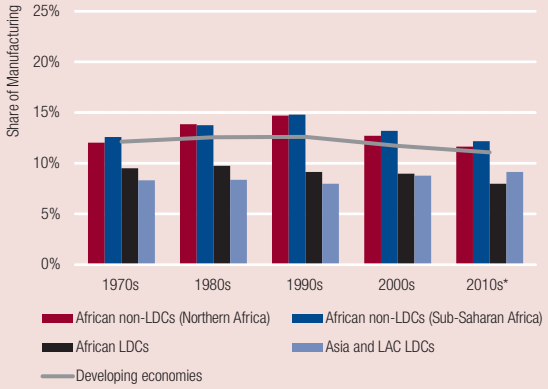
Many African and LDCs have had some of the world's fastest economic growth in the last decade and a half. But that growth stemmed from high commodity prices (which as of this writing have fallen steeply), in a context of relative peace, political stability and macroeconomic reform.[13] Further, high commodity prices have created incentives for more investment in extractive industries such as mining and hydrocarbon with limited linkages with the rest of the economy, and away from manufacturing and economic diversification, rendering Africa and many LDCs vulnerable to external shocks.

In Africa and LDCs, where agricultural productivity remains low and many rural farming communities are still subsistence-oriented and poorly connected to markets, services, political processes and information flows, structural transformation has been slow or non-existent. Rather than seeing labour shift rapidly from agriculture to manufacturing, many African and LDCs have experienced slow labour productivity growth in agriculture and a less pronounced shift from agriculture to services, and to an even lesser extent to manufacturing.[14]

LDCs in Africa remain on the margins of industrialization, as exemplified in the very low and declining shares of their manufacturing value added (MVA) in GDP since the 1970s (figure 1) and in MVA per capita, lagging significantly behind developing country averages (annex figure 1.1). Africa's MVA accounted for only 1.6 per cent of the global total in 2014, and its growth has lagged far behind that of all other regions since 1990 (annex figures 1.2 and 1.3).

Similarly, Africa exhibits the lowest regional medium- and high-tech share among global regions (annex table 1.2). Among Africa, Asia and Pacific and Latin America, Asia and Pacific experienced the most significant change in technology structure. In the other regions, manufacturing still is highly dependent on resource-based products.

Figure 1
Share of manufacturing in GDP, by country group, decade averages



Note: Unweighted averages. The last period covers only four years (2010–2014). The aggregate of Developing Economies includes Africa, Asia (excluding Japan), Latin America and the Caribbean and Oceania (excluding Australia and New Zealand).
Source: UNIDO calculations based on UNSD Main Aggregates Database (http://unstats.un.org/unsd/default.htm).

While people have moved out of rural areas and the share of agriculture in employment and value added has dropped since the 1960s, the primary beneficiaries have been urban and often informal services, not manufacturing. African labour has tended to move from agriculture to services, and while services have had much higher productivity than agriculture, their productivity gains over time have been very limited. Thus the transformation of some of these economies has not been in an enabling environment where transformation could be translated into decent income opportunities.

To illustrate these changes in greater detail, one must break down the contribution of structural change to aggregate productivity into the *static* effect (positive when labour is reallocated to a sector that has higher productivity) and the *dynamic* effect (positive when labour is moving to a sector in which productivity is growing, regardless of whether it is higher or not than in the original sector). On this distinction, the pattern of structural change in Africa can be better described as a pattern of "static gains with dynamic losses".[15]

Sub-Saharan Africa shows wide range in patterns of structural transformation. Most of its MICs have positive average labour productivity growth in the agricultural sector, as well as a declining share of agriculture in total GDP. In most of its low-income countries,[16] agricultural productivity growth has been positive, although it is still low compared with that in MICs and other regions.

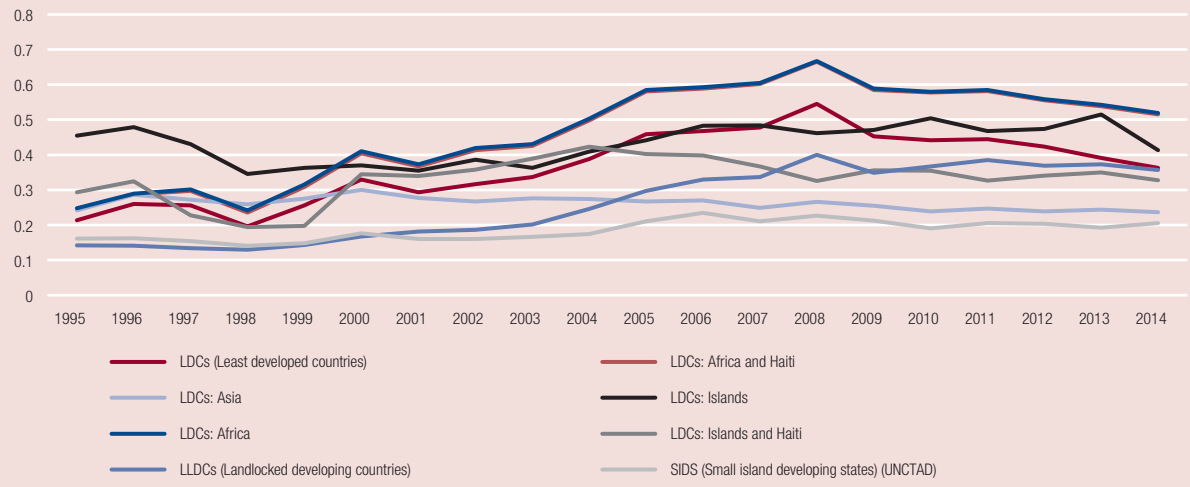
Productivity in Africa's manufacturing still is far below that of developed countries (around 40 per cent of that of the United States for the most advanced countries in the continent), and most of the firms in manufacturing are small and informal. Egypt, Morocco and South Africa stand out for their higher specialization in manufacturing and higher labour productivity. These countries have positioned themselves as assembly hubs for automobiles in, for example, Durban (South Africa), and in textiles and clothing for European firms in Tangier (Morocco), Monastir (Tunisia), and in other such "garment towns" in these two countries, as well as in Mauritius. But these are exceptions—almost 90 per cent of manufacturing exports in Africa are in natural resource–based sectors.[17] Among non-African LDCs, Bangladesh has carved out a successful export-oriented textile industry.[18] (When an LDC industrializes, its default is into low-value, low-skilled segments of traditional industries such as apparel and textiles, or leather products.)

A tiny share of global exports

LDCs' share of global exports more than doubled between 1995 and 2013, but still represents only around 1 per cent of exports globally (figure 2). Product concentration increased, too, making LDCs more vulnerable to external shocks, including crises and commodity cycles. In 2014, 70 per cent of LDC merchandise exports depended on only three products (composition varies by LDC), up from 40 per cent in 1995. Primary commodities accounted for 67 per cent of LDC exports in 2014, with almost half being fuels.

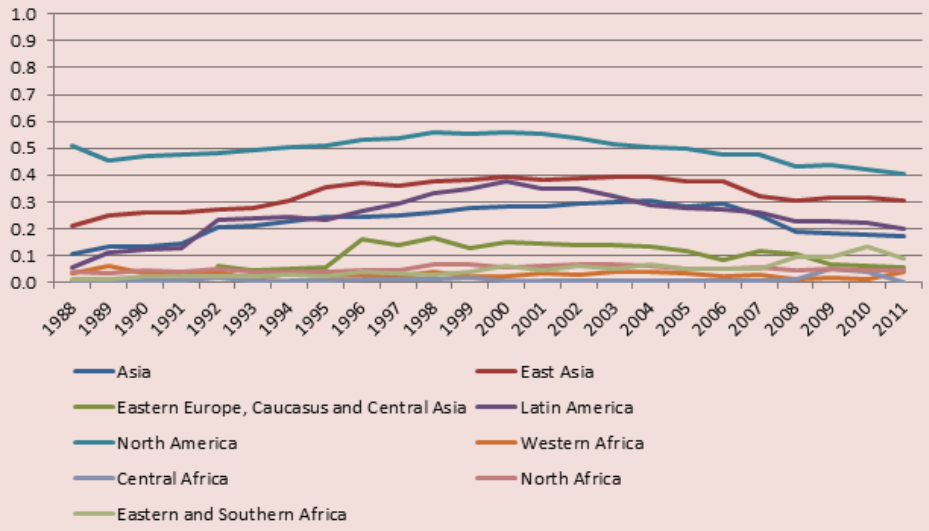
Diversification is a major challenge in Africa and LDCs. According to the concentration index (indicating the level of product diversity in imports and exports) LDCs in Africa trade in few products compared with LDCs in Asia (figure 3). Still, LDCs' exports of services more than doubled between 2005 and 2013, from under US$15 billion to over US$40 billion, the majority of which was attributable to the growth in exports of services from LLDCs

Figure 2
Import/export concentration of LDCs



Note: An index value closer to 1 indicates a country's exports or imports are highly concentrated in a few products; values closer to 0 reflect exports or imports more distributed among a series of products.
Source: UNCTAD data.

Figure 3
Intra-industry trade scores (0–1)



Note: A higher IIT score reflects two-way trade of products within the same sector and is associated with high economic development and its related indicators, such as greater specialization, innovation, FDI and knowledge accumulation.
Source: UNIDO calculations based on UN Comtrade data.

(annex figure 1.4). LDCs in Asia and Africa also doubled their exports of services, while island LDCs and Haiti saw modest growth from a low base.

Shallow participation in global value chains

The functional and geographic fragmentation of value chains is creating opportunities for industrialization in Africa and LDCs.[19] Trends in intermediate goods trade are indicative of regional and global value chain integration, as fragmented production processes require parts, components and partially manufactured subassemblies to cross borders, sometimes more than once, before final goods are produced and shipped to final consumer markets.

Africa is capturing a small but growing share of global trade in intermediaries, which rose from 1.4 per cent in 1995 to 2.2 per cent in 2011. Almost three quarters of this growth was due to backward integration (the share of foreign value added embedded in a country's exports).[20]

Although the share of mining and quarrying has been recently declining, it remains the sector with the greatest foreign value added in African exports in absolute terms, supplying intermediate goods for global production of copper wire, steel, petroleum, chemicals and non-metallic mineral products. Yet Africa adds value to only 14 per cent of its exports, compared with 27 per cent for emerging Asia and 31 per cent for developed economies. Africa's forward integration is largely limited to primary (commodity) exports.[21] In Asian LDCs, global value chains (GVCs) deal mainly with agricultural and manufacturing products, reflecting their economic structures.[22]

Analysis of over 400 traded goods in the four traditional GVCs—apparel, footwear, electronics and autos—shows that Sub-Saharan Africa is not highly integrated into these GVCs, whether exports or imports (annex figures 1.5 and 1.6).[23] Among these industries, vehicle manufacturing, mainly assembly, leads on foreign value added embedded in exports. Other medium-tech manufacturing, such as electrical machinery and metal products, follows a similar structure.[24]

African regions have some of the lowest regional intermediate goods intra-industry trade (IIT) scores

in the world, indicating little participation in regional value chains and low economic integration (figure 3).[25]

Africa's GVC integration is generally shallow, but it increased by 80 per cent between 1995 and 2011,[26] albeit from a very low base (annex figures 1.7 and 1.8).[27] Five African countries—Lesotho, the Seychelles, Swaziland, Tanzania and Zimbabwe—are among the world's top 30 countries in terms of intensity of GVC participation; 13 countries—predominantly in Western and Central Africa—are among the bottom 30 globally. Six of the 10 most integrated countries are in Southern Africa. Small, open economies such as Lesotho and Mauritius source more inputs from abroad and produce more inputs used in GVCs than larger economies such as Nigeria or South Africa.[28]

Primary sectors tend to make up 20–30 per cent of upstream GVC participation (25 per cent on average). Low- and high-tech manufacturing contributes 10 per cent and 9.5 per cent, respectively, on average. The major contribution to upstream GVC participation comes from low-tech (28 per cent) and high-tech (27.5 per cent) services.[29]

3

Main challenges to industrialization

The main reasons the industrialization gap has opened up include structural weaknesses such as poor infrastructure, weak logistics and trade facilitation, slow regional integration and absence of accreditation frameworks. These structural factors have contributed to the relative isolation of LDCs and low levels of trade between LDCs—particularly in Africa, where continental trade in merchandise represented only 11 per cent of total trade between 2007 and 2011 (compared with 50 per cent in Asia and 70 per cent in Europe)—preventing firms from exploiting a huge potential market.

Lack of competitiveness

Despite overall improvements in competitiveness, compared to low-income Asian countries, most African LDCs have struggled to take advantage of low labour costs to increase their share of labour-intensive manufacturing. This can be explained by a combination of poor business environments, low institutional capacity, weak infrastructure and relatively high unit labour costs in manufacturing, which compare unfavourably with competitors in Asia. The challenge therefore is to tackle a combination of obstacles to improve the business environment and encourage foreign investment. For instance, although Tanzania and Ethiopia—two LDCs in Africa—have competitive unit labour costs, they also suffer from intermittent power supplies and low quality transport infrastructure, including ports.[30]

In most African countries, road, rail and freight transport systems date from colonial times and focus on moving unprocessed raw materials from extraction zones to coastal areas for onward shipment to international markets. And even if in recent years the continent has invested hugely in transport and logistics, capabilities in these areas are still low—and Africa needs US$93 billion a year to close its infrastructure gap.[31] (In Africa, railways have only a marginal role.)

Lack of energy and information and communications technology infrastructure further constrain development. The amount of electricity per person in Sub-Saharan Africa is lower today—excluding South Africa—than it was 30 years ago. Indeed, only 290 million out of 915 million people in Sub-Saharan Africa have access to electricity, and the number without access is increasing (annex figure 5.3).

