UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

Sudan

Industrial Diagnostic Study 2021

In collaboration with Global Policy Incubator.

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Glossary

AfCFTA African Continental Free Trade Area.
ATMs Automated Teller Machines.

CAGR Compound Annual Growth Rate.
CBOS Central Bank of Sudan.
CBS Central Bureau of Statistics.
CEDAW Convention on Elimination of All Forms of Discrimination Against Women.
CIP Competitive Industrial Performance Index.
CO2 Carbon dioxide.
COMESA Common Market for Eastern and Southern Africa.

DMC Domestic Material Consumption.

EDC Entrepreneurial Development Committee.
EU European Union.

FDI Foreign Direct investment.

GDP Gross Domestic Product.
GHI Global Horizontal Irradiance.
GPI Global Policy Incubator.

HCIPSD Higher Council for Investment & Private Sector Development.
HIPC Heavily Indebted Poor Countries.
HS Harmonized Commodity Description and Coding System, short *"Harmonized System"*).

IES Industry Export Specialization.
IIAG Ibrahim Index of African Governance.
ILO International Labour Organization.
ILOSTAT International Labour Organization, Department of Statistics.
IMF International Monetary Fund.
ISIC International Standard Industrial Classification.
ITC International Trade Centre.
ITPO Investment and Technology Promotion Office.

LI Low-income countries.
LMI Lower middle-income countries.
LPI Logistics Performance Index.
LUP Latent Untapped Potential.

M&E Monitoring and Evaluation System.
MED Sudan Ministry of Electricity and Dams.
MHT Medium High Tech.
MoPE Ministry of Petroleum and Energy.
MSMEs Micro, Small and Medium-sized Enterprises.
MTN Multi-Lateral Trade Negotiations.
MVA Manufacturing Value Added.

OECD Organisation for Economic Co-operation and Development.

PPP Purchasing Power Parity.
PPPL Public-Private Partnership Law.

R&D Research and Development.
RCA Revealed Comparative Advantage.

SDG Sustainable Development Goals.
SEDC Sudan Electricity Distribution Company.
SEHC Sudan Electricity Holding Company.
SETC Sudan Electricity Transmission Company.
SEZ Special Economic Zones.
SHREC Sudan Hydro and Renewable Energy Company.
SMEs Small and Medium-sized Enterprises.
SSA Sub-Saharan Africa.
STPG Sudan Thermal Power Generation Company.

TVET Technical and Vocational Education and Training.

UAE United Arab Emirates.
UNCTAD United Nations Conference on Trade and Development.
UNDESA United Nations Department of Economic and Social Affairs.
UNDP United Nations Development Programme.
UNESCO United Nations Educational, Scientific and Cultural Organization.
UNIDO United Nations Industrial Development Organization.
UNSD United Nations Statistics Division.
USA United States of America.
USAID United States Agency for International Development.

VTCs Vocational Training Centers.
VTECs Vocational Training and Employment Centres.

WBES World Bank Enterprise Survey.
WGI World Bank Worldwide Governance Index.
WIPO World Intellectual Property Organization.
WITS World Integrated Trade Solution.

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Executive Summary

The aim of this report is the analysis of the performance of Sudan's industrial sector over the past years. In particular, the report sheds light on the development potentials and obstacles for industries in Sudan and proposes recommendations for further action.

Sudan's industrial sector is still at an infant stage. The industrial sector contributes with over 30% to the gross domestic product (GDP). This significant share is, however, largely a result of the dominant mining sector. A structural transformation towards more manufacturing and an increasing processing of existing natural resources has not started yet. The share of manufacturing has been relatively stable at around 7% of GDP and is mainly constituted by the production of gold. Most of the manufacturing activities are still resource-based and/or remain on basic levels of processing.

Sudan has a large domestic market, which gives reason to believe that many Sudanese manufacturers orient their production towards domestic sales instead of benefiting from exporting their products abroad. In general, Sudan's global market integration is relatively limited, which is reflected by a small share of only 4% of exports in GDP and a high concentration of export products and markets. In 2019, the top five export products (mainly gold, crops and crude petroleum) accounted for over 90% of total exports. In the same year, more than 90% of manufactured exports go to only two foreign markets, the United Arab Emirates and China.

These and more detailed analyses in Section 1 of this report draw a picture of a manufacturing sector in Sudan that still lacks a positive development dynamic and lags behind the average of the COMESA region and, in particular, the chosen role model countries. However, the report simultaneously highlights the favorable endowments of Sudan for growing manufacturing and the positive contributions that a growing industrial sector could make to the overall development of the country in the future.

Sudan is characterized by abundant natural resources, including oil and various metals, has vast quantities of land for cultivation, the second-biggest livestock in Africa and sufficient water availability. This offers great opportunities for developing new and deepening existing value chains in manufacturing. Sudan also has a great sustainable energy potential, which - if used in a strategic manner - would allow to leapfrog to clean production and circumvent the adverse environmental effects that usually come along with industrialization. More than other sectors, manufacturing has the potential to create multiple linkages to the rest of the economy, to have positive spill-over effects on the respective communities and to employ large numbers of workers. Depending on the particular sector, these effects can vary significantly. In Section 2, the report provides projections, which sectors in Sudan are the most promising to contribute to economic development and employment generation in the future. A complete overview of identified sub-sectors to potentially be promoted in the short and the long term can be found in Section 2.4.

Sudan has not yet made use of its manufacturing development potential. This is partly due to external conditions, first and foremost, the international sanctions that prevented the country from deepening its global integration. More importantly, the country lacks the institutional environment and basic foundations for industries to evolve. Section 3 analyzes in detail the particular bottlenecks for the manufacturing sector. Macro-economic instability due to hyperinflation, an insufficient regulatory framework, massive constraints in the area of infrastructure, in particular the supply of electricity and transportation, as well as access to finance and informality are among the general factors that hamper industrial development. It is the opportunity of the government to take effective action to overcome these obstacles and to create an environment conducive for industrialization.

In addition, Section 3 reveals that the transitional Government of Sudan is still at a preparatory stage of developing a national Industrial Policy. The document "The New Sudan: Investment Prospectus Sudan 2021" issued by he Ministry of Investments and International Cooperation of Sudan (2021) recognizes the need to go beyond primary production and stresses the importance to deeper integrate the resource-

based sectors into the economy. However, a strategic focus how to develop industries that manifests in a clear vision and comprehensive Industrial Policy strategy are still missing. The recently adopted law on investment is the first step forward to developing a sufficient regulatory framework.

As a young government with largely new staff members, the country would benefit from strengthening its policymaking and technical capabilities. The analytical results in this report reveal a significant decrease of Sudan's policymaking capabilities over time. There is a need to improve the understanding of economic development and industrial policy fundamentals and how to turn them into effective policies in Sudan. Policy decisions must be based on evidence and solid analyses. For this aim, industrial statistics in Sudan should be improved. Given the lack of relevant data, this report uses, inter alia, trade statistics as a proxy for domestic production, which comes with significant limitations. Any solid policy design or monitoring of an industrial policy rely on quality data. Statistical capacities showed improvement between 2012 and 2020; nonetheless, the general capacity level remains very low, in particular related to statistical coverage.

To sum up, the transitional Government of Sudan is given the task and opportunity to shape the future industrial sector in the country. Against the background of the vast potentials and the current infant stage of industries, policy decisions can have a significant impact not only on the industrial but the overall development of Sudan. For an Industrial Policy to be effective, the Government needs to develop an in-depth understanding of the importance of manufacturing, to initiate a close coordination with the private sector and to be strategic in their policy choices for setting the ground towards a structural transformation in the country. Based on the findings of this report, two streams of recommendations can be distinguished, the first relates to capacity building and the second to relevant strategic policy orientations.

Recommendations in the thematic area of governance: Capacity Building for Industrial Policy

The first dimension of recommendations relates to building particular capacities required to design and implement effective policies. The long-term success of any Industrial Policy depends on the progress in building up these capacities within the government and private sector. This diagnostic report provides in Section 3 a detailed assessment of the Government's policy capacities. The following capacity development recommendations are based on the findings of this analysis.

1. **Conceptual capacities:**

   Capacities in economic development foundations, in understanding the importance and varying role of the industrial sector for structural transformation and the overall development of a country and many other related areas present foundational knowledge that is indispensable for designing effective industrial policies.

2. **Policy-management capacities:**

   Capacities in how to set up effective policy-design processes that ensure the alignment of Industrial Policy towards the National Development Goals, determine realistic objectives and targets and translate them into budgeted action plans is key. This includes capacities on the part of the government how to create effective inter-institutional collaboration across ministries and state agencies, and how to involve and create a mutually productive cooperation with the private sector. Strengthening capacities in Industrial Policy on part of the private sector is equally important for ensuring effective advocacy.

3. **Statistical capacities:**

   As of today, there is only limited national data available that gives insight into the actual performance of the industrial sector with respect to value addition and job creation, the firm structure in manufac-

turing or the regional distribution of industries and other relevant indicators. Capacities in how to set up and run an industrial survey according to international standards are very much needed in Sudan.

4. **Analytical capacities:**

   Finally, analytical capacities in how to conduct industrial diagnostics or to set up and run a Monitoring and Evaluation system of the Industrial policy are essential. This includes also strengthening capacities outside the government (business associations, research institutes) to independently create intelligence and critically support the government's work. The analysis conducted in this report is a first step into creating these capacities in Sudan.

Strategic policy orientations

The second dimension of recommendations relates to the content and directions of industrial policy in Sudan. The complexity but also effectiveness of policy approaches suggested in the following increase from recommendation 1 to 3. It is important to note that more complex policy designs require also increased capacities on part of the implementing governmental authorities. Consequently, the policy approach should be chosen according to the given level of capacities within the government.

1. **Macroeconomic stabilization:**

   Ensuring macroeconomic stability is critical for sustained and inclusive development. Large swings in economic activity, high inflation, deteriorating fiscal positions, unsustainable debt levels and volatile exchange rates may put the success of any policy at risk. In particular, combating current hyperinflation should be of high political priority. Monetary and Fiscal Policy are not part of Industrial Policy in a narrow understanding, but key framework conditions for Industrial Policy to be effective.

2. **Harvesting low-hanging fruits and initiating an incremental structural transformation:**

   Given the broad range of obstacles and limited resources available, any Industrial Policy in Sudan has to be selective in its measures. Available resources have to be invested in a careful and strategic manner. Consequently, the initial policy design should be relatively simple and guided by the principle of feasibility. Only policy measures that are being implemented can be effective.

   Therefore, the government is recommended, first, to continue its efforts to create a conducive regulatory framework for industrial companies to operate in. The new law on investment was a step ahead and much appreciated by the private sector. Further legal reform needs should be identified in close consultation with the private sector.

   Second, in Section 1 and more detailed in Section 2, the report analyzed which sub-sectors might in a short and medium term bear attractive development potential. The final selection of sub-sectors to be supported should be mainly driven by, first, the objectives of Industrial Policy and, second, the feasibility of implementation. Industrial Policy objectives can vary. If a country seeks to benefit from global market dynamics and a deeper integration in global trade or puts a focus on increasing value addition through deepening of domestic value chains and sectorial upgrading or mainly wants to increase employment in particular regions, the sectors to be prioritized may fundamentally differ. The feasibility of building up the required industrial capabilities with the given resources should be the second selection criterion. Section 2 provides a framework for selecting sectors that combines both criteria. At the current stage of Sudan's development, it is highly recommended to identify those sub-sectors that may qualify as "low-hanging fruits" and have the highest potential to unfold a positive development dynamic with the least support needed. With respect to evaluating the positive development contributions, the second section of this report can be a good starting point. The projections

suggest for the objective of employment creation that "non-metallic minerals" or "wearing apparel and dressing of leather" are promising sectors. For a deeper integration in international trade "food and beverages" and "jewellery" are sectors, which promise to have positive impacts. These are preliminary results and the final selection of sub-sectors should be part of a structured and stakeholder-engaging process to design the country's Industrial Policy. Such an inclusive and participatory policy design approach includes also the prioritization of policy objectives and assessing the feasibility to build up particular capabilities.

In pursuing this "low-hanging fruit" approach, the government can ensure to be effective in its support and achieve desired positive effects. Embedded in an incremental policy development process, this approach will help the government to deepen its knowledge and experience in designing and implementing effective support measures. This policy approach will not yet pursue long-term targets such as developing new sectors in the country, but a gradual way - based on learning and experimentation – to initiate the first steps of a structural transformation towards more manufacturing.

3. **Developing and implementing more comprehensive industrial policy packages:**

   Once policy-makers have gathered sufficient experiences and basic analytical policymaking and implementation capacities have been institutionalized, more sophisticated and long-term oriented policy designs can be developed.

   Section 2 also identifies sub-sectors that bear development potentials for Sudan in the long term. Exploiting these potentials, however, will likely require longer-term development horizons, more investments and significant efforts in building the required industrial capabilities and, hence, possess also a significantly higher risk to fail. For these policies to be successful, a high degree of collaboration between government and private sector and excellent monitoring and policy adaptation capacities are essential.

Introduction

This comprehensive industrial diagnostic of Sudan is divided into three main sections. Section 1 analyses the industrial development on the macro level. It examines the economic, social and environmental dimensions of Sudan's industrial performance. In the economic dimension, it explores the country's structural transformation path, analyzes the production performance of the manufacturing sector, labor productivity as well as manufactured exports' competitiveness, diversification, value addition and regional economic integration. In addition, it covers key production enablers such as investment and finance. In the social dimension, the report analyzes Sudan's performance in manufacturing employment, gender equality and youth participation. The environmental dimension is divided into three sub-sections. The first sub-section assesses the capacity to produce and distribute electricity, energy efficiency and use of renewable energy as well as energy intensity. In the second sub-section, the reports covers manufacturing emissions, material extraction and efficiency. In the third sub-section, the topic of deforestation is being discussed.

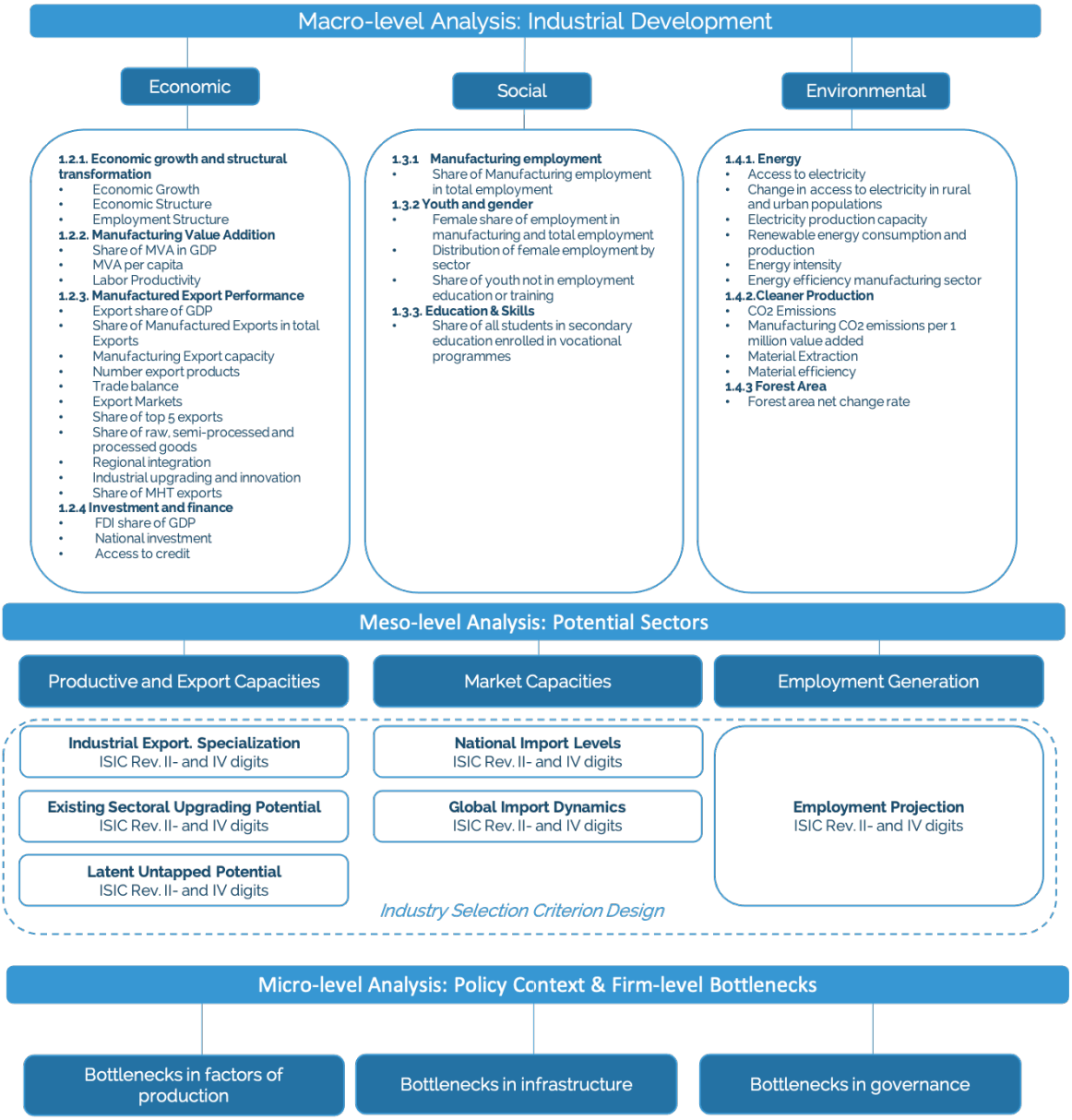
Section 2 focuses on the meso-level as it identifies potential priority sectors and sub-sectors for industrial development. It examines Sudan's export capabilities by looking at the country's Industrial Export Specialization (IES), sectoral upgrading potential of existing sectors, Latent Untapped Potential (LUP), national and international market dynamics, and employment projections of potential sectors.

Section 3 offers a micro-level analysis by using the World Bank Enterprise Survey 2014 for Sudan and other data sources. It identifies key bottlenecks manufacturing firms face in the realms of factors of production, infrastructure and governance. It compares those bottlenecks with manufacturing firms in the COMESA region and provides further insights into the country's challenges. Figure 1 illustrates the structure of the report.

The analyses presented in this report have been developed using statistic data from international databases as well as relevant online resources, academic literature, reports from governmental agencies and international organization. In order to contextualize the findings of this diagnostic study, several consultations with relevant national stakeholders were carried out. Finally, UNIDO conducted the "Sudan Firm Level Survey" in 2021 to understand the private sector's perspective on relevant issues covered in the study. The results have been integrated throughout the report. Details on the UNIDO Survey can be found in Appendix Section C.3.

The results of this analysis are intended to provide general orientation to the Government of Sudan in its effort to boost inclusive and sustainable industrial development, and in particular to shape its Industrial Policy for the future.

Figure 1: Structure of the report



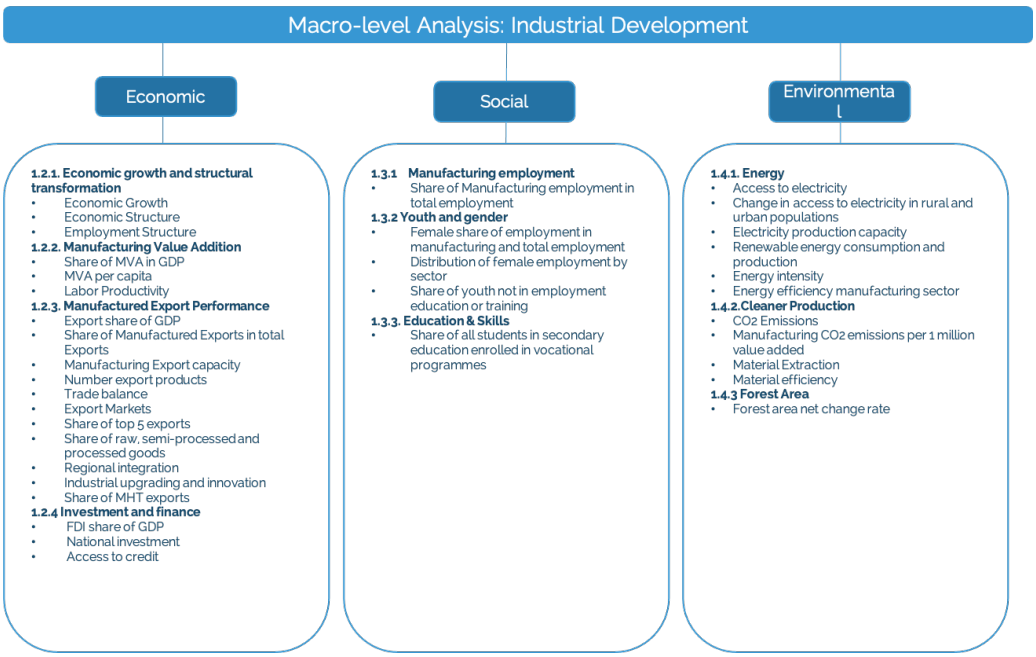
Data source: UNIDO

1 Block 1: Industrial performance

1.1 Structure of the analysis

Section 1 analyzes the industrial performance of Sudan in various dimensions. The aim is to obtain a picture of the country's socio-economic development path and current status. The section is divided into three sub-sections: economic performance, social performance and, environmental performance of the industrial sector. Each analysis is benchmarked against a selected group of comparator countries.[1] Figure 2 provides a visual structure of the macro-level analysis presented in this section.

Figure 2: Structure of Block 1



Elaboration: UNIDO

1.2 Economic performance

1.2.1 Economic growth and structural transformation

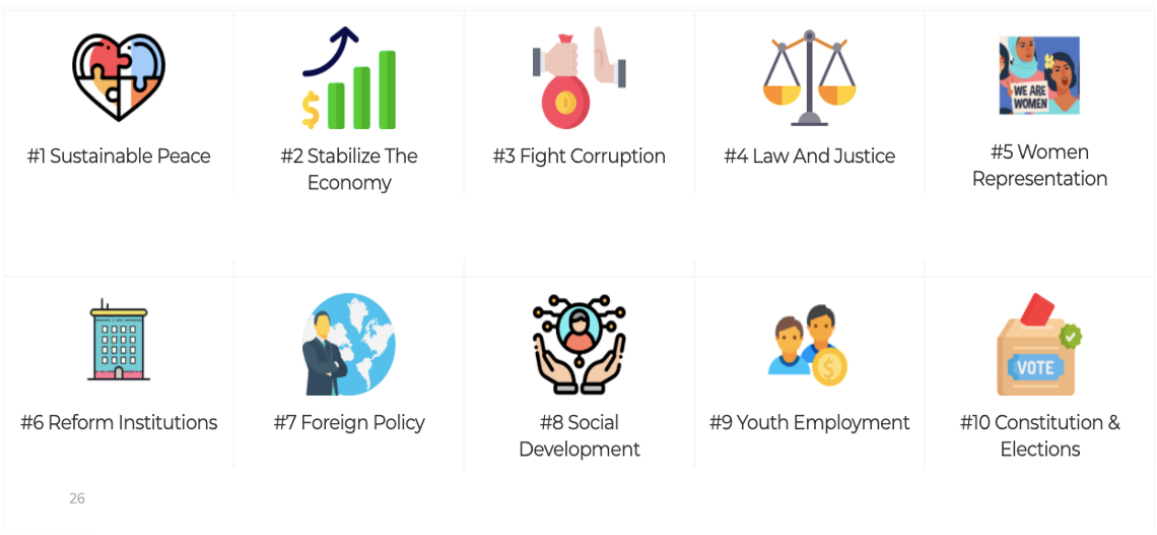
After decades of the Sudanese economy being hampered by political conflict, international isolation and sanctions, the country is now undergoing a transition towards democracy, peace, and an economic transformation process. The transitional government's focus lies on stabilizing Sudan's economy, eradicating corruption, strengthening state institutions, and promoting social development (Atlantic Council, 2019). The vision of the government is to *"Build a democratic, development-based State for everyone, where citizens will all enjoy peace, freedom, justice, and welfare"* (Cabinet Affairs, 2019). A new constitution in Sudan was drafted and signed in August 2019 in which the key principles guiding the transitional government have been established (The Republic of Sudan, 2019).

Although Sudan is the third-largest country in Africa and the fourth-largest economy in Sub-Saharan Africa, many challenges for sustainable economic development still persist. The national survey of household budgets and poverty (2014–2015) showed that one in every three persons in Sudan lives below the poverty line (Cabinet Affairs, 2019). Overcoming these challenges requires a robust strategic orientation.

[1] Benchmark countries were selected based on geographical proximity and economic structure similarities: Nigeria, Zambia, and Ethiopia. Role Model countries also possess a similar endowment structure but managed to develop more dynamically in the past: Vietnam and Egypt.

The lack of strategic guidance including the absence of clear goals and a plan of action have prevented Sudan so far from capitalizing on its development potential. Today, developing a national development vision is on the list of political priorities for the transitional government (NextGen, 2021). In December 2019, Prime Minister Abdalla HAMDOK became the first Sudanese leader to attend the Atlantic Council in over 30 years to seek international support for the transitional government (Atlantic Council, 2019). The transitional government is committed to achieving ten strategic priorities as highlighted in Figure 3. In September 2020 the prime minister's office issued a proposal for the development of a national vision entitled "Vision, challenges & development priorities of the governance of the transitional period" (G. SHEIKHELDIN; M. ALNEEL, 2021).

Figure 3: Top 10 strategic priorities



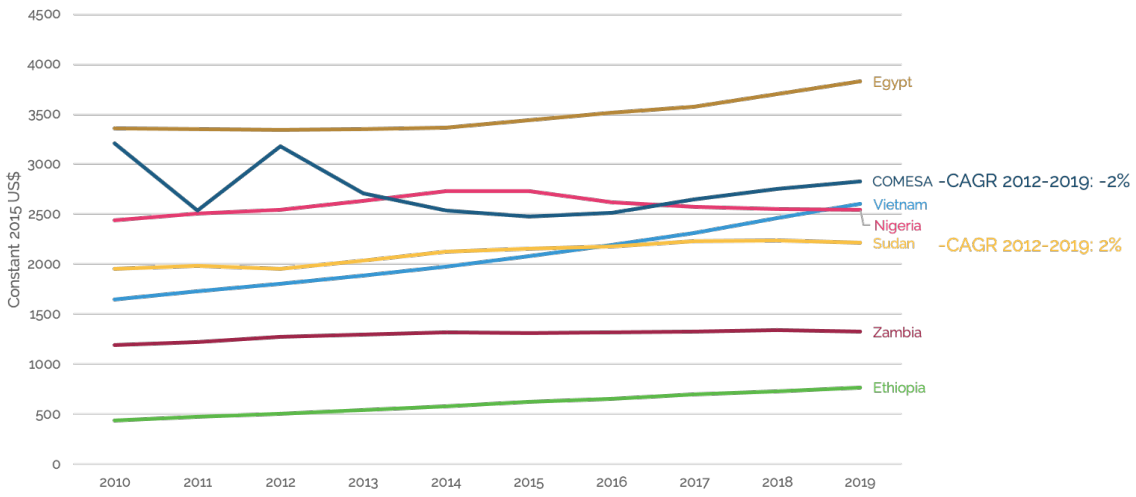
Note: First priority: Putting an end to war and building fair, comprehensive, and sustainable peace. *Second priority:* Addressing the economic crisis and establishing the bases of sustainable development. *Third priority:* Combating corruption and commitment to transparency and accountability. *Fourth priority:* Promoting public and private freedoms and safeguarding human rights. *Fifth priority:* Ensuring the promotion of the rights of women in all areas and their equitable representation in the structures of governance. *Sixth priority:* Restructuring and reforming the organs of the State. *Seventh priority:* Establishing a balanced foreign policy that ensures the interests of Sudan. *Eighth priority:* Supporting social welfare and development and preserving the environment. *Ninth priority:* Enhancing the role of the youth of both sexes and expanding their opportunities in all areas. *Tenth priority:* Organizing the process of constitution-making and preparation for free and fair elections. The results of the Atlantic Council are summarized in this figure which has been developed by NextGen (2021). *Data source:* NextGen (2021)

Among the major impediments to the Sudanese economy are high inflation rates, which currently exceed 350%, and high national debt. Sudan's liabilities to international financial organizations and lender countries account for approximately US$ 56 billion. The country has made significant progress to overcome the situation and is now seeking a comprehensive debt relief through the Heavily Indebted Poor Countries (HIPC) Initiative. This could increase the fiscal space and help to reintegrate Sudan in the global economy (Ministry of Investments and International Cooperation of Sudan, 2021). In May 2021, the Paris Conference took place to support Sudan's historic transition towards democracy. The Conference aimed at acknowledging the full reintegration of the country in the international community, launched the country's debt relief process and encouraged private investments in Sudan (Permanent Mission of the European Union to the World Trade Organization (WTO), 2021).

Economic growth With a GDP per capita of US$ 2,213 in 2019 (constant 2015 US$), Sudan ranks below the COMESA average of US$ 2,830 per capita (see Figure 4). Compared to benchmark countries within and beyond the COMESA region, Sudan is solely ahead of Ethiopia and Zambia. Nevertheless, over the past years (2012 to 2019), Sudan's GDP per capita displayed a Compound Annual Growth Rate (CAGR; see appendix A.1 for more information) of 2%, while the COMESA average over the same period was -2%.

However, this does not imply a slow closing of the income gap as in recent years COMESA (dark blue line) was developing more dynamically than Sudan (yellow line). In order to put the country on a sustained development track, higher and constant growth rates must be achieved. Vietnam reached in the same period an annual growth rate of 5%.

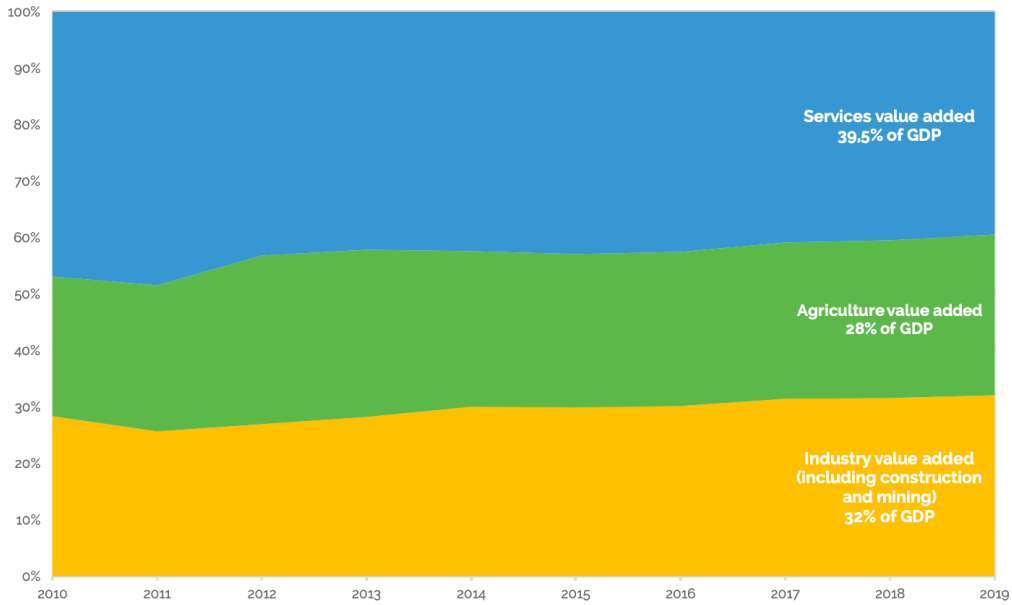
Figure 4: GDP per capita



Data source: World Development Indicators, World Bank.

Economic Structure Sudan is characterized by abundant natural resources, including oil and various metals such as gold. Sudan is among the 20 countries accounting for an estimated 38% share of the world's gold production (Geological Research Authority of Sudan (GRAS)). It also possesses vast quantities of land for agriculture and pastoral activities; it contains around 10% of the world's available arable land and a rich variety of soil types. Sudan enjoys 43% of the Nile basins and is located on the world's largest fossil aquifer, representing a competitive advantage for the economy (Ministry of Investments and International Cooperation of Sudan, 2021). Sudan's endowment structure offers favorable conditions for a broad and diversified productive base. Figure 5 illustrates the composition of Sudan's economy. It shows that it is largely sustained by the tertiary sector (services) which accounted for 40% of the country's GDP in 2019. During the same period of analysis (2010-2019), the industry value added, which contains manufacturing but also construction and mining, has grown by 3% p.a and contribute with 32% to GDP. Finally, agriculture activities represent 28% of GDP. The composition of the economy has not experienced significant changes over the past years.

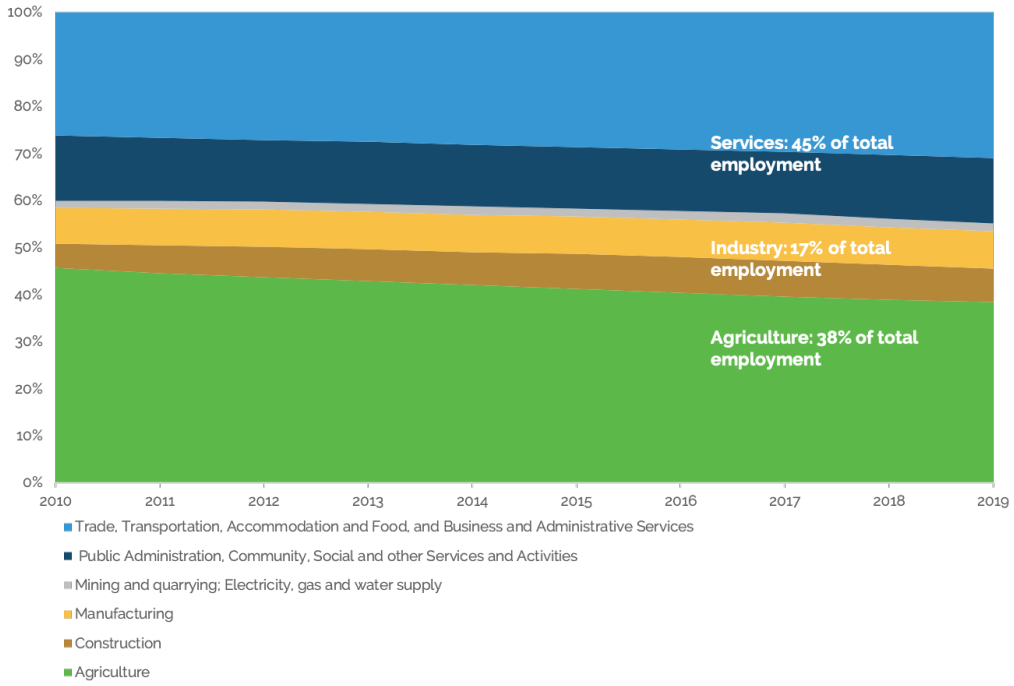
Figure 5: Economic structure of Sudan: share of value added in GDP



Data source: World Development Indicators, World Bank.

Apart from their contribution to value creation, the three sectors contribute to various extent to job creation. Figure 6 shows the respective share of employment of each sector in total employment. According to the ILOSTAT data, which does not consider informal employment, the service sector is the leading source of employment for the population with a share of 45% of total employment in 2019. The agriculture sector employs around 38% of the workers and the industry sector accounts for around 17% of Sudan's workforce. It is important to mention that the data for this and other analyses in this report only refer to formal employment and leave informal work relationships aside. In developing countries, employment in sectors such as agriculture or mining, which are both strong in Sudan, is usually characterized by high informality. Given this specificity, the results of the analyzes might slightly misrepresent the actual employment structure of Sudan. Consequently, agriculture but also particular industries may absorb very large portions of the informal workforce.

Figure 6: Employment structure of Sudan: share of employment by sector



Data source: ILOSTAT

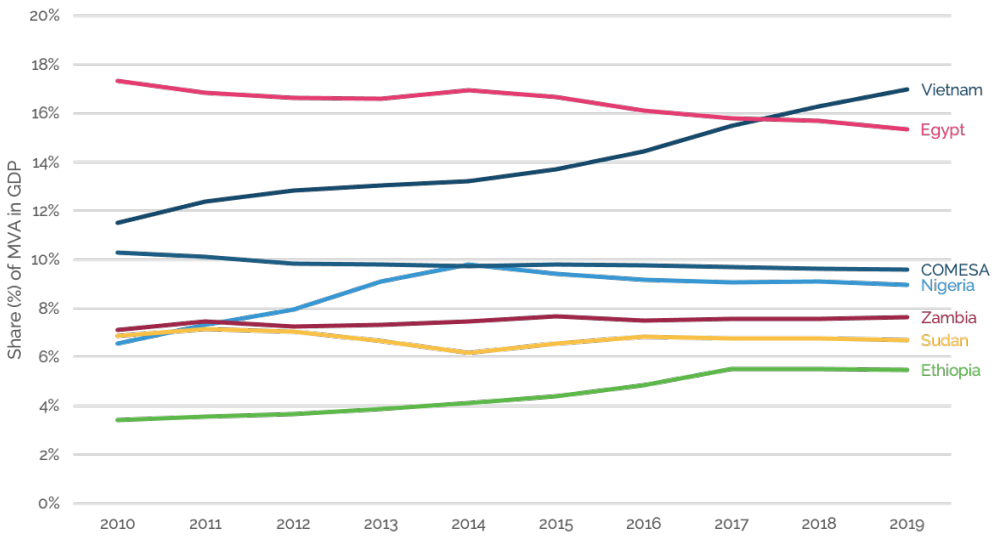
1.2.2 Performance of the manufacturing sector in Sudan

The manufacturing sector can play a key role in the economic development of developing countries as it promotes structural change from low value-added to higher value-added activities. Manufacturing offers development possibilities through innovation and technological change. It has the potential to create numerous jobs and to offer decent salaries due to expansion and technological upgrading. Empirical evidence has also shown that the manufacturing sector can create strong linkages with other sectors of the economy as well as cause positive spillover effects on local communities. Other sectors benefit from increasing manufacturing activities due to skill development and supply and demand relationships. Manufacturing firms are important consumers of financial, transport or communication services and purchase domestic raw materials and agriculture products (UNIDO, 2017). An Industrial Policy is a powerful tool that allows to systemically integrate social development and environmental protection and helps the government to guide the economic development of the country.