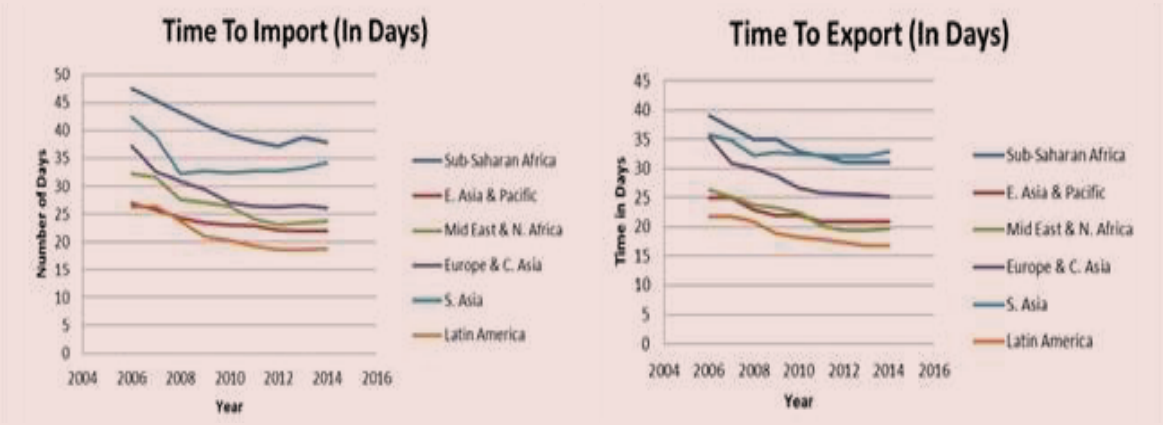
Weak logistics and trade facilitation systems

Improving sustainable logistics performance is critical for trade, economic integration, growth and competitiveness. Efficient border management is critical for eliminating shipment delays and enhancing predictability in border clearance. Coordination among government customs control agencies on regional transit regimes, introducing best practices in "single windows for trade", automation and risk management in non-customs control agencies are all vital for improving trade facilitation.

Poor trade facilitation undermines industrial competitiveness (annex table 1.4). According to the World Bank's Logistics Performance Index (LPI), over 2007–2014, low-income Sub-Saharan Africa showed the weakest performance of all World Bank regions and income groups (annex figure 1.9).[32] According to the Doing Business survey, the average cost of shipping a container for African exporters in 2012 was US$1,990, compared with US$1,268 in Latin America.[33] And the cost for many landlocked countries, such as Niger, Rwanda and Zambia, was more than 50 per cent higher than that average.[34]

Countries in Sub-Saharan Africa have made progress in improving trade facilitation with the biggest reductions in time to trade as measured by the World Bank Group's Doing Business Trading Across Borders indicator between 2009 and 2014. According to the World Bank's Doing Business survey, 46 of the 133 trade facilitation reforms implemented in this period were in Sub-Saharan Africa.[35] But Africa still has much to do to catch up with other regions on both the

Figure 4
Time to import and export by region, 2004–2014



Source: World Bank Group, Doing Business.

time (figure 4) and cost (figure 5) of trade indicators. Ratification and implementation of the WTO's Trade Facilitation Agreement is one concrete measure that countries should take to reduce these costs.

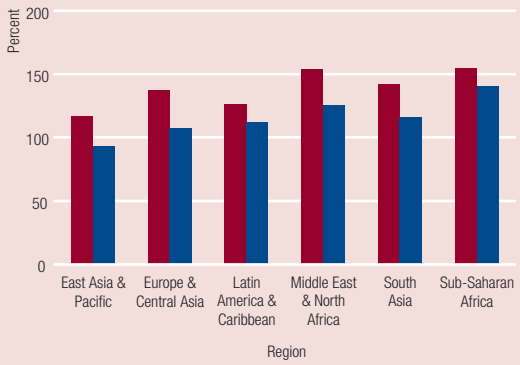
Slow regional integration in Africa

Africa is one of the least regionally integrated continents in the world. Trade barriers among African countries often are higher than those between them and the rest of the world.[36] While the continent's trade with the rest of the world has grown at double-digit rates since 1995, it remains dominated by trade with developed countries and is highly concentrated in natural resources and primary commodities.

Africa's intraregional trade is more diversified than that with the rest of the world, and some two thirds of it is in manufacturing (annex figure 1.10). Yet its real potential remains heavily untapped. The share of intra-African trade, at 16.3 per cent in 2013, is the lowest among global regions.[37]

According to the most recent calculations available, local value added represented only about 9.5 per cent of the total value added in intra-African trade in 2011.[38] In other words, most of the value added in intraregional trade was imported rather than created locally. This matches the lack of exports of manufacturing intermediates in the region.

Figure 5
Trade costs in manufacturing by region, 1996 and 2010



Source: WBG/UNESCAP bilateral trade costs database.

The overall fragmentation of the African market is very costly for all African countries, with loss of wealth creation and its equal distribution; no prospects to realize economies of scale and scope; and under-provision of regional public goods, particularly infrastructure, knowledge and a harmonized trade and investment regime among countries.

Cross-border infrastructure has to be made widely accessible and reliable, supported by institutional harmonization in the trade regime, to increase productivity and competitiveness. In addition, consistency

between trade and industrial strategies with an African perspective is of pivotal importance to foster regional integration, especially as the continent's own multiple regional trade agreements often form their own obstacles.[39]

Absence of accreditation frameworks

The lack of such systems crimps African firms' entry into international markets. Only three countries in Africa—Egypt, South Africa and Tunisia—have national accreditation bodies. International bodies step in when African countries lack one: for example, Tanzania's laboratories and certification bodies apply to the South African National Accreditation Service. Many African economies, however, do not require laboratories, inspection organizations or certification bodies to provide conformity assessment services for technical regulations.[40] This is a major lacuna in any technical regulation regime, and a major impediment for exporters of products falling within the scope of targeted markets' technical regulations. Many governments also restrict testing to domestic public (often non-accredited) laboratories and do not accept certificates of conformity from internationally accredited laboratories.

4

Socioeconomic costs of tardy structural transformation

Slow structural transformation and industrialization in Africa and LDCs carry heavy economic, social and environmental costs, preventing large segments of the population, including women and youth, from benefiting from economic growth and created wealth. Such tardiness hampers opportunities for promoting social justice and equality, with potentially stark political repercussions. It makes it harder to productively employ increasing numbers of jobseekers. It often leaves economies heavily dependent on job creation in the informal sector, even though formal manufacturing typically is not only the most dynamic sector, but also the main driver of technological development and innovation, and a major engine of broader sector productivity and growth.

Premature deindustrialization—under which the share of manufacturing in GDP and total employment starts to decline much earlier than seen in today's advanced economies—may, however, be a serious threat to growth in some developing countries, smothering the growth potential of manufacturing for technological learning, innovation, job creation and the creation of a middle class. It can make democratization less likely and, possibly, more fragile.

Population growth and increasing numbers of poor people put additional pressure on these countries' need to pursue inclusive industrialization. It is estimated that over 70 per cent of the working age population is unemployed or has no job security, and that unemployment is about 40–50 per cent in most Sub-Saharan African countries. As 70 per cent of Africa's population is under 30, unemployment is likely to worsen unless governments take steps immediately.

Poverty in Africa and LDCs

More people today are poor in Africa than in 1990,[41] youth unemployment has increased, the number of poor women[42] has risen and environmental problems persist. These all point to a failure of economies to industrialize and diversify, grounded in the four earlier structural weaknesses, as well as untapped opportunities for value addition in agriculture and lack of skills. Policies need to focus on creating long-term and decent work, driving investment in productive sectors for economic diversification, responding to environmental concerns and converting African and LDCs' static comparative advantages into dynamic ones. There are several factors that need to be in place to attract private investment, including clear and predictable investment and public procurement regimes; independent regulatory systems; soft and hard infrastructure; and a business-friendly environment.[43]

Estimations based on World Bank's PovcalNet tool suggest that in 2011 there were almost 580 million people in African and non-African LDCs living on less than US$1.25 a day. The majority were in Sub-Saharan Africa (470 million); around 100 million were in non-African LDCs.

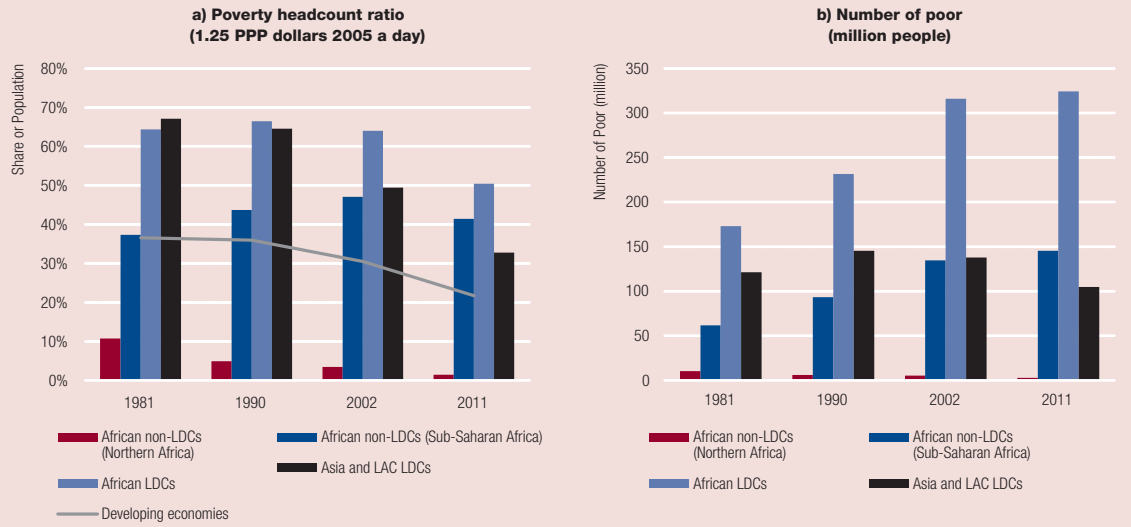
Even though Africa and LDCs have made substantial progress in reducing poverty during the last decade (figure 6, left panel), such progress has not been fast enough to outpace population growth: the absolute number of people living on less than US$1.25 a day has risen inexorably in African LDCs since 1981 (right panel).

Social inclusiveness

Industrialization is tied to social inclusiveness by providing decent jobs and expanding the fiscal revenues needed for social investments. Figure 7 illustrates the positive relationship between industrialization (horizontal axis) and three measures of social inclusiveness (vertical axis). (Annex 4 shows other indicators.)

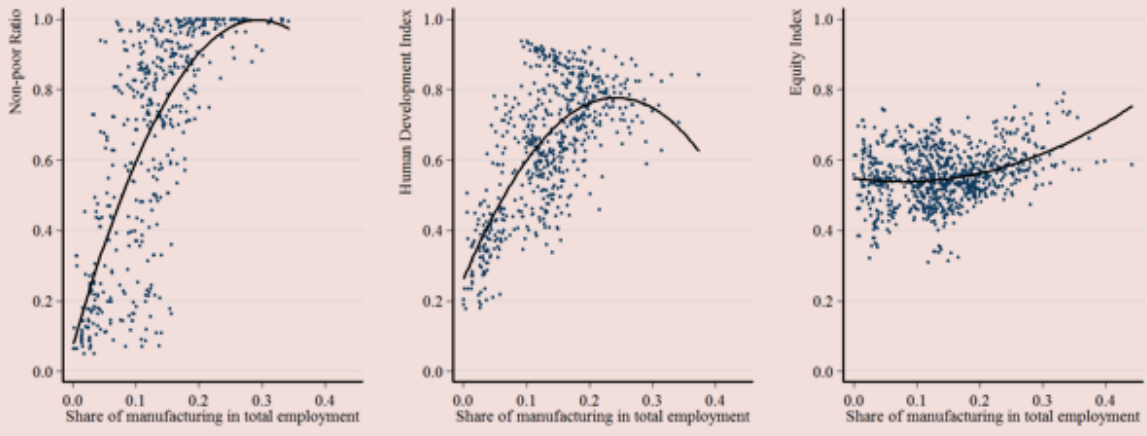
Manufacturing is particularly well suited to create direct and indirect jobs, better paying than other sectors and typically with better working conditions. The generation of direct and indirect jobs in manufacturing and manufacturing-related services includes more people in the growth process. It also increases wages and family incomes, reducing poverty.[44]

Figure 6
Poverty headcount ratio (US$1.25 PPP 2005 a day) and number of poor, 1981, 1990, 2002 and 2011, Africa and LDCs



Note: Average poverty headcount ratios by region were calculated using World Bank's PovcalNet. Absolute numbers were calculated by multiplying the average headcount ratios by the population figures published by UNSD in its Main Aggregate Database.
Source: UNIDO calculations based on World Bank's PovcalNet and UNSD Main Aggregate Database.

Figure 7
Inclusiveness indices by share of manufacturing in total employment, 1970–2010



Note: Sample of almost 100 countries. Each dot represents the average value of each country for a five-year sub-period. In all cases a quadratic trend is also included in the figures to indicate the general trend of inclusiveness.
Source: UNIDO 2015.

Higher and more stable growth also brings higher tax revenues—and less dependency on foreign aid—to many countries, helping them, for example, improve their domestic health and education systems. The associated opportunities for decent work, especially for young people, should also help alleviate socio-political tensions.

In Africa and LDCs, lack of job prospects, especially for young potential workers, produces excess labour that remains idle. It also encourages migration.

The formidable challenges of the upcoming demographic transition make it vital for these countries to create new sources of economic growth that create many jobs.[45] The slump in commodity prices and subsequent rapid deceleration of growth in a number of Sub-Saharan countries since mid-2014 only underlines the issue.

Women's participation in the workforce

Women are disproportionately affected by the failure of Africa and LDCs to create jobs (box 2). Women represented more than half the population in 2014 but a far lower share of the manufacturing workforce: the share of female employees in manufacturing dropped sharply from 50 per cent in 1991 to 38 per cent in 2014.[46] Due to the higher wages in manufacturing jobs, this sector would be important for reducing the wage gap between men and women.

African non-LDCs show very high male and female unemployment rates, above the developing country average (figure 8, left panel). This gap is wider among women: female unemployment is, respectively, 20 per cent and 13 per cent against the average of 10 per cent for all developing countries (left panel). In both African and non-African LDCs, these rates are below the developing country average.

In LDCs, the main problem (for men and women) is vulnerable employment. As the right panel shows, the LDC share of own-account and contributing family workers in total employment is much higher than

Box 2
Women reduce poverty

Women's participation in the formal sector workforce is associated with poverty reduction. The World Bank, for example, found that women's growing participation in the labour force—and among low-income women in particular—was instrumental in reducing extreme poverty in Latin America and the Caribbean during the last decade: female labour market income in this region contributed 30 per cent reduction in extreme poverty between 2000 and 2010.[47]

But despite significant progress over the past 25 years in some developing regions, notably South Asia and East Asia, pervasive and persistent gender gaps remain in labour productivity and earnings across sectors and jobs in most developing countries. They stem primarily from differences in the economic activities of men and women, although gender differences in human capital and in the returns to worker and job characteristics also feature.