Contribution of the manufacturing sector to the economy In order to understand the current status quo of Sudan's manufacturing sector, we will first take a look at the contribution of manufacturing to the overall national economy. Manufactured Value Added (MVA) stands for the economic value created by the manufacturing sector within one year. It is defined as *"the returns received from output minus the costs of all materials and services required for production. MVA is closely approximated by adding manufacturing wages + manufacturing profits + taxes from manufacturing, which are the sources of income for workers, business owners, and governments, respectively"* (UNIDO, 2010). In 2019, the share of MVA accounted for 6.7% of the Sudanese economy (GDP) (see Figure 9). The relative size of the formal manufacturing sector is below the COMESA region (9.8%) and way below the role model countries of Vietnam (17%) and Egypt (15%). Compared to its benchmark countries, Sudan still lags behind Zambia (8%) and Nigeria (9%). The analysis of the growth trend reveals that the sector has not changed its contribution since 2010, when the share of MVA in GDP was 6.9%. This implies that the manufacturing sector grew just as fast as the overall economy. The fact

that the overall industrial sector is growing by 3% and the manufacturing sector only by 2% implies a faster growth of the mining or construction industries in Sudan. The COMESA Industrial Strategy 2017-2026 aims at increasing the regional manufacturing share of GDP to at least 20% by 2026 in order to achieve its vision of "a globally competitive environmental-friendly, a diversified industrial sector which is based on innovation and manufacturing as tools for transforming regional resources into sustainable wealth and prosperity for all" (COMESA and AFRICA, 2017). Increasing the share of manufacturing from 6.7% to 20% of GDP in Sudan requires a fundamental transformation of the economic structure of the country, which to achieve presupposes significant and coordinated efforts.

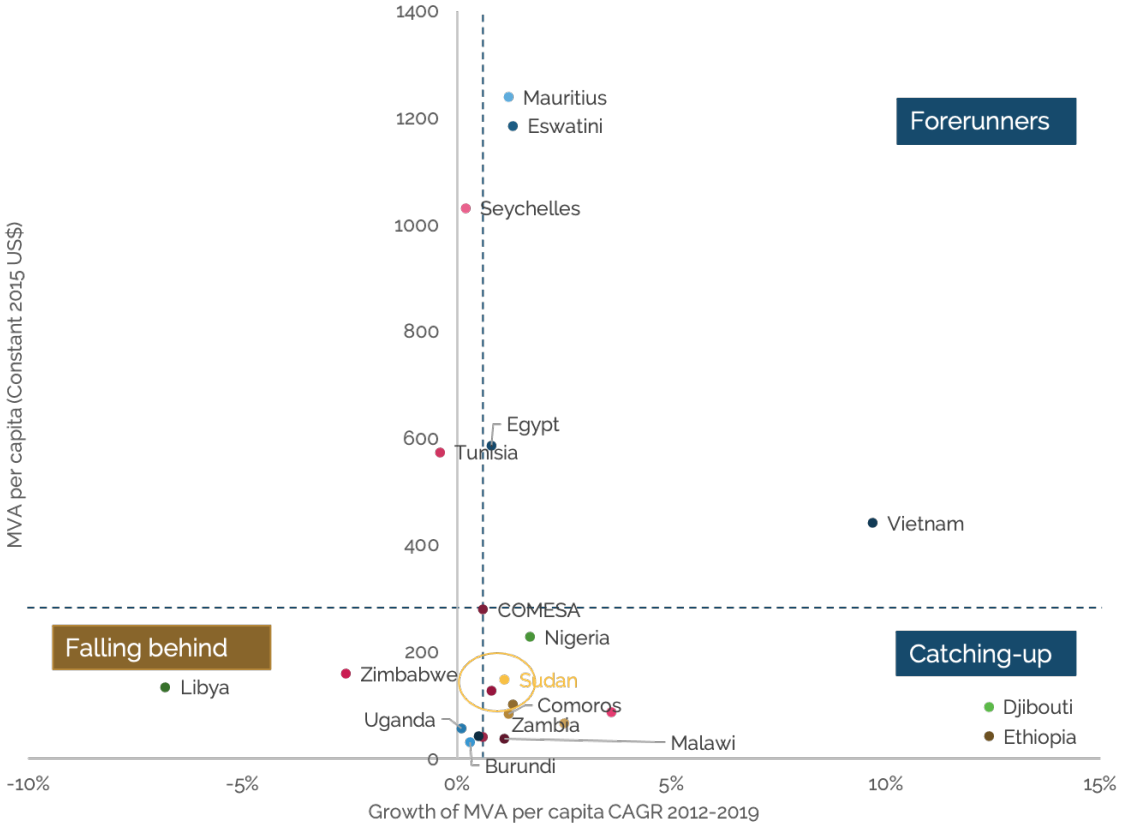
Figure 7: Share of MVA in GDP



Data source: UNIDO

MVA per capita MVA per capita is a key indicator to measure the industrial capacity of a country. It provides insight into the country's level of industrialization and is an indication of its capacity to add value to the manufacturing process. As it adjusts for the size of the population, it allows for a comparison with and learning from benchmark countries despite their larger or smaller populations. Figure 8 compares Sudan's MVA per capita level in 2019 on the Y-axis and the growth trend of MVA (CAGR 2012-2019) on the X-axis with most COMESA and role model countries. With an MVA per capita of US$ 148.2 in 2019 (constant 2015 US$), Sudan's industrial capacity falls significantly below the COMESA average of US$ 276 (blue line). However, the analysis also indicates that the manufacturing sector in Sudan is growing slightly faster (1.1%) than COMESA (0.6%) but remains still considerably far from growth rates other countries such as Ethiopia (12%) or Vietnam (10%) achieved. According to this comparison, Sudan can be characterized as a catching-up country.

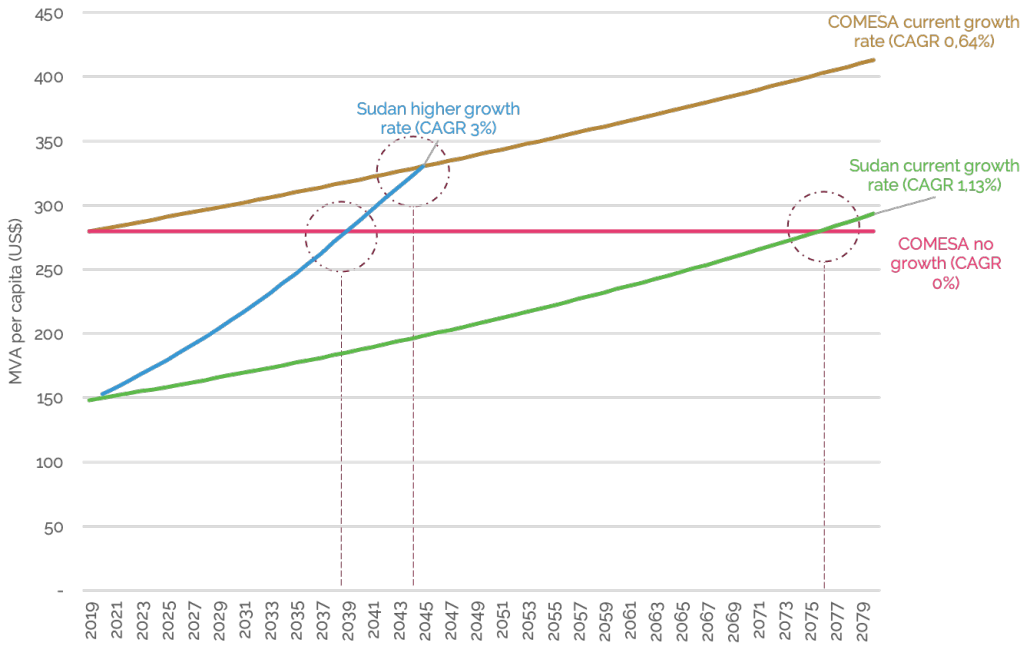
Figure 8: Industrial capacity and growth 2012-2019



Note: *Achievers* show a performance level that exceeds the COMESA average, but a growth trend that is below the average. *Forerunners* demonstrate an above-average level, as well as growth trend in the respective indicator and hence, are further increasing their leadership role in the performance dimension. *Catching up* countries perform at a lower level than the COMESA average,but their growth trend exceeds that of most other states. *Falling behind* states traditionally play a smaller role in the industrial development of the region and their slow or negative growth trend leads to an increasing gap to more successful countries.
Data source: UNIDO

Figure 9 illustrates different growth scenarios for the manufacturing sector and puts the above-mentioned growth rates in perspective. Although Sudan is growing faster (green line) than the COMESA average (yellow line), it is not fast enough to reach its level in the near future. Even if we assume that COMESA's MVA per capita will not grow but remain at its current level (pink line), it will take 55 years for Sudan to reach this level. Such projections can inform policymakers about which growth rates are needed to reach, for instance, the average manufacturing capacity in the region in the near future. In order for Sudan to achieve COMESA's current level of MVA per capita in 20 years, the targeted growth rate should be at around 3%. This growth rate (blue line) would allow Sudan to match with COMESA's projected manufacturing capacities in 25 years. The government may consider a 3% or higher growth rate as one of the Industrial Policy's targets that allow the country to to catch up with its peers and to play a larger role in the region.

Figure 9: MVA per capita growth rates scenarios



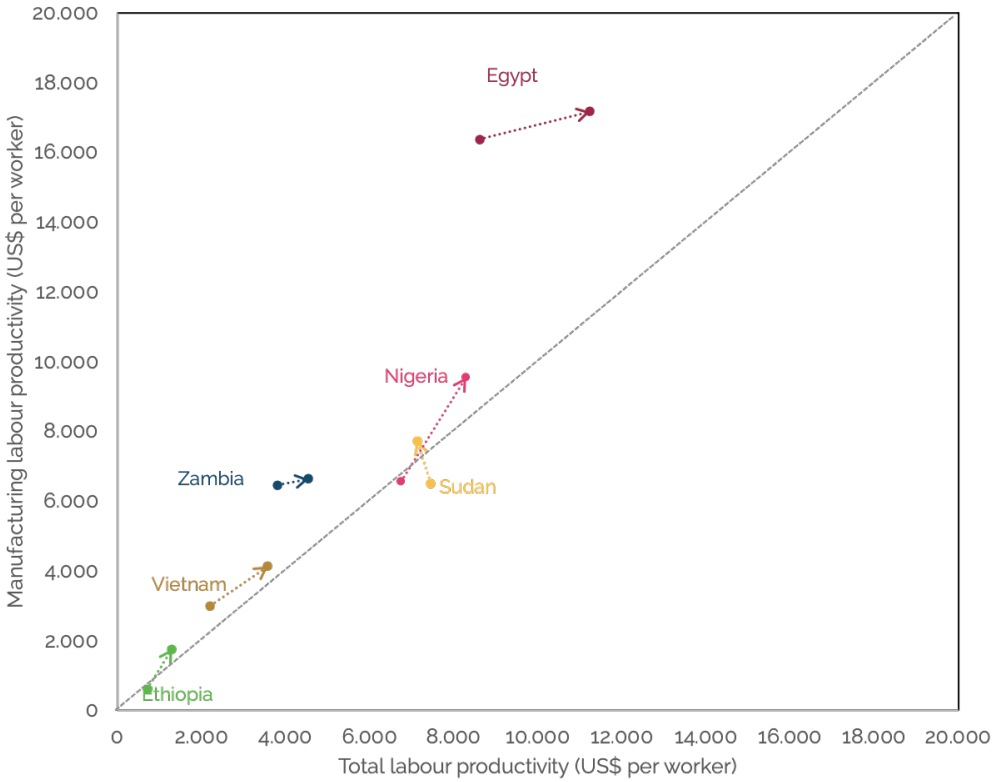
Note: 1. Blue line: Sudan's higher growth rate was calculated based on the CAGR formula using the 2019 MVA per capita value for Sudan as beginning value and COMESA 2019 as end value over a period of 20 years. 2. Green line: Sudan MVA per capita was extrapolated using the current CAGR 3. Pink line: COMESA MVA per capita was maintained at current values assuming a 0 growth rate 4. Yellow line: COMESA MVA per capita was extrapolated using the current COMESA CAGR
Data source: UNIDO

The composition of the manufacturing sector measured as shares of industries in MVA and their particular development trends provides a more differentiated picture of the specific production capacities and their dynamics. Unfortunately, for Sudan, there is no sub-sectoral MVA data available. However, anecdotal evidence (based on consultations with the national stakeholders) indicates that manufacturing is still highly underdeveloped and primarily dependent on petroleum and mining. Beyond these two industries, manufacturing is characterized by the prevalence of Small and Medium Enterprises (SMEs), which mostly focus on agro-industries and depend on raw materials from food and non-food crops, fisheries, and trees. In particular, the sugar industry is well established, followed by wheat and bakery products, beverages, canned foods, processed seeds, fruits and vegetables, spices, and edible oils. Sudan has not fully taken advantage of its abundant natural endowments such as arable land, animal wealth, fishery, and huge water resources, which offer great potential for Sudan's processing industries to grow (African Development Bank Group, 2018). Among others, Sudan has the second largest livestock herd in Africa (Geological Research Authority of Sudan (GRAS)). It is estimated that Sudan possesses 138 million heads of animal stock, offering a unique opportunity for the leather sector to continue expanding. The leather and textile sectors are labor-intensive industries and hence, conducive sectors to create formal jobs. Another important resource is gum arabic, which is used in various products such as food, confectionery, beverages, pharmaceutical, cosmetics, printing, photosensitive chemicals, ink, pyrotechnics, textiles, paper, paints, and adhesives. Sudan is responsible for approximately 80% of the world´s gum arabic exports.

Labor productivity Labor productivity is defined as the amount of value added generated by one employee on average. This indicator can be applied to understand the productivity differences across sectors. Increasing labor productivity is of key importance for building a competitive industrial sector. Higher labor productivity, which usually translate into lower costs per unit, has also the potential to translate into lower prices for consumers and/or higher incomes for workers (African Development Bank Group, 2018).

Figure 10 illustrates the total labor productivity on the X-axis and on the Y-axis the manufacturing labor productivity for 2009 and 2019 for Sudan and benchmark countries. The analysis reveals that Sudan possesses one of the highest levels of total labor productivity with US$ 7,132 per worker in 2019 only exceeded by Egypt with US$ 11,236 per worker and Nigeria with US$ 8,294 per worker. When analyzing the manufacturing productivity, it can be observed that Sudan has increased its productivity from US$ 6,498 in 2009 to US$ 7,719 in 2019. Sudan's manufacturing productivity is higher than Vietnam's, even though Vietnam has a much bigger manufacturing sector. The potential explanation may lie in the different structures of the manufacturing sector. Vietnam's main industrial sectors, such as textiles and assembly activities for electronics, are heavily labor-intensive. Sudan's industries, instead, are dominated by basic processing of minerals, first and foremost, gold and petroleum. Both sectors exhibit large outputs but do not possess the capacity to absorb many workers due to the nature of their production process. Accordingly, Sudan displays a relatively high manufacturing labor productivity. Figure 10 also compares productivity between manufacturing and the overall economy. Countries above the 45° line show higher productivity in industries than in the overall economy, while countries below the line show higher total productivity than in the industrial sector. The fact that total labor productivity in 2009 is approximately as high as the labor productivity of the manufacturing sector should not be interpreted as a success story of a high labor productive economy, but rather as an indicator for the high employment informality in the service and agricultural sectors. This means that GDP may capture the monetary value produced by the informal sector, but it does not account for the informal workers and, hence, indicates an erroneous high productivity. It can be assumed that if informal workers are brought into the equation, the total labor productivity of Sudan would be significantly lower. However, the figure shows that in 2019 in Sudan, but more impressively in Nigeria or Egypt the productivity gains that can evolve from the manufacturing sector exceeds other sectors. The manufacturing sector has the potential to quickly create jobs in labor-intense industries. It has also the potential to lead to significant productivity gains and a dynamic growth of value addition through capital- or knowledge- intense industries with high labor productivity. Fostering and balancing this process of a structural transformation towards the desired effects should be at the heart of Sudan's Industrial Policy.

Figure 10: Manufacturing labor productivity and total labor productivity 2009 & 2019



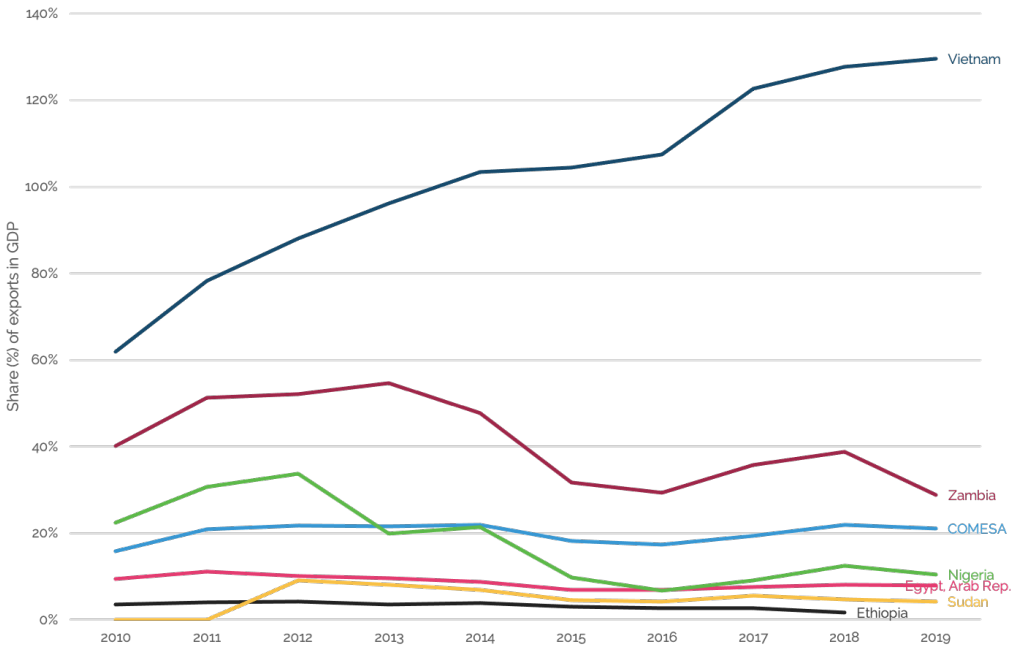
Data source: UNIDO & ILOSTAT

1.2.3 Manufactured export performance

The relevance of exports in the economy Sudan is located at the Red Sea, which is a major advantage for its integration in international trade. It is placed at the crossroad of Africa and the Middle East, and close to two large markets, Asia and Europe. However, international sanctions imposed in the 1990s impeded the capacity of Sudan to integrate into international trade. In recent years, as sanctions have been lifted, the private sector has started to explore options for increasing exports. Figure 11 shows the share of exports in GDP. This indicator marks to which extent the economy relies on exports. Sudan[2] has with only 4.2% in 2019 one of the lowest shares of exports in GDP. The COMESA region on average has a share of exports in GDP of around 21%. Some countries, as for instance Vietnam in this sample, are characterized by an over-dependency on exports (129% in 2019). Compared to the remaining benchmark countries, Sudan is only ahead of Ethiopia. However, Ethiopia possesses a significantly larger domestic market, which could explain the limited relevance of exports for domestic producers. Boosting manufacturing exports offers opportunities for economies of scale as well for improving Sudan's balance of payment. To date, the country's integration in international trade is very limited and offers a great potential for development.

[2]There is no export data reported for Sudan in the years 2018 and 2019. In order to improve the timeliness of the analysis, this report uses mirror data for all years in the export analyzes. Mirror data are considered a proxy to export data as it informs on imports from Sudan reported by other countries. The quality of data can vary depending on the reporting countries and must be interpreted with caution.

Figure 11: Share of total exports in GDP

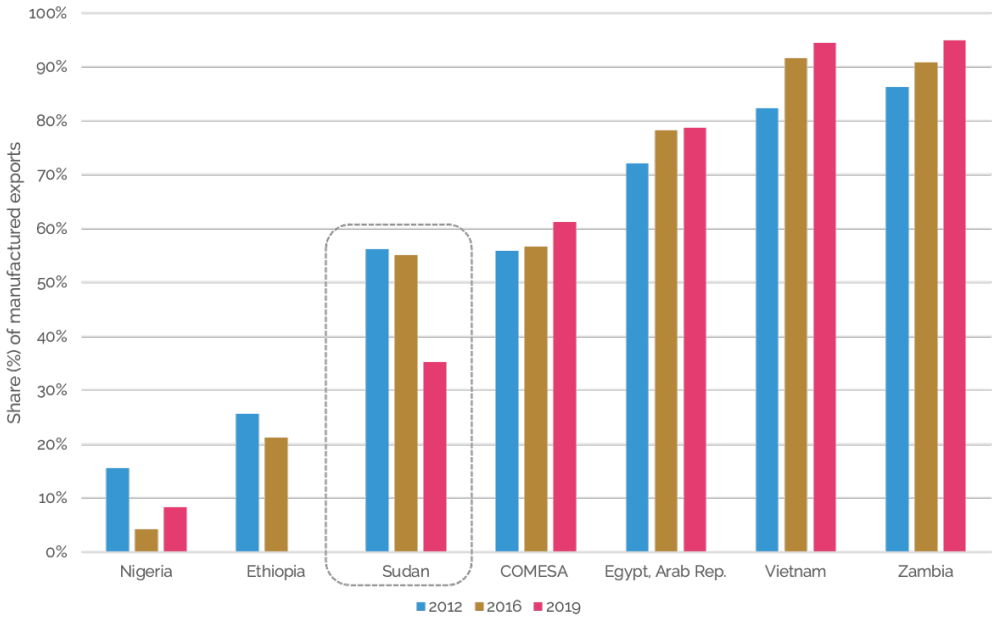


Data source: United Nations UN Comtrade (2020) database.

The role of manufacturing exports The share of manufactured products in Sudan's export basket is a good indicator to assess if the country exports predominantly primary goods, or if it is moving towards exporting processed products.[3] Figure 12 shows that in 2012 Sudan's manufacturing exports accounted for more than half of total exports (56%). In more recent years, it has decreased considerably to only 35% in 2019. Most of the manufactured export products of Sudan are gold and food products. Compared to the COMESA average, Sudan is lagging behind its fellow member states. In 2019, COMESA manufacturing exports on average accounted for 60% of total exports with a positive growth trend over the years. In 2019, Zambia and Vietnam achieved a share of more than 90% of manufacturing products in national exports.

[3]The export performance analysis has been developed on the basis of UNIDO's Competitive Industrial Performance Index (CIP) manufactured export classification.

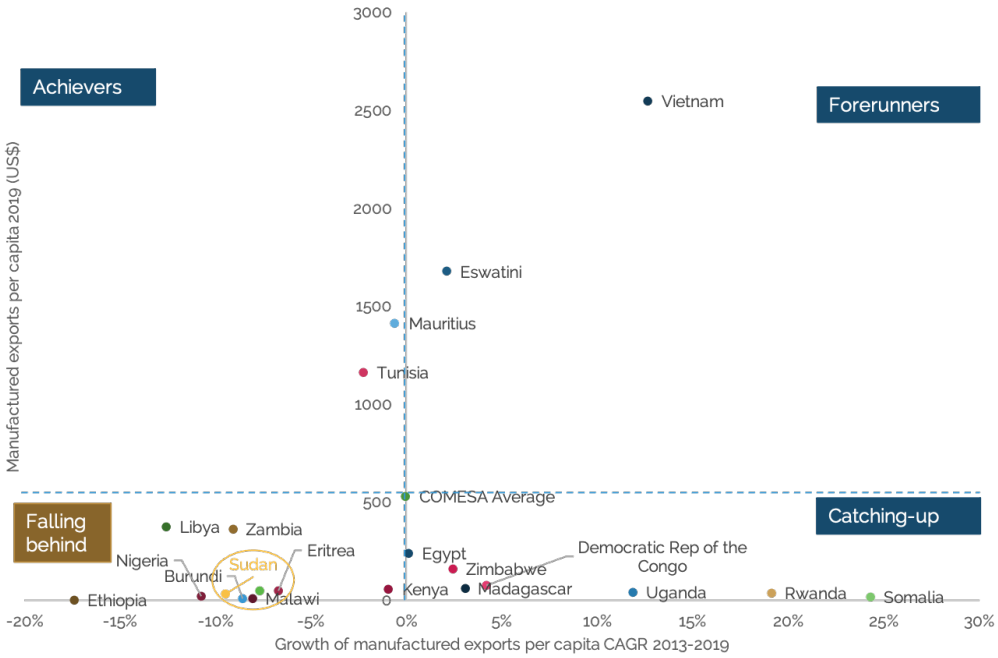
Figure 12: Share of manufactured exports in total exports



Data source: United Nations UN Comtrade (2020) database.

Manufactured exports capacity While the share of manufactured exports in total exports reflects the structure of a country's export basket, manufactured export per capita indicates the export capacity and trade competitiveness of the industrial sector. Figure 13 illustrates COMESA member states and role model countries' manufacturing exports per capita in 2019 (Y-axis) as well as the Compound Annual Growth Rate (CAGR) of the same indicator from 2013 to 2019 (X-axis). This analysis indicates that Sudan is far behind the COMESA average both in growth and level of manufactured exports per capita. Sudan's exports have shrunken significantly, with a CAGR rate of -9%, and has one of the lowest levels of manufactured exports capacity with only US$ 32.8. Based on this methodology, Sudan as well as eight other countries can be classified as "Falling behind" states in terms of exports compared to the COMESA average. Important to note is that COMESA as a regional body is also not growing its manufacturing export capacities as it stands in 0% growth rate and US$ 531 exports per capita. Countries like Vietnam and Eswatini based on this indicator are "Forerunners" as both the level of exports per capita as well as the growth compared to the COMESA average.

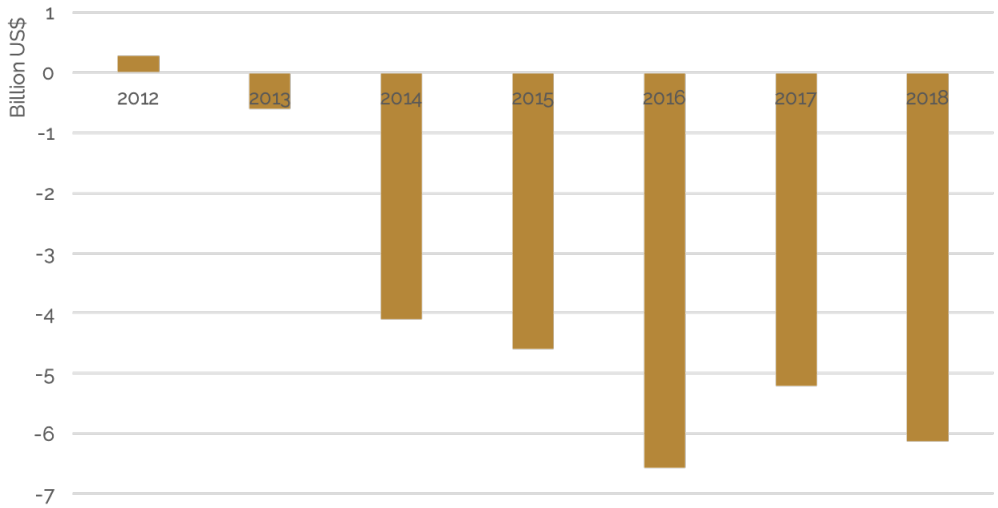
Figure 13: Manufacturing exports growth and level



Note: *Achievers* show a performance level that exceeds the COMESA average, but a growth trend that is below the average. *Forerunners* demonstrate an above-average level, as well as growth trend in the respective indicator and hence, are further increasing their leadership role in the performance dimension. *Catching up* countries perform at a lower level than the COMESAaverage, but their growth trend exceeds that of most other states. *Falling behind* States traditionally play a smaller role in the industrial development of the region and their slow or negative growth trend leads to an increasing gap to more successful countries.
Data source: United Nations UN Comtrade (2020) database.

Trade balance After decades of international sanctions, which affected the country's ability to export, Sudan is now successfully working towards a reduction of its trade deficit. Until 2018, as Figure 14 indicates, Sudan's trade deficit had been growing up to US$ 6 billion.

Figure 14: Trade balance of Sudan



*Data source:*United Nations UN Comtrade (2020) database.

In 2019, the trade deficit could be reduced to US$ 3.4 billion according to Figure 15, which means a decline by US$ 2.6 billion in only one year (OEC - The Observatory of Economic Complexity). In 2018,

the Central Bank of Sudan (CBOS) adopted a policy aiming to "achieve monetary and financial stability to contribute in attaining economic stability, development, and sustainable growth; through stabilizing the general price levels, the exchange rate, as well as improving the balance of payments performance by reducing the current account deficit to a sustainable level" (Central Bank of Sudan, 2018). In the second pillar of this policy, the component "Exchange Rate and External Sector Stability" contains measures to promote exports and regulate imports. In order to support exporters (supply side), the government is:

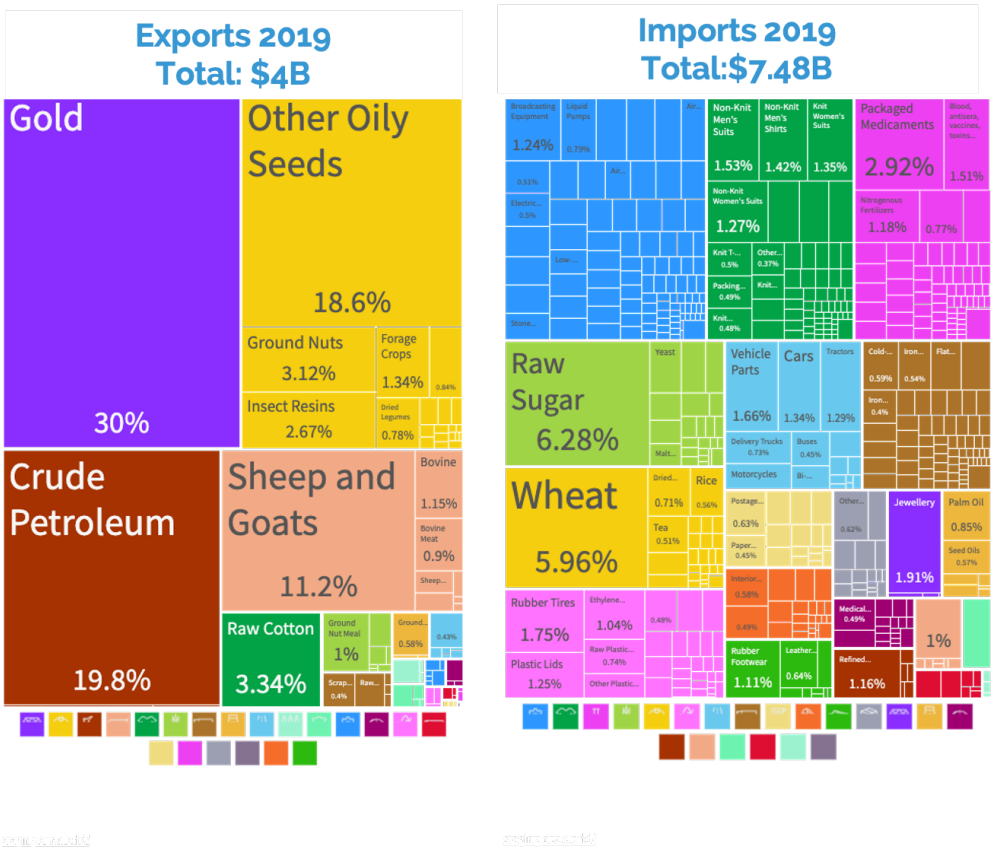
1. Allowing banks to purchase export proceeds at the exchange rate declared by the independent market makers mechanism.
2. Authorizing banks to utilize 100% of the exports proceeds.
3. Permitting export of gold by any natural or legal person in accordance with specific rules and regulations.
4. Encouraging exports through the simplifications of some regulations allowing all methods of payment.

In addition, to manage the demand of foreign exchange resources, particular measures for importers were taken:

1. Mobilize resources for the importation of priority goods, in order to secure the country's needs for strategic goods and production inputs.
2. Banning the use of advanced payment method for importation, except for medicines and medical supplies.
3. Prohibiting importation without value transfer (Nil-Value) excluding importation under the Investment Law.
4. Tightening of banking regulations, especially methods of payment and financing of imports through commercial banks, in order to reduce the demand for unnecessary goods and encourage import-substitution policy.

While these actions proved to be effective, further incentives for producers to export more products with higher value added, as well as to substitute particular imports by local production, could make an additional contribution towards a more even balance of payment. Figure 15 indicates the main export and import products in 2019. As analyzed in the section before, most of the products exported by Sudan are raw materials or semi-processed goods with low value addition. When it comes to imports, a relevant share of imports are manufactured goods such as vehicles parts, pharmaceutical products or clothing accessories. With respect to petroleum, it is relevant to mention that while 19.8% of Sudan's exports are crude petroleum, the country imports refined petroleum in a significant amount (1.16% of imports). Some of these sectors could potentially be developed in the country to reduce the import dependency on essential goods.

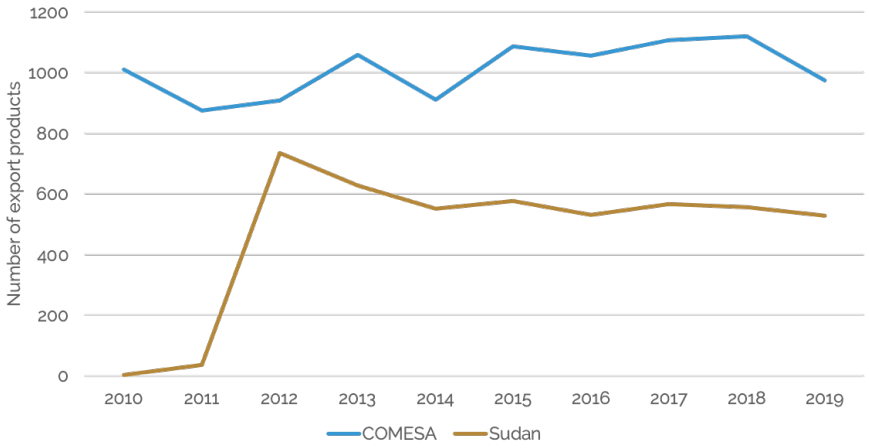
Figure 15: Imports and exports of Sudan in 2019



Data source: Observatory of Economic Complexity (OEC)

Regional competitiveness and export markets Sudan's total number of export products has also remained rather low, reaching only a total of 527 products in 2019 among the more than 5,300 products that exist in the 6-digit Harmonized System Nomenclature (Figure 16). Countries in the COMESA region export on average around 974 products in 2019. Compared to its regional peers, Sudan is clearly falling behind in trading competitive goods. Sudan may consider establishing an export promotion mechanism. Through this mechanism, policies to enhance the firms' expertise on export standards such as packaging, quality management, and marketing skills to sell on international markets could be promoted. Detailed analysis of the main bottlenecks for the development of the manufacturing sector can be found in Section 3 of this study.

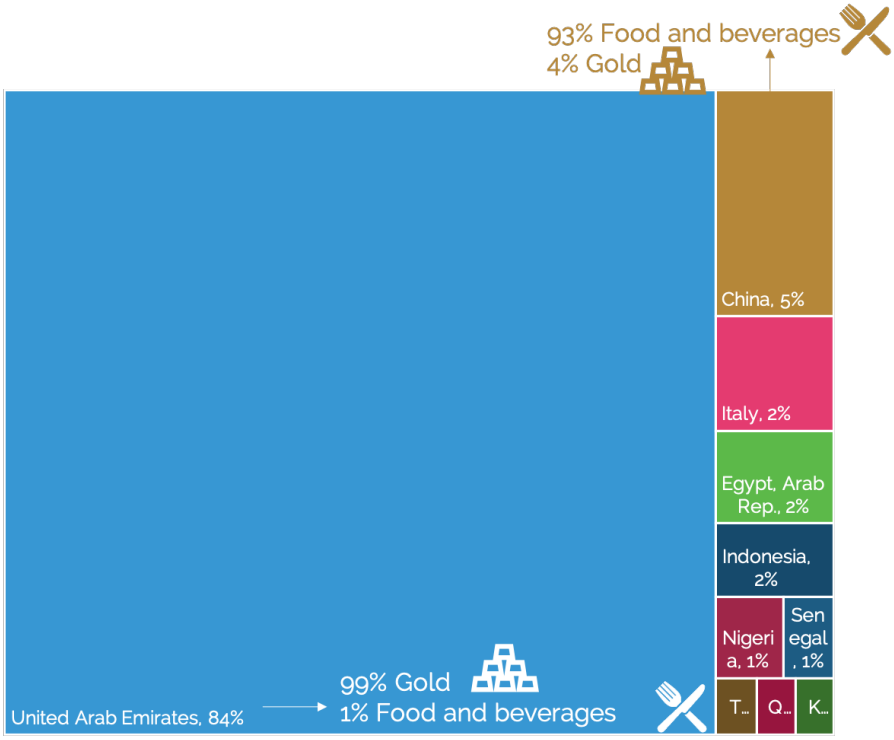
Figure 16: Number of export products in Sudan and COMESA



Data source: United Nations UN Comtrade (2020) database.

With respect to export markets, Figure 17 illustrates a very high level of dependency on export partners as in 2019 almost 90% of total manufactured exports went to two destinations, the United Arab Emirates UAE and China, with a share of 84% and 5% respectively. Furthermore, the analysis reveals that products exported to these two trading partners are highly concentrated. 99% of all manufactured exports to the UAE are gold and food and beverages represent only 1% of the exports. Opposite to that, 93% of exports to China are food and beverages and 4% are attributed to gold. Given the existing trend, it can be assumed that China's role as an importer of Sudanese goods will further decrease. This would mean that gold exports to UAE will represent an even larger portion of exports. Given the high export concentration, Sudan's exports are extremely vulnerable in terms of foreign sales markets and products.

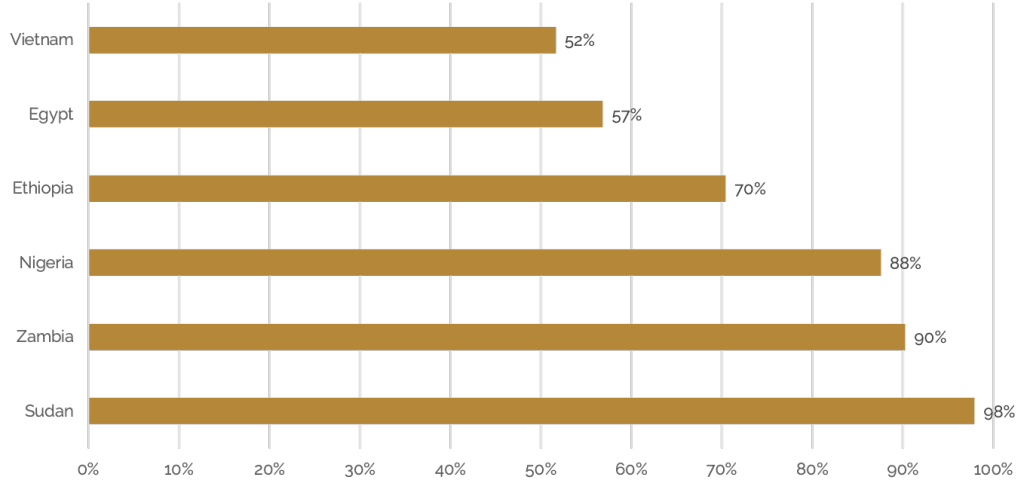
Figure 17: Manufactured export markets in 2019



Data source: United Nations UN Comtrade (2020) database.

Manufactured exports diversification A common pattern for resource-rich countries such as Sudan is to get trapped in the production and export of a limited number of primary goods. Diversifying the production and export structure of a country has the potential to be a key driver of economic development, especially for economies at a relatively early growth stage. A good indicator for understanding how diversified or concentrated the export basket of a country is can be derived from calculating the cumulative share of the top five export products. While large shares indicate a highly concentrated, lower numbers a more diversified export structure. Figure 18 demonstrates that in 2019 Sudan's top five export products accounted for 98% of total exports. Countries such as Zambia, Nigeria, and Ethiopia show concentration rates between 70% and 90%. More diversified economies like Egypt and Vietnam reach with 50% concentration rate also a more diversified export basket. Sudan has the potential to diversify its export basket beyond exporting a range of raw materials. By processing existing natural resources, the manufacturing sector can increase the value addition of already existing export products and can engage in the production and export of new products. This may allow the country to participate more in global value chains as well as open new international market opportunities.

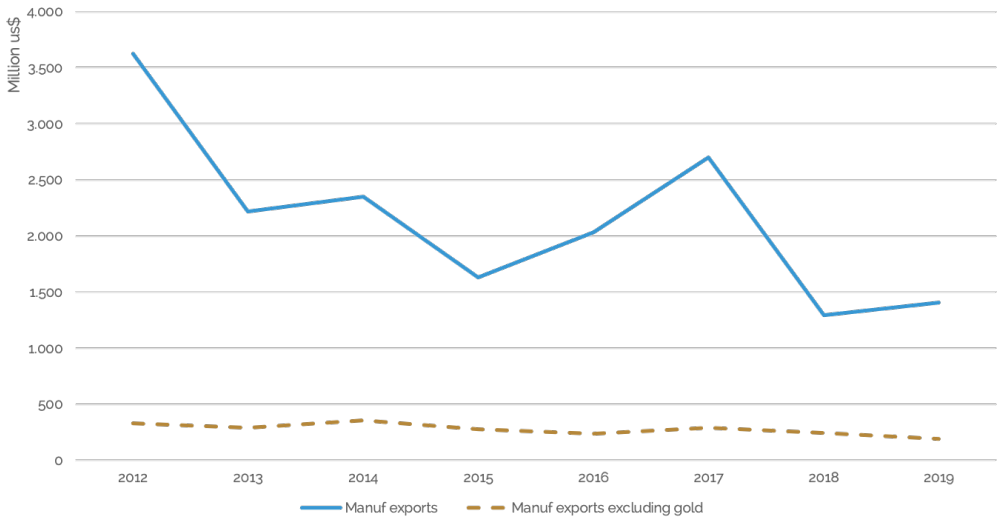
Figure 18: Share of top 5 exports in total exports in 2019



Data source: United Nations UN Comtrade (2020) database.

In Sudan, the export of basic metals (mainly gold), accounted for 86% of all manufactured exports in 2019. Figure 19 illustrates the value of manufacturing exports with and without gold. This indicates a dangerous level of dependency, which increases the risk for external shocks for the economy of the country. While the global price of gold increased between 2013 and 2019, Sudan's gold exports were falling during the same period. This means that the production and export volume has fallen even more than the graph suggests, implying potential problems related to domestic production. Probably, also related to domestic production conditions, gold export volumes show high volatility, which is very critical for the most important export product of a country. Manufacturing exports excluding gold have remained relatively stable, with a slight downward trend. For more details on the gold processing degrees (see Figure 21). Diversifying and broadening the manufacturing base of member states has been a priority of the COMESA Industrial Strategy. As of today, the manufacturing sector is still weak across the region and COMESA countries export mainly raw materials and low value-added products while importing finished products in return (COMESA and AFRICA, 2017).

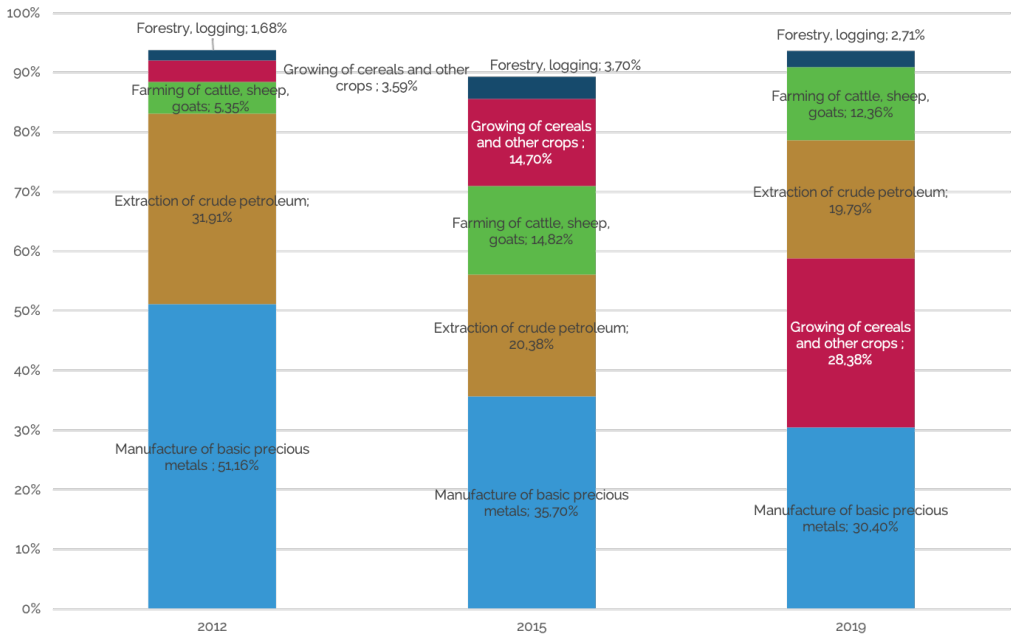
Figure 19: Manufactured exports excluding gold



Data source: United Nations UN Comtrade (2020) database.

To understand more of the country's export structure Figure 20 shows the top five products in total exports in 2012, 2015, and 2019. This trend analysis indicates that while Sudan has made some progress in reducing the dependency on gold, the export structure is not only highly concentrated, with the top five products accounting for over 90% of exports, but it is also dominated by raw materials. In 2012, manufactured precious metals accounted for 50% of total exports, this has been reduced to 30% in 2019. However, the share has been replaced by other commodities, such as cereals and other crops (29%), crude petroleum (20%), and cattle (13%). This pattern leaves Sudan extremely vulnerable to external shocks. Not only does the country have a very limited range of productive activities, but they are highly concentrated in only resource-based sectors, which currently create low levels of value addition. However, Sudan has the potential to play a greater role in international commerce and to increase the diversification of the productive sector, if it allocates the resources to invest in human and institutional capital, infrastructure, and businesses development in order to capitalize on its vast natural endowments (African Development Bank Group, 2018).

Figure 20: Top 5 total exports in 2012, 2015 & 2019



Data source: United Nations UN Comtrade (2020) database.

Adding value to exports An incremental way for upgrading the industrial base and moving towards a structural transformation builds upon existing comparative advantages and endowments of a country. Such a strategy looks for opportunities to increase the level of value addition in processing existing raw materials and primary goods. Apparently, the transitional government of Sudan intends to pursue that development path (NextGen, 2021) and has identified the following priorities:

- Increase production and a trend towards exporting manufactured products to achieve added value.
- Develop and promote the agricultural, animal, and industrial products sectors.
- Focus on creating a number of projects with preferential advantages and value added chains such as meat, leather, oilseeds, and gum arabic.

Figure 21 explores the processing degree of 12 sub-sectors of interest. These sectors have been selected because they either represent main export sub-sectors of the country or are sub-sectors of political relevance. The political relevance has been assessed based on a comprehensive literature and document review. The Multilateral Trade Negotiation (MTN) classification available in the UN (UN Comtrade, 2020) database distinguishes between unprocessed, semi-finished, and finished goods. [4]

- Minerals products and precious stones: As established in the analysis above, gold corresponds to almost 90% of manufactured exports of which, according to this indicator, 100% of the material is exported as semi-finished products.[5]. This share has not changed over the past years, meaning there has not been any investment to enhance the country's capacity to manufacture and export precious metal to compete in the international market. More details on the potential for upgrading gold production can be found in Section 2 of this report.

[4] Details on the nomenclature and its classification can be found at wits.worldbank.org

[5] The majority of Sudan's gold exported are in unwrought form, which can be located at the very early stages of the value chain as it requires a minor level of processing degree. Based on the MTN Classification, it is considered a "semi-finished" product. For more details on the gold sector, see Section 2

- Oily seeds, fats, and other oils: Agriculture in Sudan represents a very strong comparative advantage due to the vast land and water resources. For the level of development of the country, agro-industries offer a unique opportunity for deepening domestic value chains and linkage creation. Sudan produces around 5% of the world's groundnuts and around 20% of the world's sesame crops (Ministry of Investments and International Cooperation of Sudan, 2021). 93% of oily seeds are exported as unprocessed or semi-processed. However, over the years, the share has been slowly decreasing while the share of processed seeds has increased to 7% in 2019. UNIDO is well aware of the potential of this sector and it is supporting its development through the implementation of a project to increase export revenues of sesame seed by improving the quality of sesame seed, increasing capacity to comply with food safety measures, and enhancing market access to value added markets (UNIDO, 2021b).

- Petroleum: Most of the oil reserves left available on the Sudanese territory remain under-exploited (Geological Research Authority of Sudan (GRAS)). This means the country has still the opportunity to re-emerge as an oil producer. However, to date, 100% of the commodity is being exported as crude petroleum and only a tiny share of 7.4% was exported as refined petroleum in 2015. The government is currently seeking to attract quality FDI in order to increase the country's production capacities.

- Textile and clothing: The textile sector is considered one of the most labor-intensive sectors with the potential to offer large numbers of formal jobs in manufacturing. The cotton growth potential in Sudan is estimated to reach an output level of up to US$ 1.5 billion per year in 5 years (Ministry of Investments and International Cooperation of Sudan, 2021). The availability of local raw materials has the potential to develop a full domestically owned value chain for the textile and garment industry. The total capacity of yarn is estimated at 59,000 tons and the fabric is estimated at 300 million yards (The Republic of Sudan, 2021). Figure 21 shows that Sudan in 2012 was exporting 95% finished textile products. However, the sector is shifting towards semi-finished products. In 2019, already almost 60% of textiles were exported as semi-finished products. This means, Sudan leaves finishing textiles and its respective value creation to other countries.

- Leather, rubber, and footwear: Animal husbandry also represents a comparative advantage of Sudan, as the country is the second-largest producer of livestock in Africa after Ethiopia (African Development Bank Group, 2018). Therefore, Sudan is in a favorable position to develop the entire leather value chain. However, by 2017 the existing capacity was very limited with only 4 large, 3 medium, and 12 small capacity tanneries operating in Sudan (The Republic of Sudan, 2021). Additionally, besides only having a handful of tanneries, the value chain is concentrated in only the early stages of the leather production. Sudan has the potential to increase both, the volume of production and the value addition, in the sector. Figure 21 indicates that over the last years, the leather sector focused on the export of semi-processed products, with a share of almost 100% in 2019. An important point to consider is that the tannery sector represents a risk to the environment, mostly at the early production processes (slaughterhouse and tanning). Consequently, Sudan is bearing the negative environmental effects of the sector but not fully benefiting from the potential value added of finished goods such as footwear and garments.

- Sugar: The sugar industry is a well-established sub-sector of the agro-industries in Sudan. However, in 2019 the country exported 95% of the material as semi-processed products, passing up a high untapped potential in processing this essential good. In 2018, Sudan imported US$ 638 million of semi-processed sugar (mainly from India, Thailand, and UAE) and US$ 6 million worth of processed sugar (mainly from China and Turkey). In the same year, Sudan exported US$ 12 million worth of semi-processed sugar to Turkey and the EU and only US$ 18 thousand worth of processed sugar to Saudi

Arabia and the EU. There is space for Sudan to grow domestic capacities instead of importing from abroad. Refined sugar can play an even larger role in international markets, positioning Sudan as a regional sugar producer (World Bank, 2020d).

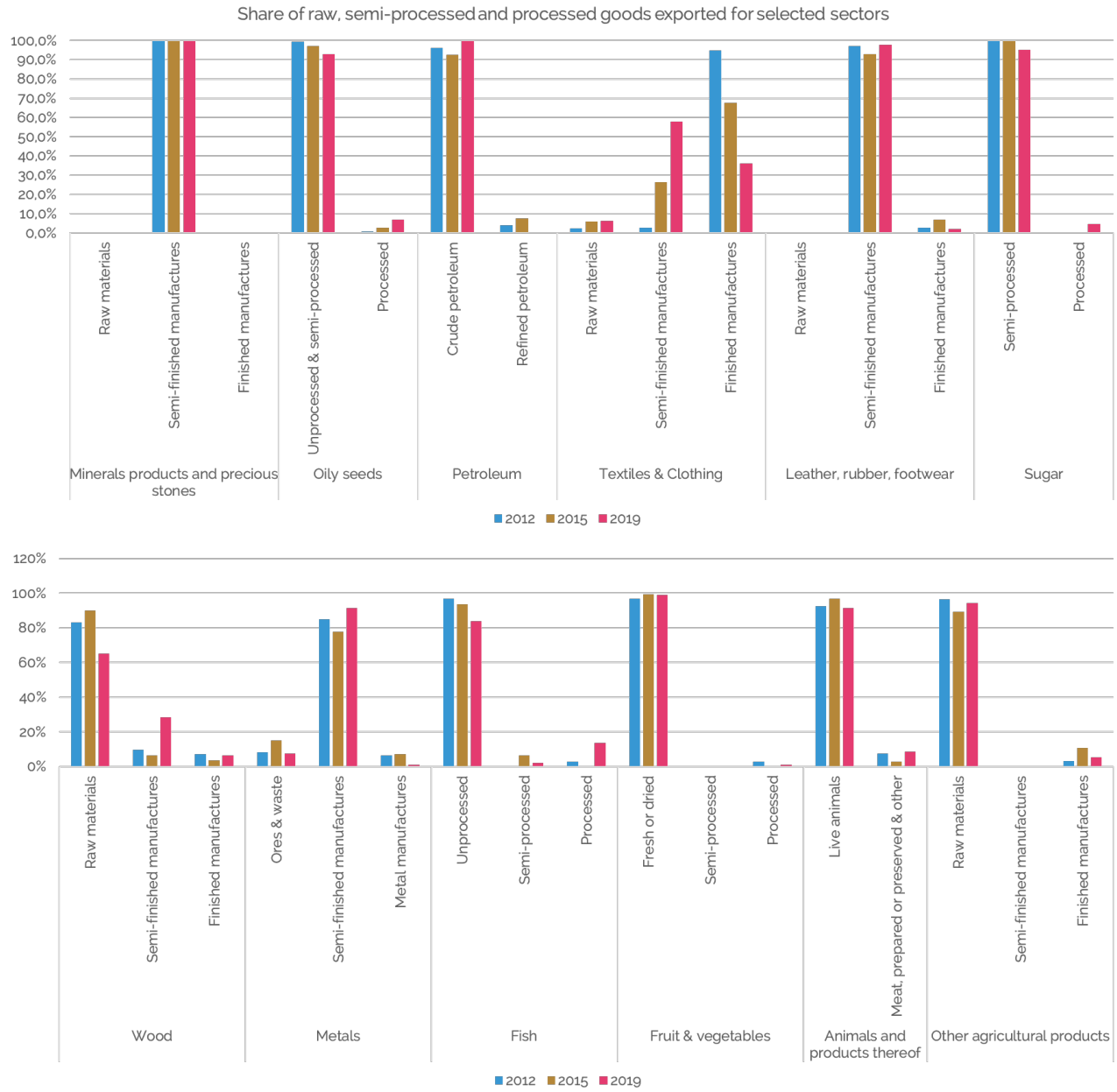
- Wood: The wood sector is highly dominated by exports of raw goods. In 2019, Sudan exported 65% of wood as unprocessed products. However, it has slowly been moving towards higher degrees of processing. Still in 2015, the share of raw wood being exported exceeded 90%. In 2019, semi-finished products represented 28% of wood exports, and only 5% were exported as finished products.

- Metals: Sudan enjoys a large variety of base and rare metals deposits all around the country. Besides gold reserves, Sudan has silver, zinc, iron, chrome, nickel, aluminum, and more (Ministry of Investments and International Cooperation of Sudan, 2021). In 2019, almost all metal products were exported as semi-finished manufacturing with a share of 92%, while 8% of the materials are exported as ores and wastes.

- Fish: Sudan benefits from over 700 km long of coastline and has direct access to an unlimited demand for fresh fish from Asia. Sudan has also opportunities in aquaculture in fresh water and deep-sea fishing. However, so far, Sudan exports 84% of fish as raw products and only 14% as finished goods.

To conclude, Sudan has a highly untapped potential for deepening existing value chains. The majority of current key resources of the country are exported either as raw or semi-finished products. This lack of value addition represent an economic leakage for the economy, as many of the benefits that come with processing natural resources are left to foreign countries. Currently, efforts are being made to establish a state agency designed to accelerate the transformation of the agriculture and livestock sectors towards more productivity and improvement of quality for agro-industrial inputs. The mandate of this agency will be defined through its establishing act, which is not publicly available yet (G. SHEIKHELDIN; M. ALNEEL, 2021).

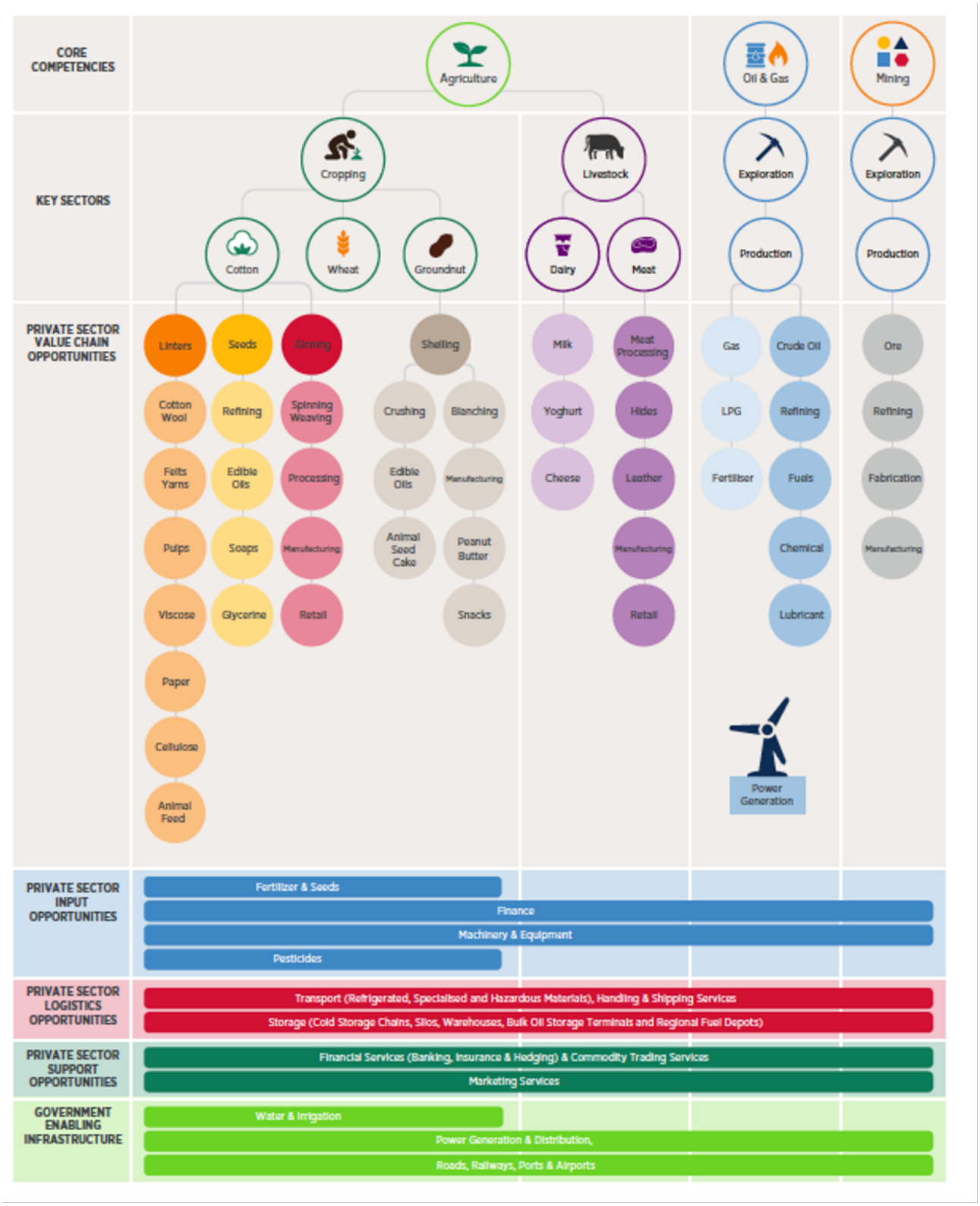
Figure 21: Share of raw, semi-processed, and processed goods exported for selected sectors



Data source: United Nations UN Comtrade (2020) database.

Figure 22 expands on these sectors and highlights the existing potential for value chain development in Sudan. This was developed by the Ministry of Investments and International Cooperation in collaboration with USAID as a way to promote FDI in the country. Based on the competitive advantages of Sudan, the methodology identified potential value chains. However, in order to detonate these sectors, basic capabilities need to be developed, such as in transportation, infrastructure and energy (see Appendix C). It also highlights the prerequisites to develop value chains that go beyond the very first levels of processing.

Figure 22: Value chain potential sectors



Data source: Ministry of Investments and International Cooperation of Sudan (2021)

The government is well aware of the need for creating a conducive regulatory framework and providing incentives to promote value chains. Under the government's priority addressing the economic crisis and establishing the basis for sustainable development, the key lines of action are:

- Setting strict rules and controls for the mandate of the Ministry of Finance and Economic Planning on added value (for example by lifting financial pressure, controlling and rationalizing public expenditure, activating the Consolidated Treasury System, and enhancing institutional and human capacities).
- Increasing production and turning towards exporting processed products to realize added value.
- Developing and promoting productive sectors (agriculture, livestock, industry).
- Focusing on creating several projects with comparative advantage and value-added chains (meats, leather, oilseeds, gum arabic). [6]
- Creating a suitable environment for medium, small and micro enterprises and securing technical and financial support for them, thereby moving towards regulating the informal sector.
- Conducting a population and housing census as well as an agricultural, livestock, and industrial census and household surveys as bases for the process of development planning.
- Reviewing tax and customs exemptions.
- Developing a program of action to rehabilitate the existing industrial areas and establish specialized industrial areas.
- Raising awareness on the role of cooperatives as well as supporting and increasing the efficiency of production, consumption, and services cooperatives.
- Setting strict measures to address the imbalances of trade and payments.
- Upgrading and producing agricultural production inputs (fertilizers and pesticides).
- Increasing the production of gold and the government's share of production.
- Enhancing the partnership with the private sector.
- Attending to entrepreneurship, innovation, and the development of small and medium industries.

Box 1: Gum arabic

Besides the selected sectors addressed in Figure 21, gum arabic deserves attention, as Sudan is the world's largest producer and exporter of raw gum arabic. The country contributes to around 70% of gum production in the world (World Bank, 2020d). From 2015 to 2019, the production increased by 24% (see Table 1). Gum arabic is for Sudan a major source of foreign currency, with a value of US$ 117.3 million in 2018 (World Bank, 2020d).

Table 1: Gum arabic production from 2015 to 2019

	Gum Hashab	Gum Talha
Uses	Confectionary and medical industry	Dairy products (yogurt)
Production Area	Sandy terrain, Kordofan and Darfur	Muddy terrain, southern Sudan
Production in tonns (1992)	220,000	3,000
Production in tonns (2015)	241,940,000	392,860,000
Production in tonns (2019)	273,810,000	514,780,000
Price epr ton (2019)	USD 2,400	USD 711

Note: Due to data limitations, it is not possible to assess the processing level of gum arabic using MTN Classification. *Data source:* (World Bank, 2020d).

[6] For more details on gum arabic see Box 1.

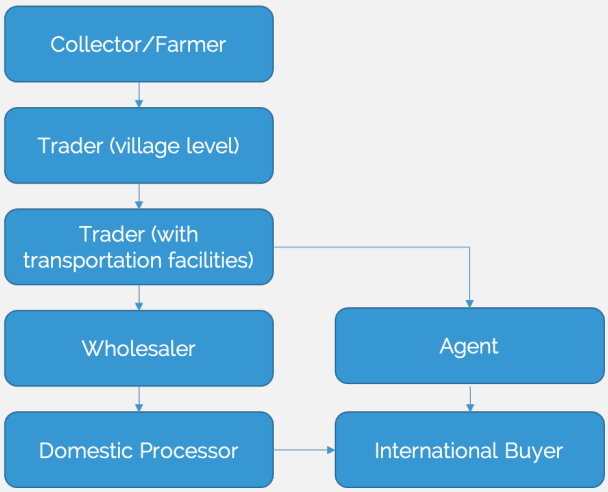
The gum arabic belt extends across the poorest 13 of Sudan's 18 states (see Figure 23). It represents an important sector for poverty alleviation as it contributes to 15-25% of household incomes. It is estimated that about 1 million households depend on the gum arabic sector. Most of the production is dominated by small-scale farmers. The value chain is characterized by intermediaries, leading to limited connection between small farmers, producers, and exporters. Other actors involved in the value chain and which work towards enabling the environment include the Gum Arabic Board, Forestry National Corporation, Terminal Market Administration, and private associations (Hassan, 2017).

Figure 23: Gum arabic belt

Data source: (Hassan, 2017)

Figure 24 illustrates various steps of the gum arabic value chain, starting from the collector or farmer, who cultivates the gum, passing through a first intermediary who connects the farmer with a "trader" or city merchant that offers transportation and sales networks. This trader (the second middleman) sells the gum to either a local store (wholesaler) or to a third intermediary who is the agent in charge of connecting with international buyers. This is where the product is either processed nationally or sold in raw form for processing abroad. The process involves three main steps: 1) cleaning and drying 2) kibbling, and 3) spray-drying. Kibbling which means making uniform gum pieces, granulating, spray-drying, and powdering increases the price of gum considerably. But to date, from 25 licensed companies, only 10 firms have kibbled processing plants (World Bank, 2020d). The kibbled, however, does not add the highest value added as the real gain in processed gum arabic is the spray-dried gum. International buyers prefer purchasing crude gum instead of processed gum as they aim at saving the processing margins and ensuring control over the highest quality. The price of kibble gum increases by US$ 100-150 per ton compared to the raw material. Sudanese exporters of raw gum arabic tend to quote lower than the market price with the hope of increasing the volume of sales, which makes it extremely hard for processing firms to compete in international markets. As a result, 17 factories were shut down by 2020. These harmful practices take place due to the lack of national regulations for producers and exporters. Through an effective Industrial Policy, the government can ensure that competition is fair and that all actors in the value chain collaborate in order to increase the production and exports of final gum arabic products in Sudan (World Bank, 2020d).

Figure 24: Gum arabic value chain



Data source: (Hassan, 2017)

Another study demonstrates that in order to upgrade the gum arabic value chain, the government can consider: 1. Stimulating innovation and investment in tapping tools by promoting the commercialization of designs made by local farmers. 2. Promoting research in the uses of gum arabic with a focus on medical and health-promoting applications. 3. Improving the marketing capacities of all local actors (from farmers to traders and producers) 4. Regulating prices and incentivizing higher value added to export products. (Hassan, 2017) More details on the trade dynamics of gum arabic can be found in Appendix B.

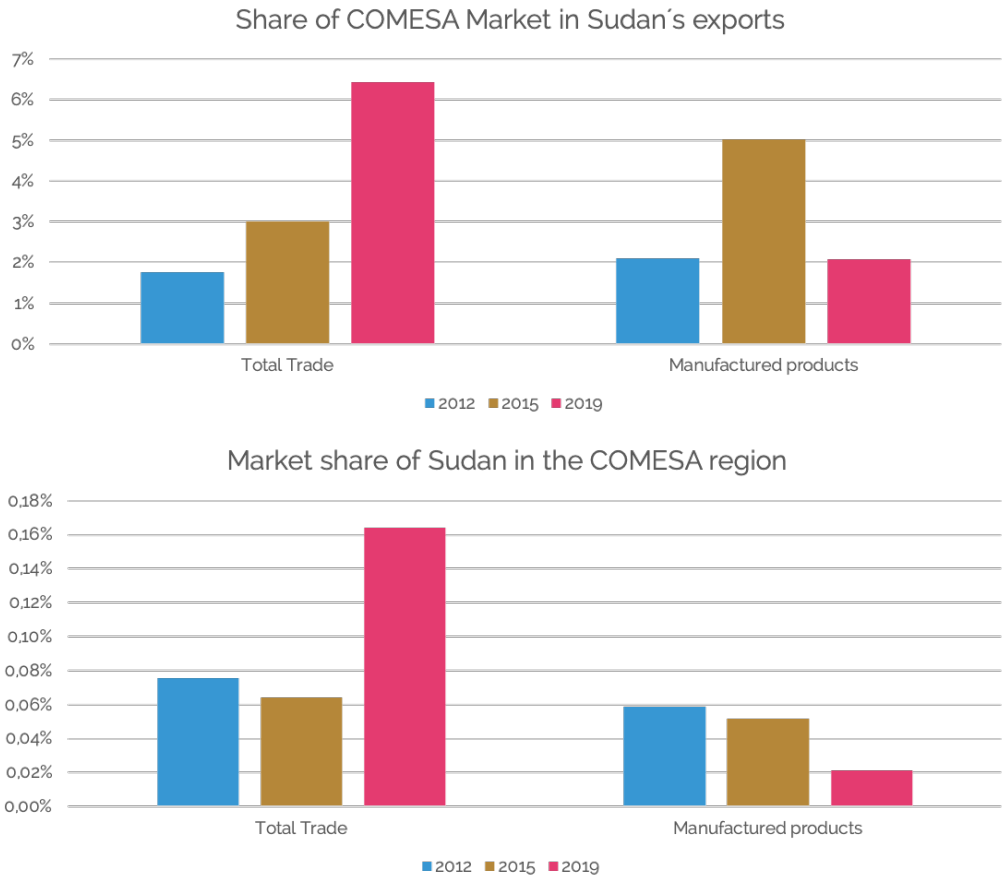
Regional integration One starting point for overcoming the large dependency on resource-based exports to the United Arab Emirates (UAE) and China is the active integration of Sudan's industry within the COMESA region. This is also an important policy goal in compliance with the African Continental Free Trade Area (AfCFTA) integration process. Sudan is part of the agreement but has not yet signed the most recent rectification (AfCFTA, 2021). Regional economic communities can play an important role for countries that are trying to establish themselves in global markets. Generally, some benefits from participating in regional market integration initiatives are lower logistical costs and shared infrastructure costs, similar competitiveness levels, short distances, similar institutions, among others. In this regard, the COMESA regional industrial strategy (COMESA and AFRICA, 2017) aims at achieving the following objectives:

- Increase the availability of industrial goods and services for the intra-common market.
- Improve the competitiveness of the industrial sector thereby enhancing the expansion of intra-regional trade in manufactures in order to achieve structural transformation of the economy that would foster the overall socio-economic development in the Member States.
- Increase intra-regional manufactured exports relative to total manufactured imports to the region from the current 7% to 20% by 2026.

Nevertheless, Sudan's main trading partners remain outside the region. Figure 25 shows that the regional market of COMESA is almost irrelevant for Sudan's exports today. While COMESA countries accounted for roughly 5% of manufactured exports in 2015, this share went down to only 2% in 2019. However, while manufactured exports to COMESA member states have decreased, total trade has increased from 3% in

2015 to over 6% in 2019. The analysis of the market share of Sudanese products on regional markets in the lower part of Figure 25 highlights some even more fundamental challenges. The type of products that regional markets demand, are currently not being offered by Sudanese exporters at all. Hence, the share of Sudan's products on the COMESA market for manufactured goods stands at only 0.02% in 2019. The same holds true for total trade, with a modest share of 0.16% in the same year. This analysis shows that Sudanese companies are currently not yet able to actively benefit from regional integration. This can only change if the country starts producing a wider range of manufactured goods that match the demand structure on the regional markets. From a policy perspective, trade liberalization and regional integration will not be sufficient to develop domestic manufacturing. Also, an active industrial policy is needed to promote the creation of domestic production capabilities. COMESA member states that liberalize their trade but do not nurture domestic industries will inadvertently become highly import-dependent without being able to benefit from export opportunities. Sudan's geographical location at the Red Sea and its vast resources offer plenty of opportunities for the country to gain a strong position in export markets and take full advantage of the benefits that regional integration offers.

Figure 25: Regional integration



Data source: United Nations UN Comtrade (2020) database.

A policy instrument deployed by many countries to enhance regional participation and strengthen manufacturing capacities and exports are Special Economic Zones (SEZ). Special Economic Zones, Exports Processing Zones, or Industrial Parks are a popular form of a spatial Industrial Policy in which the government offers special fiscal incentives or regulatory and administrative benefits to companies.

Box 2: Special Economic Zones

SEZs have been priority to many countries since the 1950s and are still widely deployed today. SEZs refer to the government's efforts of promoting a geographical area for commercial purposes, in which companies enjoy various benefits. The key objectives for establishing economic zones are usually 1) boosting industrial competitiveness and 2) promoting a regionally balanced growth. Based on a range of known success cases, it has been proven that a SEZ, if applied effectively, can increase the economic performance of a country by fostering structural change. It may allow several regions within a country to play a role in national development, and at the same time, it offers opportunities to integrate in the global market. Sudan's regime for free zones is governed by the 2009 Free Zones and Free Markets Law. The implementing regulation was adopted in May 2013. The responsible authority for free zones is the National Council for Free Zones, which started operation in 2013 (UNCTAD, 2015). In Sudan, the objective of the SEZ regime is to "promote domestic and foreign investment in areas determined by the Council, taking into account the country's development objectives." (UNCTAD, 2015). To date, there are two Special Economic Zones operating in Sudan, the Red Sea Free Zone (41% industrial activities, 15% commercial activities, 44% service activities) and the Garri (Al-Gaili) Free Zone (industrial investment and assembly industries, food industries and petrochemicals and plastic products industry). The Free Port Project is currently under development (Ministry of Investments and International Cooperation of Sudan).
The incentives offered by the government to attract investment are:

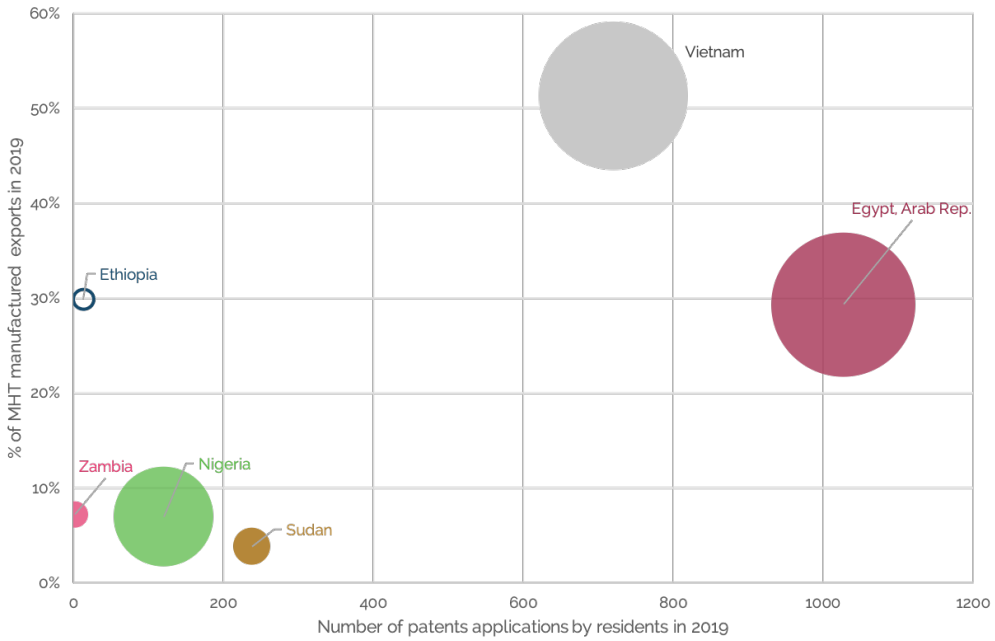
- 100% foreign ownership is allowed for all sectors.
- Exemption from taxes on profits for 15 years, renewable for an extra period.
- Exemption from personal income tax for salaries of expatriates.
- Exemption from all customs fees and taxes except service fees for products imported into or exported abroad from the zone.
- Exemption from all taxes and fees for real estate inside the zone.
- Authorization to transfer invested capital and profits from Sudan abroad through any bank licensed to operate in the zone.
- Exemption from customs fees for products of industrial projects established in the zones depending on materials used, and local costs incurred in production and provided the value be estimated by a designated committee.
- Guarantees that money invested in the zones may not be frozen, confiscated, or arrested.
- Authorization to store goods transiting Sudan in zones under the supervision of customs police.
- Authorization to rent its land and buildings according to the terms it agrees upon and without being bound by any other law (Ministry of Investments and International Cooperation of Sudan, 2021).