Figure 8
Unemployment rates and share of vulnerable employment in 2014, by region

Note: Unweighted averages. The aggregate of Developing Economies includes Africa, Asia (excluding Japan), Latin America and the Caribbean and Oceania (excluding Australia and New Zealand). Vulnerable employment is defined as the sum of own-account and contributing family workers as a proportion of total employment.
Source: UNIDO calculations based on ILO World Employment and Social Outlook 2015.

the developing country average. For women, the difference is extremely large: 86 per cent of female workers in African LDCs and 76 per cent in non-African LDCs are in vulnerable occupations—far above the developing country average for female workers of 53 per cent.

Women suffer most from the lack of structural transformation. In African MICs they tend, for example, to show unemployment rates that not only are much higher than among male workers but also much higher than the average female unemployment rate in developing countries. In LDCs, the vast majority of women workers are in vulnerable occupations.

Environmental degradation and climate change

In Africa and many LDCs, environmental degradation is due to economic, legal, ethnic and other barriers. Such barriers prevent access to cleaner and more resource-efficient production technologies and practices that decouple economic growth from unsustainable resource consumption and environmental degradation, and that enable economies to achieve climate resilience.

Livelihoods reliant on smallholder agriculture, livestock production, fishing and other forms of subsistence production depend on access to land and natural resources. In urban areas, the lack of land tenure prevents effective development of infrastructure, including water provision.[48] The impact of climate change and the frequency and magnitude of natural disasters hit agriculture, accelerating urbanization and intensifying migration pressures. Most LDCs, especially those in Sub-Saharan Africa, rely on natural resource commodities, causing, via exploitation and processing, environmental pollution and degradation.

Given the importance of agriculture in sustaining livelihoods, land degradation is a major problem in Africa and LDCs. Unsustainable land management practices lead to scarcity of water for drinking and agriculture. Climate change is increasing extreme weather events in LDCs (extreme temperature, floods and droughts).

Environmental protection often is weaker in developing countries. For example, Africa and LDCs such as Ghana and Nigeria are destinations for large-scale shipments of hazardous waste. Bangladesh, an LDC in Asia, also receives shipments of illegal electronic waste (e-waste),[49] which is seldom disposed of in an adequate manner. The United Nations Environment Programme (UNEP) estimates that 50 million tonnes of e-waste from goods such as computers and smart phones will be generated by 2017. Currently, however, up to 90 per cent of e-waste is traded illegally or dumped in poor countries, creating hazards for local populations.

While environmental services have developed into a multi-billion dollar industry worldwide, it is largely absent in Africa and LDCs. This is both a missed business opportunity and a threat, since the e-waste contained in used computers consists of high-value components such as copper and gold, but also highly toxic substances such as lead, mercury and arsenic.

Access to green and clean energy is of particular importance to SIDSs, and enhances export capability to fully benefit from the integration into GVCs. While geography favours a switch to fully replace carbon-based energy production through wind and solar power, these countries often lack the finances to achieve ambitious renewable energy targets.

LDCs in Asia have formulated national priorities that can be enhanced and implemented through multilateral cooperation. Key elements include sustainable management of natural resources through increased environmental legislation and regulation; diversification of the economy and sources of revenue; enhanced agricultural produce; and improved education, health and employment for youth. Timor-Leste, for example, has set up a dynamic cane and bamboo industry through skills development for crafts people. Networks and links in triangular cooperation have been beneficial to the country, which can be replicated in other SIDSs.

5

A sustainable and inclusive path to industrialization

Africa and LDCs have a substantial, but achievable, task ahead, focused on agriculture and agribusiness, GVCs, a greater role for the private sector, and green and clean industrialization.

The contribution of agriculture and agribusiness to poverty reduction

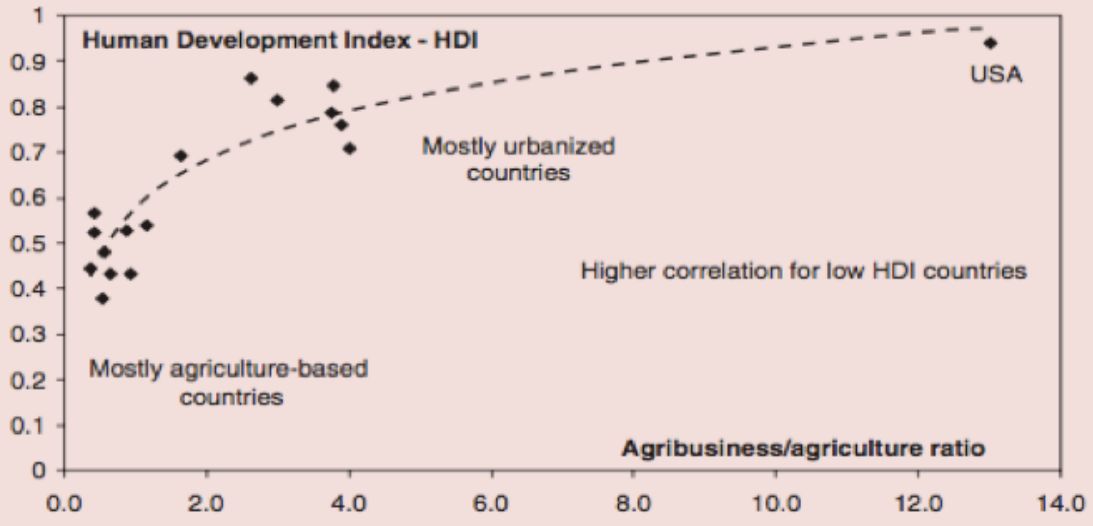
With a shortage of industry across the continent, agriculture remains the primary employer for 60 per cent of adult workers in Sub-Saharan Africa and is regarded by many economists as the sector with the most potential for poverty reduction.[50] Agriculture offers several prospects for poverty reduction and development, including high labour intensity and opportunities for technological updating, among others.

Agribusiness offers a prime opportunity for inclusive economic development. Empirical evidence indicates that GDP growth originating from agriculture is more effective at reducing poverty than growth coming from other economic sectors. There is a positive correlation between human development and the agribusiness-to-agriculture ratio (figure 9).

Agriculture in Sub-Saharan Africa is dominated by smallholders and lower-value staple crops; the latter's prevalence impedes meaningful increases in revenue. Further issues include uncertain land tenure, difficulty in obtaining loans or other financial products, lack of capital for fertilizers and seed, poor access to market information and high transaction costs in accessing markets.[51] There is scope, however, for raising smallholders' incomes and creating new jobs through higher-value horticulture and livestock products, which typically require higher levels of management skills and coordination with input and output markets,[52] as well as through linkages with agro-food industries and tourism.

Expanding employment through downstream activities in value chains, including local agro-industries, will be essential for reducing poverty and for meeting growing demand. Agro-industries, as a component of manufacturing where value is added to raw agricultural materials through processing, preservation, preparation and other handling processes, are engines of growth that contribute to post-harvest loss

Figure 9
Correlation between human development and the agribusiness to agriculture ratio



Source: Wilkinson and Rocha 2009.

reduction, enhanced food safety and quality, improved export performance, job and income creation, and overall economic development.

The value of agro-industries as a share of total manufacturing is high in many African countries, such as 50–60 per cent in Senegal, Madagascar, Ethiopia and Ghana.[53] They account for some three fifths of manufacturing in many countries in Sub-Saharan Africa. This contrasts with 42 and 37 per cent for transformation and urbanized developing countries, respectively.[54]

SMEs—a key feature of agro-industries in low-income countries—account for a large and growing share of value addition and employment.[55] As they are not formally registered in most of the covered countries, there are few figures on the number of jobs created by them.

Over the past decade, Africa's agribusiness productivity has increased faster than that in any other region. Output of cereals grew by 3.3 per cent a year between 2000 and 2013. In Kenya, for instance, cut-flower exports have bloomed, but more traditional exports like coffee have wilted, from almost 100,000 tons a year in 2000 to below 40,000 in 2013. Housing development and foreign competition, among others, have made traditional farming activities less competitive.[56]

Developed economies use agro-processing to add value to their agricultural inputs. This is not the case in Africa. For instance, African countries' share of global cocoa bean production was 66 per cent between 1993 and 2013, but none of the African countries made it to the top 10 chocolate-exporting countries, underlining the need for Africa to upgrade its agro-industries.[57]

Linkages with other economic sectors and international markets

Vertical integration of agriculture, agro-food and the tourism industry can be an effective growth strategy for some African and LDCs. Forward and backward linkages will interact and stimulate the integration of economic sectors in these countries. By linking tourism and culture with agribusiness, high value added can be created generating social and economic returns such as innovation, diversification and jobs, especially in rural areas.[58]

Linking local suppliers to national and international markets can foster value addition and product innovation as demanded by national and international markets; improve the efficiency of the collection, transport and export processes; encourage greater investment in the agricultural and logistics private sector; and increase exports.

Linkages to local, urban, regional and global chains can raise overall productivity and living standards but should be underpinned by a sound business environment and solid transport infrastructure, power and logistics.

GVCs—a path to industrialization

What GVCs offer Africa and LDCs

The main interest in GVCs of Africa and LDCs ultimately lies in their potential for industrializing economies and creating jobs (especially for its young population), for adding value to products and services and for upgrading workers' skills and knowledge.

In most globalized industries, increased specialization and large-scale production drive more efficient geographical allocation of industrial activities and increase the range of intermediate goods in the developing world. Competitive pressures from imported intermediate goods are likely to provide strong incentives for firms to innovate.[59]

For developing countries, trade, investment and knowledge flows in GVCs can provide mechanisms for rapid learning and innovation.[60] Linking to leading players in GVCs potentially offers them greater prospects to enter new markets; to gain access to new skills, knowledge and information; and to upgrade their industrial capabilities. Latecomers can "leapfrog" those that went before in some areas, tapping into new technologies, new products and specific tasks in the chain, rather than having to reproduce, domestically, the entire previous technological trajectory or value chain. They can seek GVC involvement at their level of comparative advantage and technological competence,

and can leverage this involvement to produce more sophisticated goods and services.[61]

GVCs alone are not, however, sufficient for sustainable and inclusive growth and do not ensure upgrading. For instance, firms and countries can become locked in particular segments of GVCs. There are other potential costs associated with GVC participation, such as the shift to less-labour intensive production because of external sourcing, although over the long term improvements in competitiveness can offset job losses and lack of government capacity to deal with structural adjustment. Other potential adverse effects are that companies link with GVCs and disconnect from the local economy, and pressures to drive down costs along with environmental, occupational safety and health standards can lead to the low road of competitiveness, disregarding social and environmental concerns.[62] These all underline the point that collective actions are needed to address negative externalities.

What Africa and LDCs offer GVCs

Africa and LDCs have latent comparative advantages in some light manufacturing industries, in particular, in leather goods, garments, agricultural processing and automotive parts and components. These industries could initiate rapid, substantial and potentially self-propelling waves of rising output, employment, productivity and exports that can push countries like Ethiopia onto a path of structural change of the sort achieved in China and Vietnam. Like Asia, Sub-Saharan Africa could benefit from applying policies that accord free access to domestic and international markets for the inputs and outputs associated with light manufacturing and create conditions conducive to attracting FDI.

Beyond the fact that Africa has 25 per cent of the world's arable land and rich minerals (including oil, copper, gold, diamonds, coal, iron, uranium, nickel, chrome, tin and platinum), Africa and LDCs must convert their demographic challenges of increasing population density into assets.[63] Its "youth bulge" represents an unprecedented opportunity to generate inclusive growth and reduce poverty, as the rest of the world—especially the developed world—ages.

Major untapped solar, hydro and gas energy resources lie in Africa, while Asian and Pacific LDCs have potential in renewable energy such as biomass and solar, leather and leather goods, bamboo and fisheries, among others. The major challenge for Africa and LDCs is, however, to leverage these assets and potentials by linking to the regional and global chains to develop industrial capabilities and diversify their economies, step by step.[64] Ethiopia presents some achievable outcomes (annex 6).

The importance of interoperability

The efficient functioning of GVCs requires the seamless combination of intermediate components from many different locations and suppliers. Africa and LDCs need not only to meet internationally agreed standards such as those for labour, health, safety (phytosanitary) and environmental standards, but also increasingly privately agreed standards and other product and quality specifications, most often defined by the lead firms that control GVCs.[65] For most firms, conforming to these standards (either through mutual recognition or harmonization) has therefore become indispensable.

Developing countries linked to GVCs are keener than those not linked to them to invest in enhancing their rules and regulations, norms and standards, physical infrastructure, ports and customs modernization, and in general to have better connections with the global economy and greater opportunities for technological learning and innovation.[66] Such enhanced "institutions" contribute to lower transaction costs and thus to better and cheaper imports of intermediates.

Getting ready to join and then move up the chain—input from firms and governments

Participation in GVCs may induce firms to improve efficiency in individual value chain activities such as *process innovation* (improving the efficiency of internal processes in one link of the value chain, or *product*

innovation (when old products are improved through quality and price performance). Firms may also reposition themselves in the chain or adopt functional innovation, which might involve either a change in the firm's mix of tasks, such as taking responsibility for purchasing that was formerly done by a buyer, or moving from production to design. They may even move into new chains.

Upstream activities such as research and development (R&D) and design, and downstream activities such as distribution and advertising, have greater added value than assembly of components. In many GVCs, producers from poorer developing countries and LDCs can be locked into low value-added activities, with low economic returns and thus weak export incentives.[67] The challenge therefore is for domestic firms to quickly accumulate new capabilities. Public policies and collective actions involving local clusters, foreign players and government at different levels (central to local) are important in supporting such upgrading.[68]

Developing-country firms should not rely on government, however, and can lift their productivity through three main channels: combining domestic and foreign intermediate inputs that can spur productivity in downstream sectors; generating knowledge and technology spillovers via direct imitation or reverse engineering; and exploiting the specialized knowledge garnered through participating in GVCs to export or set up production abroad, directly or through contractors and suppliers.

Targeted strategies and special economic zones with a business-friendly environment can work very well for GVC industrialization—Shenzhen in China is probably the best known. Such zones, if properly planned and managed, are useful to attract foreign investors, stimulate SME development (see just below) and their linkages with foreign partners, and to foster industrial agglomeration and industrial and economic diversification.