Industrial upgrading and innovation To date, Sudan largely relies on basic economic activities which generate low value added and have very limited spillover effects on the economy. Products with a low decree of sophistication make the economy highly vulnerable to external shocks, such as volatile commodity prices or demand shocks. In particular, the extraction of natural resources such as gold does not yet offer

significant positive linkages to other sectors of the economy. For these reasons, it is important to invest and attract investment that can upgrade the structure of the manufacturing sector towards producing and exporting products with higher technological content in the future.

Figure 26 reveals the lack of high and medium-high technology (MHT) activities in Sudan's exports in 2019, which serve in this analysis as a proxy to measure the level of sophistication of Sudan's manufacturing sector. Sudan's share of MHT manufactured exports stands with only 4% considerably below its benchmark countries. In particular, Vietnam and Egypt stand out with an MHT share of 51% and 29% and serve as role model countries for industrial upgrading. One of the prerequisites for technological upgrading is innovation in industrial processes that can provide the foundation for advanced sectors to successfully develop in countries. Figure 26 also shows that the benchmark countries with stronger innovation performance (proxied by the number of patents by residents) are the ones that tend to exhibit a more sophisticated industrial structure, while less innovative countries often fail to enter high and medium-high-technology sectors. Similarly, the size of circles for each country represent the number of industrial design applications. Industrial design applications also serve as a proxy for manufacturing upgrading as more sophisticated industries tend to be the ones ensuring the protection of their industrial patents.

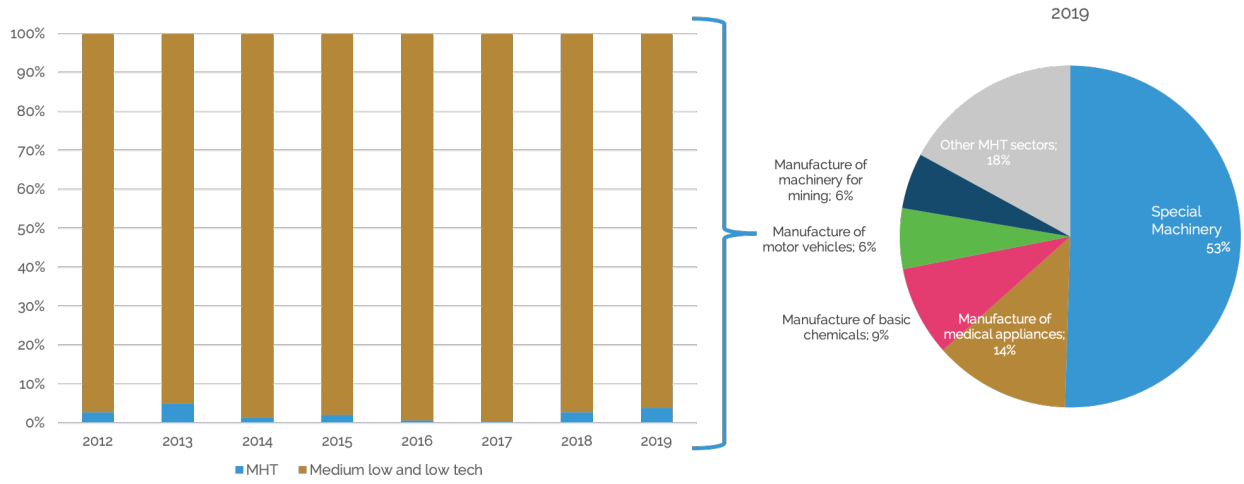
Figure 26: Innovation & MHT exports 2019



Note: Circle sizes are industrial design applications. Data is not available for Ethiopia, Nigeria makes reference to the year 2013 and Sudan to year 2018. For patents application, Nigeria and Ethiopia make reference to the year 2018.
Data source: United Nations (UN Comtrade, 2020) database, World Development Indicators (World Bank) & World Intellectual Property Organization(WIPO)

Figure 27 also illustrates that Sudan has not been able to increase the complexity of industrial production. Throughout the period of observation, the share of MHT remained stable under 5%. In 2019, the MHT sector was dominated by special machinery with a share of 53% of total MHT, followed by manufacturing appliances (14%), basic chemicals (9%), motor vehicles (6%), and machinery for mining (6%). A structural transformation towards more sophisticated production will generate positive linkages such as knowledge spillovers and improvements in human skills that will benefit the whole society. Accordingly, strengthening productive capabilities and the development of an industrial innovation system should be considered core pillars of an effective industrial policy in Sudan. This together can lay the foundations for the medium to long-term emergence of advanced manufacturing activities in the country.

Figure 27: High and Medium High-Tech exports in Sudan



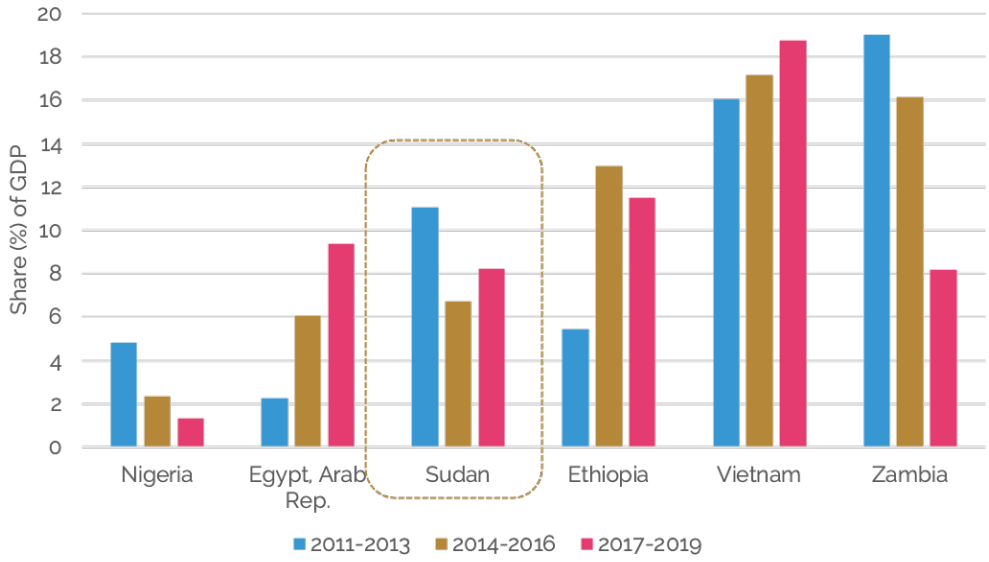
Note: Details on High and Medium High-Tech classification can be found in appendix B
Data source: United Nations UN Comtrade (2020) database.

1.2.4 Investment and access to credit

Foreign Direct Investment (FDI) In October 2017, the USA ended a the economic embargo on Sudan. Sudan can start now conceiving and implementing the most needed actions to overcome the post-sanction macroeconomic challenges (African Development Bank Group, 2018). The abolition of these international sanctions created a momentum for the government to implement far-reaching policy reforms. As part of these efforts, the government focuses on attracting more FDI to Sudan. One of the priority tasks of the government under the strategic focus to "stabilize the economy" is to "develop the investment process in Sudan through an attractive legal and administrative environment, and a review of the Investment Law and its procedures, taking advantage of global and regional platforms and consultative meetings in attracting Investors." (Cabinet Affairs, 2019) The latest amendment to the Investment Law created in 1996 was adopted in 2013. With the support of UNCTAD, the country has reviewed and replaced this policy with the new "Investment Encouragement Act 2021" (The Republic of Sudan: Investment Encouragement Act, 2021). The objectives of this act are to: 1. Support the preparation of a conducive environment to attract investments, in consistency with the state strategic economic and developmental objectives and priorities; 2. Increment the rates of economic growth, local production, productivity, and value added, in addition to providing job opportunities, improvement of balance of trade, utilization of natural and human resources, transformation of relative advantages into competitive advantages as it may contribute to the attainment of sustainable and balanced development; 3. Deepen and propagate awareness of the importance of local and foreign investments, and promote investment environment; 4. Expand, diversify and localize the production base and raise the rates of local production; and 5. Transfer and localize the knowledge, technology, methods of modern administration, scientific, technical, and marketing expertise, for the purpose of human capacity building and upgrading (The Republic of Sudan: Investment Encouragement Act, 2021). Figure 28 shows the average share of FDI in GDP in three recent periods. Overall, the volume of FDI has been highly volatile over time, and is a result of large individual investments rather than numerous regular new investment projects, which would be much more favorable for the country. However, in the most recent period 2017-2019, FDI has been increasing, representing 11% of GDP compared to 6% between 2014 and 2016. Compared to its benchmark countries, Sudan is well positioned, with a relatively fair share of FDI in GDP, exceeding Nigeria and even Egypt and Zambia in more recent years. This must be attributed to the government's success in improving the country's investment climate and the lifting of international

sanctions. Regarding its role models, Vietnam's share of FDI (18%) is significantly high. The country' strong export-orientation makes Vietnam an attractive destination for FDI. A similar relationship can be observed for Zambia, where FDI and exports have simultaneously decreased in recent years. Sudan's main sources of FDI are China and Arab countries. China is the biggest investor in Sudan, accounting for 38% of the country's total investment in 2018. However, it is highly concentrated in the oil industry. 99.9% of China's total investment in Sudan is destined for this sector (African Development Bank Group, 2018).

Figure 28: Foreign Direct Investment (FDI) as share of GDP

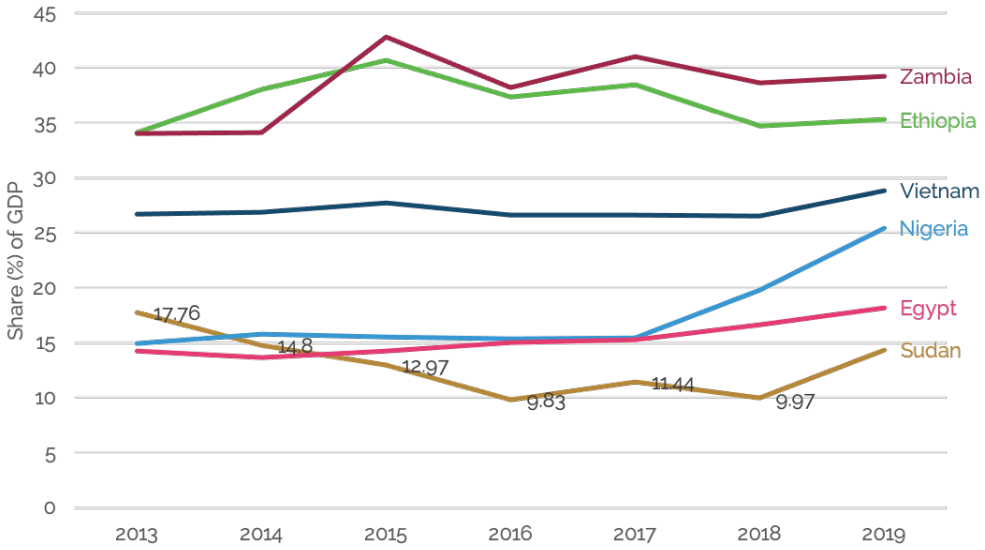


Data source: World Development Indicators, World Bank.

National Investment Apart from foreign investment, it is equally important to analyze domestic investments, which, in volume, usually exceed (FDI) by far. Unfortunately, there is no data on domestic investment available for Sudan. Therefore, Figure 29 shows the capital investment as a share of GDP for the period between 2013 and 2019 for Sudan and benchmark countries as a proxy for domestic investment. This indicator is calculated as the procurement of new plants and equipment by firms, as a share of GDP. The higher the number, the higher the investments relative to GDP and the better for long-term economic growth as current investments improve future production capacities (Global Economy, 2021). Figure 29 illustrates that Sudan has by far the lowest capital investment, with a share of 14% of GDP. The timeline indicates that the country is slowly moving towards higher investments and might close the gap with other regional competitors in the future. Sudan is followed by Egypt (18%), Nigeria (25%), Vietnam (28%), Ethiopia (35%), and Zambia (39%).

The transitional Government through the Ministry of Finance and National Economy has committed itself to the ambitious target of creating 250,000 jobs within a 2.5 years' period. This calls for a holistic strategy that addresses the promotion of domestic investment to leverage foreign investment into Sudan. ITPO Bahrain has been active in Sudan since 2001. In light of the current changes in Sudan; ITPO Bahrain developed with the various stakeholders between September 2019 and February 2020 a national strategy for Entrepreneurship and SMEs for Sudan. These efforts to promote domestic investments have been further materialized with the establishment of the Higher Council for Investment & Private Sector Development (HCIPSD) (UNIDO Sudan Field Office, 2020).

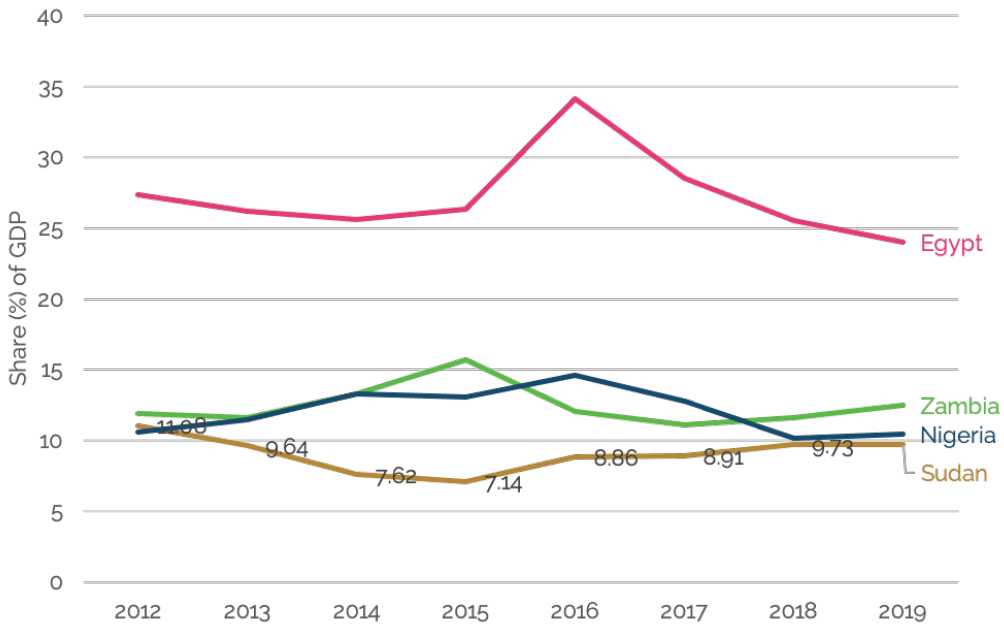
Figure 29: Capital investment as share of GDP



Data source: The Global Economy Database.

Access to credit Access to finance is a challenge for business in most developing countries. Improving the capacities of banks to offer suitable financial products is in particular relevant for countries like Sudan where SMEs play an important role in the expansion of the manufacturing sector. Bank credits to the private sector can be used as a proxy to understand how developed the financial system in a country is. It is defined as the "credit extended by the banking institutions to the private sector" and it is essential for an economy to function well. It is the basic mechanism to promote domestic investment as well as to increase the purchasing power of the population. For developed economies, an average share of bank credits to the private sector is around 70% of GDP while for least developed countries this share is in average around 15% (Global Economy, 2021). Figure 29 shows that Sudan is lagging behind all benchmark countries with a share of 9.73%. In contrast, Egypt displays a much better performance of the financial system with a share of 24%. In order to improve the access to finance in the country, the Government could explore options to support banks in expanding the availability of their financial products. Section 3.2.2 provides a more in-depth analysis of the key bottlenecks for private sector development in Sudan.

Figure 30: Bank credit to the private sector as share of GDP



Data source: The Global Economy Database.

Box 3: Impact of the COVID 19 pandemic on the productive sector in Sudan

In Sudan, from January 2020 to date, there have been 37,620 confirmed cases of COVID-19 and 2,784 deaths. As of August 2021, less than 1% of the population has been vaccinated and a total of 827,961 vaccine doses have been administered (WTO, 2021). The pandemic has increased unemployment as well as prices for basic foods. A study conducted by the World Bank in December 2020 assessed the socio-economic impact of COVID-19. The study found that in July 2020 more than 20% of households were unable to buy bread, cereals, milk and milk products due to the increase in prices. Around 46% of the households expressed concerns about having enough food and many reported modified eating habits. Additionally, about 38% of households have experienced a decrease in their income, particularly affecting those families that depend on remittances. 29% reported a decline in international remittances and 24% on domestic remittances. Only around 2% of the households reported receiving any type of social assistance from the government (World Bank, 2020c). The COVID-19 pandemic impacted also the macroeconomic stability of the country. First of all, the pandemic led to a decline of 46% of fiscal revenues in 2020. This decline combined with the negative supply shock and the continued monetization of the fiscal deficit has led to high depreciation and inflation (IMF, 2021).

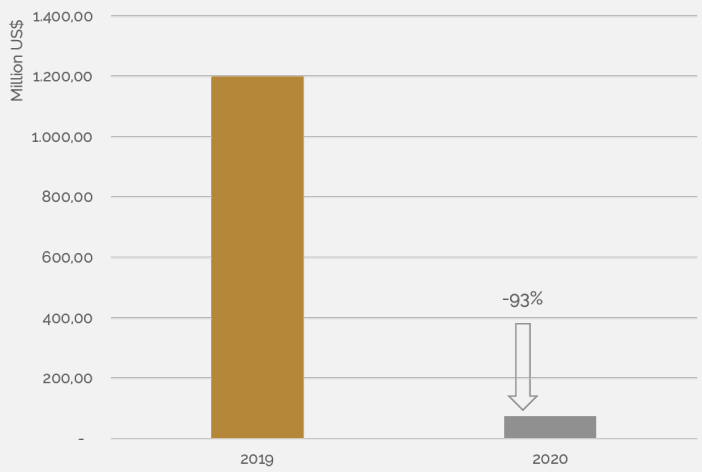
The World Bank jointly with the Central Bureau of Statistics (CBS) implemented the "Sudan High-Frequency Survey on COVID-19" in December 2020 to "quickly collect enterprise-level information, using phones, to monitor the crisis and assess the dynamics of the impacts of COVID-19 on MSMEs in Sudan." The sample was a total of 489 enterprises (World Bank, 2020b). The survey found that over 70% of the surveyed entrepreneurs are micro enterprises, employing less than five workers. 31% were reported as manufacturing firms. Manufacturing and other services were with about 50% the sectors with the highest level of closures during the lockdown. The manufacturing firms that remained open reported an 83% reduction in sales (World Bank, 2020b). However, fortunately, MVA has increased by US$ 133 million from 2019 to 2020 (UNIDO, 2021c). The Min-

istry of Industry and Trade of Sudan requested UNIDO's technical assistance to support selected food-processing industries. The project provides technical assistance to dairy food safety systems and production practices and mitigates the impact of the COVID-19 pandemic by providing direct financial support to selected dairy enterprises and setting up effective governance structures for the Entrepreneurial Development Committee (EDC) in Khartoum. EDC focuses on building and strengthening the entrepreneurial and technical skills of business incubators as well as established entrepreneurs (UNIDO, 2021b). Sudan's exports are highly concentrated in a few products and markets, which makes the economy highly vulnerable to external shocks such as the current COVID-19 global crisis. Figure 31 illustrates the massive impact that COVID-19 has had on Sudan's gold exports to the world.[a] From 2019 to 2020 gold exports declined by 93%.

In order to cope with the negative impacts on the social-economic development, the government of Sudan has taken some policy measures (IMF, 2021) :

- An agreement with CBS has been achieved to provide US$ 55 million in foreign currency to support both the local production and import of health products.
- Due to the exchange rate reform in February 2021, the "Sudan Family Support Program" could be initiated that provides qualified individuals with US$ 5 per month for one year to cope with the impact of inflation (which stood at 330% in March 2021).
- In the 2021 state budget expenditures on healthcare have also been increased (the volume is unknown).

Figure 31: COVID-19 impact of Sudan's gold exports to the world



Data source: ITC Trade Map

[a] HS4 Classification: Product group *7108 - Gold, incl. gold plated with platinum, unwrought or not further worked than semi-manufactured.*

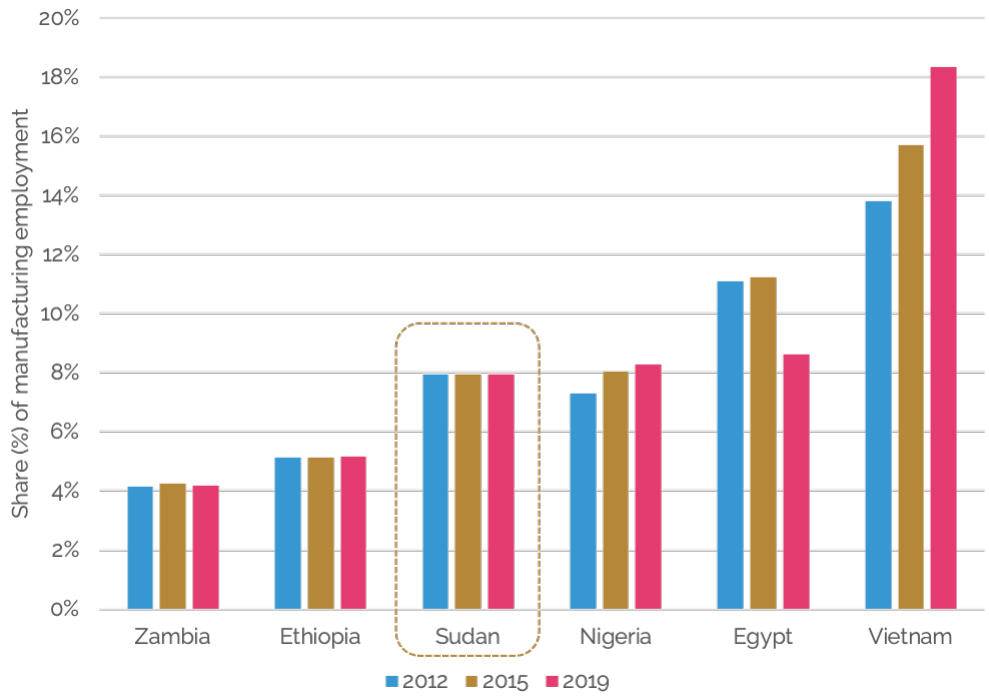
1.3 Social performance

1.3.1 Manufacturing employment

As mentioned in the previous section, a booming manufacturing sector is not only conducive for a structural transformation towards more sophisticated production and higher value added in the country, but also for creating more and better jobs. Figure 32 illustrates the share of manufacturing employment in total

employment by country in 2012, 2015, and 2019. It shows that most of the benchmark countries have similarly low levels of manufacturing employment. However, Sudan's share of manufacturing employment has been trapped over the period of analysis with a share of 8%, and it is only ahead of Zambia (4%) and Ethiopia (5%). This mirrors the performance of the manufacturing contribution to GDP, which has also not seen an increase over the same period. Lessons can be learned from Vietnam, which has managed to increase manufacturing employment from 14% to 18%. In Vietnam, the main manufacturing sectors are considered "labor-intensive" such as textiles and assembly activities. These sectors are known for requiring a large amount of low-skilled workers. Unemployment is a major source of poverty in Sudan and the manufacturing sector, as the most productive activity of the economy, fails to absorb a large number of workers compared to agriculture or services. A study based on the latest household survey (2014/2015) confirmed that there is no evidence of a structural transformation in Sudan during the period of analysis (Etang Ndip and Lange, 2019). However, a growing manufacturing sector would offer a great opportunity to reduce unemployment and therefore poverty, especially for the youth and women (African Development Bank Group, 2018).

Figure 32: Share of manufacturing employment in total employment



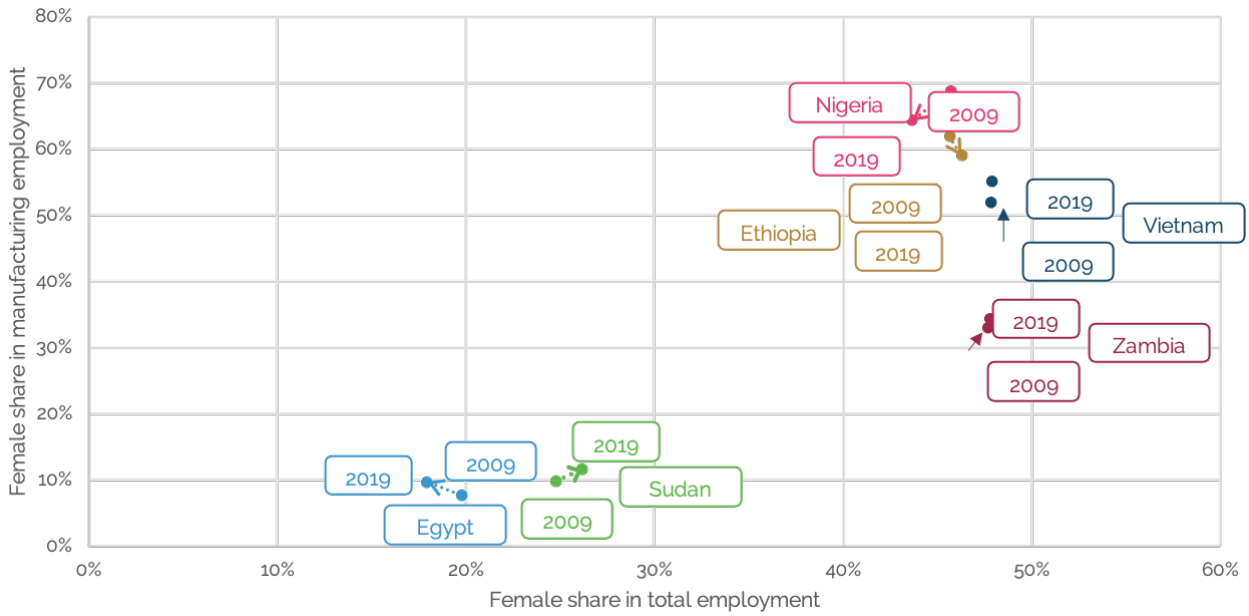
Data source: ILOSTAT

1.3.2 Youth and gender

Inclusive manufacturing sector One of the strategic priorities of the transitional government is *"Ensuring the promotion of the rights of women in all areas and their equitable representation in the structures of governance, acknowledging that a woman is a real actor in society and primarily as a human being, this requires the development of indicators that enhance her role and contribution in all aspects of life"* (Cabinet Affairs, 2019). Figure 33 illustrates the share of female employment in the manufacturing sector on the Y-axis and the share of female employment in total employment on the X-axis for 2009 and 2019. Sudan shows one of the lowest shares of female employment in the manufacturing sector among benchmark countries with a share of 12% in 2019, only ahead of Egypt (10%). The trend in Sudan shows only a very limited increase of

females in the manufacturing sector from 10% in 2009 to 12% in 2019. Countries like Nigeria and Vietnam exhibit a significantly higher gender integration with a participation of 64% and Vietnam 55% respectively.

Figure 33: Female share in manufacturing and total employment

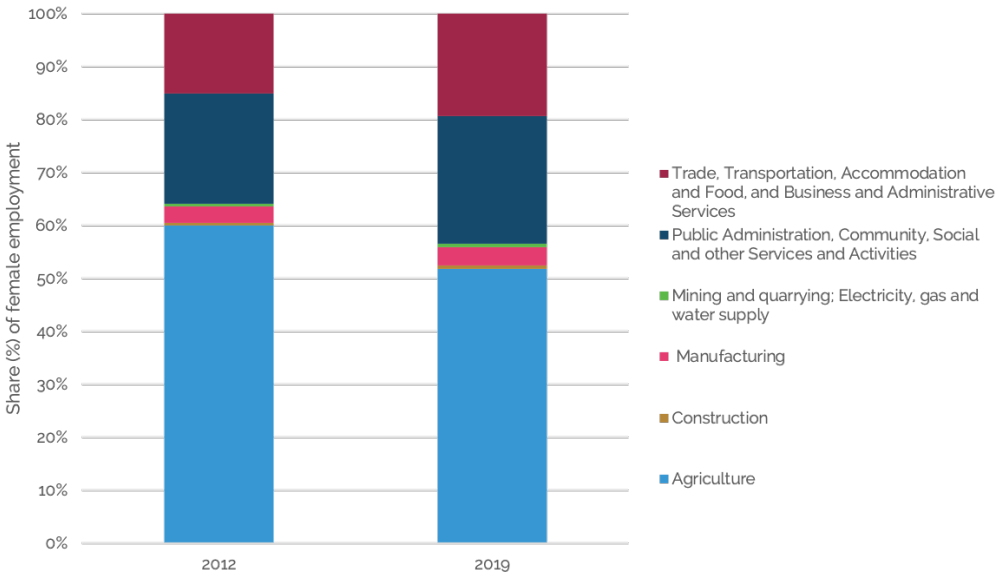


Data source: ILOSTAT

Overall, the level of workforce participation indicate gender inequality in Sudan. In 2018, 76% of men were active compared to only 31% of women across all sectors (African Development Bank Group, 2018). There are also large gender disparities regarding the quality of work. A study based on the latest household survey (2014/2015) showed that in average wages of women are only 60% of those of men (Etang Ndip and Lange, 2019). Figure 34 shows the share of the female workforce by sector of the economy. Agriculture offers most of the opportunities for women, even though it has decreased modestly during recent years. Currently, 52% of total female workers work in agriculture while services represent a share of 19%, public administration a share of 24%, and manufacturing a share of only 4% of female workers. The lack of employment opportunities for women in the manufacturing sector is a constraint for the economy as a whole. Research shows that one of the most effective ways to reduce poverty is to empower women economically. Access to income and decent employment can have multiple positive effects on the economy, as women are more likely to invest in their children's schooling, food security and tend to reinvest in their communities (UNIDO, 2015a).

In Sudan, the challenges for female employment are structural and related to labor laws and cultural customs. Sudan is one of the few countries, which have not signed the Convention on Elimination of All Forms of Discrimination Against Women (CEDAW) yet (UN WOMEN, 2021). From a policy perspective, it is important to identify the manufacturing sub-sectors that have the potential to absorb female labor and offer decent incomes. It is of key importance to develop inclusive growth policies that aim at removing constraints on women's labor and at promoting empowerment, for instance through technical training, entrepreneurship guidance and access to finance and land.

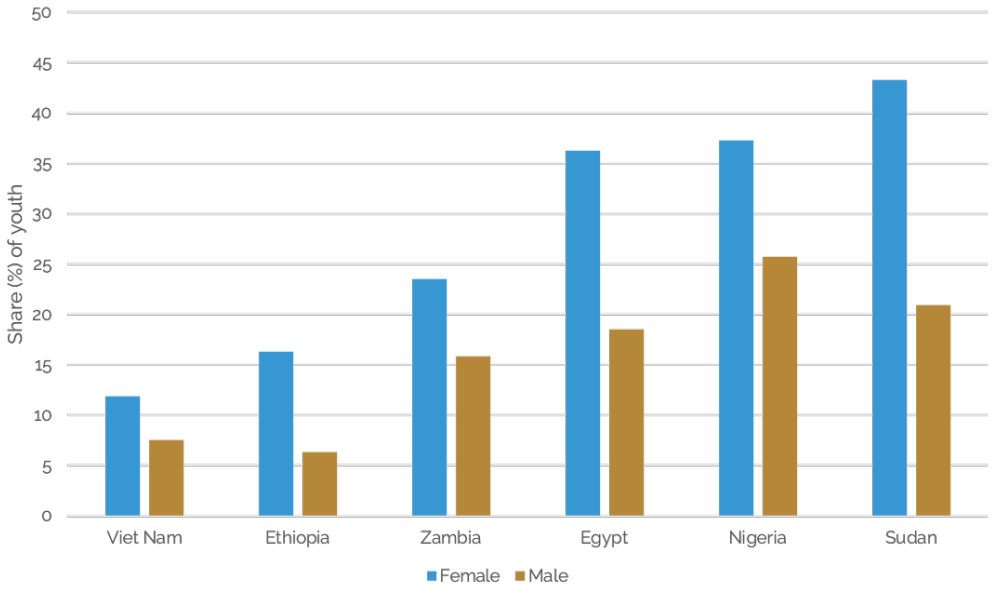
Figure 34: Distribution of female employment by sector



Data source: ILOSTAT

Youth In 2019, more than half of the Sudanese youth (64%) were neither employed nor involved in any education or training activities. Concerning youth, there is a gender inequality similar to that analyzed in the previous section. 43% of female youth are unemployed and not in training, compared to 20% of their male peers (Figure 35). Almost 72% of the population in Sudan is under 24 years old, which displays a huge potential for the country to generate a demographic dividend if supported by strong employment and educational policies (UNFPA). Compared to its benchmark countries, Sudan and Nigeria show the highest levels of unemployment or lack of educational integration of youth. Based on the latest household survey (2014/2015), unemployment sharply increased in urban areas, especially among the youth (Etang Ndip and Lange, 2019). Sudan has not been able to create jobs for young entrants due to a mismatch between skills and market demands. The high youth unemployment is a result of decades of over-dependency on the oil sector, which has failed to create jobs, and the negligence to promote other productive sectors of the economy (African Development Bank Group, 2018).

Figure 35: Share of youth not in employment, education or training by sex 2019



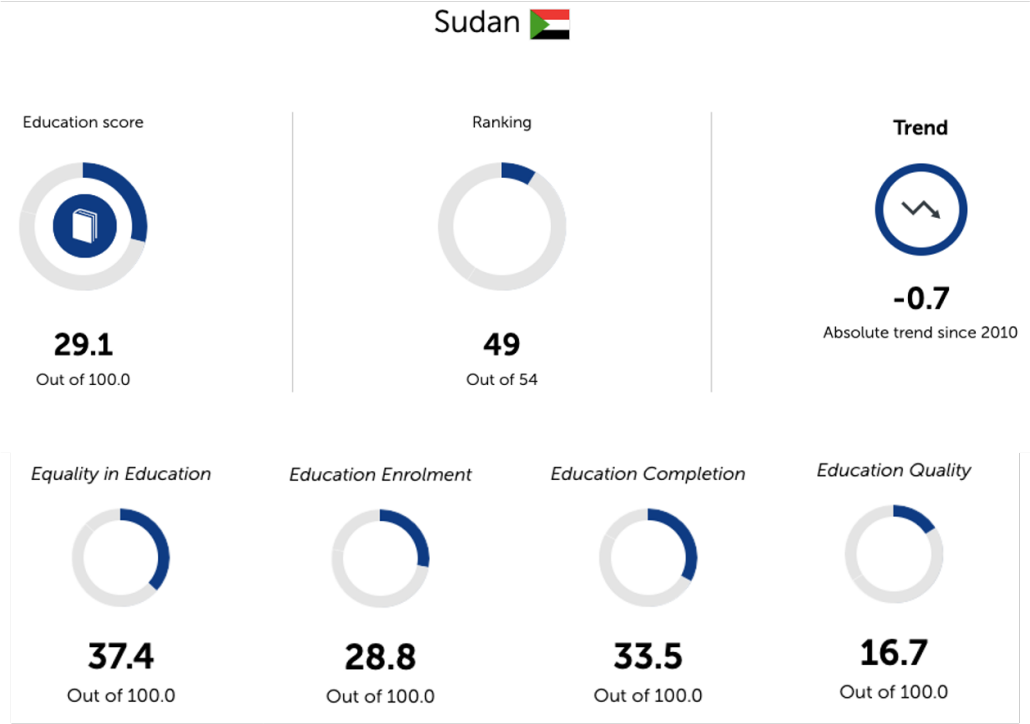
Data source: ILOSTAT

To support the economic empowerment of women and youth, UNIDO is currently implementing the project "Fostering inclusive economic growth in Kassala State through agro-value chains development and access to financial services". The project aims at improving the livelihoods, food, and nutrition security of the target population in Kassala State, especially for women and the youth. More specifically, the project focuses on three strategic components of 1) value chain integration and agriculture productivity improvement at the household level; 2) community participation in entrepreneurship development, and 3) access to finance through local micro-finance institutions (UNIDO, 2021b).

1.3.3 Education and skills

One of the key drivers of economic productivity is the level of education of the labor force. The higher the level of education of workers, the faster a structural transformation of the economy can be achieved. The skill system in Sudan is formed by 98 technical secondary schools, 21 technical colleges and 12 Vocational Training Centers (VTCs). Additionally, there are more than 3,000 secondary schools in the country (ILO, 2021). Figure 36 illustrates Sudan's scores in terms of education based on the Ibrahim Index of African Governance (IIAG) (2021) which is a tool that measures and monitors governance performance in African countries. Overall, the index indicates a score of 29 points out of 100 for Sudan ranking Sudan 49 out of 54 countries. Additionally, it shows sub-components such as Equality in Education and Education Completion in which the country is performing better. With respect to education enrollment and education quality, however, the scores indicate significant room for improvement.