Differences between regions in their latent comparative advantages lend themselves to "smart specialization", which covers areas such as knowledge creation and innovation, support for ecosystems, technology, social entrepreneurship, as well as soft measures like training and education. Examples include a sustainable petro-chemical industry complex that could thrive in Mozambique and Tanzania with their natural gas over the long run; and in West Africa, in the Mano river basin of Guinea, Sierra Leone and Liberia, the massive hydropower potential and bauxite and iron ore deposits. And Ethiopia is starting to take advantage of labour-intensive manufacturing and has good prospects to upgrade within the agribusiness and tourism sectors.

The ability to assimilate manufacturing know-how depends also on education systems, ease of access to universities and other research institutions geared to the economy's needs, and vocational training programmes. Such investments require some degree of state support.[69]

The private sector in development

A strong private sector is a key driver of economic growth, knowledge and technology generation, job creation and the provision of basic goods and services. SMEs are the largest job providers in the formal and informal sectors. Moreover, they are important to economic development as one of the key drivers of innovation in many sectors, as they exhibit higher degrees of flexibility, less bureaucratic organizational structures and lower levels of risk.[70]

In light of this, shortfalls in economic dynamism come at a heavy cost to employment, as a non-conducive business environment checks entrepreneurship while limiting opportunities for young firms—an engine of job creation and innovation in other regions.

Effective policies that create an enabling environment for the private sector, including affordable access to basic infrastructure, prudent legislation and provision of adequate finance, are imperative. Notably, and due to the composition of the enterprise population across low-income economies, a holistic approach that supports micro enterprises to enter industrial value chains or even develop into industrial SMEs through training remains critical.

The drive for innovation and process optimization —the core of any industrial upgrading effort—is crucial for developing the technologies and practices for cleaner production, for sound resource management and for reducing waste and pollution (see next subsection).

The private sector has much to gain from aligning its activities to national development priorities and integrating sustainability in its corporate strategies and operations. Yet as it requires a supply of human, natural and financial resources, unless these resources are managed sustainably, any enterprise may be compromised in the long run.

These moves will require greater promotion of green and clean industries and environmental sustainability policies in industrial production and consumption through incentives and targeted support to private industries, to SMEs in particular. Governments are key players in leveraging financial and technical support for long-term solutions, but greater private involvement also will be critical. It becomes particularly important to ensure that specialized knowledge and assistance is brought to domestic businesses and industries, in order to enhance their capability to comply with such standards. Technology transfer and the sharing of best practices from large-scale businesses, academic and research institutions and the public sector is one important form that such support can take.

Green and clean industrialization

Green and clean industrialization in Africa and LDCs means that, to avoid replicating the path of current middle- and high-income countries, their manufacturers must change their production methods to ensure that they use a different set of inputs (e.g. renewable energy replacing carbon-based inputs); use inputs efficiently (e.g. energy and materials); and promote a "circular economy", i.e., transforming bad outputs (e.g. waste) into inputs. Africa and LDCs can achieve it if their policy makers steer it, avoiding the mistakes richer countries have made.

More countries are prioritizing the transition to climate-resilient industry. The issue will become increasingly pressing for LDCs, particularly in Africa, as they tend to be those most exposed to the effects of climate change, even if they have contributed little to greenhouse gas emissions (annex 5). With little industry, Africa's CO_2 emissions have remained quite low at around 0.8 metric tonnes (Mt) per capita, compared with the world average of nearly 5 Mt per capita in 2011.

Investing in climate-resilient industrial technologies and practices therefore makes economic and political sense in Africa and LDCs. Concerns over the amount of investment required should be overcome by the long-term economic benefits from avoided mitigation and adaptation investment, higher productivity of green and clean technologies, the economic benefits of greater markets for green and clean technologies and the economic incentives for further innovation.

International policy architecture is crucial to enhance capacity building and knowledge management for climate action and to boost green and clean investments in Africa and LDCs. UNIDO has devised a set of building blocks to optimize pathways for climate-resilient industrialization, on scaled-up technology transfer and deployment; innovation and entrepreneurship; and partnerships with state and sub-national entities (including cities, businesses and regional networks) to attract investments and implement best industrial practice. They aim to advance agro-industrial production for increased food security; improve resource and energy efficiency; deploy renewable energy solutions; increase green and clean jobs; and simultaneously approach different sectors (water, energy and land) in an integrated manner.

Central to the global debate on sustainability in the 2030 Agenda is the green and clean economy, characterized by competitive, low-carbon and resource-efficient industry, eco-industry, and job creation in green-tech sectors. Under such a system industry is oriented towards green and clean technologies and environmental goods and services. This can take place in a variety of areas such as waste management and recycling, energy efficiency technology and

equipment; environmental services, including advice and monitoring (for instance, energy-service companies); and pollution-control technologies and equipment. Industry can mitigate emissions in other sectors by designing and delivering low-carbon products and services; reducing, recycling and recovering waste from its own operations and those of its supply chains; and reducing associated transport requirements.

For Africa and LDCs, the green and clean economy presents a window of opportunity. Targeted investments in new environmental technologies and projects will boost qualitatively structural transformation with green and clean technologies and products leading to the emergence of innovative industries, new jobs and new markets; it will increase energy and resource efficiency.

Renewable energy sources such as wind, solar and hydro, so far underexploited in Africa and LDCs, are a way to reduce energy import dependency and energy shortages. There is also scope for new economic sectors to emerge around renewables. Investment decisions in infrastructure should be aligned to cutting-edge technologies such as virtual power plants and energy networks of smart and micro/grid type. In manufacturing, the priorities should be waste management and recycling, water management, biotechnology, resource efficiency, cleaner production and industrial energy efficiency, for example by using industrial ecology.

6 National policy measures and global collective actions: An agenda for action

Africa and LDCs are well placed to industrialize as they have the right mix of factors, including endowments of natural resources, favourable demographics, urbanization (annex figure 1.11), an emerging middle class and a highly educated Diaspora.[71] But industrialization is never automatic. It requires the collective action of society, including government and greater private sector involvement. Beyond pursuing the policy measures outlined below, African and LDC governments will want to ensure their leadership and commitment—coordinating their efforts—and closer donor involvement.[72]

The G20 should lead engagement with non-G20 members and stakeholders, including international financial institutions in a discussion on global development policies. Building on its role as a central global forum for international economic cooperation, the G20 should collaborate more closely with these countries.

State support is vital to address market failures through a market supporting and augmenting role,[73] to institutionalize industrial policy in national and regional development strategies and to implement and enforce policy. Structural transformation demands that the state play a central role in planning, articulating and implementing policies. Development planning is needed for several reasons. The structural changes required are substantial, and free-market forces cannot optimally drive the decisions—most developing economies are characterized by pervasive market failures. The interdependence of all elements of the process needs to be reconciled through comprehensive development frameworks rather than narrow, partial models.

And as many of the necessary policies result in wins and losses—generating winners and losers—the state should negotiate the associated conflicts between social groups as a means of establishing policies that promote economic growth and transformation, without sacrificing social equity or environmental sustainability. The state therefore must have the necessary capacity, competence and legitimacy to mobilize *all* stakeholders. It further needs to set up (or revive) key planning institutions and give them the power and autonomy to do their work, and institutionalize consultative and deliberative mechanisms through which the bureaucracy can interact with all key stakeholders. Monitoring and evaluation, as well as assessment and review, should feature strongly during implementation.

Each policy should be tailored to maximize a country's comparative sector-specific advantages. African and other LDCs should move away from the "generalized" industrial policies that have proved ineffective over the last three decades. They also need to build strong institutions and viable investment climates. Finally, governments in these countries need to realize the full potential of PPPs and the opportunities for collaboration among industry, governments and other stakeholders.

1 Further the G20 Development Agenda

The G20 development agenda was launched to narrow the development gap and reduce poverty through the 2009 G20 Framework for Strong, Sustainable and Balanced Growth (the G20 Framework). G20 leaders further strengthened their commitment to the development agenda by creating the Development Working Group in 2010. Later in 2010, in the Saint Petersburg Development Outlook, the G20 refocused the approach to development on five priority areas: infrastructure, food security, financial inclusion, domestic resource mobilization and human resource development.

In most cases, international organizations and multilateral development banks are also closely involved. To tackle development challenges, pilot projects, knowledge banks and sharing platforms, workshops and peer learning forums are used.

Recommendations for G20 collective actions

1. Promote inclusive and sustainable structural transformation and industrialization in Africa and LDCs through various mechanisms such as knowledge-sharing platforms for peer-to-peer learning; share best practices, policies, measures and guiding tools; and engage in multi-stakeholder discussion to improve the environment for investment and development in accordance with national conditions, development needs, and WTO rules.
2. Establish a platform for conducting in-depth reviews of countries' strategies and policy assessment, and for providing guiding tools to support African countries and LDCs in reviewing and mainstreaming their industrialization strategies and instruments in line with Agenda 2030 and the SDGs (especially SDG 9), and with existing national and regional frameworks
3. Facilitate and coordinate research involving international organizations, financial development institutions and academia on the best policy instruments to be used to pursue inclusive and sustainable industrialization for Africa and LDCs. Facilitate long-term (one- to three-year) exchange programmes of government officials to entrench capacity building within key LDC government ministries.
4. Promote the role of the private sector for development through existing platforms for collaborative dialogue, learning and identification/transfer of best practices on the role of social enterprises and inclusive business in Africa and LDCs.
5. Promote improving the availability and reliability of industrial statistics and related services worldwide, particularly in Africa and LDCs. More reliable gender-disaggregated industrial data, as well as statistics on natural resources use and environmental impact of industries, are required.
6. Promote strong multi-stakeholder partnerships for knowledge sharing, technological capacity building and investment in new green and clean technologies and practices.
7. Review the contribution of North-South, South-South and triangular cooperation to inclusive and sustainable industrialization in Africa and LDCs.
8. Establish a platform for mapping the initiatives of G20 members and international organizations that promote industrial development in Africa and LDCs. Effective collective actions require reliable, consolidated data on national development agency initiatives and regional development strategies towards Africa and LDCs. The mapping initiative should focus on development programmes and strategies that further industrial development, as outlined in the TICAD V concept of "Hand in Hand with a More Dynamic Africa" and partnership initiatives such as the EU–Africa strategic partnership.

2 Support the agriculture and agribusiness development and their linkages with other sectors, and increase resilience to shocks

Agribusiness has huge potential in Africa and LDCs but productivity is low and inefficient. Stronger linkages between farmers and agro-industry and tighter clusters of small producers can enhance supply-chain efficiencies, improve access to local and global markets, and increase real incomes of farmers, farm workers and their families. Linking agribusiness with high value-added tourism can generate social and economic returns such as innovation, diversification and jobs, especially in rural areas.

Recommendations for G20 collective actions

1. Provide support to instruments facilitating technology transfer in areas such as irrigation systems, improved water-harvesting techniques and agro-ecological technologies, as well as training and skill upgrading for smallholders on cleaner production and resource management. Support Africa and LDCs in developing and harmonizing science- and risk-based technical and food standards.

2. Promote knowledge-sharing platforms and dissemination of information on best practices and experiences on sustainable production and consumption patterns.
3. Promote agricultural innovation and capacity development through encouraging collaboration with local counterpart R&D institutions and international organizations.
4. Facilitate the market access of agri-exports from Africa and LDCs to G20 markets through a comprehensive package of technical support.
5. Encourage international organizations to support Africa and LDCs in catching up on globally available technology and acquiring knowledge from technologically more advanced countries.
6. Encourage international organizations to support Africa and LDCs in developing and harmonizing technical and food standards, and in strengthening capacity for compliance and enforcement of norms and standards.
7. Support development of national quality infrastructure and local certification bodies.

3 Deepen, broaden and update the local knowledge base

Labour skills in Africa and LDCs serve largely the needs of low-skilled, traditional industries. The adjusted primary net enrolment rate in 2012 stood at 82 per cent. In 2012, 24 million primary age children and 21 million secondary school age adolescents were not in school in LDCs. Further, only around one third of LDCs have achieved gender parity at primary level, only two countries at secondary level and none at tertiary level. Strengthening primary and secondary education is therefore fundamental. Similarly, vocational education and training systems need to be brought closer to labour markets' current needs, including those of the predominant informal sector.

Countries should identify "common building blocks"—desirable capabilities of skills development systems.[74] Support from donor countries in the form of funding, access to technical equipment and capital, linkages between school-based vocational education and regional/international employers would help to raise local industrial human capital.

Recommendations for G20 collective actions

1. Support UN-led initiatives such as the Inter-Agency Network on Youth Development and its UN System Wide Action Plan on Youth.
2. Encourage dissemination of best practices policies and programmes of international organizations on provision of vocational training.
3. Explore ways to develop South-South and triangular co-operation programmes involving G20 members on vocational training.
4. Promote comprehensive programmes for skill upgrading to comply with international markets' requirements for technical and food safety standards and certification; and on cleaner production including on energy and resource efficiency and effectiveness.
5. Establish a knowledge-sharing platform with particular focus on skills development for rural women and youth.
6. Investigate the funding and filling of specialized academic chairs within key manufacturing systems related to higher education institutions as the most effective manner to embed the transfer of technical know-how between developed and developing countries.
7. Support talent through talent exchange and training with developed countries and Africa and LDCs in the fields of smart manufacturing, industrial software and green and clean manufacturing.
8. Support labour markets to be more inclusive and disseminate effective policies and programmes for social and economic inclusion of marginalized groups.
9. Support programmes and incentives for social entrepreneurs and inclusive business.
10. Within WTO rules, prioritize job creation for marginalized groups through incentives, requiring social and environmental criteria and provision of training programmes.

11. Develop indicators on the structure of national skill base, and share knowledge on monitoring gaps in knowledge base and how to overcome them.

4 Invest in energy and resource efficiency and promote green and clean technologies and industries

The renewable energy industry presents opportunities to improve energy access by lowering the cost of bringing power to rural areas. It can also generate new value in "whole production" value chains, by focusing on energy efficiency of the final product and processes. Concerns over the amount of investment required should be overcome by the long-term economic benefits from higher productivity of green and clean technologies, greater markets for green and clean technologies, and the economic incentives for further skill upgrading, innovation and job creation. Resource-efficiency and renewable-energy promotion needs to be preceded by (or at least paced by) a comprehensive programme for strengthening institutional and enterprise capacities.