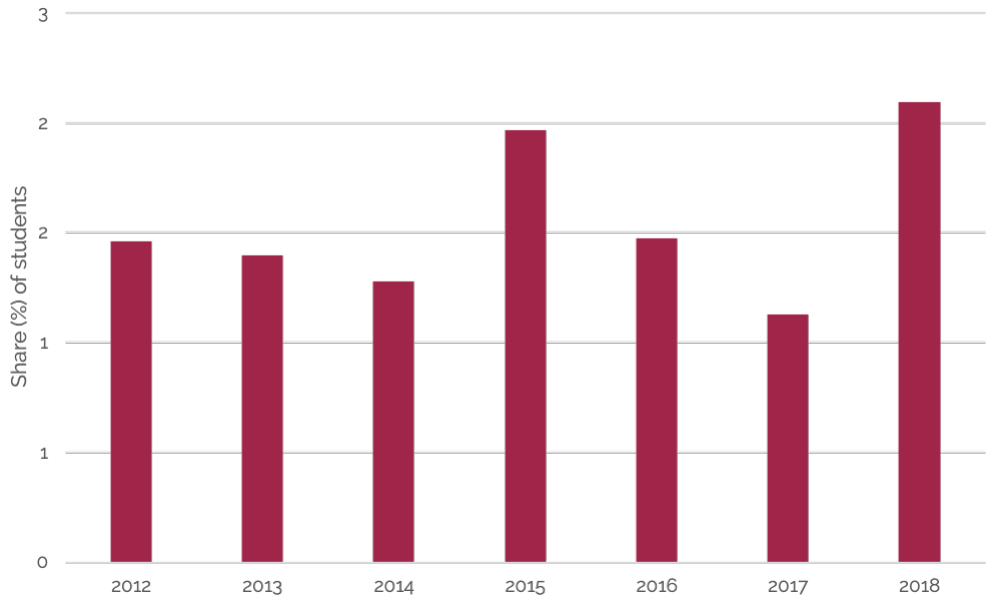
Figure 36: Sudan's education system scores based on the Ibrahim Index of African Governance (IIAG)



Data source: Ibrahim Index of African Governance (IIAG) (2021)

Unemployment policies often fail to tackle constraints that affect in particular the young population. As mentioned above, there is a mismatch between secondary and tertiary education graduates and labor markets. Most graduates suffer from a lack of experience and a lack of understanding of the labor market and its opportunities. Vocational training, instead, offers students the opportunity to "learn while doing", expand professional contacts and earn an income. Figure 37 shows the share of all students in secondary education enrolled in vocational programs between 2012 and 2018. It reveals that only approximately 2% of young students have access to vocational training. A scoping mission carried out in 2020 by ILO found that the capacity of Technical and Vocational Education and Training (TVET) is very low in Sudan. This is due to two main factors, first the lack of resources available and infrastructure that prevent the country from promoting TVET. Second and equally important, it was concluded that there is no clear coordination among those institutions in charge of the different levels of education, therefore reform of the skills development system is considered urgent to rapidly increase the level of skills of the future workers (ILO, 2021).

Figure 37: Share of all students in secondary education enrolled in vocational programmes



Data source: UNESCO

The transitional Government under the strategic priority "Enhancing the role of the youth of both sexes and expanding their opportunities in all areas" has identified, among other measures, the following lines of action to support the Sudanese youth (Cabinet Affairs, 2019):

- Developing a general policy for youth and translating it into action programs and creating an enabling environment for them to engage in societal, economic, and political work, and emphasizing their participation in the formulation and implementation of plans and programs.
- Developing youth leadership capabilities, cultivating their talent, nurturing and directing their energies and skills towards building and creating.
- Conducting a youth survey to create a database to identify their organizational and economic needs.
- Focusing on youth as an active human resource in the development process.
- Creating direct communication channels between the relevant ministries and youth to activate their community work.
- Utilizing the skills of youth in social media as platforms for training and learning.
- Attending to and supporting, youth initiatives in entrepreneurship, creativity, and innovation.
- Focusing on building the capacity of youth to supply the labor market with a qualified, skilled, and trained workforce.
- Developing a youth employment policy and encouraging entrepreneurship by ensuring decent work conditions for the youth of both sexes.

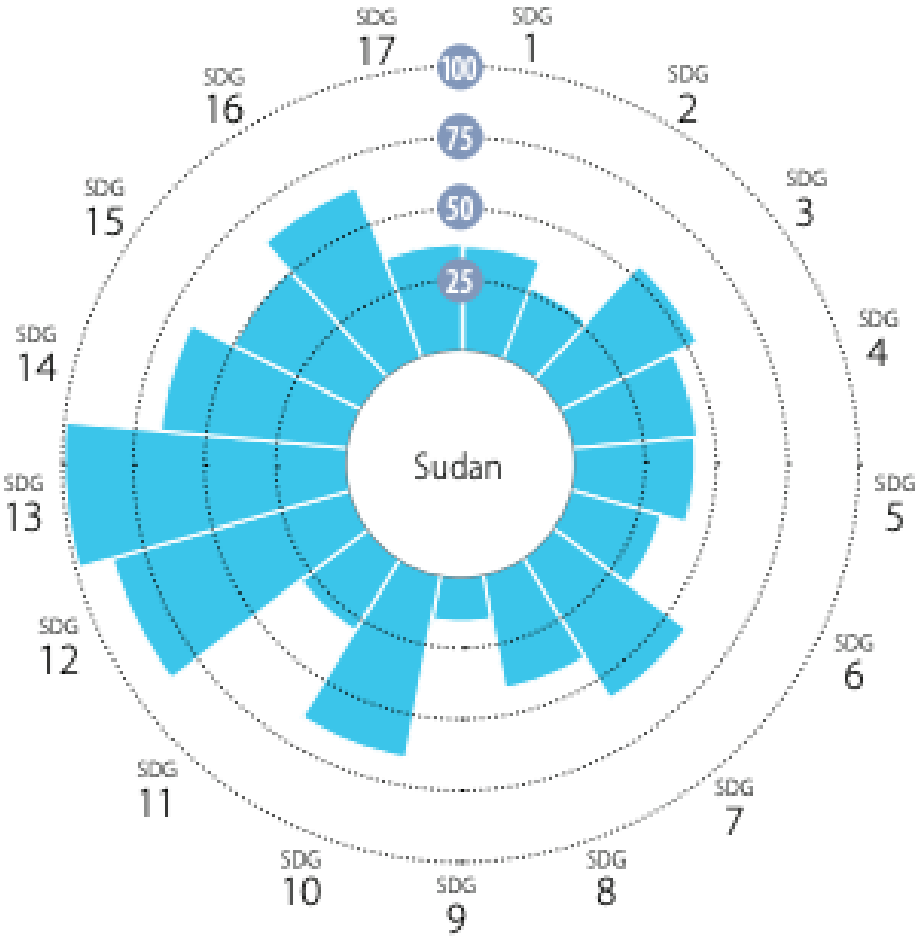
UNIDO is implementing the project "Employment opportunities and entrepreneurship development for migrant youth, refugees, asylum seekers and host communities in Khartoum State" aiming to improve the institutional capacities of the four Khartoum State Vocational Training and Employment Centres (VTECs) in terms of planning, management development and staff training in relation to the needs of Sudan's economic modernization program (UNIDO, 2021b).

1.4 Environmental performance

On the SDG Index, Sudan ranks 157 out of 164, with a score of 49.5, slightly below the regional average of 51.9. Figure 38 illustrates the performance of Sudan in all SDG's in 2021. It highlights that Sudan has achieved the goals established within SDG 13 (Climate action) and it is well-performing in SDG 12 (Responsible consumption and production). However, SDG 9 (Industry, innovation, and infrastructure) still faces significant challenges, and the score is stagnating at less than 25% of the required rate (Sustainable Development Report, 2021).

Unfortunately, the lack of data does not allow investigating more in-depth the performance of the SDG 9 components (technology, MVA, MVA per capita, manufacturing CO2 efficiency, manufacturing employment) as shown by the SDG 9 index tracker (UNIDO, 2021a).

Figure 38: Average performance by SDG



Data source: Sustainable Development Report (2021)

1.4.1 Energy and electricity

Access to energy and human development are highly correlated. There is a strong linkage between energy and poverty alleviation as productive activities, income generation activities, and even education require stable energy access. For populations to meet their basic needs and unfold their full potential, energy must be equally accessible. Sustainable energy serves as an instrument for economic development, and it is

essential for a transition from subsistence economies to more modern societies (UNDP, 2020). The energy sector in Sudan requires significant improvements, first of all, in the area of infrastructure investment.

Sudan suffers from frequent blackouts which affect significantly the manufacturing industry. Industries rely, hence, heavily on diesel generation. The generation, transmission and distribution of electricity and other energy carriers is carried out by state-owned enterprises under the supervision of the government and, in particular, the Ministry of Petroleum and Energy (MoPE). Existing electricity companies include the Sudan Electricity Holding Company (SEHC), Sudan Thermal Power Generation Company (STPG), Sudan Hydro and Renewable Energy Company (SHREC), Sudan Electricity Transmission Company (SETC), and Sudan Electricity Distribution Company (SEDC) which are integrated as part of the MoPE and do not exhibit financial autonomy. Their capacities depend on public budget allocation. The Ministry is committed to solving major issues and improving the policy frameworks and reform regulations. Some of the priorities are to adjust the electricity tariff (which is among the lowest in Sub-Saharan Africa), to strengthen the policy and legal framework, and to create investment opportunities through a set of regulatory reforms (Ministry of Investments and International Cooperation of Sudan, 2021).

To better understand the energy potentials of the country, the following section provides an overview about the main energy resources available:

- Solar: Sudan is one of the 148 sunbelt countries located close to the equator. A study carried out by Sudan's Ministry of Electricity and Dams (MED) in 2011 showed a potential of 2,000 to 2,500 kWh/m2 based on the Global Horizontal Irradiance (GHI) metrics. This means Sudan has a very high solar energy potential to be exploited. To date, solar power in Sudan is mostly used for off-grid connections and for irrigation pumping purposes (UNDP, 2020).

- Wind: The geographical location of Sudan also offers high potential for wind power. The highest average wind speeds are found in proximity to the Red Sea and in plains in the central and northern parts of Sudan. The average power density is between 250 and 664 W/m2. The top 10% of the land has an average density of 500 W/m2 which means a very good potential. The main uses of wind energy in Sudan are mechanical power and electricity generation (UNDP, 2020).

- Hydro: Sudan's hydropower capacity is estimated at about 4,860 MW. In 2017, the installed capacity was 1,928 MW consisting of 6 large reservoir dams. The main potential use for hydro energy is electricity generation, mechanical power, and irrigation. Attention must be given to the preservation of the water resources as hydropower plants can pose serious environmental and, in some cases, social issues (UNDP, 2020).

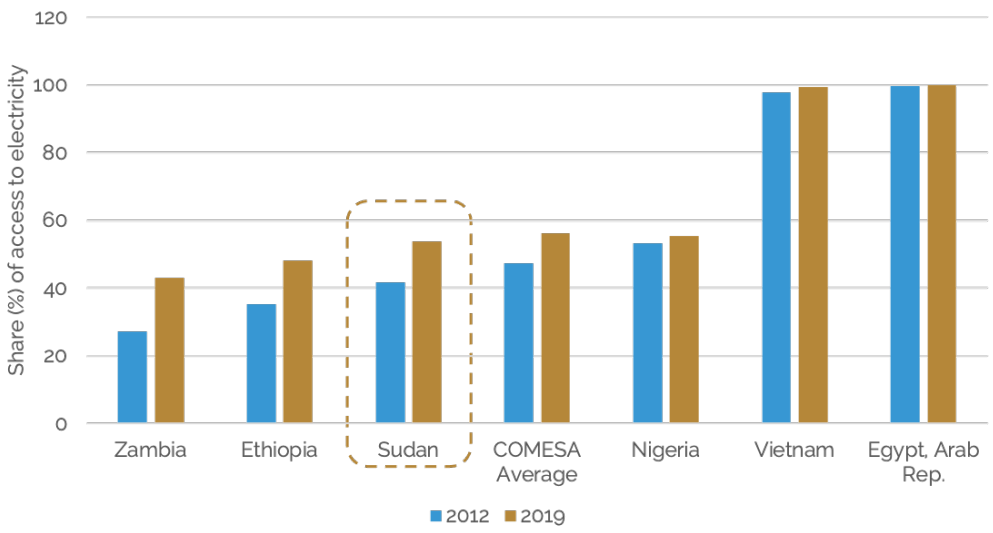
- Geothermal: In different regions of the country there is potential for geothermal energy in Sudan. A study in 2012 found that the country has a potential of around 400 MW. Although there is no electricity originating from geothermal plants yet, the government is looking for successful cases such as Kenya where experiences exist in exploiting this source (UNDP, 2020).

- Biomass: The use of this resource is mainly used for heat and cooking purposes in rural areas due to the household's lack of access to clean cooking fuels and technology. Biomass in the form of firewood, charcoal, agriculture residues, bagasse, and bioethanol is consumed in almost all economic sectors in Sudan. Firewood is mostly used for the residential sector in rural areas, and charcoal is used in commercial and service sectors. This resource accounts for the largest share of the energy mix (UNDP, 2020).

- Fossil fuel resources: Although Sudan lost 75% of its oil reserves due to the secession with South Sudan, Sudan still possesses a significant amount of petroleum. Proven oil reserves are estimated at 5 billion barrels of crude oil (UNDP, 2020).

Access to electricity In 2020, UNDP conducted a comprehensive study to assess the energy potential in Sudan and create the basis for a new national energy plan. For this aim, the Minister of Energy stated that *"[s]ustainable and affordable energy is at the heart of Sudan's efforts to provide universal access to energy to its rural and urban citizens. Our national development priorities reflect energy's central role in poverty reduction, women's empowerment, and public health improvements. We are convinced that making progress on universal energy access will also strongly contribute to progress on overall sustainable development."* (UNDP, 2020, p. 1) Based on the SDGs, access to energy is at the core of any country's economic development. For this reason, SDG 7 aims to "ensure universal access to affordable, reliable and modern energy for all". The Five-year Program for Economic Reform (2015-2019) calls for an improvement of access to electricity for all 18 states and for an increase of the share of population with access to electricity from 34% to 49% by 2019 (The Republic of Sudan: Five-Year Economic Refor Programme, 2015). Figure 39 shows that in 2019, already 53% of the Sudanese population had access to electricity, showing a quick growth since 2012 when the electricity coverage was 41%. In 2019, Sudan was at the same level as COMESA and Nigeria and slightly ahead of Ethiopia and Zambia.

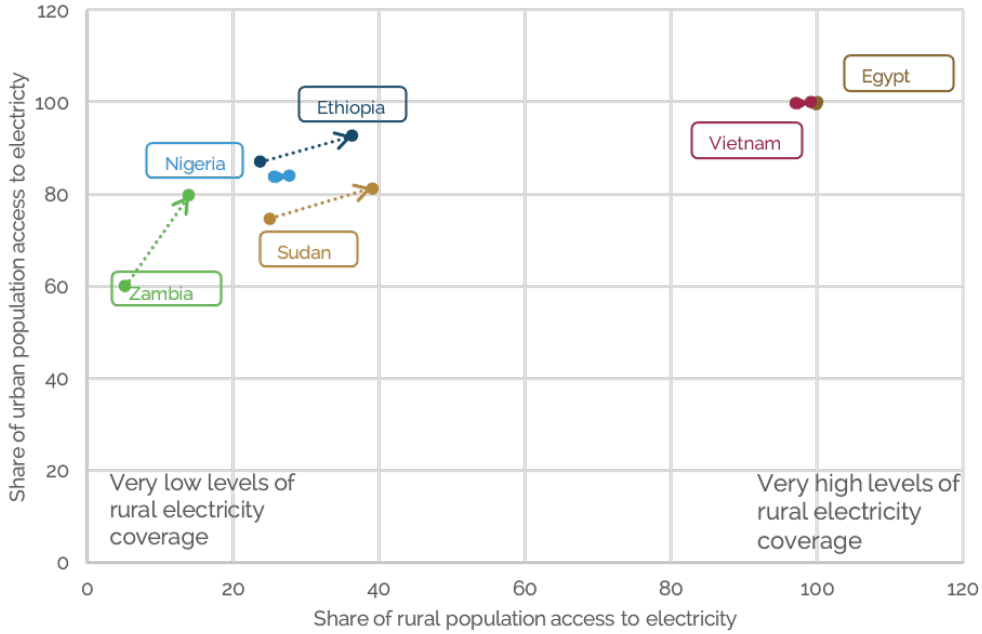
Figure 39: Access to electricity as share of total population



Data source: World Development Indicators (World Bank)

Nevertheless, efforts must continue as access to electricity is not only important for social development, but it is the basis for industrial development. The lack of equal electricity distribution in the country can create regional development imbalances and can lead to industries concentrating only in those areas or cities of the country where electricity is not a bottleneck. Figure 40 illustrates on the X-axis the share of electricity access of rural population, while Y-axis shows the share of electricity access of urban population for 2012 and 2019. Sudan shows significant progress in rural areas, where it managed to increase electricity coverage from 24% to 39%. However, efforts must be continued in order to close the gap between rural and urban areas, as 82% of the urban population already enjoy access to electricity. More industrialized countries such as Vietnam and Egypt show almost no rural-urban gap with an electricity coverage of 100% of its population.

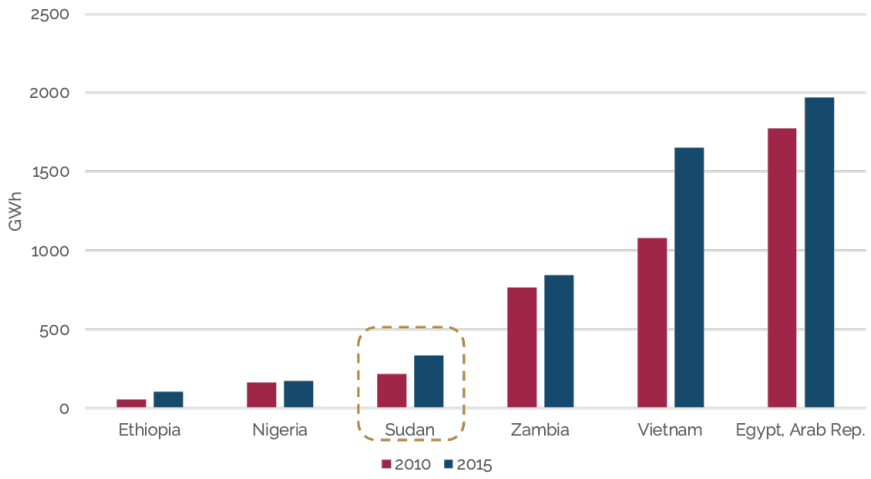
Figure 40: Change in access to electricity in rural and urban population 2012 & 2019



Data source: World Development Indicators (World Bank)

Electricity production capacity Sudan is blessed with a significant number of natural endowments for energy; from renewable resources to gas and oil reserves. The country's potential to produce power is substantial. For example, Sudan has proven reserves of 3 trillion cubic meters, which could offer an opportunity to become a significant natural gas producer and therefore, to use gas as a primary source for power generation. The oil reserve stands at around 1.5 billion barrels (Ministry of Investments and International Cooperation of Sudan, 2021). However, based on Figure 41, most of this potential is still untapped as Sudan shows the lowest levels of energy production only ahead of Nigeria and Ethiopia. Electricity output per 1 million population indicates the country's capacity to produce energy. Per one million population, the country managed to produce 335 GWh in 2015. A successful industrialization process will require a significant expansion of the energy production capacity of Sudan, which is illustrated by the electricity output of role model countries such as Egypt, which is up to five times higher (2,000 GWh) per million population basis than that of Sudan. In 2019, the installed electricity generation capacity was 3,608 MW. Yet, the available capacity was only 2,799 MW which is low compared to the demand of 3,800 MW that same year (Ministry of Investments and International Cooperation of Sudan, 2021).

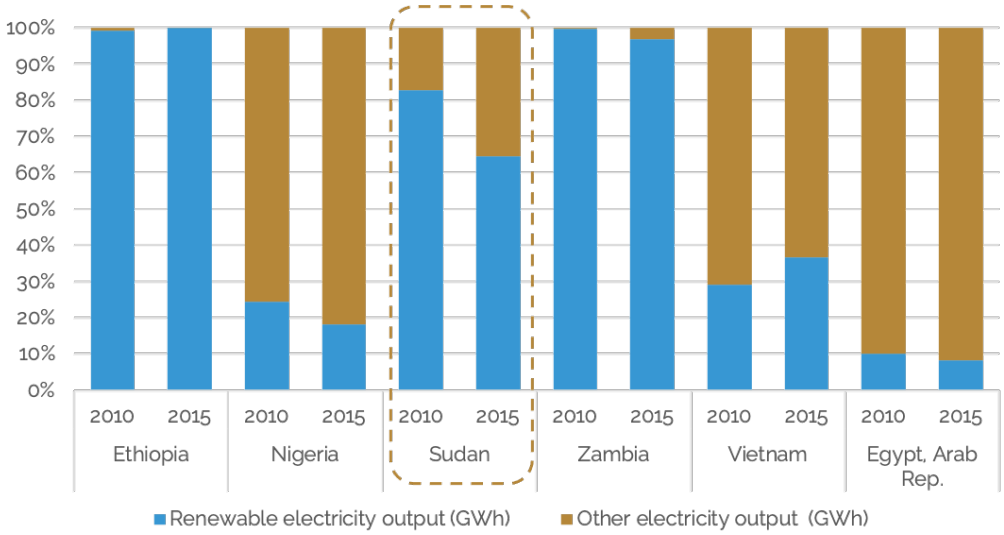
Figure 41: Total electricity output per 1 million population (GWh)



Data source: World Development Indicators (World Bank)

Renewable energy Renewable energies offer a unique opportunity to close the gap between supply and demand of energy in Sudan. Renewable or sustainable energy has been defined as the *"provision of energy such that meets the needs of the present without compromising the ability of future generations to meet their needs"* (UNDP, 2020, p. 16). However, the Long-Term Power System Plan 2012-2031 identifies coal-based thermal generation as the least-cost option for Sudan and leaves out the huge renewable energy potential (World Bank, 2019a). Thanks to its privileged location, Sudan enjoys many renewable resources including solar, hydro, wind, geothermal, and biomass energy physical resources to exploit (UNDP, 2020). At present, most of the renewable energy comes from hydro and biomass. However, biomass does not necessarily represent a modern form of energy provision, as it creates more air pollution compared to other sources of renewable energy. Similarly, the demand for biomass fuels outweighs a sustainable supply, contributing to deforestation and land degradation. Figure 42 illustrates the share of renewable and non-renewable electricity output for 2010 and 2015. While Sudan shows over 60% of renewable energy in 2015, this is lower than the share in 2010 (82%), implying a small reduction in the production capacity of renewable sources (UNDP, 2020).

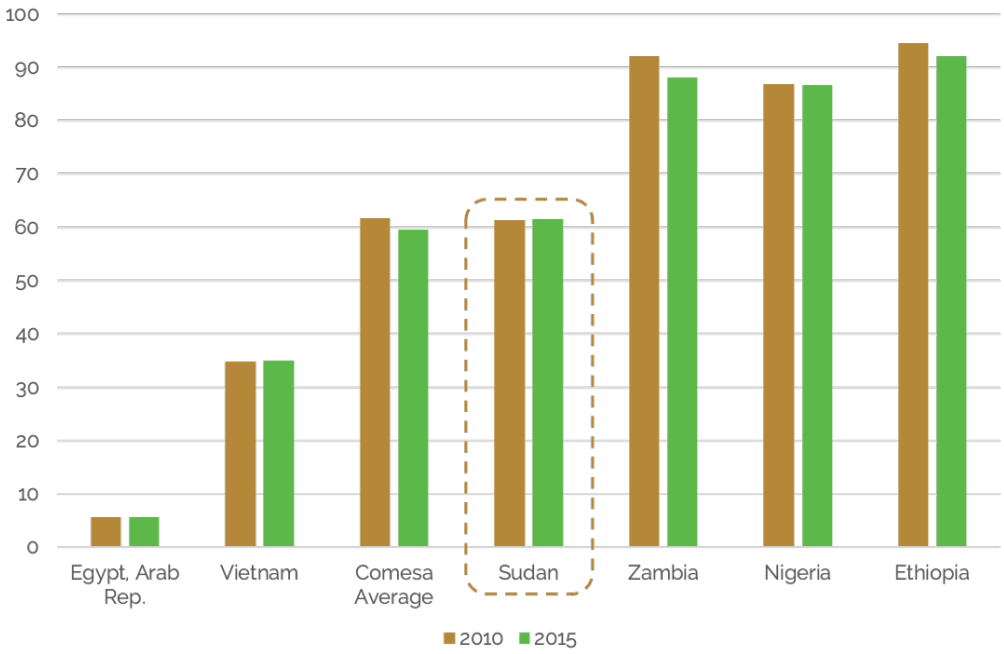
Figure 42: Renewable and non-renewable electricity output (GWh)



Data source: Sustainable Energy for All (World Bank)

Figure 43 shows also the share of renewable energy consumption in total final consumption. It can be observed that Sudan's renewable energy share in total energy consumption remained at about 60% during the period of analysis (2010-2015). While Sudan is at the same level as the COMESA average and ahead of both role models (Vietnam and Egypt) countries like Zambia, Nigeria and Ethiopia show levels up to 90% of renewable energy consumption.

Figure 43: Renewable energy consumption as share of total final energy consumption

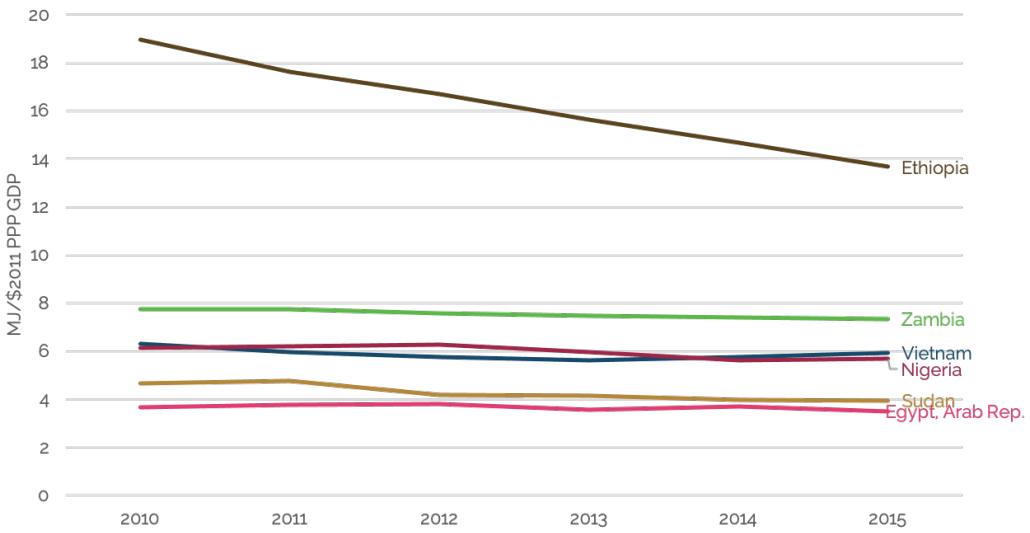


Data source: Sustainable Energy for All (World Bank)

Energy Intensity Energy intensity indicates how much energy is used to produce one unit of economic output (in US$ PPP). Primary energy can be any type of energy that is consumed directly or used to produce electricity. It can come from fossil fuels or renewable sources. The lower the ratio, the more energy-efficient

the economy is. Figure 44 shows the level of energy intensity of primary energy, indicating that for every US$ 1 created in Sudan, 4.67 MJ were required in 2010. From 2010 to 2015, the efficiency has increased, as the amount of energy required for every US$ has decreased with a compound annual growth rate of -2%. Based on this indicator, Sudan performs better than most of the benchmark countries, only falling behind Vietnam.

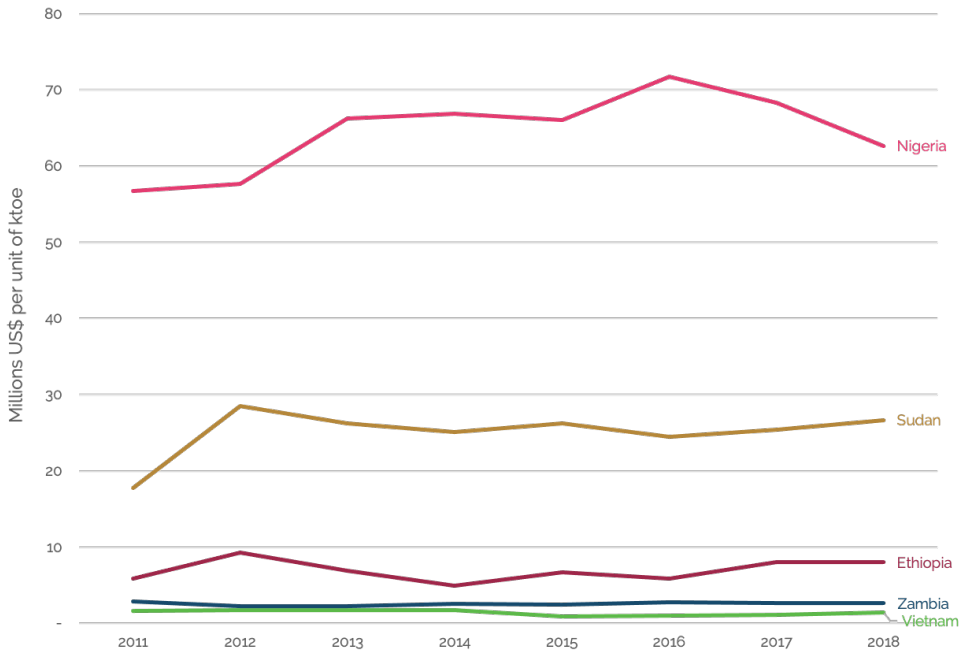
Figure 44: Energy intensity level of primary energy (MJ/$2011 PPP GDP)



Data source: World Development Indicators (World Bank)

Energy efficiency in the manufacturing sector To illustrate how much economic value is generated per every unit of energy input in manufacturing industries, the energy consumption is related to Manufacturing Value Added. The higher the value, the more energy-efficient is the sector. Figure 45 indicates that Sudan is very well positioned among benchmark countries, suggesting that the manufacturing sector performs considerably well in terms of energy usage. In 2018, US$ 26 million of value added was created per every ktoe. Nigeria, the best-performing country, produces US$ 62 million for every unit of energy, even double the value of that from Sudan. To complement this indicator, the energy efficiency of various manufacturing sub-sector should be analyzed in order to assess which sector is the most energy-intensive. However, due to a lack of statistics in the country, this has not been possible.

Figure 45: Energy efficiency of the manufacturing sector



Data source: OECD

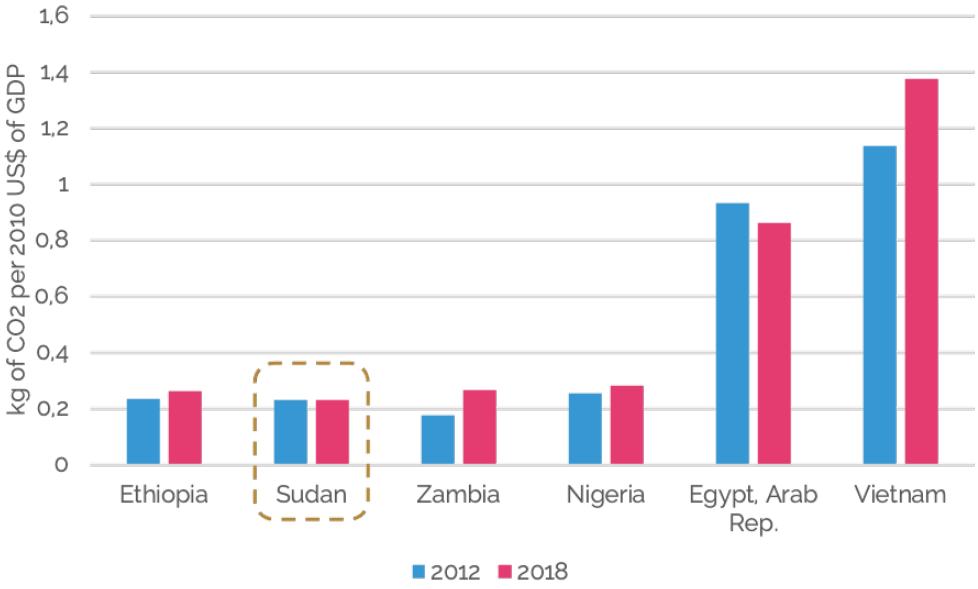
1.4.2 Cleaner production and resource efficiency

Through the promotion of green industry and cleaner manufacturing production, developing economies have the opportunity to "leap-frog" towards a decoupling scenario. This means to catch up economically by skipping harmful steps of the industrialization trajectories implemented by advanced economies, to reach more environmentally friendly technologies and processes (UNIDO, 2019). To date, Sudan has no distinct Environmental Policy. However, the Five-Year Program for Economic Reform 2015-2020 establishes the need to *"develop and update legislation and regulations in the field of the environment in accordance with the international obligations."* (The Republic of Sudan: Five-Year Economic Refor Programme, 2015, pp. 101).

To tackle the negative effects of mercury due to intense gold mining, Sudan in collaboration with UNIDO is currently undergoing the project "Minamata Initial Assessment in Sudan" to strengthen national capacity to fulfill obligations under the Minamata Convention on Mercury and promote effective implementation of its provisions while facilitating the ratification process (UNIDO, 2021b). The manufacturing sector plays a key role in the preservation of the environment, therefore, an Industrial Policy in Sudan can support this purpose by inducing manufacturing firms to become more resource efficient and innovative. For example, UNDESA (UNDESA, 2018) estimates that on the basis of different assumptions concerning the generation of waste per person per day, the level of waste per day in Sudan in 2030 could lie in a range between 11,000 and 22,000 tons per day. An industrial policy can intervene to transform part of this waste into productive inputs by increasing the efficiency in the use of resources.

CO2 emissions Figure 46 shows the CO2 emissions generated for every US$ of GDP. From 2012 to 2018, Sudan has managed to maintain the country's emissions quite stable based on this indicator. In both years of analysis, per every US$ of GDP, only 0.2 kg of CO2 was emitted. These levels are relatively low compared to other benchmark countries, such as Vietnam, showing a level of emissions 7 times higher than Sudan. The promotion of renewable energies in the country can prevent these levels to rise in the near future.

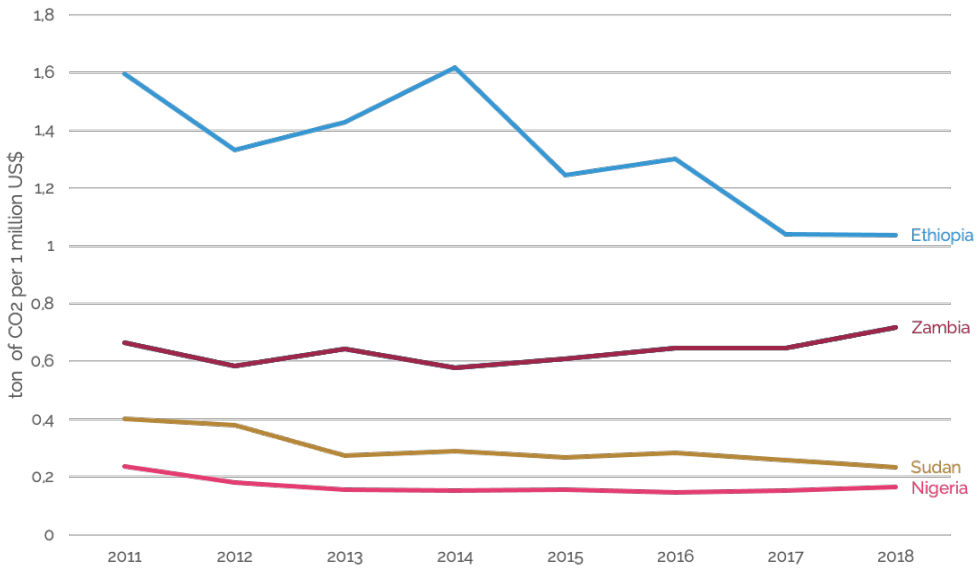
Figure 46: CO2 emissions (kg per 2010 US$ of GDP)



Data source: World Development Indicators (World Bank)

Figure 47 illustrates manufacturing CO2 emissions per every US$ million of MVA. The lower the value the least pollution the manufacturing sector emits. Compared to benchmark countries, Sudan shows the lowest level of CO2 emissions, with 0.2 kg of CO2 for every US$ 1 million of MVA, only outperformed by Nigeria. However, it is important to consider that Sudan's industrial sector is still at an infant stage and therefore these levels can increase proportional if not tackled quickly. The SDG 9 "Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation" aims at transforming the industry to become environmentally friendly and climate-resilient. UNIDO, as the leading international organization for industrialization, helps countries achieve SDG 9 through various programs. They include technology transfer and deployment for cleaner production, fostering innovation and strengthening the capacities of SMEs and entrepreneurs, and supporting partnership among national and regional actors to attract investment and increase the implementation of best practices in manufacturing industries (UNIDO, 2015b).