Recommendations for G20 collective actions

1. Support collaboration on bolder joint initiatives to support African countries to address renewable energy supply, such as the New Deal for Energy in Africa.
2. Support Africa and LDCs at the upstream level of policy and institutional frameworks and to mobilize greater investment and increased transparency in management for energy infrastructure.
3. Support the operationalization of the Green Climate Fund and the dedicated allocations of resources for Africa and LDC for their adaptation to climate change.
4. Support cleaner production methodologies and investments in green and clean industries.
5. Support countries in executing internationally agreed environmental agreements, such as those on climate change, and help countries and communities predict and prepare for the risks posed by climate change. Such preparations go hand-in-hand with industrialization policies to promote and ensure sustainable economic growth.
6. Explore ways to promote joint research and diffuse environment-friendly technologies.

5 Industrialize through trade and deeper regional integration

The overall fragmentation of the African market is very costly for all African countries, with the loss of wealth creation and no prospects to realize economies of scale and scope or to increase productivity. The key industrial agglomerations and other growth benefits could be realized from hub development around transport nodes and important urban centres.

The services sector remains undeveloped in most poor countries despite rising prominence in overall domestic output. While preferential liberalization of services trade now features under regional trading arrangements, the WTO's LDC service waiver has opened up the possibility of making them more widely available on a non-reciprocal basis.

Recommendations for G20 collective actions

1. Identify infrastructure gaps, needs and funding requirements in regional and rural infrastructure, domestic spatial frictions (travel, transport, communication costs), and domestic transaction costs that hinder competitiveness of local value chains, as well as opportunities to promote PPPs.
2. Facilitate the leveraging of multi-stakeholder resources for investment in trade, transport and industrial corridors.
3. Develop mechanisms to improve the financial and technical support for feasibility and project preparation work to support infrastructure and industrial projects to attain bankability.
4. Task international organizations to work with Africa and LDCs to assess the impact of trade facilitation reforms and trade preferences, including for non-traditional exports, and propose mechanisms that will make such preferences commercially meaningful to poor countries.[75]

Examine the impact of instruments such as duty drawbacks, tariff exemptions and VAT reimbursement schemes and see how these can be more effective.

5. Discuss successful approaches to implement trade facilitation reforms through trade agreements between African countries.
6. Facilitate knowledge sharing and peer learning on how best to leverage regional trade agreements for deepening regional integration and division of labour.

6 Leverage domestic and external finance

Domestic and external finance is important for Africa and LDCs. As reliance on ODA decreases, governments' financial constraints must be resolved. Some indicators are good: over the last two decades or so, domestic tax revenue as a share of GDP has almost doubled in Africa; domestic savings has improved; and private capital (mainly to MICs) has expanded. But much of Africa's growing financial sector is positioning itself to lend to large companies and foreign investors, neglecting agriculture and local (especially rural) SMEs. Thus African and LDC governments (and development finance institutions) need to provide the right incentives.

In 2014, FDI flows to LDCs represented only 2% of global inflows. FDI flows to LDCs went mainly to extractive industries. Flows to the manufacturing and services sectors tend to be directed towards larger and more resource-rich LDCs. A close link between FDI and domestic investment can be ascertained. Domestic productive capacities are necessary to attract multinational enterprises (MNEs), to participate in GVCs and to attract FDI.[76]

Recommendations for G20 collective actions

1. Focus on capacity-building efforts for mobilizing domestic resources through PPPs.
2. Support the piloting, further development and scaling-up of value-chain financing schemes and setting up of proper legal frameworks, policies and institutional capacity.
3. Promote transparency and effectiveness in international taxation.
4. Reduce the average cost of transferring remittances to developing countries.
5. Improve the domestic infrastructure investment climate, and work with Africa and LDCs to assess and diagnose investment bottlenecks and develop action plans.
6. Develop guiding principles on equitable access to finance to encourage SME development in non-commodity industries.
7. Build awareness of the G20 Action Plan on SME Financing adopted in 2015 that encourages G20 and non-G20 countries to fully develop credit infrastructure for SMEs.
8. Promote the blending of public and private financing for public–private partnerships to leverage the impact of development finance. Use "smart incentives" such as technical assistance from development agencies and partial risk guarantees in order to reduce risk, improve project returns and provide security to investors, rather than simply increase guarantee uptake generally.
9. Task multilateral organizations and development banks to mobilize resources through partnerships and to build institutional management capacities for loan guarantee programmes targeted at industries with high-growth potential.
10. International organizations could provide support for the development and implementation of domestic strategies, including PPPs for infrastructure, with appraisals and proposal preparation.
11. Increase investment in the information infrastructure of multilateral development banks.
12. Encourage investment funds to upgrade agribusiness and agro-industries and leverage additional finance for realizing large projects.
13. Leverage ODA for other financing, including FDI and remittances.

7 Promote the New Industrial Revolution

The New Industrial Revolution (NIR)—including the Internet of things, big data, cloud computing, artificial intelligence, robotics, 3D printing, new materials, augmented reality, nanotechnology and biotechnology—has the potential to improve productivity, reduce energy and resource consumption, and hence to protect the environment and increase resource efficiency and effectiveness. This should take into account the societal benefits and the risks of increasing economic marginalization of LDCs by the NIR.

Recommendations for G20 collective actions

1. Help and support Africa and LDCs to better understand the NIR and its impact on inclusive and sustainable industrial development, and formulate industrial development strategies and programmes in line with the trend of the NIR.
2. Support partnerships between companies and research institutes from G20 members and other developing countries on NIR technologies.
3. Support participation of public and private sector representatives from developing countries in the activities of the G20's NIR working group.
4. Support the implementation of the NIR through promoting the uptake of green and clean and smart technologies in Africa and LDCs (for instance, big data use in mining).
5. Support partnerships between companies and research institutes from G20 members and other developing countries on NIR technologies, higher education systems and related NIR clusters.

Annex 1

Statistical tables and figures

Annex table 1.1

Population projections: World, Africa and LDCs, 2015, 2030 and 2050 (thousands)

	2015	2030	2050
World	7,349,472	8,500,766	9,725,148
Africa	1,186,178	1,679,301	2,477,536
African LDCs	615,371	921,916	1,440,177
African non-LDCs (Sub-Saharan Africa)	346,915	474,937	683,055
African non-LDCs (Northern Africa)	223,892	282,448	354,304
Non-African LDCs	338,786	403,778	456,744
LDCs	954,158	1,325,694	1,896,921
Africa and LDCs	1,524,965	2,083,079	2,934,280
Share in world population (%)	21	25	30

Source: UNIDO calculations based on UNDESA 2015.

Annex table 1.2

Technology composition of manufacturing value added, by development group, region and income, 1990, 2000, 2010 and 2013

	1990			2000			2010			2013		
	Resource based	Low tech	Medium and high tech	Resource based	Low tech	Medium and high tech	Resource based	Low tech	Medium and high tech	Resource based	Low tech	Medium and high tech
World	33.0	22.5	44.6	32.0	24.0	44.1	28.1	26.0	46.0	28.0	25.3	46.7
Industrialized countries	32.0	21.8	46.3	29.0	22.1	49.0	25.7	23.3	51.1	25.7	24.2	50.1
Developing and emerging industrial economies	39.5	26.9	33.6	45.5	30.3	24.2	31.6	30.0	38.6	36.6	29.4	34.0
By development group												
Emerging industrial countries	38.3	26.5	35.3	36.2	27.4	36.5	31.0	29.6	39.5	36.0	28.4	35.5
Least developed countries	71.5	12.1	16.4	71.1	14.2	14.7	67.5	24.1	8.4	66.8	24.3	8.9
Other developing countries	47.8	31.9	20.4	55.6	33.4	11.0	39.8	31.4	29.0	35.7	34.4	29.8
By region												
Africa	42.2	36.1	21.7	44.0	33.0	23.1	45.0	31.6	23.5	44.7	32.9	22.4
South Africa	36.6	35.5	27.8	38.0	35.7	26.3	38.6	34.9	26.6	41.3	34.3	24.4
Asia and Pacific	29.8	24.2	46.1	34.5	26.2	39.5	26.0	27.0	47.0	25.1	25.6	49.3
China	36.1	26.1	37.8	31.4	25.7	42.9	28.6	30.0	41.4	28.6	30.0	41.4
India	31.4	28.6	40.0	31.4	27.5	41.2	22.7	38.1	39.2	21.2	38.0	40.8
Europe	34.8	25.0	40.3	31.0	25.1	44.0	28.7	25.0	46.3	27.9	25.5	46.6
Poland	35.9	30.4	33.7	43.2	27.5	29.3	32.7	28.2	39.1	34.8	28.1	37.1
Turkey	35.5	38.1	26.3	41.1	30.9	28.0	40.2	27.1	32.7	40.2	27.1	32.7
Latin America	34.3	24.8	40.9	37.8	24.3	38.0	36.2	29.3	34.6	37.9	29.1	33.0
Mexico	31.1	26.8	42.1	36.6	20.8	42.6	33.4	29.9	36.9	33.2	29.9	37.0
By income												
High income	42.8	27.9	29.3	34.3	39.7	26.0	33.7	31.6	34.7	33.0	29.3	37.6
Upper middle income	37.8	27.2	35.0	35.7	27.5	36.8	30.9	29.8	39.3	37.0	29.4	33.6
Lower middle income	46.7	25.7	27.6	56.2	32.0	11.8	35.4	31.6	33.0	34.9	29.7	35.4
Low income	70.6	12.1	17.4	69.5	14.8	15.8	63.2	26.1	10.7	64.6	26.0	9.4

Note: Tech classification based on Table 7.4. Regional, development level and income classification based on Annex B1 and Annex B5, Table B5.1.
Source: UNIDO elaboration based on INDSTAT2 (UNIDO 2015g).

Annex table 1.3

World manufacturing exports by development group, region and income, 1995, 2000, 2005, 2010 and 2013 (current US$ billion)

	1995	2000	2005	2010	2013
World	3,901	5,079	8,130	11,409	13,866
Industrialized countries	3,218	4,015	5,967	7,579	8,929
Developing and emerging industrial economies	683	1,064	2,163	3,831	4,937
By development group					
Emerging industrial countries	653	938	1,944	3,451	4,526
Least developed countries	7	14	24	49	39
Other developing countries	24	113	195	330	372
By region					
Asia and Pacific	346	566	1,291	2,509	3,371
Europe	83	127	302	483	620
Latin America	213	309	460	632	733
Africa	41	62	110	207	212
By income (world)					
High income	3,407	4,221	6,225	7,914	9,269
Upper middle income	417	669	1,570	2,872	3,771
Lower middle income	72	178	313	578	794
Low income	6	12	22	45	33

Note: Regional, development level and income classification based on Annex B1.
Source: UNIDO elaboration based on United Nations Comtrade database (UNSD 2015a).

Annex table 1.4

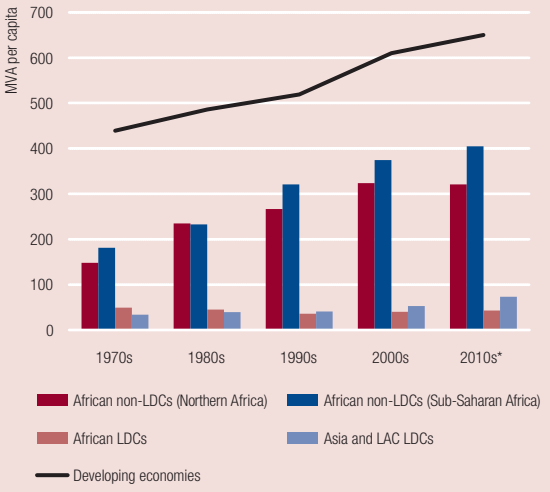
Industrial competitiveness ranking and selected indicators for LDCs and world ranking comparison, 2013

Group ranking 2013	World ranking 2010	World ranking 2013	Country	MVA per capita (2005 $) 2013	Manufactured exports per capita (current $) 2013	Impact of a country on world MVA (percent) 2013	Impact of a country on world manufactures trade (percent) 2013
1	80	77	Bangladesh	118.28	152.13	0.21	0.19
2	93	90	Cambodia	146.84	428.64	0.03	0.05
3	103	106	Senegal	98.86	117.20	0.02	0.01
4	114	109	Zambia	76.93	182.34	0.01	0.02
5	133	120	Mozambique	50.95	44.62	0.02	0.01
6	116	121	Tanzania, United Rep. of	43.04	32.95	0.02	0.01
7	121	123	Madagascar	37.22	42.51	0.01	0.01
8	134	126	Niger	18.40	66.96	0.00	0.01
9	125	127	Yemen	59.45	36.04	0.02	0.01
10	124	128	Nepal	26.32	23.97	0.01	0.01
11	130	129	Uganda	27.28	17.28	0.01	0.01
12	135	134	Haiti	50.58	6.19	0.01	0.00
13	131	135	Malawi	22.59	22.21	0.00	0.00
14	136	136	Rwanda	22.03	26.96	0.00	0.00
15	139	138	Ethiopia	13.33	6.81	0.01	0.01
16	138	139	Central African Republic	15.92	4.96	0.00	0.00
17	142	141	Eritrea	10.91	0.44	0.00	0.00
18	141	141	Gambia	22.53	0.64	0.00	0.00

Note: MVA is manufacturing value added. Red indicates a fall in the rankings from year 2010, while blue is a rise. Group ranking is based on CIP ranking for 2013.
Source: UNIDO elaboration based on Competitive Industrial Performance index database (UNIDO 2015a).