Figure 47: Manufacturing CO2 emissions per 1 million Manufacturing Value Added (MVA)

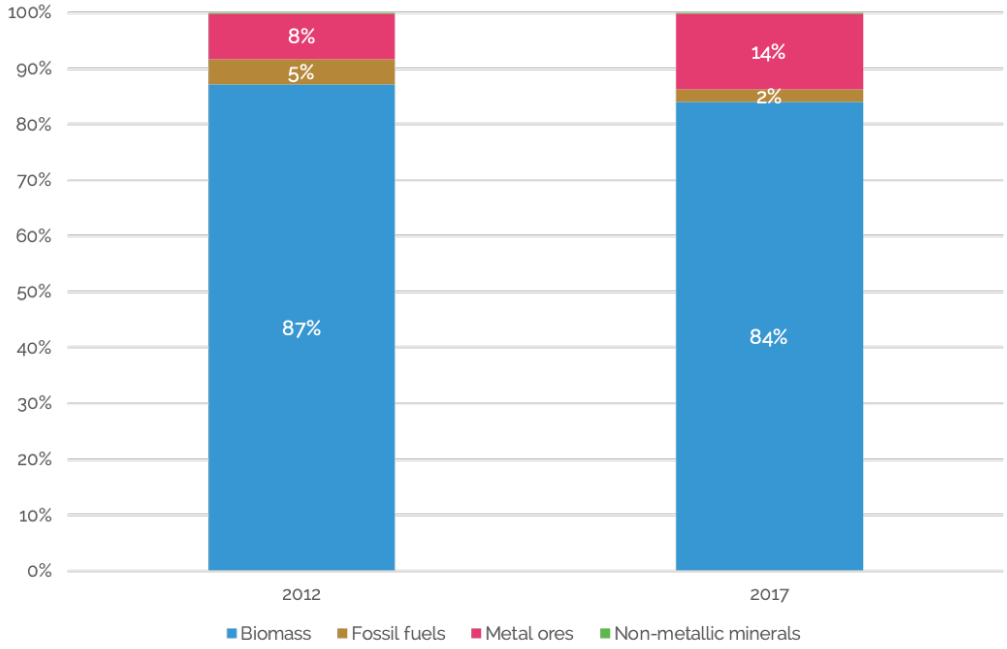


Data source: OECD

Material Extraction Sudan is a country with various natural resource endowments that could provide plenty of economic and social benefits. However, the country's high dependency on a few materials can have long-term negative impacts on both the economy and the environment. Between 2012 and 2017, total domestic extraction in Sudan increased by 48.8%, from 138 million kt in 2012 to 206 million kt in 2017 (WU Vienna, 2019). Figure 48 illustrates the share of domestic extraction by type of material in 2012 and 2017. Biomass had the largest share of material extraction in 2017 (84%) followed by metal ores. The share of extraction of metal ores has increased by almost double in only 5 years, from 8% in 2012 to 14% in 2017, which could imply that a larger quantity of mining is taking place. Fossil fuels represent a 2% share and showed a decrease of 3% in the period of analysis.

In the framework of the Industrial Policy dialogue it is key to ensure the participation of relevant stakeholders to identify potential social and environmental effects of industries. Among others, communities in gold mining areas can be highly affected by this activity. In the past, these communities faced difficulties in voicing their concerns and pressuring for environmental regulatory measures and increasing the number of audits of gold companies. However, these efforts have led to the closure or relocation of companies. The protection of the land and its resources is a clear development objective for the population and must be acknowledged in the Industrial Policy in order to achieve a sustainable and inclusive economic development (G. SHEIKHELDIN; M. ALNEEL, 2021).

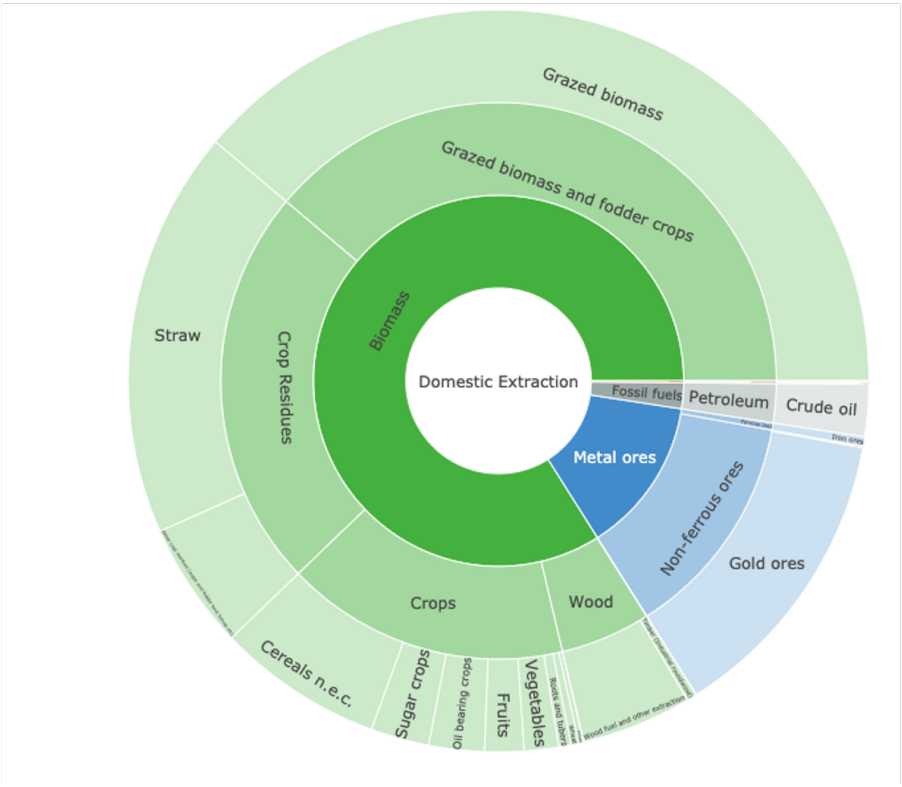
Figure 48: Sudan's material extraction



Data source: WU Vienna (2019)

Figure 49 presents the main components of each material extracted in 2017. Within the biomass category, grazed biomass and fodder crops (fruits, vegetables, cereals, rice, etc) dominate the group with 46.3%, followed by crop residues (27.8%). The second-largest material group is metal ores, mostly composed of gold. The third main group is fossil fuel, specifically crude oil.

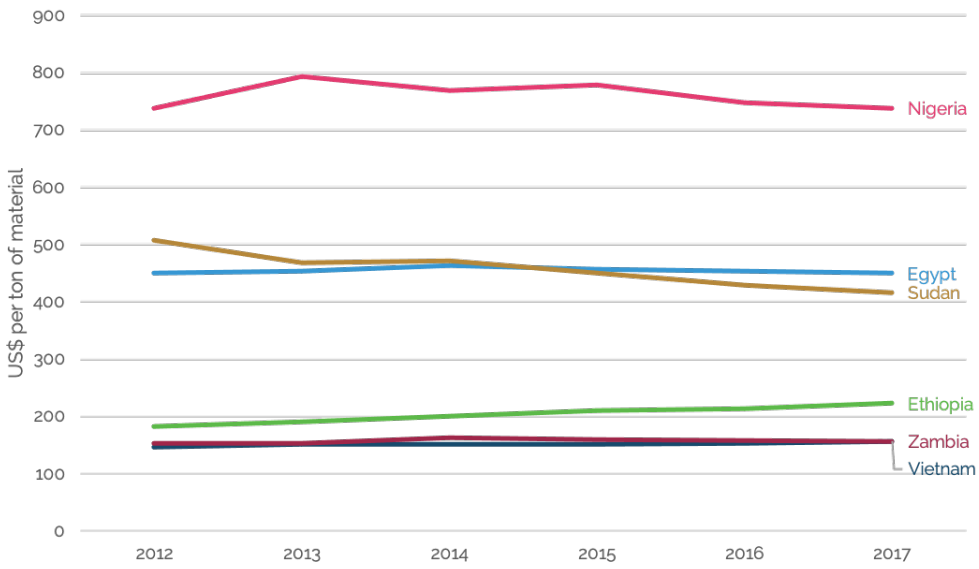
Figure 49: Sudan's domestic extraction in 2017 by material group



Data source: WU Vienna (2019)

Material efficiency Increasing the material efficiency at both, national level and sectoral level can support the country to move the economy from resource-intensive activities towards higher value-added production. It also improves the competitiveness of the manufacturing sector by promoting technological enhancement and cost-cutting strategies. Resource efficiency indicates how much value (in US$ for example) is being generated per unit of material input. Figure 50 illustrates the material efficiency from 2012 to 2017 by setting GDP in relation to the Domestic Material Consumption (DMC). DMC reflects the number of materials that are used within the national borders of the economy. Among the benchmark countries, Sudan has generated US$ 416 per ton of material in 2017. The highest material efficiency could be found in Nigeria with US$ 737 per ton of material, followed by Egypt. Even though Sudan is well positioned in terms of material efficiency, the analysis indicates a tendency towards an increasing in-efficiency. As the country becomes more industrialized, increasing the value addition to raw materials will become extremely relevant.

Figure 50: Material efficiency



Data source: WU Vienna (2019)

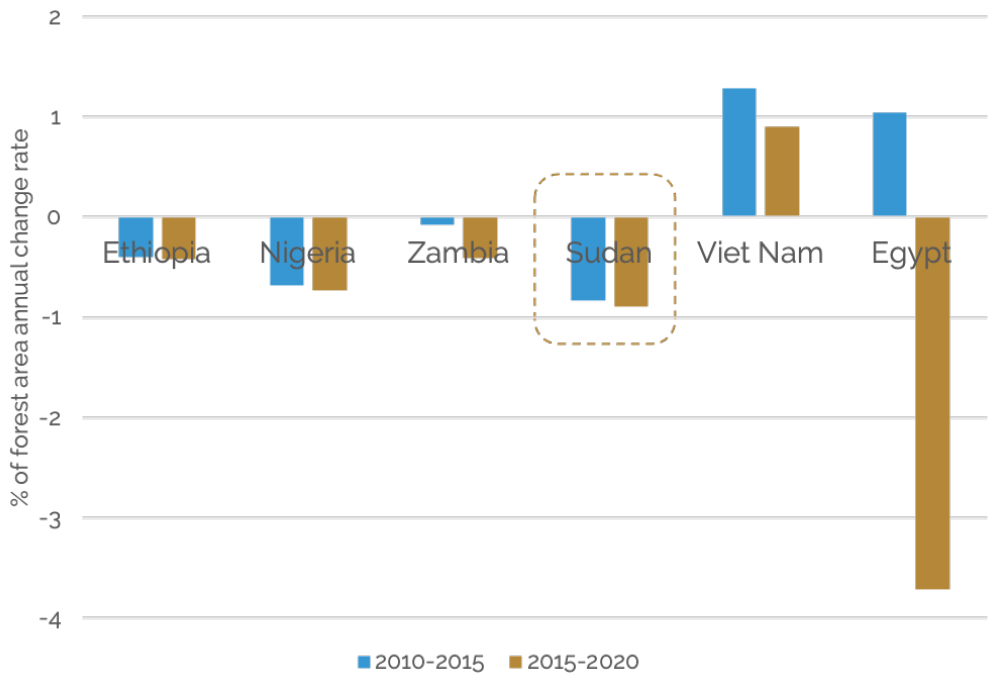
Waste management The waste collection system in many parts of Sudan is poorly established, making open dumping and open burning the main mode of waste disposal. There is currently no national law or strategy for urban waste management. Only some municipal regulations are in place in larger states (for example in Khartoum State). The Ministry of Environment, Natural Resources, and Physical Development is responsible for waste management at the national level and municipalities are responsible for waste collection (African Clean Cities, 2018). In Khartoum State, around 5,100 tons of waste are generated daily out of which almost 70% (3,570 tons per day) are disposed in open landfills after the separation of recyclable materials such as plastic, glass, and metals. The main problems solid waste management systems in Sudan face are the absence of treatment plants, unsorted waste at the collection stage, limited financial resources, and, related to that, the lack of required machines and equipment. The emissions from biodegradable waste represent a significant source of greenhouse gas and possesses health risks for the population surrounding these landfills (Gasmelseed, Elsarraf, 2017). In order for the government to successfully implement a waste management strategy, data and information on sources and types of solid waste as well as data on the composition and generation rates must be developed. Additionally, it is key to

invest in technological upgrades for efficient waste transportation, waste separation, the capture of landfill gases, and recycling methods.

1.4.3 Forest land

Protecting the forest from deforestation is a key objective of the international agenda under SDG 15 "Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss". Sudan's forest covers around 10% of the national territory and there are various reasons why protecting the forest from deforestation is relevant for Sudan (UNSTAT, 2021). First because of the country's leading role as a producer of gum arabic. The vast presence of Acacia Senegal trees (Gum Hashab) and Acacia Seyal trees (Gum Talha) represent a key source of income for the economy and therefore is essential that the sector's basis is protected and used in a sustainable manner. Second, wood products represent a source of income for rural populations. Third, a large portion of the population depends on agriculture activities and farmers tend to deforest in order to increase the arable land. Figure 51 shows the forest annual change rate in Sudan and benchmark countries between two periods, from 2010 to 2015 and from 2015 to 2020. During the first period, Sudan lost -0.83% of its forest coverage while in the second period it slightly decreased –0.89%. Legal institutional frameworks and regulatory systems need to be created in order to ensure sustainable management of forest land. An Industrial Policy can support this process by identifying and regulating those forest products such as furniture or gum arabic that have the potential to benefit the economy without harming the ecosystem.

Figure 51: Forest area annual net change rate (%)



*Data source:*SDG Database (UNSD)

1.5 Summary of results and implications for Industrial Policy in Sudan

The findings in this section reveal that Sudan's manufacturing sector is still at an infant stage but equipped with a vast potential for future growth. Sudan is characterized by abundant natural resources, including

oil and various metals, has vast quantities of land for cultivation and pastoral activities, water availability, and great energy potential. This combination offers a unique opportunity for diversifying the economy and initiating a structural transformation towards more manufacturing. However, the incremental transformation of the economy through increased processing of existing natural resources has not started yet. The industrial sector contributes to GDP with over 30%, however, this is largely driven by the mining sector and, in particular, the production of gold. Most of the manufacturing activities are still resource-based and/or remain on basic levels of processing. This has been backed by assessing the current level of processing in key industrial sub-sectors. By designing and implementing a solid Industrial Policy, the government of Sudan can foster the emergence of national value chains and raise the level of processing in selected sub-sectors. Selecting appropriate sub-sectors is crucial for achieving the respective policy objectives such as the creation of strong linkages to the local economy, large employment creation, or other goals. Section 2 of this report will inform this selection process with a number of sub-sector analyzes.

To date, Sudanese exports play a limited role in the economy, with a share of 4% in GDP. Sudan's exports are characterized by a lack of diversification. In 2019, the top five export products accounted for over 90% of total exports. Similarly, the export markets indicate a high level of concentration, as the top 2 export markets for manufactured products (UAE and China) account for almost 90% of total exports. If Sudan aims at increasing its integration in international trade, a diversification strategy striving for a more balanced export basket and a larger range of trading partners will be needed. Within this diversification strategy, upgrading the manufacturing sector towards producing and exporting products with higher technological content is one element that may deserve more attention. In 2019 Sudan's share of medium and high-tech (MHT) manufactured exports was only 4%.

A well-established industrial sector in Sudan can provide large numbers of employment opportunities. Currently, the industrial sector employs only 8% of the working population and lacks any positive dynamic as this share has remained relatively stable over the past 8 years. An Industrial Policy is a powerful tool in the area of job creation. By supporting labor-intense sub-sectors, industrial development can absorb a large number of workers and create plenty of formal jobs. An Industrial Policy can also be conducive for empowering females and youth by increasing integration of those groups in the job market. Finally, an Industrial Policy that promotes the skill development of workers, as well as the capacity building of firms, does not only create the basis for continuous upgrading of the industrial sector but also significantly contributes to the overall human development of the country.

Infrastructure and energy are at the core of any country's industrial development strategy. Sudan is blessed with vast natural endowments that can serve as sources of renewable energy. Most of this potential remains still untapped. The opportunities to economically and sustainably leapfrog into a clean industrial sector are enormous. As Sudan's industrial sector is still at an infant stage, an Industrial policy has the opportunity to make sure that Sudan's industrial development will not be at the expense of the environment and future generations. In particular, Sudan has the prerequisites for pursuing a sustainable industrial development path that is able to prevent negative impacts on the environment which would affect not only further economic development but the society as a whole.

In conclusion, effectively supporting value chains, enhancing human capacities and infrastructure are crucial cornerstones for sustainable industrialization in Sudan. The findings of this report demonstrate the urgency of a clear and strategic orientation of Industrial Policy, which should serve as the main tool to promote the shift from raw material dependency to a more diversified, resilient, and modern manufacturing sector.

Designing and adjusting such an Industrial Policy relies on reliable statistic data and its analysis. It is therefore of utmost importance to strengthen statistical capacities in the country. The data that is available to date is extremely limited and does not allow for a comprehensive analysis and monitoring of the performance of the manufacturing sector. A proper industrial survey that gathers firm-level data on pro-

duction, firm-characteristics, employment and other aspects is key for steering the industrial development in a country. The government may consider requesting support in setting up and conducting respective surveys and strengthening the capacities of the National Statistics Office.

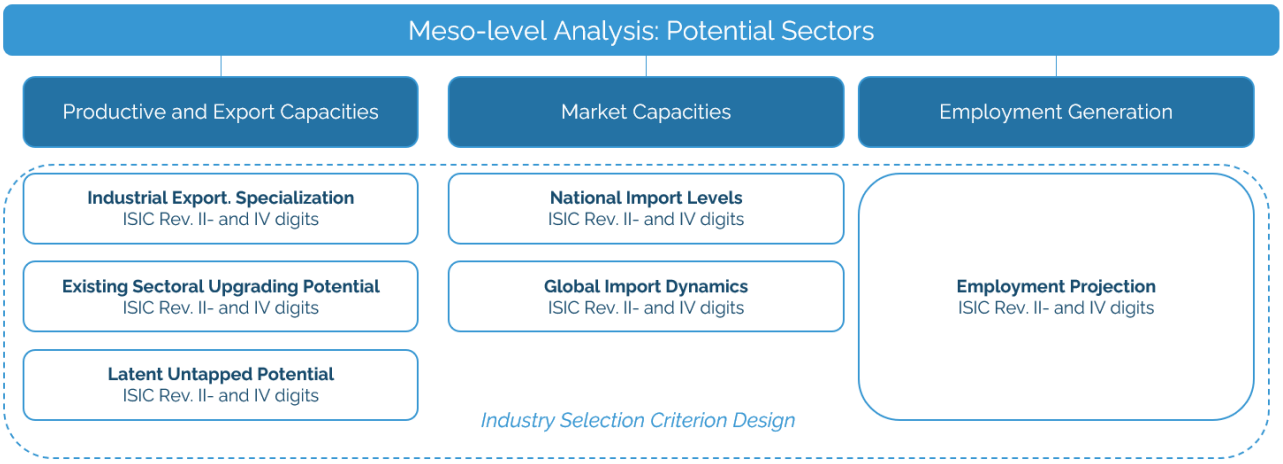
2 Block 2: Analysis of manufacturing sectors

2.1 Structure of analysis

This section is dedicated to a sub-sector analysis of manufacturing industries in Sudan. This analysis aims to identify attractive sub-sectors that may bear the potential to make significant contributions to the country's overall development. The analysis does not substitute a sector selection process in the framework of designing an Industrial Policy. However, by assessing the i) production and export capacities, ii) market capacities, and iii) employment generation of the manufacturing sector, this analysis will provide valuable inputs into this selection process.

The manufacturing sector classification follows the International Standard Industrial Classification, Revision 3 (ISIC Rev. 3) database by the United Nations Statistics Division INDSTAT (2020) and is described in greater detail in Section 2.2.2 as well as in the appendix B.3. Attractive sectors are identified at the ISIC Rev. 3 II-digit level as well as the more granular sub-sector level corresponding to the ISIC Rev. 3 IV-digit classification. Lastly, it is verified whether the national development strategies incorporate sectors identified by the analysis. Figure 52 illustrates the three pillars and six criteria of the assessment.

Figure 52: Structure of the analysis



Elaboration: UNIDO - GPI.

2.2 Industry selection criterion design

2.2.1 Pillars

The industry selection criteria design, which lies at the heart of this meso-level analysis, builds upon the following components:

- **Existing production and export capabilities:** it assesses the competitiveness of certain manufacturing industries of Sudan in relation to global markets. The indicators and analysis proposed in this segment identify sectors that demonstrate existing as well as potential capabilities in global trade patterns:
  - The first criterion used to analyze this dimension is the Industrial Export Specialization (IES). A high IES in a sector corresponds to higher development and existing production and export capabilities of the respective sector, which manifests itself in the sector's global competitiveness. The concept, drawn from the Revealed Comparative Advantage approach, is introduced in Sec-

tion 2.3.1 as part of the in-depth sub-sector analysis, which aims at identifying a selection of attractive ISIC Rev. 3 II-digit and IV-digit sub-sectors.

  - The second criterion used is the sectoral upgrading potential of existing sectors, based on the potential for moving into more sophisticated and higher value added activities within these sectors. It identifies value chains that can be further developed from activities that already take place in the country. The criterion is introduced in Section 2.3.2 as part of the in-depth sub-sector analysis, which aims at identifying a selection of attractive ISIC Rev. 3 II-digit as well as IV-digit sub-sectors.
  - The third criterion used to analyze Sudan's production and export capacities of Sudan is the Latent Untapped Potential (LUP). It identifies hidden or obscured production capacities that currently remain below the national potential in relation to otherwise observed trends across comparable countries. The concept of the Latent Untapped Potential is introduced in Section 2.3.3 as part of the in-depth sub-sector analysis, which aims at identifying a selection of attractive ISIC Rev. 3 II-digit and IV-digit sub-sectors.

- **Market capacities:** They identify a sizeable domestic demand base as well as the existence of dynamic international markets.

  - The first criterion used to analyze this dimension is the Import Substitution Potential captured by the national import levels for one specific sector. More specifically, it evaluates the size of sector-level imports (per capita) of manufacturing sectors. Sectors with high national demand that currently are accommodated through imports have the highest potential for import substitution. The concept of National Import Levels is introduced in Section 2.3.4 as part of the in-depth sub-sector analysis, which also identifies a selection of attractive ISIC Rev. 3 II-digit and IV-digit sub-sectors.
  - The second criterion used to analyze this dimension is the Global Import Dynamics. It highlights sectors where global demand is fast-growing and identifies sectors with the potential to gain importance due to increasing global demand. Sectors identified in this way can allow the country to explore a dynamic and expanding global market with ample opportunities for future growth. The concept of Global Import Dynamics is introduced in Section 2.3.5 as part of the in-depth sub-sector analysis, which aims at identifying a selection of attractive ISIC Rev. 3 II-digit as well as IV-digit sub-sectors.

- **Employment generation:** It projects the employment level of manufacturing industries for countries of a similar economic configuration as Sudan.

  - The criterion used to analyze this dimension is the Employment Projection which evaluates the potential of a sector to generate employment. Because of the lack of data, it is not possible to compare the projected employment patterns with actual country-level observations. Instead, the indicated employment levels serve as a rough guideline in terms of which manufacturing sectors are expected to produce the highest contribution of manufacturing employment at a given income level. The concept of Employment Projection is introduced in Section 2.3.6 as part of the in-depth sub-sector analysis, which aims at identifying a selection of attractive Rev. 3 II-digit as well as IV-digit sub-sectors.

2.2.2 Industry classification and data sources

The manufacturing sector level classification used in this analysis follows the International Standard Industrial Classification, Revision 3 (ISIC Rev. 3) database by the United Nations Statistics Division; see Sec-

tion 2.2.2 as well as appendix B.3 for more information. Whenever possible and unless noted differently, the concepts described above are analyzed at the II-digit level and are further brought down to a more disaggregated level, i.e., ISIC Rev. 3 IV-digits, in order to identify sub-sectors that can be associated with interesting product groups. All trade-related data is taken from UN Comtrade (2020) and follows the Harmonized System (HS) 2007 nomenclature at AG6 level, respectively. Correspondence between both the HS2007 commodity classifications and the manufacturing sector classification following ISIC Revision 3 can be found in Section B.2. Throughout the report, only trade in manufacturing-related commodities is considered. Consequently, whenever talking about trade-related indicators, the analysis is based on traded commodities that can be attributed to a certain manufacturing sector and follow the re-classification procedure discussed in Section B.3. An additional caveat is that - as a result of a lack of more detailed data - all trade analysis is performed on the level of gross exports and gross imports which, by definition, also include re-imports as well as re-exports. Due to the unavailability of country-level trade data for the entire period covered by this section (2012 to 2019), "mirrored" trade data reported by Sudan's trading partner countries is used.[7]

Employment data on the ISIC Rev. 3 II- and IV-digit level comes from INDSTAT (2020) while any macroeconomic variables are taken from Feenstra et al. (2015). Income group classifications, as well as manufacturing sector technology classifications, are taken from World Bank (2019b) and OECD (2011), respectively.

2.3 Manufacturing sector analysis

This section discusses the results of the manufacturing sector analysis for each of the six criteria defined in Section 2.2. The analysis is first conducted on the level of ISIC Rev. 3 II-digit sectors in order to identify broader potential sectors, and furthermore delves into the identification of the corresponding more disaggregated ISIC Rev. 3 IV-digit sub-sectors. Additional and complementary information on specific characteristics as well as methodological and practical explanations are provided in text boxes throughout this section.

2.3.1 Industrial Export Specialization (IES)

Definition of concept

This criterion identifies the industrial export sectors in which the country is more specialized in comparison to the world average for that specific sector. Indicators higher than 1 correspond to high specialization and indicate higher industrial export production and export capabilities in the respective sector: The value gives an approximation of the level of specialization, with an $IES > 1$ a country exports more of a particular good than would be expected given its overall propensity to export. The concept draws from the Revealed Comparative Advantage methodology; however, the indicator is adjusted to isolate the industrial sector from the rest of the economy, hence capturing better small movements within the manufacturing sector. A technical description of the concept of the Industrial Export Specialization Indicator can be found in Section B.4.

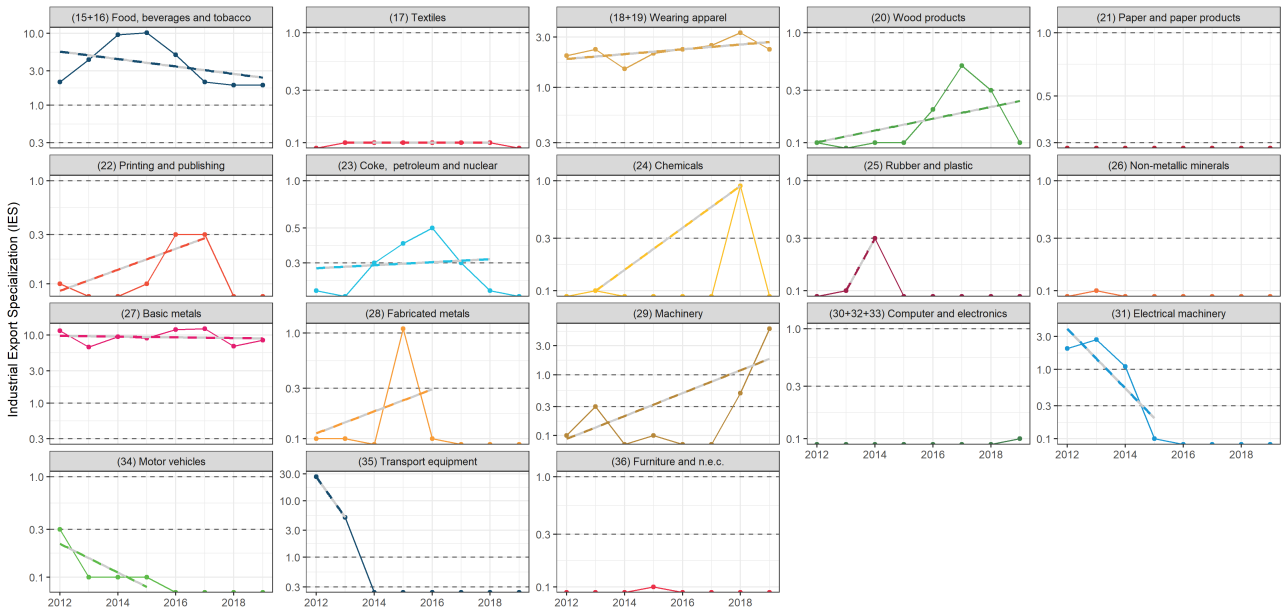
Results II-digit sector analysis

Considering the period of 2012 to 2019, Sudan shows industrial export specialization only in three sectors from all ISIC Rev. 3 II-digit manufacturing industries. The most prominent is sector *(27) Basic metals*, with

[7] Sudan country-level data is available for the years 2012-2018 in the United Nations' Comtrade Database. However, the difference between data reported by the country and partner countries is very significant. Country data availability can be found at `https://comtrade.un.org/data/da`.

an index of 10 in 2019, which has remained relatively stable over the years; see Figure 53. The second one is *(15+16) Food, beverages, and tobacco*. However, after achieving the peak of 10 in 2016, its IES indicator decreased sharply and stagnated around two from 2017 to 2019, showing a substantive gap from the first place. This index behavior reveals that the sector has been losing its productive and exporting capability in recent years. The third sector that stands out according to the IES criterion is sector *(18+19) Wearing apparel, and tanning and dressing of leather*. Moreover, its indicator has grown slightly in the last decade.

Figure 53: Sudan: Industrial Export Specialization (IES) by sector, over time (ISIC Rev. 3 2-digits)

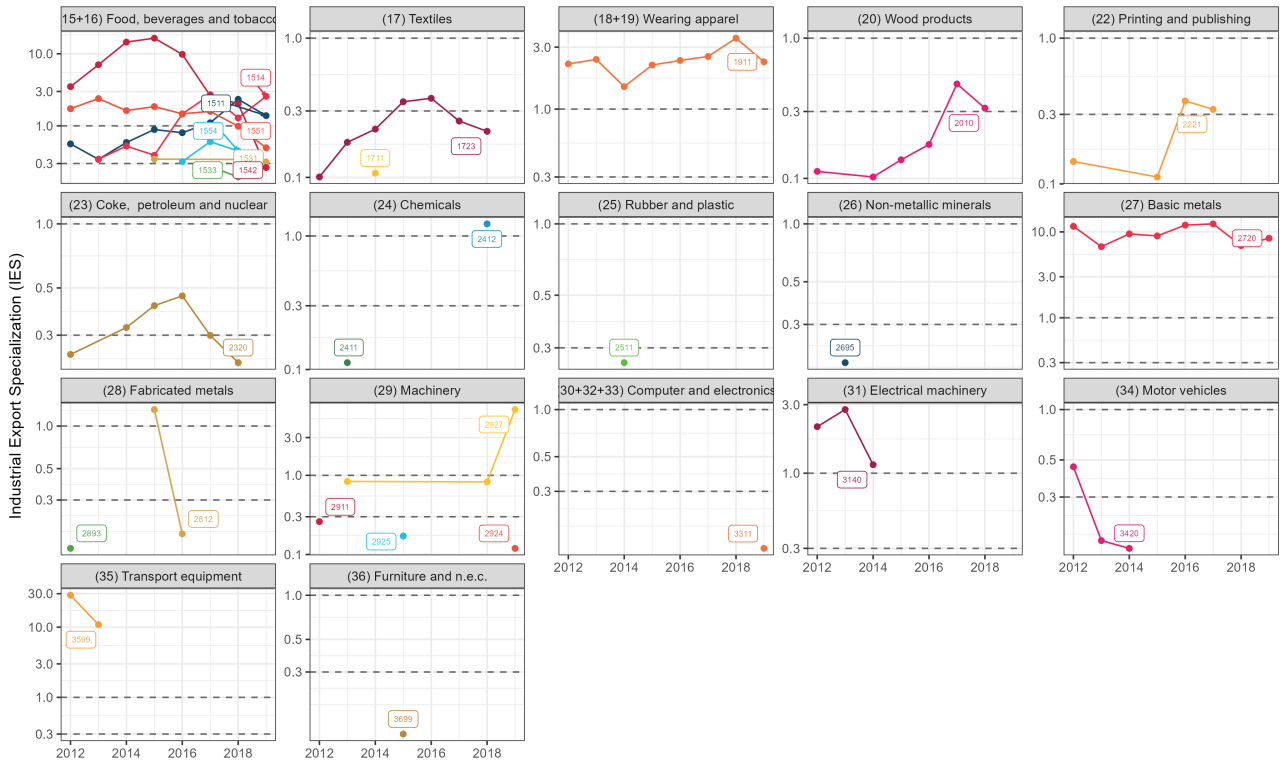


Note: Only industries with an IES larger or equal to 0.1 are provided.
Data source: United Nations UN Comtrade (2020) database; see appendix B.2 and B.3 for more information on the concordance of traded commodities and ISIC Rev. 3 sector classification, respectively. Indicator based on Sudan mirrored data, weighted 4-digit aggregates

Results IV-digit sector analysis

At a more disaggregated level (IV-digit), a small set of six sub-sectors exhibit a value of the IES index of one or greater, revealing Sudan has very limited or narrow capacities established for producing and exporting manufactured goods (Figure 54). Sub-sector *(2720) Manufacture of basic precious and non-ferrous metals* has by far the highest IES and reflects the great capacity of the country in mining and exporting gold in its unwrought form. The second sub-sector is *(1911) Tanning and dressing of leather*. Sub-sector *(1542) Manufacture of sugar* has shown, until 2018, an IES higher than one - being even higher than basic precious metals between 2014 and 2016 - however, it has decreased steadily since 2017. In 2019, the indicator dropped below the threshold that characterizes industrial export specialization. It is worth noting that this particular sub-sector drives the behavior of sector *(15+16) Food, beverage, and tobacco* observed at the II-digit level analysis. The same pattern is observed for *(1551) Distilling, rectifying, and blending of spirits*. On the opposite direction, the IES of sub-sector *(1514) Vegetable and animal oils and fats* has grown substantially since 2015, showing after that year an IES higher than one. In the last two years, Sudan also presented IES in (1511) Production, processing, and preserving of meat and meat products. A few other sub-sectors exhibited an indicator higher than one; however the results are seen only for very short periods (between one to three years), suggesting they are likely just the consequence of occasional operations larger than the usual, not sub-sectors with solid IES. This is the case for *(3599) Other transport equipment n.e.c., (3140) accumulators, primary cells and primary batteries, (2812) Tanks, reservoirs and containers of metal, and (2927) Weapons and ammunition*.

Figure 54: Sudan: Industrial Export Specialization (IES) by sector, over time (ISIC Rev. 3 4-digits)



Note: Only industries with an IES larger or equal to 0.1 are provided.
Data source: United Nations UN Comtrade (2020) database; see appendix B.2 and B.3 for more information on the concordance of traded commodities and ISIC Rev. 3 sector classification, respectively. Indicator based on Sudan mirrored data.

Box 4: Sub-sectoral concentration of export capabilities: Composition of sectors *(27) Basic metals* and *(15+16) Food, beverages and tobacco*.

A more detailed sub-sectoral analysis demonstrates that the production and export capabilities of Sudan's manufacturing sector are even more concentrated in very few products. *(27) Basic metals* exports are exclusively concentrated in gold in an unwrought form in 2019 (more than 98%) (Figure 55, and sector *(15+16) Food, beverages and tobacco* is very concentrated in just two sub-sectors, namely: *(1514) Vegetable and animal oils and fats*, and *(1511) Production, processing and preserving of meat and meat products*, which account for almost 50% and 40% of the sector's total exports, respectively (Figure 56). Within these sub-sectors, the commodities of oil-cake and other solid residues from ground-nut oil (31%); meat of bovine animals, bone-in (23%); and ground-nut oil crude (18%) stand out.

These findings, along with the results from the previous analyses, show that Sudan has extremely low capabilities of producing and exporting manufactured products competitively, and even the few sectors that display greater capabilities at first, have their production and exports concentrated in only a few products. Due to this pattern, a dissemination of knowledge and capacities within and among sectors, which is essential for the process of industrial development, cannot be assumed. Overcoming this situation requires major efforts by the government to build and diversify its industrial base, not only by deepening existing but also by creating new capacities that can connect with existing sectors or even build new manufacturing niches.

Figure 55: National export structure sector *(27) Basic metals*, 2019

Note: Traded US$ in sector (15 + 16) Food, beverages and tobacco by ISIC Rev. 3 IV-digit industry. For a particular ISIC Rev. 3 IV-digit industry, shares correspond to commodities' contributions to total exports in relation to each II-digit industry. Area drawn proportionally to traded volumes.
Data source: United Nations UN Comtrade (2020) database; see appendix B.2 and B.3 for more information on the concordance of traded commodities and ISIC Rev. 3 sector classification, respectively.

Figure 56: National export structure sector *(15 + 16) Food, beverages and tobacco*, 2019

Note: Traded US$ in sector (15 + 16) Food, beverages and tobacco by ISIC Rev. 3 IV-digit industry. For a particular ISIC Rev. 3 IV-digit industry, shares correspond to commodities' contributions to total exports in relation to each II-digit industry. Area drawn proportionally to traded volumes.
Data source: United Nations UN Comtrade (2020) database; see appendix B.2 and B.3 for more information on the concordance of traded commodities and ISIC Rev. 3 sector classification, respectively.

2.3.2 Existing sectoral upgrading potential

Definition of concept

The sectoral upgrading potential criterion identifies existing sectors that have the potential of incorporating new, more sophisticated, and higher value added activities by further developing the value chain of existing activities that exhibit production and export capabilities. Sudan has many natural resources endowments that could be further explored to further develop the manufacturing sector, such as cotton, sesame seeds, and livestock, to name a few. For the purpose of this analysis, two existing sub-sectors were selected:

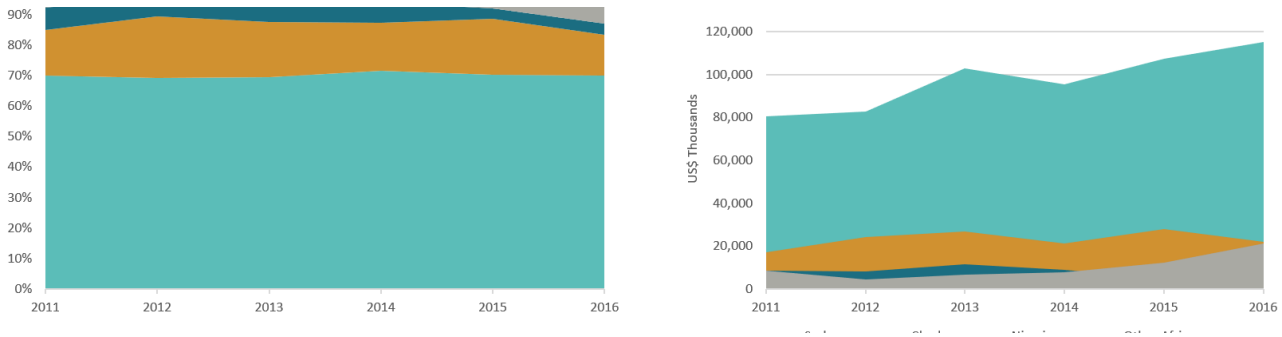
- **Gold:** Due to its weight in the country's manufacturing exports (according to ISIC Rev. 3 classification) - 85% in 2019.
- **Gum arabic:** Due to the country's position as the world-leading producer (70% - 80% of total global production) and the vast application possibilities.

Results: Industrial upgrading potential from gum arabic

Given its natural origin and suitable properties for applications such as stabilizer, emulsifier, sugar crystallization control, thickening agent, flavor carrier or film former, gum arabic is widely used in a broad set of manufacturing industries. It is used in the manufacturing of food and beverages (confectioneries, bakery products, dairy, flavoring, soft drinks, among others), pharmaceuticals (medical and botanical products), beauty and cosmetics, printing, ceramics, photosensitive chemicals, pyrotechnics, textiles, paper, ink, paints, and adhesives.

Sudan is the world's largest producer and exporter of raw gum arabic (Figure 57), accounting for around 70% of the world's crude exports in 2016 (US$ 115 million) - the latest data available for world raw gum arabic (UNCTAD, 2018). The crucial role that this product played for the manufacturing sector in Sudan and the world is proved by the fact that gum arabic was the only exemption from the trade sanctions imposed by the United States between 1997 and 2017. The importance of gum arabic for Sudan is twofold: it provides international currency through its exports, and is a significant and steady source of income to rural families, especially in dry years when crops fail, since 5 million persons (over 10% of the country's population) are estimated to rely directly or indirectly on the gum arabic sector (Hassan, 2017).

Figure 57: World's main exporters of crude gum arabic, market share and values (FOB)

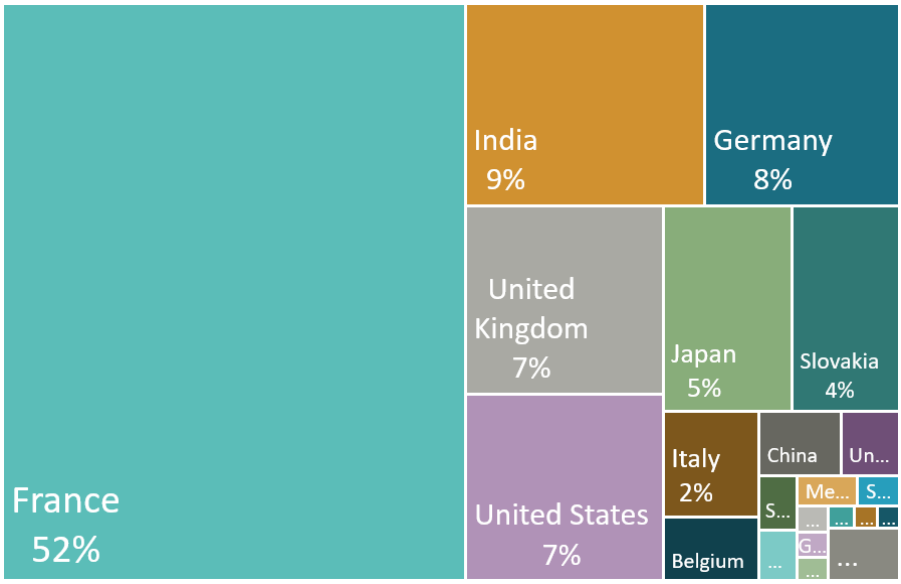


Data source: UNCTAD (2018)

Although Khartoum has a few local processors, crude gum accounted for around 97% of Sudan's exports of crude and processed gum arabic between 2016-2016 (UNCTAD, 2018). The largest importer of Sudan's gum arabic is, by far, France, corresponding to 51% of the total exports, followed by India (9.3%), Germany

(7.6%), United Kingdom (7.2%) and the USA (7.2%) (Figure 58). Therefore, processing, manufacturing and value addition take place outside of the country, mainly in developed nations, which refine the product to export and also to use it in other manufacturing sectors.

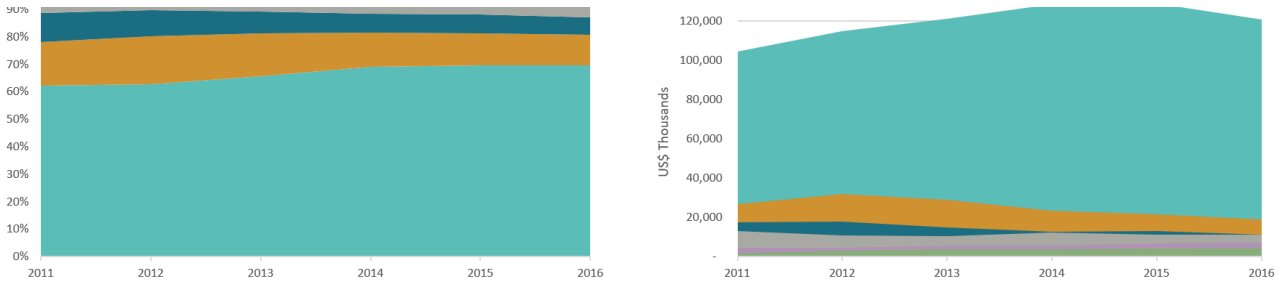
Figure 58: Importers of gum arabic from Sudan, 2019



Data source: OEC - The Observatory of Economic Complexity

France is also the world's leading exporter of processed gum arabic, accounting for around 65% of total world exports in 2016, followed by other developed countries, namely: United Kingdom, United States, Germany, and Italy. The five countries account for 95% of the exports of refined gum arabic. In contrast, Sudan accounts for only 2.4% (Figure 59). It is important to note that Sudan's exports of crude gum arabic was twice the amount of the processed gum arabic exported by France (72,500 tons against 36,500 tons) (UNCTAD, 2018). Yet, both captured almost the same monetary value from the commodities (Sudan: US$ 115 million, France: US$ 120 million). This reflects the greater added value found in the refined gum arabic compared to its crude version.

Figure 59: World's main exporters of processed gum arabic, market share and values (FOB)



Data source: OEC - The Observatory of Economic Complexity

Such value could be created and kept in Sudan if the country moves along the product's value chain towards processing quality gum arabic. However, the gum arabic value chain will only make significant changes in Sudan's socio-economic development if the country manages to move towards downstream sectors that are highly dependent on gum arabic, such as the food and beverages sector, particularly sub-sectors: *(1543) Sugar confectionery, (1554) Soft drinks, (1520) Dairy product, (1549) Other food products*. This move could be strategically planned to be achieved in the medium term. As a long-term develop-

ment strategy, the country could aim for the chemical sector, especially *(2423) Pharmaceuticals, medicinal chemicals, (2422) Paints, printing ink, (2423) Perfumery, and toilet preparations (cosmetics)*. Upstream subsectors of those value chains could as well be developed: *(2925) Machinery for food and beverages, and (2929) Other special purpose machinery*.

However, it takes more to develop value chains than increasing the number of gum arabic processing centers. Although Sudanese crude gum arabic has an exceptional reputation, the industry's feedback is that processed gum arabic from Sudan has a lower quality compared to that processed in Europe (CBI, 2020). The European gum arabic is mainly sprayed-dried, whereas Sudan uses mainly mechanical processes (Hassan, 2017). Gum arabic processed in Europe has a very high quality that comes from high production standards, compliance with international food and pharmaceutics safety requirements, quality system and product certification, investments in research and development, and skilled labor. Moreover, developed countries also have more advanced marketing capacities and financial access.

One way to access the skills, investment, technology, and experience needed is through foreign direct investment. However, significant industrial deepening like this is not likely to happen by itself. It may not be in the immediate interest of global refinery companies and producer countries. France, the main buyer from Sudan's crude gum, is also the largest exporter of refined gum arabic, and therefore is expected to have little interest in producing high-quality refined gum arabic in Sudan. The company Afritec embodies best the existing global production structure of gum arabic. Afritec is a joint venture between the French company Nexira - the world's largest exporter of refined gum arabic - and the Sudanese Yagoub Group, which mainly produces and exports kibble gum, instead of products of higher added value.

Due to its world leadership in gum arabic production and the difficulty in finding a suitable substitute for the product, Sudan is in a privileged position to negotiate conditions for foreign access to the product. One of these conditions could be the requirement to refine the product in the country according to the quality, safety, and certification standards required internationally. Nonetheless, it is necessary that the Government puts forward a comprehensive and coordinated range of Industrial Policy interventions that can facilitate and stimulate more advanced industrial activities in this sector. Within this policy package, other complementary measures must be included to ensure the effectiveness of the Industrial Policy, such as border control to avoid raw gum arabic smuggling. Furthermore, it is crucial to address the country's bottlenecks to attract and enable foreign investments by building productive capabilities, transport infrastructure, and in particular upgrading the energy system.

Results: Industrial upgrading potential from gold production

Figure 60 reveals that the sector *(2920) Basic metals* corresponds to 86.2% of Sudan's manufacturing exports (ISIC Rev. 3, II-digit level), of which almost the totality is composed by gold (98.5%). The country is Africa's 3rd largest gold producer, with around 80 MT a year, and an additional 533 MT of proven gold reserves in the Red Sea hills alone (Ministry of Investments and International Cooperation of Sudan, 2021). The sector is mainly operated by artisanal miners, estimated at 1.5 million, who work in unsafe conditions and use environmentally degrading methods.

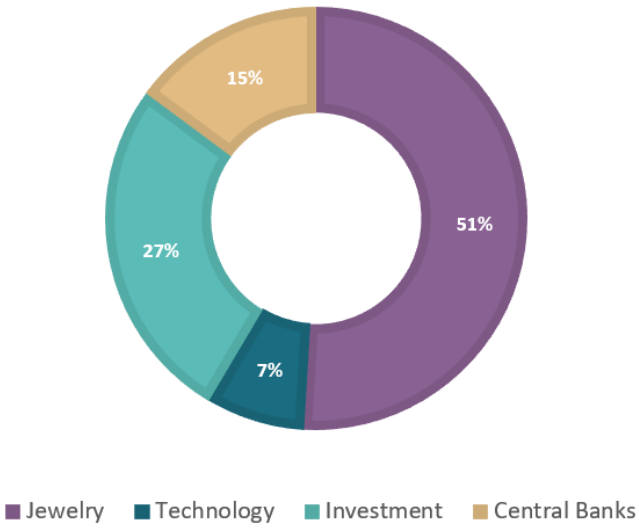
In 2020, Sudan opened the trade with the precious metal further to private investors, allowing them to trade all exports, which was before the monopoly of the Central Bank of Sudan. This action was set to promote the development of the sector, including attracting foreign and large-scale firms, introducing more industrialized methods, and reducing smuggling. This was meant to increase revenues for the country as well as benefits for workers, the local environment, and local communities. As an immediate consequence, Orca Company - a Canadian large-scale mining firm - has recently announced the recommencement of exploration of gold at the north of Sudan (Block 14), with an estimated CAPEX of US$ 350 million. When in operation, the company will be the first (and only) large-scale mining firm in the country.

Figure 60: Sector share in Sudan's manufacturing exports, 2019

Note: Traded US$ in manufacturing by ISIC Rev. 3 IV-digit industry. For a particular ISIC Rev. 3 IV-digit industry, shares correspond to commodities' contributions to total exports in relation to each II-digit industry. Area drawn proportionally to traded volumes.
Data source: United Nations UN Comtrade (2020) database; see appendix B.2 and B.3 for more information on the concordance of traded commodities and ISIC Rev. 3 sector classification, respectively.

After mined and initially refined, gold is sold to traders or banks (to be used as investment or reserve), and manufacturing companies. Jewelry constitutes the largest single source of global gold demand, representing 51% of the demand in 2019 (Figure 61). Other demanding manufacturing sectors are related to the technological industry (electronic devices, components, and appliances), medical instruments and applications (including dental), watch and clocks, among others (UNCTAD, 2016). The rapid acceleration of 5G infrastructure deployment, and the increasing use of advanced technologies that rely on electronic components and devices, fuel the expectation of further use of gold by the computer and electronic sector.

Figure 61: Demand of gold, by final use, 2019



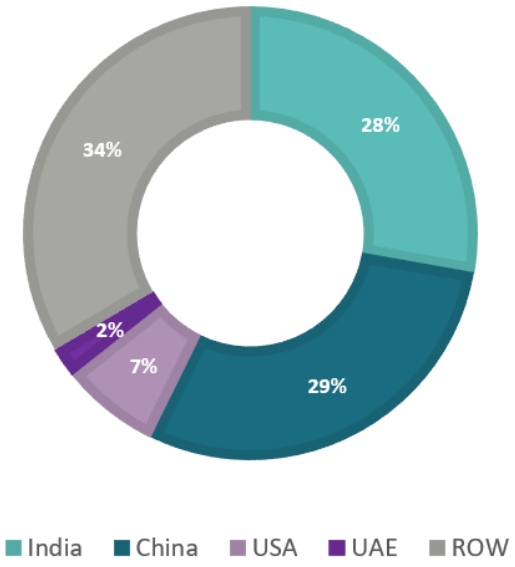
Data source: World Gold Council

The totality of Sudan's gold is exported in unwrought form. Further processing could be made towards semi-finished forms such as grain, wire, minted bar, coin bars, armillary coins, and precious metals alloys

for the watch industry. Australia, the second-largest world producer of gold, holds the same position as an exporter of semi-manufactured gold (accounting for 17% of the exports), while it ranks 6th as the world's unwrought gold exporter (3.8%) (OEC - The Observatory of Economic Complexity).

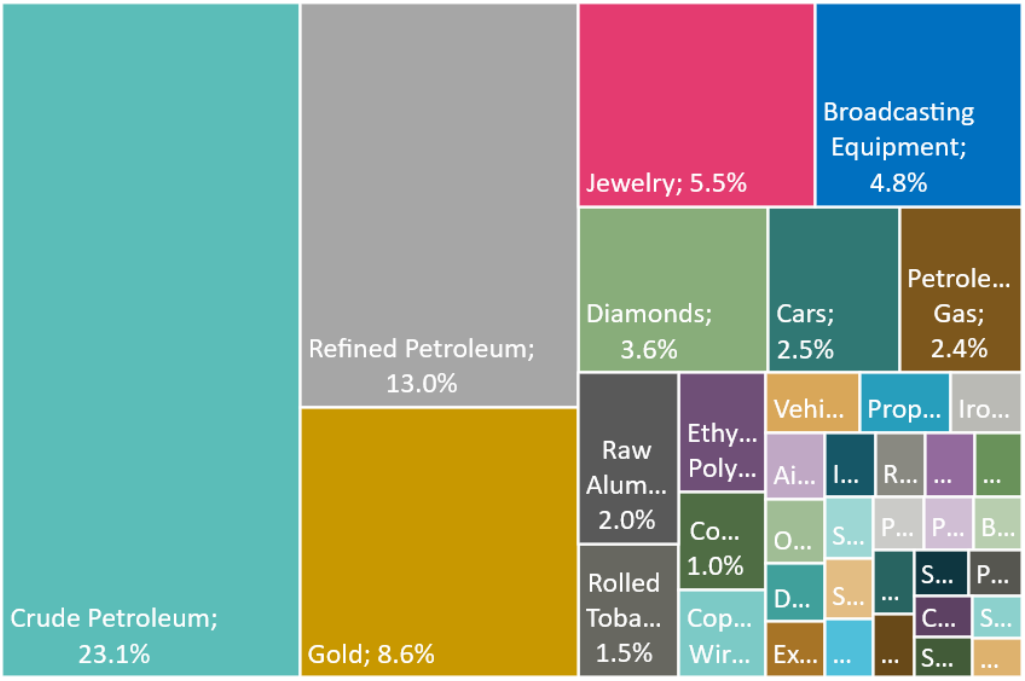
As a next step, Sudan could diversify and increase its manufacturing industry sophistication and value creation by moving downwards in the gold value chain towards the jewelry sector. China, the world leader in gold production and jewelry consumption, barely exports unwrought and semi-manufactured gold as the country uses the vast majority domestically, especially for manufacturing jewelry (UNCTAD, 2016). It also stands out as a jewelry exporter. Sudan's unwrought gold exports are heavily concentrated in just one country, The United Arab Emirates, which received over 97% of the exports in 2019. UAE, in turn, is the fourth largest consumer of jewelry in the world (Figure 62). The sector also represented almost 6% of the UAE total exports in the same year (Figure 63). An Industrial Policy that, inter alia, targets the gold sector, could allow Sudan to take advantage of the established trade network and to reconfigure its role in the gold value chain. The findings of Section 2.3.5 reveal that the global demand for the jewelry sub-sector grew over 20% a year between 2012-2019 and represented around 1.2% of total manufacturing imports, reinforcing the sector's potential as an economic growth path for Sudan.

Figure 62: World's largest consumers of jewelry, 2019



Data source: Refinitiv (2019)

Figure 63: Sectoral share of UAE's total exports, 2019



Data source: OEC - The Observatory of Economic Complexity

As a strategy for the long-term industrial development, the country can explore further the gold manufacturing value chain towards downstream sectors such as electrical components and medical instruments, as well as upstream ones such as manufacturing of mining machinery, furnaces as well as equipment and tools. For that aim, it is imperative that the country designs a robust and cohesive set of Industrial Policy measures especially aiming at upgrading workers' skills and knowledge, and developing energy and transport infrastructure.

2.3.3 Latent Untapped Potential (LUP)

Definition of concept

The Latent Untapped Potential (LUP) identifies hidden or obscured production and export capacities that currently remain below the national potential in relation to otherwise observed trends across comparable countries. It compares national gross exports per capita dynamics with average trends observed for low- and lower-middle-income countries (LI & LMI) and COMESA. A sector is identified to have a latent untapped potential if it (a) performs below what is expected for an LI & LMI and COMESA, and (b) displays a positive, national growth pattern over time.

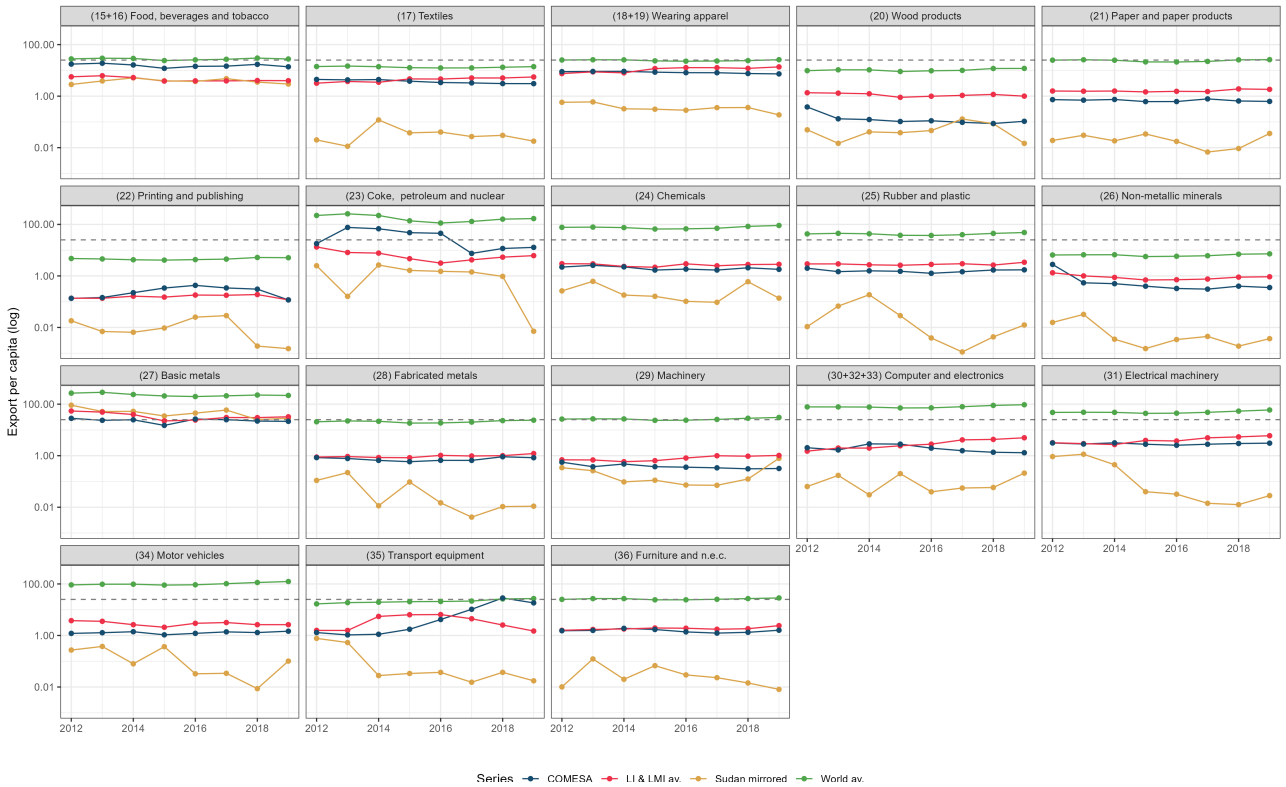
Results II-digit sector analysis

According to this criterion, no 2-digit sector fully meets the requirements. Nonetheless, it is possible to consider two sectors as latent if the criterion is relaxed, namely: *(17) Textiles*, and *(20) Wood products* Figure 64.

In relation to wood products, it is worth noting that the exports per capita of Sudan have already caught up with COMESA, therefore the sector surpasses the criterion requirement. However, they are still below the values shown by the LI & LMI countries. Moreover, the sector has grown in most of the years within the period of analysis. The textile sector, in turn, did not show a steady growth, but it exposes a larger

gap between Sudan's per capita exports in relation to COMESA and LI & LMI than the other sub-sectors. Therefore, textile should be considered a latent sector. It is latent not because it is already giving clear signs of an emerging sector in the country but from the perspective that it should have a higher level and dynamism than it exhibits at the moment.

Figure 64: Export levels per capita, ISIC Rev. 3 II-digits



Note: Trends visualized for COMESA, low- and lower-middle-income countries as defined by World Bank (2019c) as well as national and World averages, respectively. Vertical dashed lines identify highest national per capita sector-level exports in 2019 which corresponds to sector *(27) basic metals* with a value of 25.1.
Data source: United Nations UN Comtrade (2020) database; see appendix B.2 and B.3 for more information on the concordance of traded commodities and ISIC Rev. 3 sector classification, respectively. See appendix B.1 for more information on the trade data used for the COMESA aggregate.

Results IV-digit sub-sector analysis

As seen in Figure 65, sub-sectors with latent untapped potentials on a more disaggregated level are: *(1514) Vegetable and animal oils and fats; (1531) Grain mill products; (1533) Prepared animal feed; (1541) Bakery products; (1711) Preparation and spinning of textile fibers, weaving of textiles; (2413) Plastics in primary forms and of synthetic rubber; (2423) Pharmaceuticals, medicinal chemicals and botanical products; (2694) Cement, lime and plaster; (3000) Manufacture of office, accounting and computing machinery; (3130) Insulated wire and cable; (3699) Other manufacturing n.e.c.*.

Figure 65: Export levels per capita, selected sub-sectors, ISIC Rev. 3 IV-digits

Note: Trends visualized for COMESA, low- and lower-middle-income countries as defined by World Bank (2019c) as well as national and World averages, respectively. Vertical dashed lines identify highest national per capita sector-level exports in 2019 which corresponds to sector *(27) basic metals* with a value of 25.1.
Data source: United Nations UN Comtrade (2020) database; see appendix B.2 and B.3 for more information on the concordance of traded commodities and ISIC Rev. 3 sector classification, respectively. See appendix B.1 for more information on the trade data used for the COMESA aggregate.

2.3.4 Import substitution potential

Definition of concept

The criterion selects the sectors with the highest level of imports in the latest available year. This indicator captures the size of imports substitution potential for one specific sector. More specifically, it measures the size of sector-level imports (US$, per capita) of manufacturing sectors in Sudan. The indicator measures the potential for import substitution as a result of high national demand, which is currently accommodated through high imports.

Results II-digit sector analysis

Table 2 shows the import levels in US$ per capita of all manufacturing sectors for Sudan for the last five available years. On the basis of this criterion, the following sectors stand out: *(24) Chemicals and chemical products, (15+16) Food, beverages and tobacco, (29) Machinery, and (18+19) Wearing apparel*. Presenting lower import per capita level, but still very significant, there are: *(34) Motor vehicles, (25) Rubber and plastic, and (17) Textiles*.

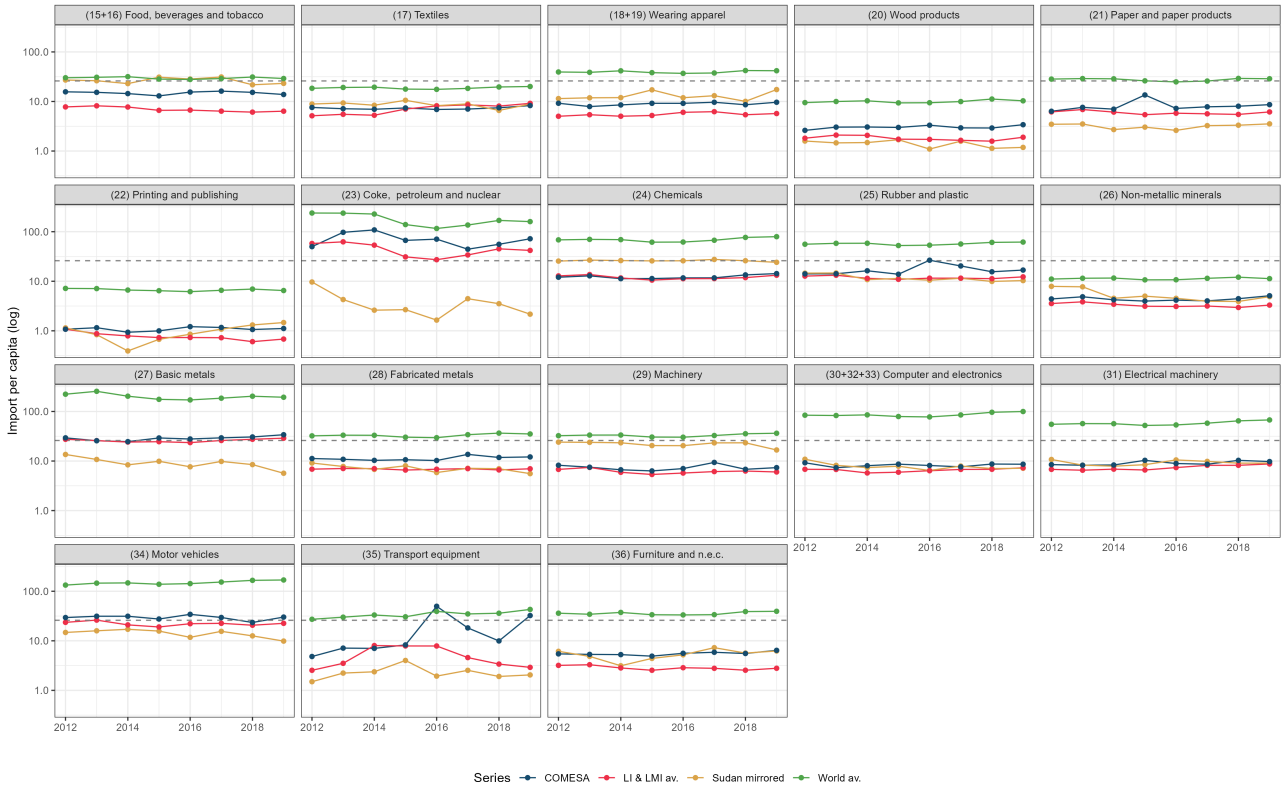
Complementing the analysis, Figure 66 reveals that all of the first set of sectors pointed out by the import substitution criterion not only show the highest import per capita levels, but their values are also higher than the average of COMESA and low- and low-middle-income countries, which means Sudan's import dependency for these sectors exceeds what is expected from its benchmark countries.

Table 2: Sudan import levels per capita, ISIC Rev. 3 II-digits

	Year				
ISIC Sector	2015	2016	2017	2018	2019
(15+16) Food, beverages and tobacco	30.95	28.34	31.23	21.73	23.18
(17) Textiles	10.57	8.22	8.94	6.60	8.86
(18+19) Wearing apparel	17.17	11.90	13.08	10.05	17.40
(20) Wood products	1.69	1.10	1.58	1.13	1.18
(21) Paper and paper products	3.04	2.61	3.25	3.32	3.53
(22) Printing and publishing	0.67	0.85	1.08	1.31	1.47
(23) Coke, petroleum and nuclear	2.67	1.65	4.45	3.52	2.17
(24) Chemicals	25.77	25.90	27.55	25.97	24.12
(25) Rubber and plastic	11.39	10.51	11.48	9.93	10.32
(26) Non-metallic minerals	5.01	4.52	3.96	3.91	4.89
(27) Basic metals	9.88	7.65	9.82	8.47	5.67
(28) Fabricated metals	8.01	5.86	7.13	6.98	5.57
(29) Machinery	20.51	20.42	23.24	23.33	16.72
(30+32+33) Computer and electronics	7.86	6.45	7.92	7.04	7.15
(31) Electrical machinery	8.44	10.52	9.84	9.06	9.07
(34) Motor vehicles	15.73	11.76	15.53	12.58	9.87
(35) Transport equipment	4.01	1.94	2.54	1.91	2.05
(36) Furniture and n.e.c.	4.42	5.21	7.27	5.66	6.23

Note: ISIC Rev. 3 II-digit results based on sum of ISIC Rev. 3 IV-digit aggregates. Per capita figures used to account for population-driven demand effects.
Data source: United Nations UN Comtrade (2020) database.

Figure 66: Import levels per capita, ISIC Rev. 3 II-digits



Note: Trends visualized for COMESA, low- and lower-middle-income countries as defined by World Bank (2019c) as well as national and World averages, respectively. Vertical dashed lines identify highest national per capita sector-level exports in 2019 which corresponds to sector *(24) chemicals* with a value of 26.
Data source: United Nations UN Comtrade (2020) database; see appendix B.2 and B.3 for more information on the concordance of traded commodities and ISIC Rev. 3 sector classification, respectively. See appendix B.1 for more information on the trade data used for the COMESA aggregate.

Results IV-digit sub-sector analysis

The ISIC Rev. 3 IV-digit industries with the highest import per capita values are: *(1810) Wearing apparel, except fur apparel, (1542) Sugar, (2423) Pharmaceuticals, medicinal chemicals and botanical products, (2520) Plastics products, (3410) Motor vehicles, and (2924) Machinery for mining* (Table 3).

Sugar stands out for being a well-established industry in Sudan. Nevertheless, as shown in Section 1.2.3, in addition to the sector's inability to export processed sugar, it also fails to meet the country's domestic demand for semi-processed sugar, making it necessary to resort to large imports.

The machinery for mining, and the pharmaceuticals and botanical products sub-sectors are particularly interesting because they integrate into the gum arabic and mining value chains that are both prominent in Sudan. The mining machinery can be integrated via backward linkages to the gold production. The guaranteed demand for mining machinery along with a coordinated set of public policies, conditionality, and regulations could drive the value chain towards more diversified and complex activities. *(17) Pharmaceuticals*, on the other hand, can be coupled downstream to the gum arabic production chain and require a long-term industrial development strategy that could be set to attract foreign investment from countries that are great importers of Sudan's gum arabic and exporters of pharmaceuticals to the country, such as France and India. It is also important to note that the country already presents a latent untapped potential in this sub-sector.

Both activities would reduce foreign production dependency and improve the level and quality of employment. Given the technological complexity of these sub-sectors, the development of adequate industrial engineering capabilities in the country is a key prerequisite to enter these sectors.

Table 3: Sudan import levels per capita, ISIC Rev. 3 IV-digits

ISIC Rev. 3		Year				
II-digit sector	IV-digit sectors	2015	2016	2017	2018	2019
(15+16) Food, beverages and tobacco	1542	12.249	11.531	16.115	10.420	10.975
	1514	3.760	2.570	3.258	3.353	3.447
(17) Textiles	1711	4.581	3.711	4.562	3.241	4.617
	1721	3.464	2.783	2.672	2.095	2.204
(18+19) Wearing apparel	1810	10.050	7.003	8.577	7.287	12.539
	1920	5.929	3.978	3.486	1.958	3.635
(20) Wood products	2010	0.909	0.476	0.664	0.487	0.472
	2021	0.662	0.473	0.721	0.460	0.470
(21) Paper and paper products	2101	1.930	1.588	2.060	2.096	1.991
	2102	0.598	0.541	0.590	0.699	0.781
(22) Printing and publishing	2219	0.407	0.496	0.770	0.973	1.248
	2211	0.110	0.183	0.113	0.181	0.114
(23) Coke, petroleum and nuclear	2320	2.662	1.629	4.435	3.514	2.158
	2330	0.009	0.013	0.011	0.009	0.005
(24) Chemicals	2423	10.923	10.200	11.551	9.261	8.706
	2413	4.240	4.387	4.838	4.327	4.062
(25) Rubber and plastic	2520	7.500	6.787	7.364	5.741	6.293
	2511	3.118	3.109	3.455	3.514	3.279
(26) Non-metallic minerals	2610	2.097	1.601	1.662	1.507	1.873
	2693	1.152	0.853	0.779	0.991	1.308

Table 3: Sudan import levels per capita, ISIC Rev. 3 IV-digits *(continued)*

II-digit sector	IV-digit sectors	2015	2016	2017	2018	2019
(27) Basic metals	2710	8.859	6.603	8.692	7.369	4.704
	2720	1.027	1.046	1.128	1.103	0.965
(28) Fabricated metals	2899	4.579	3.407	3.519	3.362	3.312
	2811	1.814	1.297	2.065	2.250	1.064
(29) Machinery	2921	2.958	2.834	2.819	3.869	2.721
	2924	3.536	3.936	5.014	5.064	2.474
(30+32+33) Computer and electronics	3220	0.724	0.625	1.126	0.908	1.893
	3000	2.274	1.457	1.865	1.743	1.736
(31) Electrical machinery	3110	2.319	4.200	3.826	3.241	2.848
	3150	1.713	1.530	1.428	1.432	1.467
(34) Motor vehicles	3410	11.027	7.875	11.317	8.806	5.618
	3430	4.249	3.318	3.794	3.330	3.857
(35) Transport equipment	3591	1.089	1.240	1.214	0.907	1.430
	3592	0.278	0.239	0.333	0.184	0.300
(36) Furniture and n.e.c.	3691	0.929	1.996	3.356	2.720	3.331
	3610	1.764	1.815	1.914	1.688	1.481

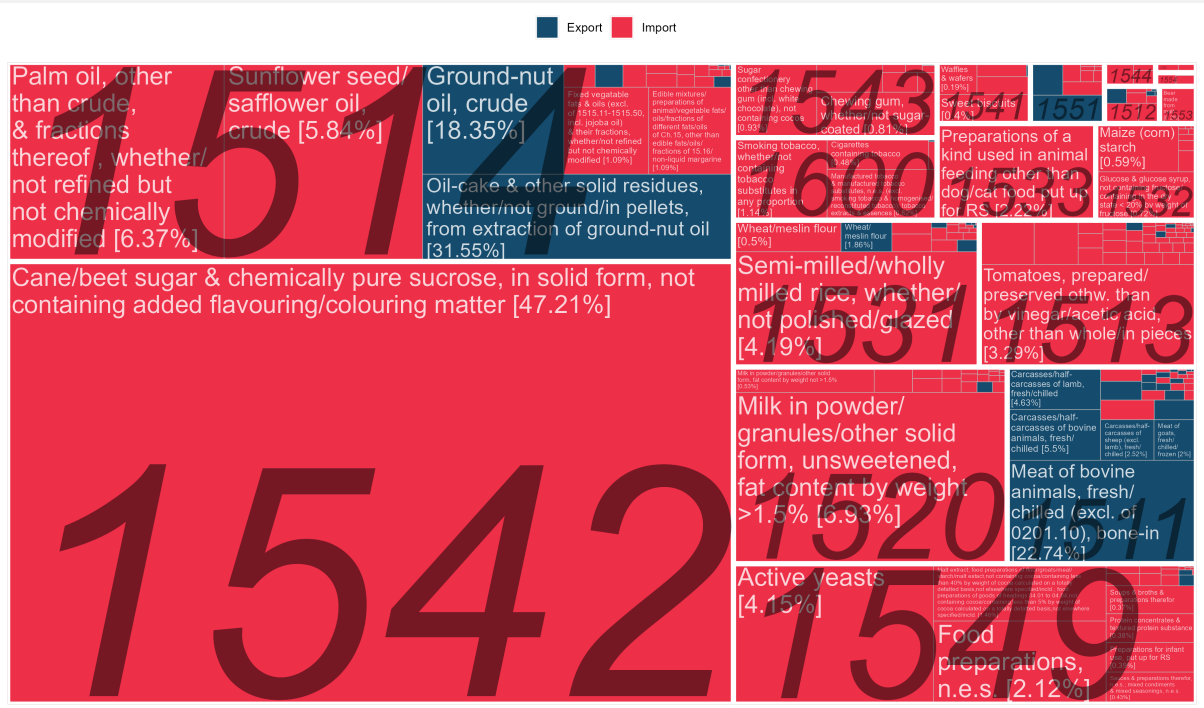
Note: Per capita figures used to account for population-driven demand effects.
Data source: United Nations UN Comtrade (2020) database.