Annex figure 1.1

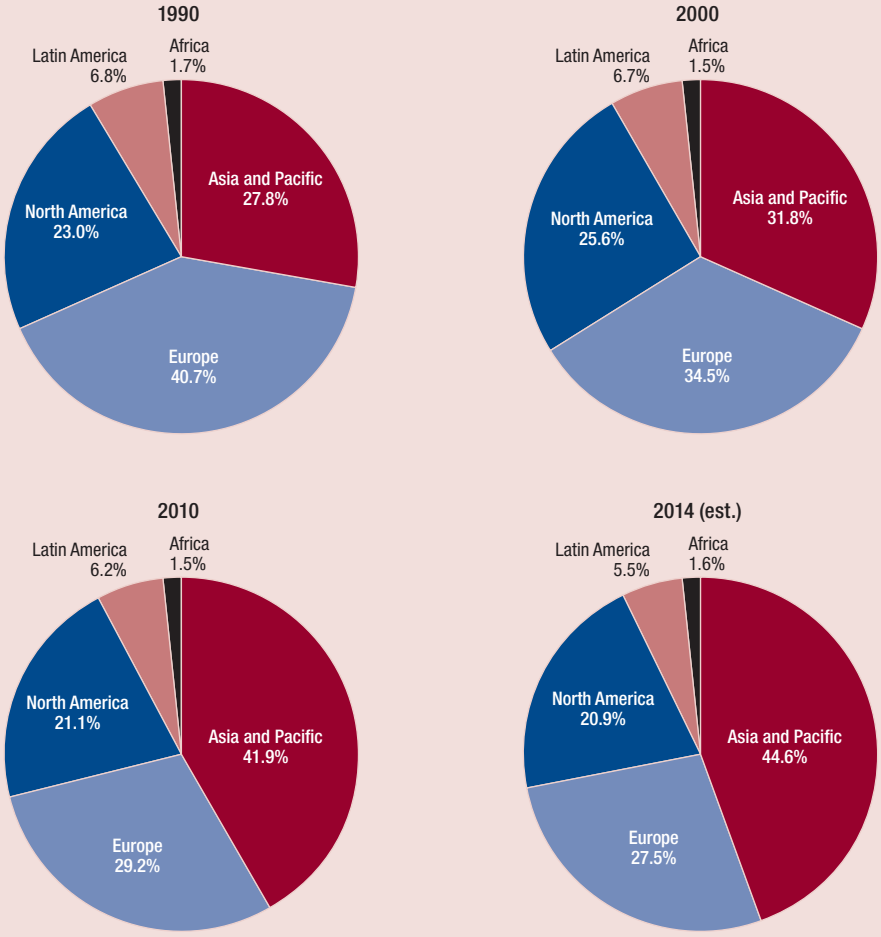
MVA per capita by country group, decade averages



Note: Unweighted averages. The last period covers only four years (2010–2014). The aggregate of developing economies includes Africa, Asia (excluding Japan), Latin America and the Caribbean and Oceania (excluding Australia and New Zealand).
Source: UNIDO calculations based on United Nations Statistics Division (UNSD) Data Main Aggregates Database.

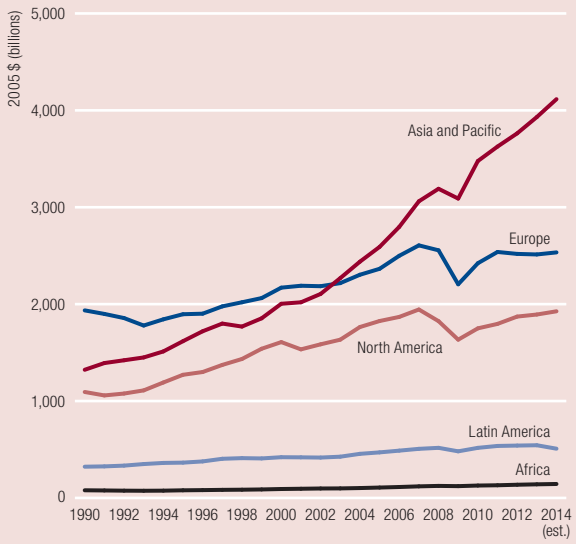
Annex figure 1.2

Manufacturing value added by country groups and regions in global total, 1990, 2000 and 2014



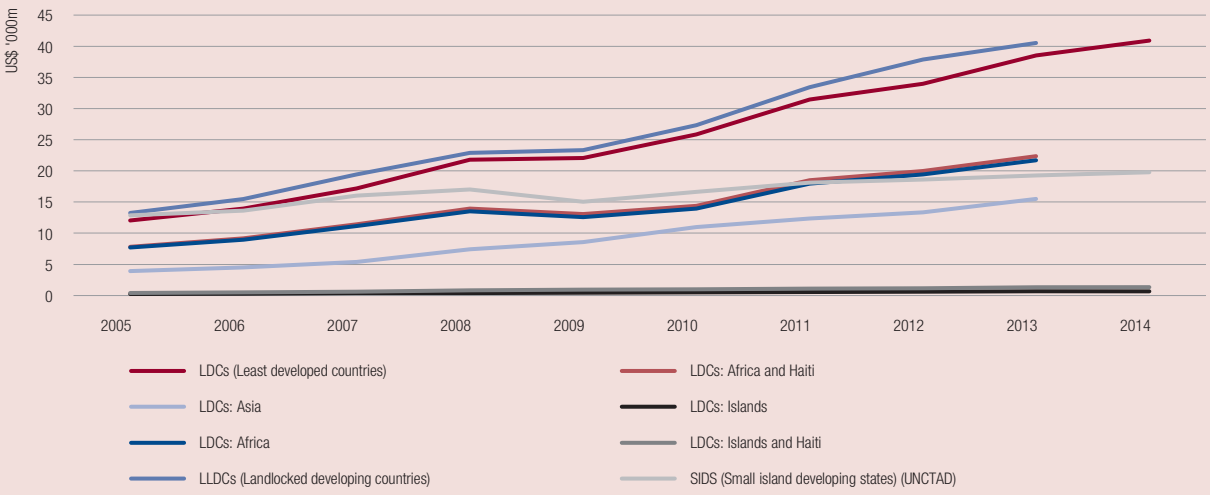
Source: UNIDO 2016.

Annex figure 1.3
Regional trends in manufacturing value added, 1990–2014



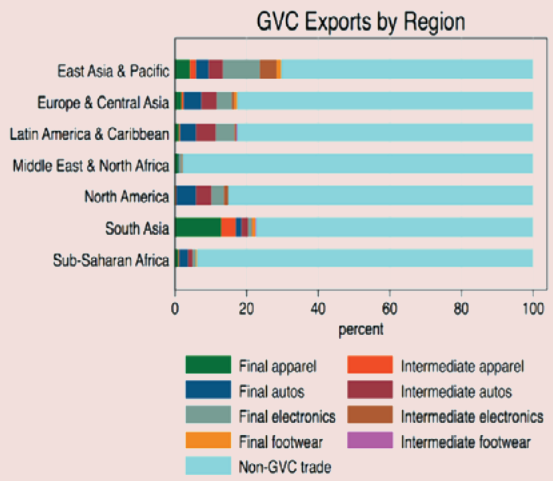
Note: Regional classification based on Annex B1, Table B1.1.
Source: UNIDO elaboration based on Manufacturing Value Added Database (UNIDO 2015e).

Annex figure 1.4
Exports of services (US$ billion)



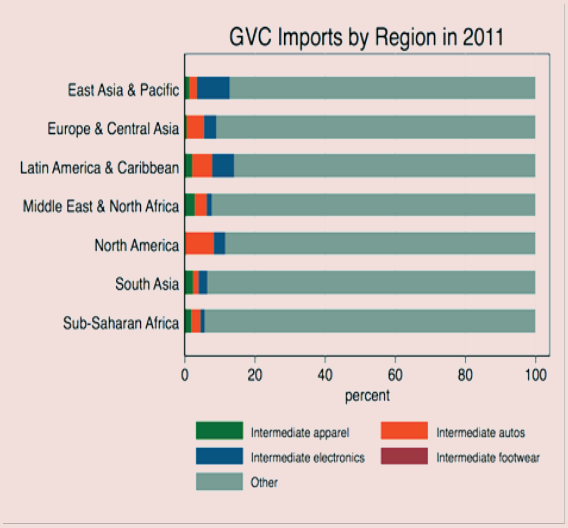
Source: UNCTAD data.

Annex figure 1.5
GVC exports by region, 2011



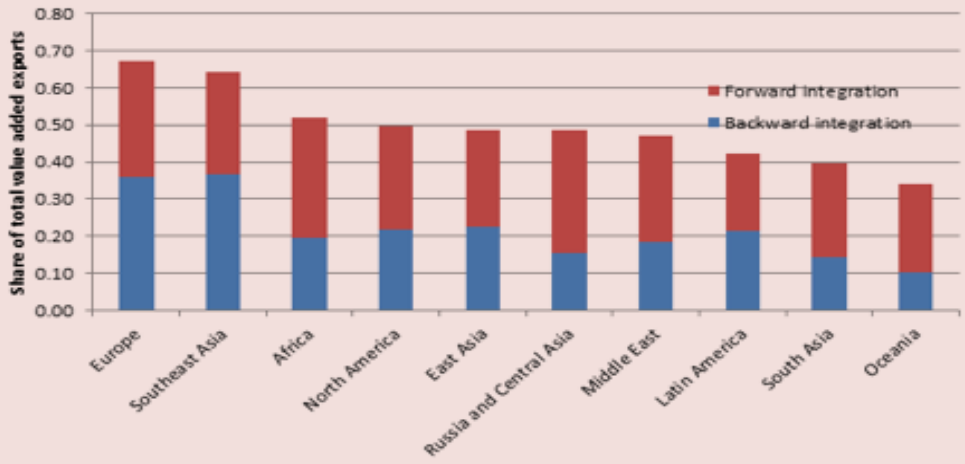
Source: Sturgeon and Memedovic 2011.

Annex figure 1.6
GVC imports by region, 2011



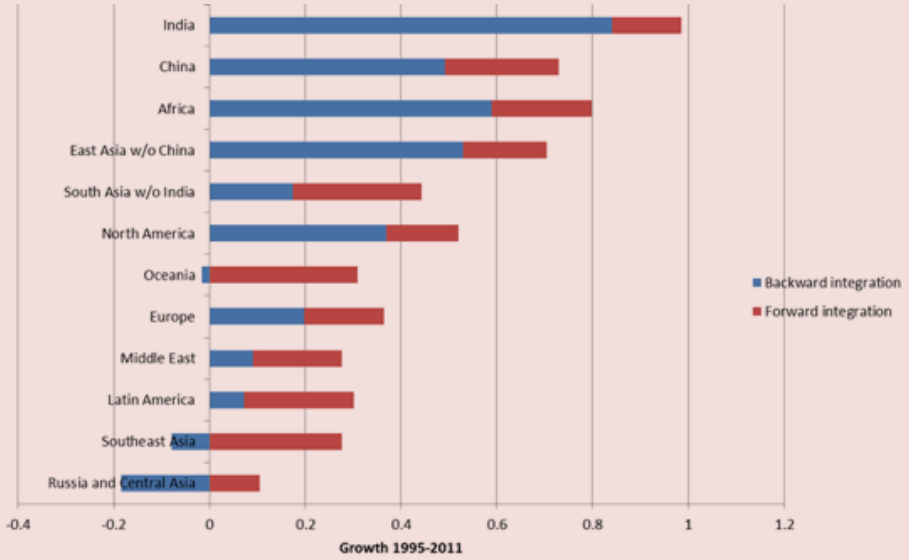
Source: Sturgeon and Memedovic 2011.

Annex figure 1.7
Integration of world regions into GVCs, 2011



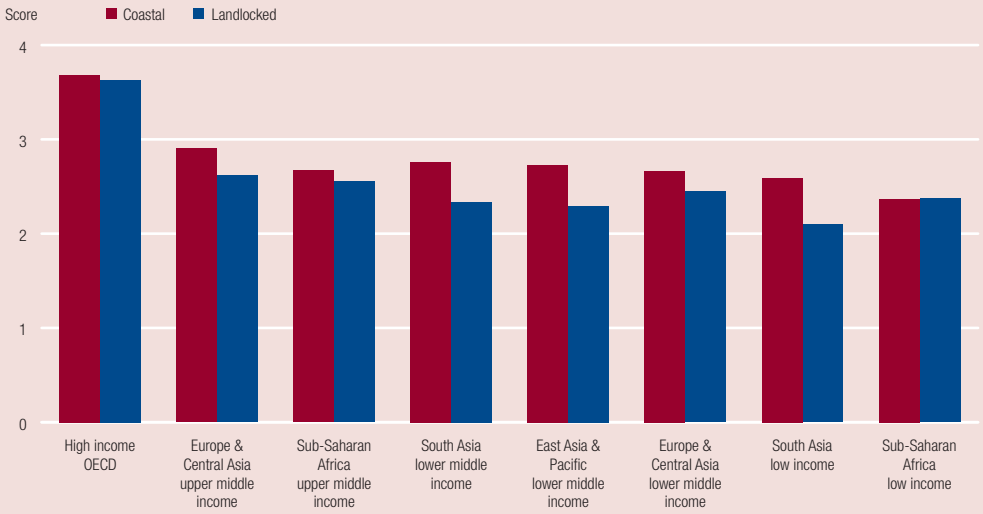
Note: Backward integration is measured by the share of foreign value added embedded in a country's exports. Forward integration is measured by the share of a country's exported value added that is further exported by the importing country.
Source: AfDB, OECD and UNDP 2014; OECD calculations based on UNCTAD-EORA GVC database (2014).

Annex figure 1.8
% growth of GVC integration, 1995–2011



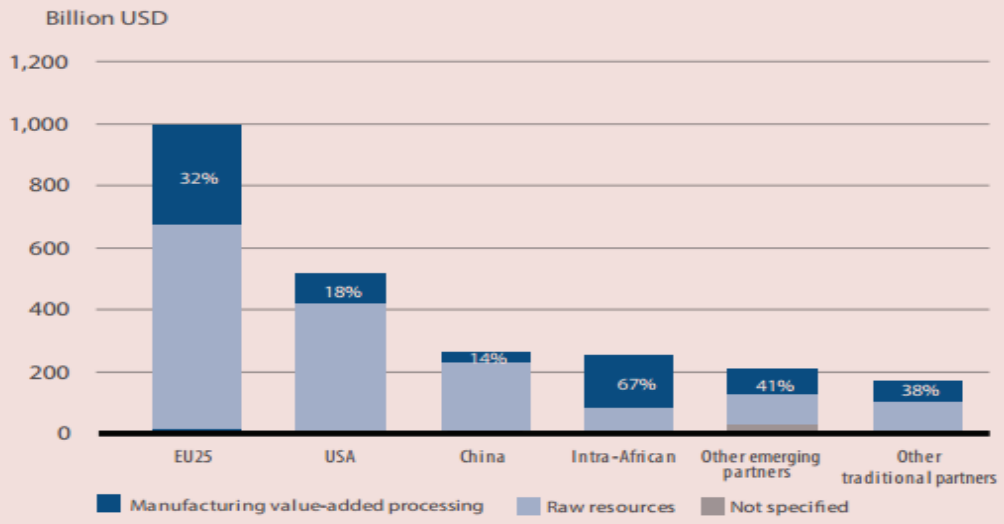
Source: AfDB, OECD and UNDP 2014; OECD calculations based on UNCTAD-EORA GVC database (2014).

Annex figure 1.9
Overall Logistics Performance Index 2007–2014, by coastal and landlocked countries and by World Bank region and income group



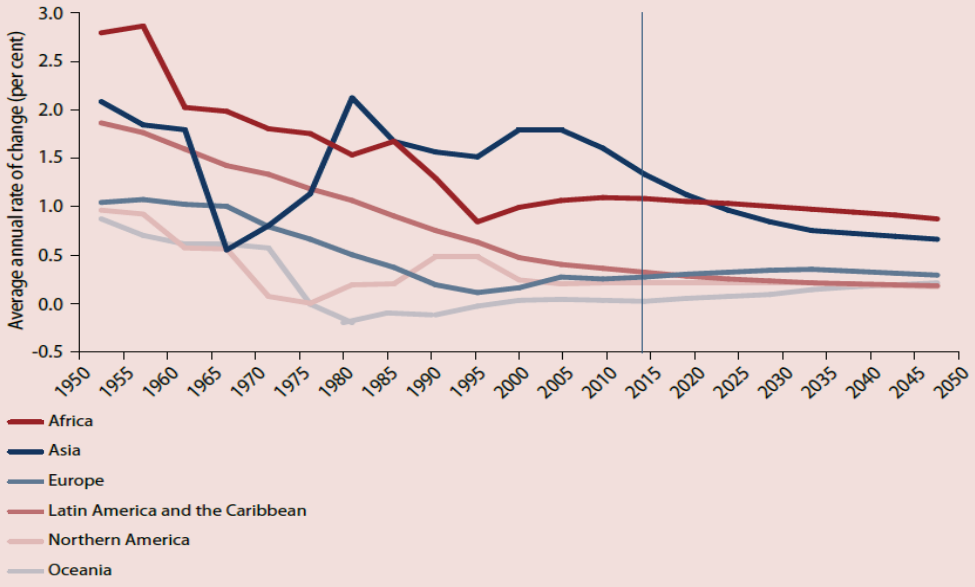
Source: World Bank Group Logistics Performance Index 2007, 2010, 2012 and 2014.

Annex figure 1.10
Manufacturing intensity, by main destination of Africa's exports, 2005–2010 (%)



Source: AfDB, OECD and UNDP 2014.

Annex figure 1.11
Regional urbanization trends



Source: UNDESA 2014.

Annex 2

Impact of industrialization among African and non-African least-developed countries on the rest of the world

Investment, consumption and trade

The industrialization of African and non-African least-developed countries (LDCs) will have a small demand impact for the global economy that could have a minor impact in maintaining the global recovery.

As seen in the text, structural shifts towards the manufacturing sector act as an engine of growth, fostering productivity, capital accumulation and average incomes. Africa's and LDCs' industrialization is thus expected to increase average per capita investment and consumption and investment in these countries.

Historical evidence suggests that increases in the share of manufacturing in GDP are positively correlated with the levels of per capita investment and consumption and investment (annex figure 2.1).

According to the figure, for every point of increase in the share of manufacturing in GDP (within the relevant range for African and other LDCs), per capita investment would increase by US$66 and per capita consumption would increase by US$190.

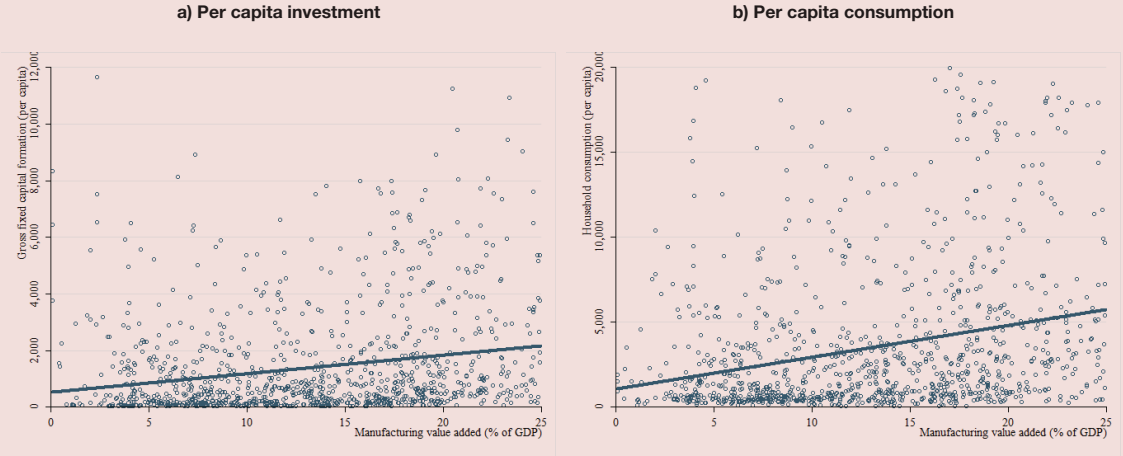
This boost in investment and consumption, in turn, would increase their requirements of imported capital and consumer goods from other regions of the world, notably G20 economies, which are the African and other LDCs' main source of capital and consumption goods (annex figure 2.2).

Increased production of capital and consumer goods in G20 economies and in Africa and LDCs will also put into motion several multiplier effects, generating further demand for intermediate inputs, augmenting incomes and increasing employment.

In what follows we present simple simulations for the effects that this process would have on G20 economies based on multi-regional input-output techniques.

Annex figure 2.1
Investment, consumption and industrialization, 1970–2014

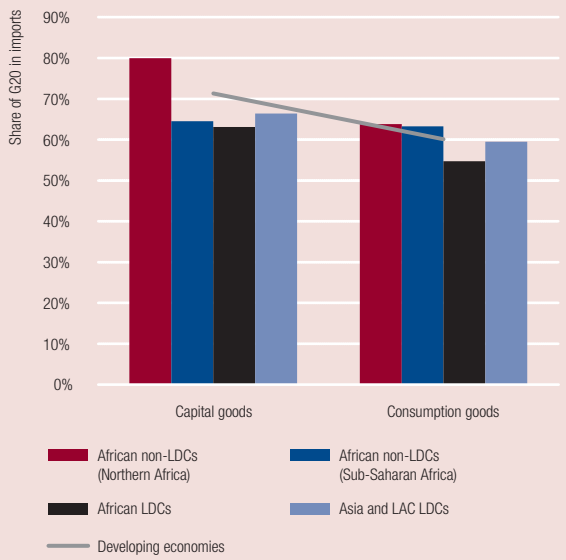
Countries with incomes below US$25,000 (international, 2005)



Note: 5-year averages. Investment and consumptions figures at 2013 constant dollars.
Slope for per capita investment (panel a) = US$66;
Slope for per capita consumption (panel b) = US$190.
The figure considers only countries with per capita incomes below US$25,000 (2005, international) and manufacturing shares below 25 per cent of GDP.
Source: Authors' calculations based on UNSD Main Aggregates Database.

Annex figure 2.2

Share of G20 economies in total imports of capital and consumption goods in Africa and LDCs, 2013



Note: Unweighted averages. The aggregate of developing economies includes Africa, Asia (excluding Japan), Latin America and the Caribbean and Oceania (excluding Australia and New Zealand).

Source: UNIDO calculations based on UN Comtrade.

Assuming that the final goal is to increase the average manufacturing shares of these economies up to 15 per cent of GDP, and taking into consideration the relationship between industrialization, investment and consumption presented above, the following tables provide estimates for the impact that this would generate in the aggregate demand for investment and consumption coming from these economies.

Annex 3

Country classifications

Total LDCs: 48

LDCs in Africa: 34 (Angola, Benin, Burkina Faso, Burundi, Central African Republic, Chad, Comoros, Democratic Republic of Congo, Djibouti, Equatorial Guinea, Eritrea, Ethiopia, Gambia, Guinea, Guinea-Bissau, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mozambique, Niger, Rwanda, São Tomé and Príncipe, Senegal, Sierra Leone, Somalia, South Sudan, Sudan, Tanzania, Togo, Uganda, Zambia)

LDCs in Asia and the Pacific: 13 (Afghanistan, Bangladesh, Bhutan, Cambodia, Kiribati, Laos, Myanmar, Nepal, Solomon Islands, Timor-Leste, Tuvalu, Vanuatu, Yemen)

LDCs in Latin America: 1 (Haiti)

54 African Countries (48 in Sub-Saharan Africa and 6 in North Africa),

- 34 LDCs
- 27 are Low-Income Countries (LICs)
- 26 are Middle-Income Countries (MICs)
- 1 is a High-Income Country (HIC)

Out of which

- 16 are Landlocked Developing Countries (LLDCs)
- 6 are Small Island Developing States (SIDSs)

Sub-Saharan Africa (48):

- Angola (MIC, LDC)
- Benin (LDC)
- Botswana (MIC, LLDC)
- Burkina Faso (LDC, LLDC)
- Burundi (LDC, LLDC)
- Cabo Verde (MIC, SIDS)
- Cameroon (MIC)
- Central African Republic (LDC, LLDC)
- Chad (LDC, LLDC)
- Comoros (LDC, SIDS)
- Congo, Republic of the (MIC)
- Congo, Democratic Republic (LDC)
- Côte d'Ivoire (MIC)
- Djibouti (MIC, LDC)
- Equatorial Guinea (MIC, LDC)
- Eritrea (LDC)
- Ethiopia (LDC, LLDC)
- Gabon (MIC)
- Gambia (LDC)
- Ghana (MIC)
- Guinea (LDC)
- Guinea-Bissau (LDC, SIDS)
- Kenya (MIC)
- Lesotho (LDC, LLDC, MIC)
- Liberia (LDC)
- Madagascar (LDC)
- Malawi (LDC, LLDC)
- Mali (LDC, LLDC)
- Mauritania (LDC, MIC)
- Mauritius (MIC, SIDS)
- Mozambique (LDC)
- Namibia (MIC)
- Niger (LDC, LLDC)
- Nigeria (MIC)

- Rwanda (LDC, LLDC)
- São Tomé and Príncipe (LDC, SIDS, MIC)
- Senegal (LDC)
- Seychelles (HIC, SIDS)
- Sierra Leone (LDC)
- Somalia (LDC)
- South Africa (MIC)
- South Sudan (LDC, LLDC)
- Swaziland (LLDC, MIC)
- Tanzania (LDC)
- Togo (LDC)
- Uganda (LDC, LLDC)
- Zambia (LDC, LLDC, MIC)
- Zimbabwe (LLDC)

North Africa (6):

- Algeria (MIC)
- Egypt (MIC)
- Libya (MIC)
- Morocco (MIC)
- Tunisia (MIC)
- Sudan (LDC, MIC)

Annex 4

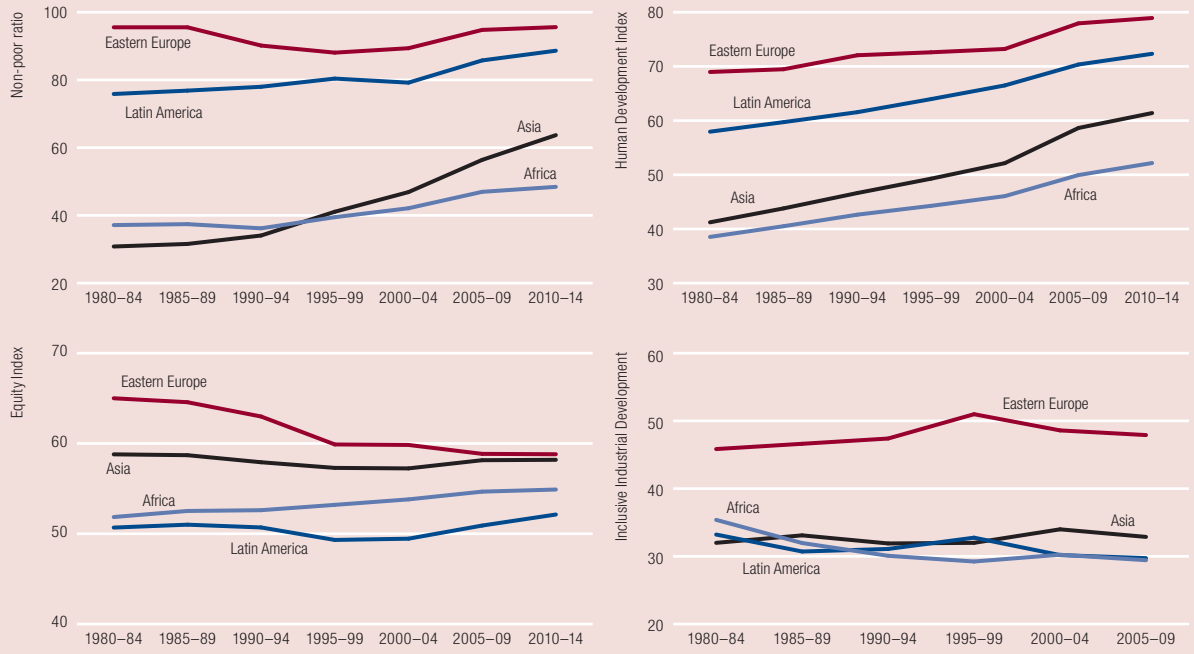
Indicators of social inclusiveness

Competition among countries to attract foreign direct investment–led technological industrialization can lead to a "race to the bottom" on taxes, labour safety regulations or environmental rules, which could ultimately worsen inequalities and social equity.

Most indicators and regions show positive trends, albeit with variations. As expected, Asia shows the best performance on poverty and human development, with an impressive increase of the Non-Poor Ratio (NPR) and the Human Development Index (HDI), especially after 1995. Its outcome on income distribution (the Equity Index and the Inclusive Industrialization Development index) is not so positive.

Africa also shows solid gains in poverty, human development and overall income distribution, though inclusive and sustainable industrialization has dropped sharply.

Annex figure 4.1
Main trends in social inclusiveness indicators, by developing region, 1980–2014



Note: Regional values are calculated as unweighted averages over countries with available data for the whole period. Developing countries are countries that in 1990 were not high income according to the World Bank's definition (see Annex A1, Table A1.2). Within these countries are four groups based on location: Africa (including the Middle East), Asia (excluding the former Union of Soviet Socialist Republics [USSR] and the Middle East), Eastern Europe (including the former USSR) and Latin America. Five-year averages are used to maximize the number of observations and minimize the potential effects of extreme years.
Source: Lavopa (2015b).

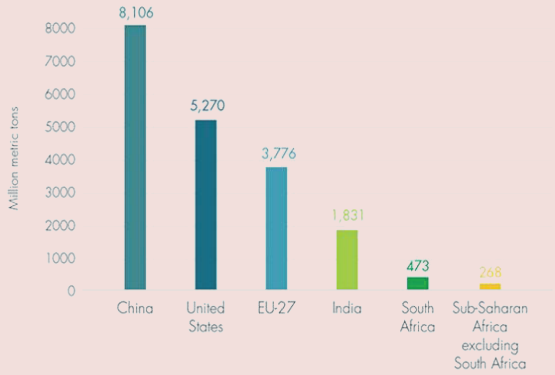
Annex 5

Concerns over environmental sustainability

Pursuing industrialization is a viable development pathway for LDCs only if they tackle sustainability concerns. Industrialization in high- and middle-income countries degraded the environment (annex figure 5.1).[77]

Recent studies indicate that the global ecological footprint (i.e. consumption of resources) is higher than the planet's capacity to regenerate resources.[78] Moreover, in a baseline scenario, greenhouse gas emissions are expected to increase to about 70–90 gigatonnes of carbon dioxide equivalent ($GtCO_2e$) per year in 2050, and in most cases global warming would exceed 4°C by the end of the century.[79] A 2° temperature constraint would be compatible only

Annex figure 5.2
Total CO_2 emissions from consumption of energy (million metric tons, 2012)

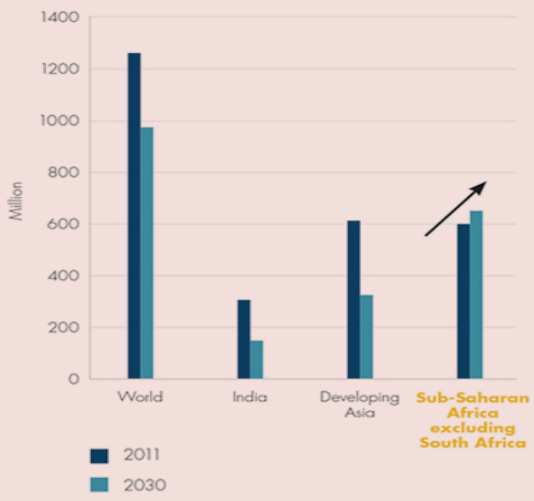


Source: US Energy Information Administration International Energy Statistics.

Annex figure 5.1
Manufacturing CO_2 emissions and real per capita MVA, by country income, 1970–2010

Source: UNIDO 2016.

Annex figure 5.3
Number of people without access to electricity in Sub-Saharan Africa



Source: International Energy Agency 2013.

with a reduction of 18–28 $GtCO_2e$ in emissions. The Intergovernmental Panel on Climate Change shows that industry is crucial for reducing global emissions (2.2–5.5 $GtCO_2e$ per year potential) with a US$50–100/$tCO_2e$ marginal cost.

Annex 6

Kicking off Ethiopia's industrialization

UNIDO's Programme for Country Partnership (PCP) for Ethiopia is a model of partnership for pursuing inclusive and sustainable industrialization at the country level. The PCP brings together actors in a multi-stakeholder platform to coordinate and optimize the contribution of each. The objective of the partnership is to accelerate and deepen the impact of the national industrial development agenda.

The PCP will initially focus on the inclusive and sustainable industrial development of the agro-food sector; leather and leather products sector; and the textiles and apparel sector. Cross-cutting sectors are: institutional capacity-building, investment promotion, industrial zones, trade facilitation, and environment and energy.

Implementation methodologies

Projects and programmes within the three priority sectors and five cross-cutting sectors implemented by UNIDO and other development partners are coordinated through the governing bodies to help ensure that the comparative advantages of diverse development actors are channelled to achieve the inclusive and sustainable industrial development objectives of the government of Ethiopia.

Arrangements for capacity-building and technology transfer

Strengthening the institutional capacity is one of the most important cross-cutting issues as Ethiopia endeavours to capitalize on the large investment flows coming into the country and to achieve its industrial development goals. Through the PCP, UNIDO will work to: (1) strengthen the analytical capacity of the Ministry of Industry in the generation of industrial intelligence and policy (primarily in agro-industries); (2) establish an "industrial observatory" to observe and benchmark industrial practices in other countries to help inform policy and industrial practices in Ethiopia; and, (3) leverage impact for inclusive and sustainable industrial development through South-South and triangular cooperation.

Technology transfer will be facilitated under the PCP primarily through investment in industrial zones and integrated agro-industrial parks, as well as technical interventions by UNIDO and other development partners.

Coordination mechanisms/governance structure

The Programme for Country Partnership for Ethiopia is being implemented within the framework of the Government's Vision 2025 and the Growth and Transformation Plan II (2015–2020).

Evaluation

A mid-term review (during the second year) of the PCP will be carried out with national partners. The review will seek to assess the suitability of the PCP design, examine performance against outcomes and assess the actual delivery against planned outputs—whether outputs are translating into expected outcomes, and whether the strategies and partnerships are effective and efficient. At the end of the fifth year, an in-depth independent evaluation will be carried out.

Notes

1. The definition has shifted over the years, and is now commonly understood to involve a reallocation of resources from low- to high-productivity activities, within and across sectors (McMillan and Rodrik 2011). It also implies a greater use of technology, and interactive and network approach to production system, underpinned by increased productivity across sectors (http://www.uneca.org/es-blog/africa-needs-structural-transformation-not-structural-adjustment). Sustained economic development typically requires a productive agricultural sector to supply the industrial sector (and other sectors of the economy) with cheaper and high-quality agricultural inputs, while releasing savings and labour. The success of the Green Revolution in Asia emphasized a more active role for agriculture in overall development. Balanced growth stresses the importance of agricultural development alongside—not isolated from—industrialization and services.
2. Saint Petersburg Accountability Report on G20 Development Commitments (http://www.g20dwg.org/documents/pdf/view/325/).
3. This was adopted by world leaders (by the 193 UN Member States) at the Third International Conference on Financing for Development held in Ethiopia in July 2015. The Agenda emphasizes the need to mobilize domestic resources, and lays the foundation for implementing the SDGs (http://www.un.org/africarenewal/magazine/december-2015/mdgs-assessment-africa%E2%80%99s-progress#sthash.KZjIAvIN.dpuf).
4. OECD 2014.
5. AfDB-OECD-UNDP-UNECA (2012) African Economic Outlook 2012: Promoting Youth Employment in Africa. AfDB-OECD-UNDP (2013) African Economic Outlook 2013: Structural Transformation and Natural Resources.
6. UNDESA 2015.
7. UNDESA 2015.
8. According to UNCTAD (2015), more than two thirds of people in LDCs live in rural areas, where poverty is also most widespread and deepest, and infrastructure and social provision most lacking.
9. http://unohrlls.org/about-ldcs/
10. World Bank 2016b.
11. http://www.imf.org/external/np/seminars/eng/2013/mic/.
12. http://www.fao.org/docrep/005/x9751e/x9751e05.htm.
13. Over 2000–2015, growth in Africa accelerated to 5 per cent a year.
14. IMF 2012.
15. de Vries et al. 2013.
16. Very few fragile countries have seen significant structural transformation, generally recording low and irregular growth. Ibid.
17. AfDB, UNDP and OECD, forthcoming.
18. AfDB, UNDP and OECD, forthcoming.
19. Sturgeon and Memedovic 2011.
20. AfDB, OECD and UNDP 2014.
21. AfDB, OECD and UNDP 2014.
22. http://www.tradeforum.org/article/opportunities-and-pitfalls-of-ldcs-in-value-chains/.
23. Sturgeon and Memedovic 2011.
24. AfDB, OECD and UNDP 2014.
25. A proxy for participation in GVCs is international trade flows of products within the same industry sector—intra-industry trade (IIT). For predicting countries' economic trajectories, IIT has advantages over inter-industry trade (the import and export of different types of goods) because growth in IIT is associated with expansion in trade through greater specialization and economies of scale rather than comparative advantage (Kawecka-Wyrzykowska 2009).
26. AfDB, OECD and UNDP 2014.
27. AfDB, OECD and UNDP 2014.
28. AfDB, OECD and UNDP 2014.

29. AfDB, OECD and UNDP 2014.
30. Ceglowski et al. 2015.
31. AICD Report of the World Bank and AfDB.
32. Including clearance and delivery of imports and exports, transparency of customs clearance and other border agencies, the provision of timely and adequate information on regulatory changes, and expedited customs clearance for traders with high compliance levels.
33. Doing Business measures the time and cost (excluding tariffs) associated with three sets of procedures—documentary compliance, border compliance and domestic transport—within the overall process of exporting or importing a shipment of goods (http://www.doingbusiness.org/data/exploretopics/trading-across-borders/what-measured).
34. ICA 2013.
35. Huria and Brenton 2015.
36. UNCTAD Stat database 2015.
37. UNECA 2015.
38. UNECA 2015.
39. Africa has eight regional economic communities, often with overlapping memberships, as 39 African countries are members of more than one REC.
40. Huria and Brenton 2015.
41. According to the World Bank's *Africa Poverty Report* of 2016, the latest estimates of the share of the African population in extreme poverty declined from 56 per cent in 1990 to 43 per cent in 2012. At the same time, Africa's population continued to expand rapidly and the number of people living in extreme poverty increased. There were still more people in Africa living in poverty in 2012 (more than 330 million) than in 1990 (about 280 million).
42. Women also generally bear the brunt of unpaid care work and get lower wages. Girls suffer more than boys from a truncated education, and are more likely to enter into informal unskilled labour and are more often victims of exploitation, violence or early marriage.
43. OECD 2015.
44. UNIDO 2015.
45. IMF 2015.
46. UNIDO calculations based on Trends Econometric Models Database (ILO 2015).
47. World Bank 2012.
48. http://www.unep.org/dewa/africa/docs/en/TRACKIKNG.pdf.
49. http://www.unep.org/newscentre/default.aspx?DocumentID=26816&ArticleID=35021.
50. European Parliamentary Research Service 2016.
51. European Parliamentary Research Service 2016.
52. Although this may be difficult for smallholders with little market information or access to these markets.
53. Roepstorff, Wiggins and Hawkins 2011.
54. World Bank 2007; FAO and UNIDO 2009.
55. FAO and UNIDO 2009.
56. *The Economist*, 16 April 2016 (http://www.economist.com/news/special-report/21696791-kenyas-flower-export-business-rare-success-coming-up-roses).
57. FAO RAF presentation, 2015.
58. Forward linkages are created as agricultural processing technology develops and the quality of agricultural products increases, increasing value added and attracting more tourists. Backward linkages are established as the tourism industry develops and more tourists are attracted to the rural areas, increasing demand for processed agricultural products and further developing the agricultural sector and expanding demand for transport and other services.
59. In a comprehensive meta-analysis, Havranek and Irsova (2011) consider 3,626 estimates from 55 studies to find positive and economically important "backward vertical spillovers" from multinationals on local suppliers in downstream sectors. In a very recent study analysing data for 165 countries between 2000 and 2011, Kummritz et al. (2016) find that the correlation of manufacturing GDP with backward GVC linkages is significantly higher for upper middle-income countries

than for low-income economies. This suggests that externalities (e.g. through technology spillovers) in manufacturing are positively associated with economic development in the FDI recipient country.

60. Lall 2000; Humphrey and Schmitz 2002.
61. Africa is leapfrogging in many ways to the latest information and communications technology. In a continent that had almost no banking system until recently, almost everyone now banks by mobile phone.
62. OECD/ WTO/World Bank. 2013. Global value chains: Challenges, opportunities and implications for policy (https://www.oecd.org/tad/gvc_report_g20_july_2014.pdf).
63. World Bank 2008.
64. Globally, an estimated 445 million ha of land are uncultivated and available for farming: about 201 million ha in Sub-Saharan Africa, 123 million ha in Latin America, and 52 million ha in Eastern Europe. See Deininger et al. (2011).
65. Cattaneo et al. 2013; López González and Holmes 2011.
66. Arvis et al. 2007; Sturgeon and Memedovic 2011.
67. Schmitz 2004.
68. Kaplinsky 2013.
69. UNIDO 2015.
70. Scherer 1991; Audretsch 2002.
71. Many of the recommendations apply equally to non-African LDCs.
72. New interventions on industrialization in Africa with existing national and regional frameworks are also articulated in the African Union's agenda on Accelerated Industrial Development in Africa (AIDA), Agenda 2063 and the First 10-Year Implementation Plan of Agenda 2063. Regional initiatives—like the Program for Infrastructure Development in Africa (PIDA), New Partnership for Africa's Development (NEPAD), African Mining Vision, Presidential Infrastructure Champion Initiatives (PICI), Boosting Intra-African Trade (BIAT), Continental Free Trade Agriculture Development Program (CAADP) Area (CFTA) and Comprehensive African —are critical in view of the catalytic role of intra-Africa trade in fostering Africa's industrialization and enforcing environmental sustainability and climate resilience. In addition, the United Nations passed a resolution at its 70th session on 25 July 2016 proclaiming the period 2016-2025 as the Third Industrial Development Decade for Africa (IDDA). The resolution calls for concerted efforts among stakeholders to support Africa's industrialization endeavours.
73. Public procurement can also be a tool for promoting domestic diversification of production and market development, steering the market towards sustainable production and consumption and incentivizing corporate sustainability standards.
74. These include foreseeing the skills needed for trade and economic diversification; engaging employers and workers in decisions about training provision; making training accessible to all sectors of society, including women and youth participation; ensuring that financing mechanisms are supportive; improve access to universal basic education and ensure quality; investing in technical and vocational training programmes; building local talent through talent exchange and training with developed and developing countries in the fields of smart manufacturing, industrial software and green and clean manufacturing; and encouraging collaboration with local R&D institutes to foster coherence and greater impact of capacity development for agricultural innovation systems in tropical countries
75. The G20 DWG can consider advocating the implementation of the decision on services waivers.
76. UNCTAD 2015b.
77. UNIDO 2016.
78. UNIDO 2016.
79. UNEP 2015.

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