Box 5: Trade composition of sector *(15+16) food, beverages, and tobacco* and the potential of the agro-processing industry

As seen previously, Sudan has industrial export specialization in the sector (15+16) Food, beverage, and tobacco, albeit the indicator has decreased sharply since 2016. It was also observed that the sector's exports are highly concentrated in (1514) Vegetable and animal oils and fats, and (1511) Production, processing, and preserving of meat and meat accounting. Despite having relevant productive and export capacities, the imports of food, beverages, and tobacco are more than seven times the amount exported by the country in 2019. Moreover, it is the second-largest sector in Sudan's manufacturing imports, accounting for about 15% of the total imports (Section B.10). The sub-sectors (1542) Sugar and (1514) Vegetable and animal oils and fats represent around 47% and 15%, respectively, of the total sector imports (Figure 67).

Moreover, the country's import per capita level is higher than the average observed in COMESA and LI & LMI countries. These results, along with the fact that Sudan has a food security bottleneck to overcome, reinforce the sector's relevance as a possible route for Sudan's industrial development through the substitution of imported products by national production. Agricultural processing strengthens the links with other sectors and can help to drive industrialization, besides expanding employment opportunities both in upstream and downstream activities from the farm. Yet, the possibilities go beyond the food and beverage sector, including irrigation equipment, tools, agriculture machinery (simple tractors), agricultural chemicals (fertilizers, pesticides, among others), animal feed production, and manufacturing of packaging materials. Some of those were already pointed out by this section as being potential paths for Sudan, such as several food products, prepared animal feeds paper, plastic products, machine tools, and special purpose machines.

Figure 67: National trade structure sector *(15 + 16) Food, beverages and tobacco*, 2019



Note: Traded US$ in sector (15 + 16) food, beverages and tobacco by ISIC Rev. 3 IV-digit industry. For a particular ISIC Rev. 3 IV-digit industry, shares correspond to commodities' contributions to total exports (imports) in relation to each II-digit industry. Area drawn proportionally to traded volumes.
Data source: United Nations UN Comtrade (2020) database; see appendix B.2 and B.3 for more information on the concordance of traded commodities and ISIC Rev. 3 sector classification, respectively.

2.3.5 Global import dynamics

Definition of concept

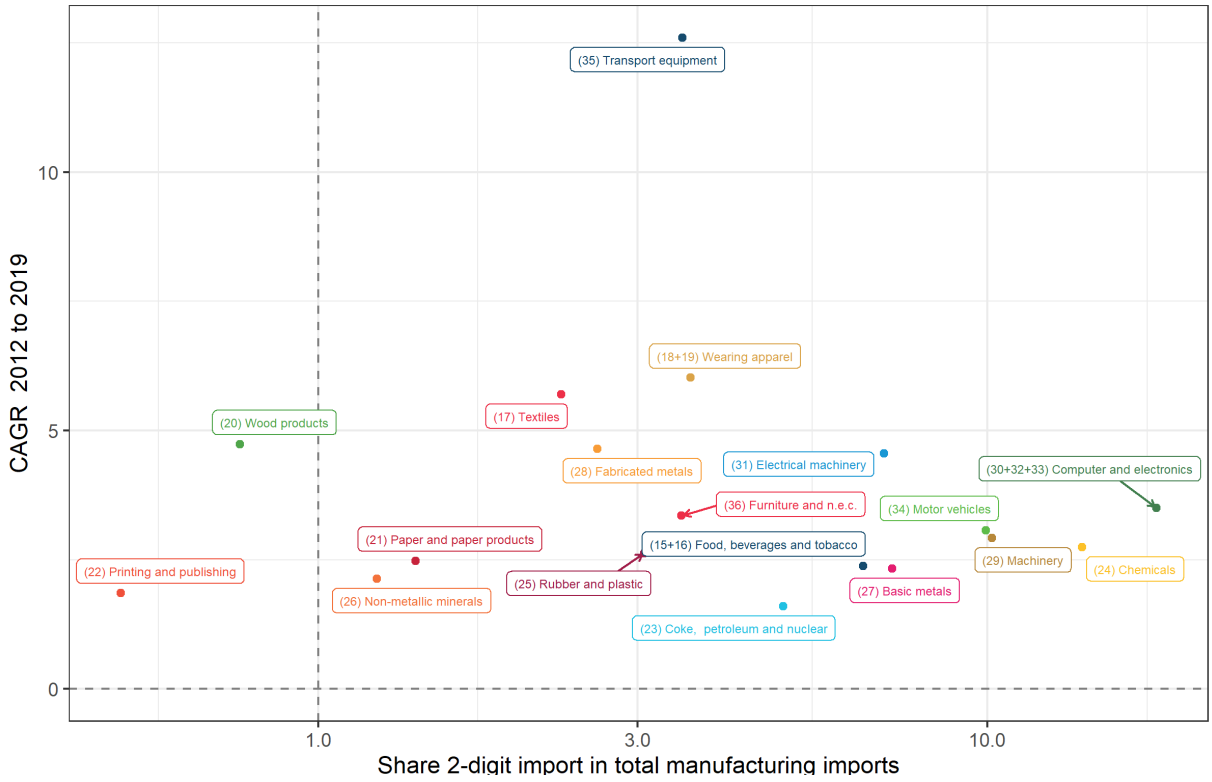
The criterion selects the sectors with the highest growth rate (vs. highest trend) of world imports between 2012 and 2019. It highlights the sectors where global demand is growing rapidly and is useful to identify sectors with the potential to gain from global demand. Sectors identified in this way may allow the country to tap into an expanding and dynamic global market with extensive opportunities for future growth moving forward. The selection requirements for this criterion are based on the growth rate (dynamism) of a particular sector as well as its overall size (measured in its share in total manufacturing imports). While this criterion offers a good indication of sectoral global market opportunities, given Sudan's very limited existing industrial production capacities, it is unclear whether the country will be able to successfully tap into these markets.

Results II-digit sector analysis

The sector that shows the highest compound annual growth rate (CAGR) between 2012 and 2019 is *(35) Transport equipment* (Figure 68), Its share of the global imports is also significant (about 4%), hence offering strong demand-driven opportunities. Sector *(17) Textile* draws attention for its fast growth, although it represents a smaller share of total global imports. With a lower but still high growth rate, and larger share of total global imports *(18+19) Wearing apparel* stands out. The following sectors also presented important growth rates and share on world imports in the analyzed period: *(30+32+33) Computer and electronics, (31)*

Electrical machinery, (34) Motor vehicles, (24) Chemicals, (27) Basic metals, and (15+16) Food, beverage, and tobacco.

Figure 68: Global manufacturing import CAGR (2012-2019) vs. sectoral share of manufacturing imports, ISIC Rev. 3 II-digits



Note: Vertical dashed line identifies sector-level share of 1%.
Data source: United Nations UN Comtrade (2020) database; see appendix B.2 and B.3 for more information on the concordance of traded commodities and ISIC Rev. 3 sector classification, respectively.

Results IV-digit sub-sector analysis

A large set of sub-sectors exhibited a positive CAGR in the global market between 2012 and 2019 (Figure 69). Among those, the following ones demonstrated both high growth rates and more significant weight in total world imports, therefore, the most attractive sub-sectors from the global import dynamics point of view are:

- **Food, beverages, and tobacco:**
  - (1511) Production, processing, and preserving of meat and meat products
  - (1512) Processing and preserving of fish and fish products
  - (1520) Dairy products
  - (1543) Cocoa, chocolate, and sugar confectionery
  - (1549) Other food products n.e.c.
  - (1554) Soft drinks; production of mineral waters
- **Textiles and wearing apparel:**
  - (1730) Knitted and crocheted fabrics and articles

  - (1721) Made-up textile articles, except apparel

- **Textiles and wearing apparel:**
  - (1810) Wearing apparel, except fur apparel
  - (1912) Luggage, handbags, and the like, saddlery and harness
  - (1920) Footwear

- **Wood and wood products:**
  - (2010) Sawmilling and planing of wood

- **Coke, refined petroleum products and nuclear fuel:**
  - (2320) Refined petroleum products

- **Chemicals and chemical products:**
  - (2423) Pharmaceuticals, medicinal chemicals, and botanical products
  - (2413) Plastics in primary forms and of synthetic rubber

- **Rubber and plastic products:**
  - (2520) Plastic products

- **Basic metals:**
  - (2720) Basic precious and non-ferrous metals

- **Fabricated Metals**
  - (2899) Other fabricated metal products n.e.c.

- **Machinery:**
  - (2929) Other special purpose machinery

- **Computer and electronics:**
  - (3000) Office, accounting, and computing machinery
  - (3210) Electronic valves and tubes and other electronic components
  - (3311) Medical and surgical equipment and orthopedic appliances
  - (3312) Medical instruments and appliances

- **Electrical machinery and apparatus :**
  - (3120) Electricity distribution and control apparatus
  - (3190) Other electrical equipment n.e.c.

- **Medical, precision and optical instruments, watches and clocks:**
  - (3311) Medical and surgical equipment and orthopedic appliances

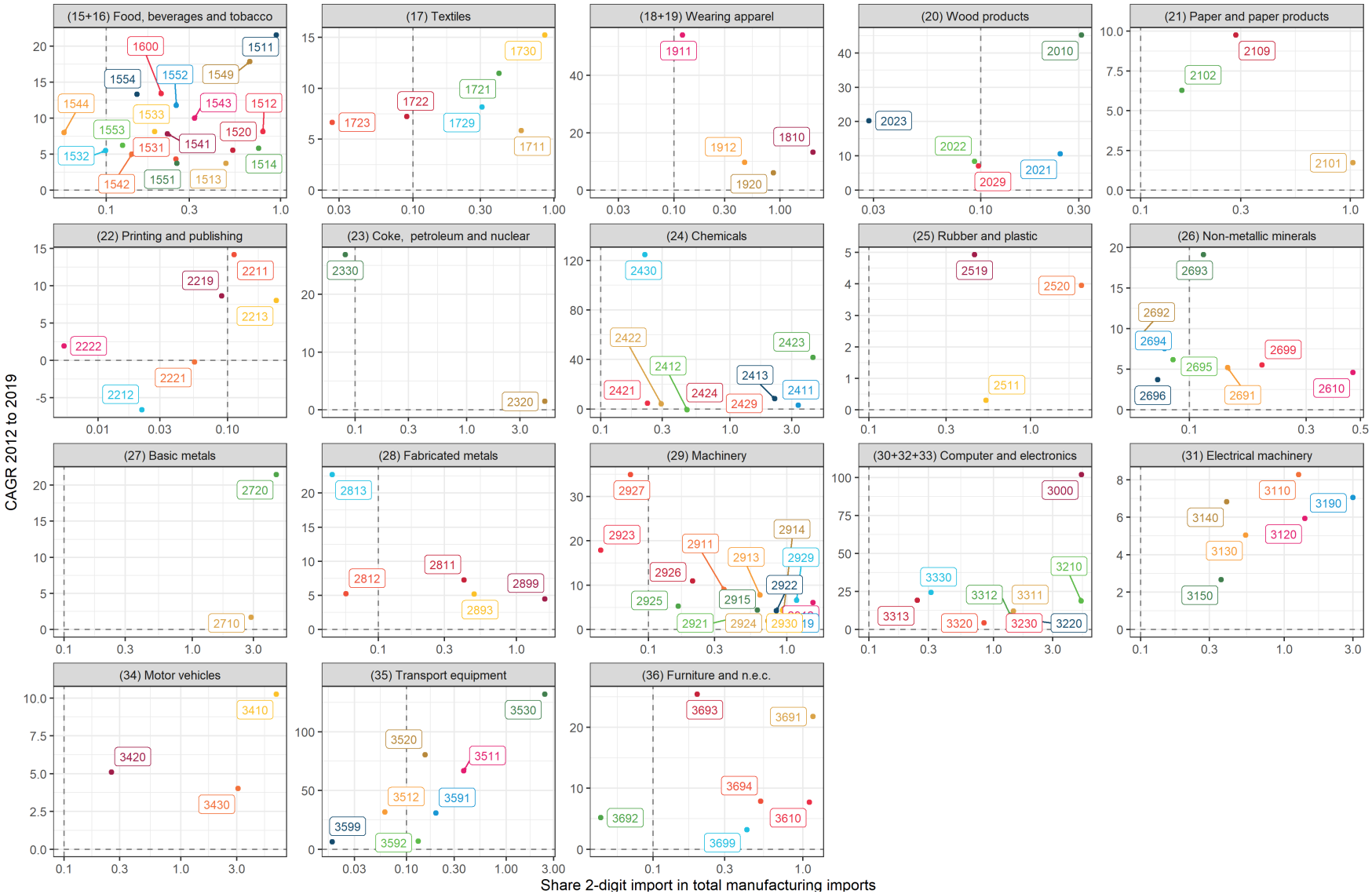
- **Motor vehicles:**

  - (3410) Motor vehicles

- **Other transport equipment:**
  - (3530) Aircraft and spacecraft
  - (3511) Building and repairing of ships

- **Furniture and manufacturing n.e.c.:**
  - (3691) Jewelry and related articles

Figure 69: Global import CAGR (2012-2019) vs. sector share, ISIC Rev. 3 IV-digits



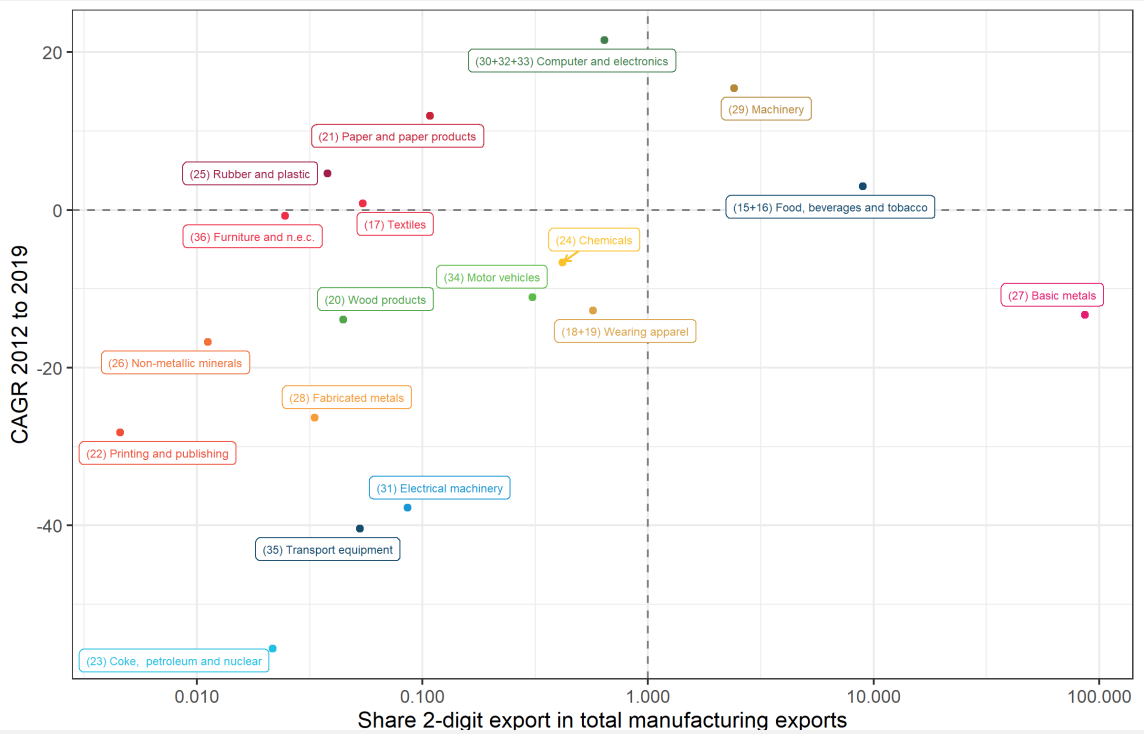
Note: Vertical dashed line identifies sector-level import share of 0.1%.

Data source: United Nations UN Comtrade (2020) database; see appendix B.2 and B.3 for more information on the concordance of traded commodities and ISIC Rev. 3 sector classification, respectively.

Box 6: Assessment of the sector-level integration process of Sudan

This box evaluates national export dynamics of the manufacturing sectors in relation to the results of Section 2.3.5. Sudan already exhibits some industrial export capabilities and a positive growth rate in food, beverage and tobacco, and wearing apparel. This indicates that the country can take advantage of external markets in these sectors (Figure 70). Furthermore, some of the globally fast-growing sectors are related to the gold mining industry - especially the electronics sector.

Figure 70: Country-level export CAGR vs. sector share, ISIC Rev. 3 2-digits, 2012-2019



Note: Vertical dashed line identifies sector-level share of 1%.
Data source: United Nations UN Comtrade (2020) database; see appendix B.2 and B.3 for more information on the concordance of traded commodities and ISIC Rev. 3 sector classification, respectively.

Regarding the sub-sectors at IV-digit level, the following can be said: Although Sudan has presented positive growth in several sub-sectors (See Figure 92 in Section B.7), only a small number of sub-sectors coincides with those that have shown a rapid global growth between 2012-2019, namely:

- (1511) Production, processing, and preserving of meat and meat products
- (1543) Cocoa, chocolate, and sugar confectionery
- (1721) Made-up textile articles, except apparel
- (2101) Pulp, paper, and paperboard
- (2520) Plastic products
- (3000) Office, accounting, and computing machinery
- (3110) Electric motors, generators, and transformers

This result shows that the country is barely integrated with the world dynamics, hence not taking advantage of the opportunities global demand has been offering. Section 1 has already highlighted that the same holds true for regional markets for manufactured products in COMESA, where Sudan also does not play a significant role yet. However, given the proximity and structural characteristics of these regional markets, and the existence of even higher entry barriers in other regions, it could be beneficial to focus on a regional export-oriented strategy for Sudan rather than immediately targeting the world market. This opportunity could be analyzed in more detail during the Industrial Policy design process, with a specific analysis of industrial market demand in COMESA countries.

2.3.6 Employment projections

Definition of concept

The criterion selects the sectors with the highest employment levels across all industrial sectors at the GDP (per capita) income level of Sudan. The indicator captures the potential of a sector to generate employment. Because of the lack of data, it is not possible to compare the projected employment patterns with actual country-level observations of Sudan (see Section B.8 for more information). Consequently, the results should serve as a guideline in terms of which manufacturing sectors could generally be expected to produce the highest contribution of manufacturing employment at a given income level. However, given the lack of data for Sudan, the results should be handled with caution.

Results II-digit sector analysis

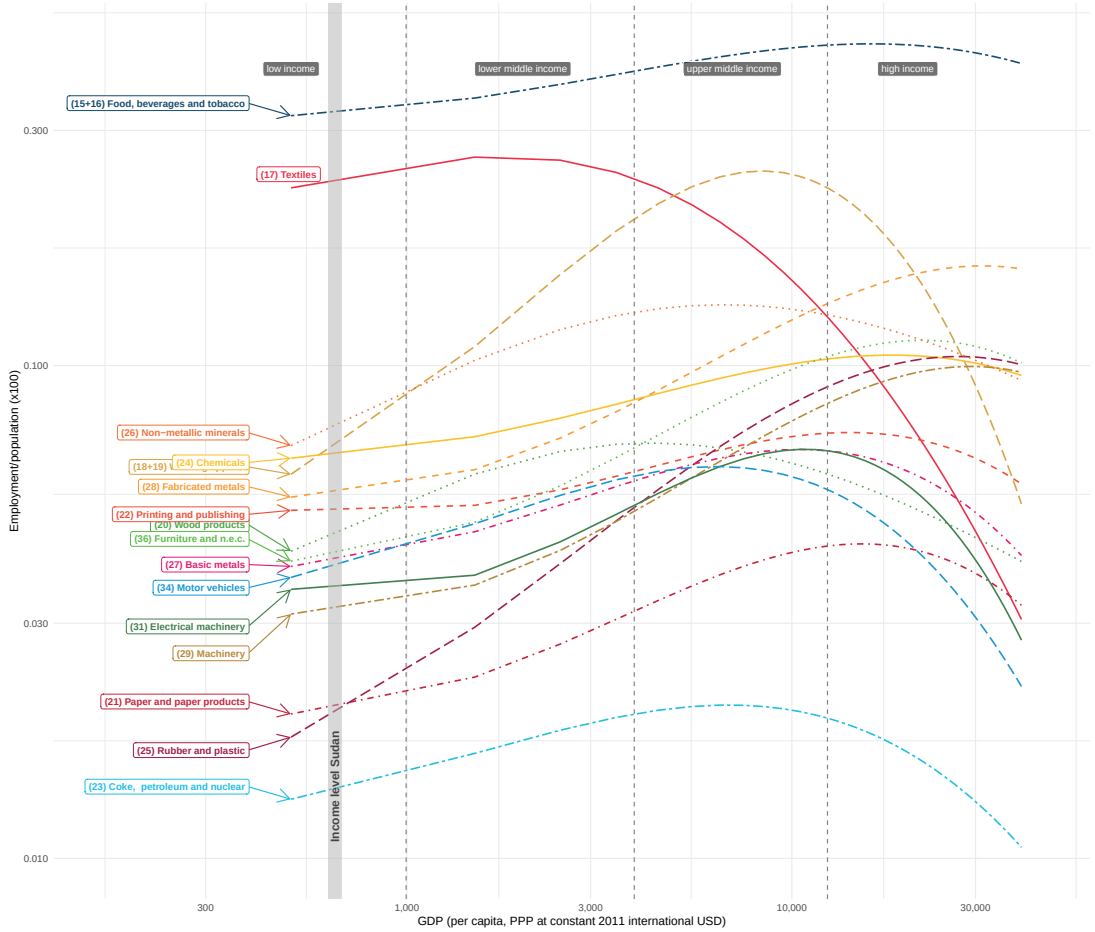
As shown in Figure 71, the sector with the largest potential for job creation at Sudan's level of income per capita (PPP at constant 2011 international US$) is *(15+16) Food, beverages, and tobacco*. The strong effects of this sector on employment are also expected to be observed at all stages of a country's development, including in high-income countries. Therefore, it generally exhibits great potential for short, medium, and long-term development strategies. Considering that Sudan already has some production and export capabilities in this sector, and there is the possibility of expanding them even more, especially from the development of activities downstream from the exploration of gum arabic. Reinforcing the sector seems to be a promising approach to foster the country's socio-economic development. The strong backward linkages to the agriculture sector, which currently absorbs almost 40% of the country's labor, is another striking argument.

From a global perspective, the *(17) Textiles* sector usually fosters employment in lower levels of income per capita; however, as countries reach middle-income levels, the projections reveal a sharp downward trajectory. For the short and medium-run, sectors *18 + 19) Wearing apparel* and *(26) Non-metallic minerals* also stand out as potential drivers of employment for low-income countries, however, they are not expected to hold up among countries with higher income levels. In the case of textiles, the negative effect on job creation is already likely to happen in countries that are on the brink of moving from low-middle- to upper-middle-income. However, for wearing apparel – in which sector Sudan presents some industrial export specialization – the level of employment is expected to start decreasing only when the countries are closer to the threshold with high-income countries.

At a lower level than the others, but still standing out, is the sector *(28) Fabricated metals*. What sets it apart is that this sector tends to gain weight as countries move forward along their development path. Therefore, it may present an attractive choice for long-term development strategies in terms of employment generation.

Regarding sector *(27) Basic metals*, in which Sudan has stronger industrial production and export capabilities - more precisely, manufacture of gold - the employment generation is usually not very high. Although it is expected to somewhat increase employment for middle-income levels, it usually declines again in high-income countries. As shown in this section, basic metals can set the base for developing other sectors downstream in the gold value chain and stimulate the generation of more jobs in the country. However, as they are more technology-intensive sectors, such as electronic equipment, medical equipment, and watches, the capacity of employment generation capacity is more limited. However, it is important to note that the quality of those jobs is usually very high.

Figure 71: Global employment projections



Note: Axis in log-scale. Projected employment/population ratio ($\times 1000$) based on pooled cross-country data for up to 153 countries between 1963 and 2017. Income group cut-offs were identified by the dashed vertical lines at US$ 995, US$ 3,896, and US$ 12,375 as defined by World Bank Country and Lending Groups (World Bank, 2019c). Projected employment/population ratio ($\times 1000$) based on 2017 real GDP per capita.
Source: Calculations based on INDSTAT (2020) and Penn World Tables 9.1 (Feenstra et al., 2015) and following methodology described in appendix B.5.

Results IV-digit sub-sector analysis

Table 4 shows that, based on other countries' experiences at Sudan's current stage of income, the following IV-digit sectors have presented high employment generation projections: *(3120) Electricity distribution and control apparatus*, *(3190) Other electrical equipment, (1551) Distilling, rectifying and blending of spirits, (1810) Wearing apparel, except fur apparel, (2423) Pharmaceuticals, medicinal chemicals, etc., and (3430) Parts/accessories for automobiles*.

Table 4: Employment projections, ISIC Rev. 3 IV-digits

ISIC Rev. 3, IV-digits sectors	Employment projection (x1000)
(1551) Distilling, rectifying & blending of spirits	0.43
(1554) Soft drinks; mineral waters	0.18
(1600) Tobacco products	0.09
(1711) Textile fibre preparation; textile weaving	0.55
(1730) Knitted and crocheted fabrics and articles	0.03
(1810) Wearing apparel, except fur apparel	0.22
(1920) Footwear	0.03
(1911) Tanning and dressing of leather	0.01
(2101) Pulp, paper and paperboard	0.04
(2222) Service activities related to printing	0.02
(2423) Pharmaceuticals, medicinal chemicals, etc.	0.25
(2411) Basic chemicals, except fertilizers	0.03
(2511) Rubber tyres and tubes	0.05
(2520) Plastic products	0.05
(2694) Cement, lime and plaster	0.11
(2610) Glass and glass products	0.06
(2710) Basic iron and steel	0.12
(2899) Other fabricated metal products n.e.c.	0.13
(2811) Structural metal products	0.07
(2912) Pumps, compressors, taps and valves	0.05
(2914) Ovens, furnaces and furnace burners	0.03
(3140) Accumulators, primary cells and batteries	0.07
(3430) Parts/accessories for automobiles	0.31
(3420) Automobile bodies, trailers & semi-trailers	0.03
(3610) Furniture	0.19

Note: ISIC Rev. 3 IV-digit industries, selected years. based on pooled cross-country data for up to 153 countries between 1963 and 2017.
Source: Calculations based on INDSTAT (2020) and Penn World Tables 9.1 (Feenstra et al., 2015) and following methodology described in appendix B.5.

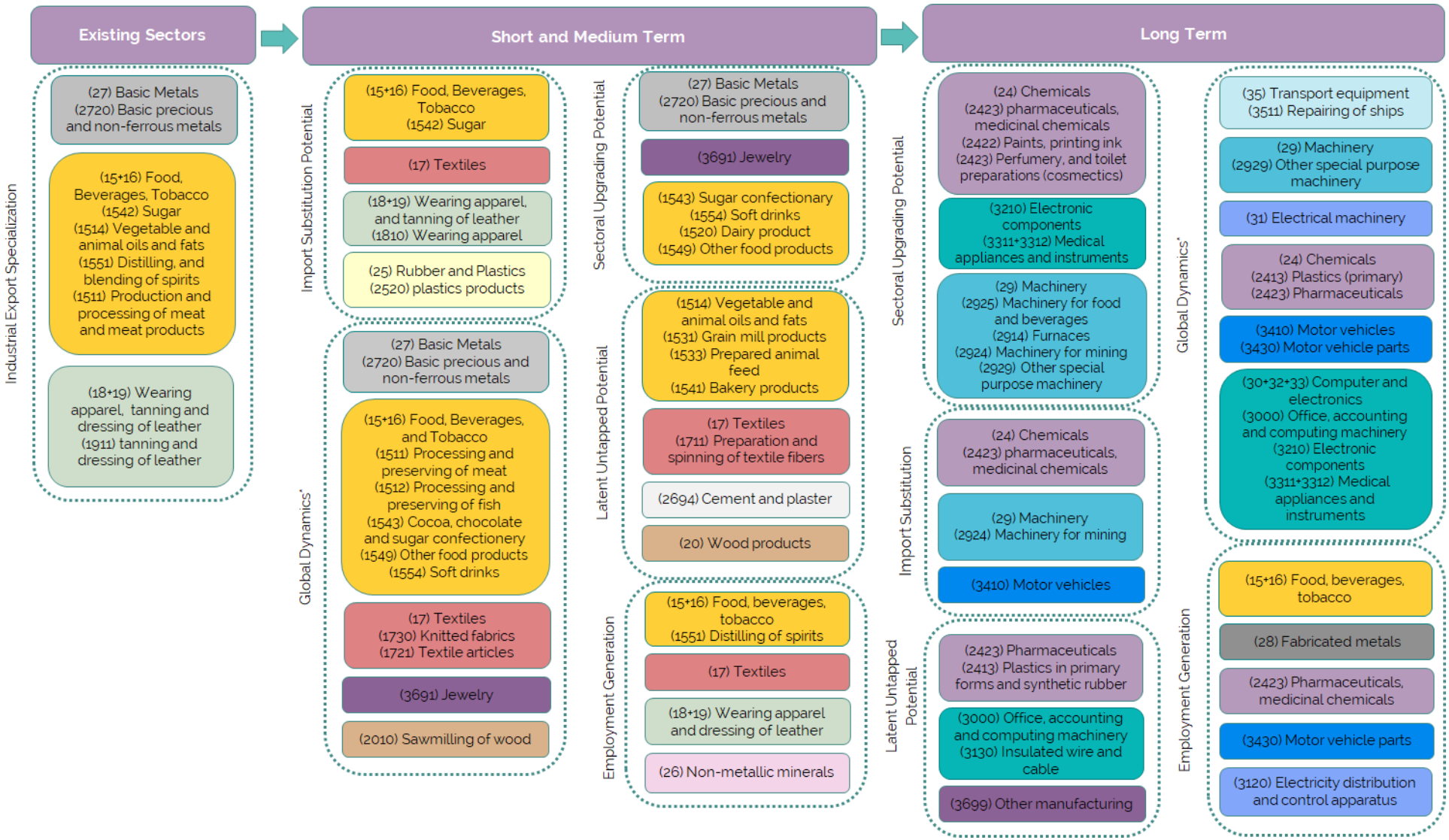
2.4 Summary of results and implications for Industrial Policy in Sudan

The meso-level analysis revealed that manufacturing in Sudan is still a nascent economic activity, with industrial production and export capacities overwhelmingly concentrated in products based on natural resources that share many characteristics of primary commodities. However, some relevant industrial production and export capacities could be identified, especially in the sectors of basic metals; food, beverages, and tobacco; and wearing apparel, and tanning of leather, with a focus on the sub-sectors of basic precious and non-ferrous metals (gold), vegetable and animal oils, production and processing and preserving of meat, and tanning and dressing of leather.

Figure 72 provides a summary of the findings of the meso-level analyses, distinguishing between existing sectors, short-to-medium-term potentials, and long-term potentials.[8]

[8]The distinction between short-term and long-term targets is based on the acknowledgment that certain advanced manufacturing activities require a higher level of industrial capabilities than more basic activities. The long-term target sectors presented here will presumably require a longer time horizon to strengthen the industrial capabilities that are prerequisite for entering into these production activities than the short-term targets, which could become feasible more quickly.

Figure 72: Summary of identified existing and potential sectors in the short/medium and long term



Data source: UNIDO - GPI

Based on existing capacities, there is a great potential for industrial development from deepening these sectors. In particular, the main short to medium-term opportunity for the country lies in the further development of the agro-processing industry linked to the gum arabic value chain (especially sugar confectionery, soft drinks, bakery, and dairy product), and the jewelry sector, connected downstream to the gold production. These new activities generate greater value added, require more qualified workers, and have stronger linkages with the rest of the economy than the mining and agricultural activities. Gradually, Sudan could build other capacities and target other final sectors directly linked to those value chains as a long-term development strategy, such as pharmaceuticals and botanical products; perfumery and toilet preparations; machinery for the food and beverage, and the mining sectors; and electronic components.

A wide range of opportunities for medium- and long-term import substitution can also be identified, particularly in sugar, textiles, wearing apparel, basic iron and steel, machinery for mining, and other food products. The sector analysis also shows that Sudan is poorly integrated with global market dynamics, benefiting very little from the growth of world imports in several segments. Yet, the national and international import and export dynamics identified several sectors as potential avenues for the country's development, namely: basic metals; food, beverages, and tobacco; textile; jewelry; transport equipment, machinery; chemicals; motor vehicles; and computer and electronics.

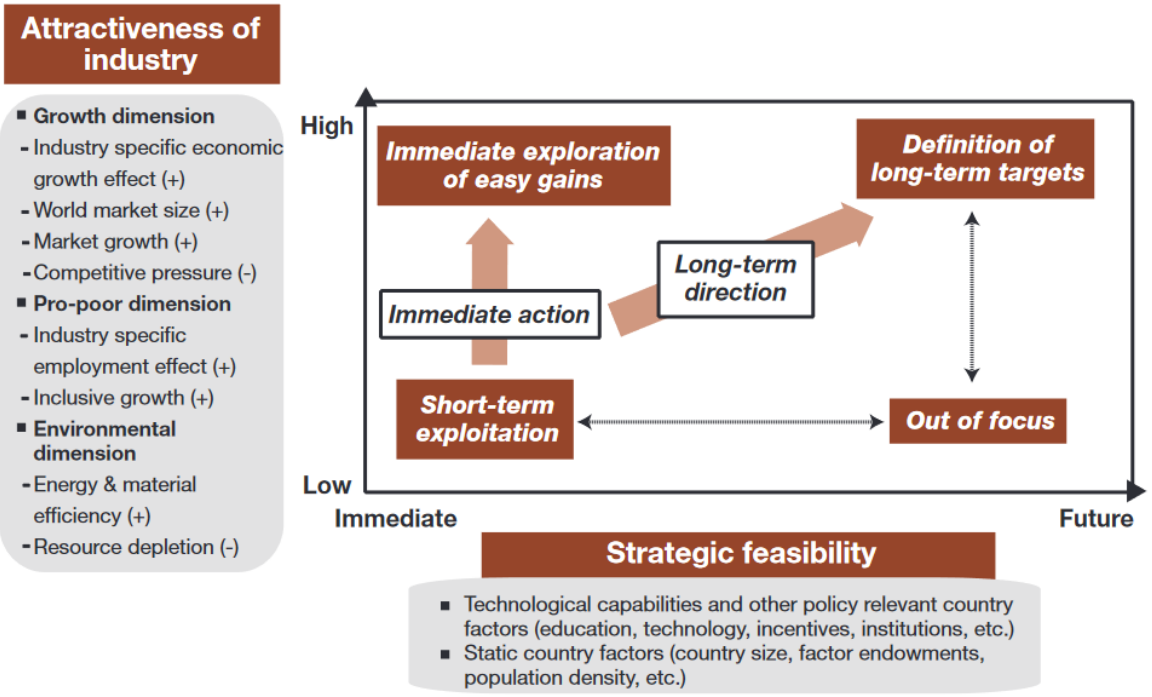
The comparison of the country's exports with its benchmark countries revealed untapped capacities in several food sub-sectors such as vegetable and animal oils and fats, prepared animal feed, and bakery products that could be explored in the short- and medium-term by the country, as well as preparation and spinning of textile fibers, cement and plaster, and wood products. For the long run, the following latent untapped potential sectors could be pursued: pharmaceuticals, plastics in primary forms and synthetic rubber, office, accounting and computing machinery, and insulated wire and cable.

In addition, the employment projection analysis shows that the sector of food, beverages and tobacco is most likely the sector that will contribute most to employment generation not only for countries at Sudan's income per capita level, but also for middle and high-income countries. Based on other countries' experiences, for the short and medium-term strategy, textiles and wearing apparel could also contribute significantly to job creation, however, employment levels are unlikely to be sustained at later stages of development. As income per capita rises, fabricated metals may intensify their positive effects in terms of employment, making it an attractive sector to consider for sustainable industrial job creation.

The potential sectors highlighted by this study are aligned with Sudan's overall objectives of short and long term. The country is in the preparatory stage for developing a national Industrial Policy. The transition Government has broadly mapped and put forward the main intentions. The document "The New Sudan", issued by The Ministry of Investment of Sudan recognizes the need to go beyond pure primary production and stresses the importance to integrate the resource-based sectors into the economy (Ministry of Investments and International Cooperation of Sudan, 2021). Moreover, it also maps possible sectors for investment opportunities in the country.

Any industrial policy support project in Sudan should pay special attention to the importance of sub-sectoral development potentials. In particular, it is advisable to dig deeper into the potential priority sectors identified in this section to arrive at a final list of focus sectors that are chosen in a participatory process with all key stakeholders. Defining the concrete short-, medium-, and long-term focus sectors should consider their relative attractiveness and strategic entrance feasibility, as illustrated in Figure 73. The process for selecting priority sectors should thus be based on a realistic assessment of Sudan's current industrial capabilities in order to identify which sectors are feasible in the short and medium term and which sectors will require a more significant development of new human and technological capabilities, and hence are more suitable for the longer term.

Figure 73: Framework for the definition of short and long-term priority sectors



Data source: UNCTAD and UNIDO (2011)

The priority sector selection process should also critically reflect on the respective sector's potential to contribute to addressing the big socio-economic issues in the country, such as food security, poverty alleviation, infrastructure improvement (especially transport, telecommunications, and energy), housing, and health access, and creation of better jobs. In a next step, clear targets for the development of the selected industries have to be set, detailed sectoral action plans of policy interventions should be developed and an in-depth sectoral monitoring and evaluation system to keep track of progress needs to be operationalized.

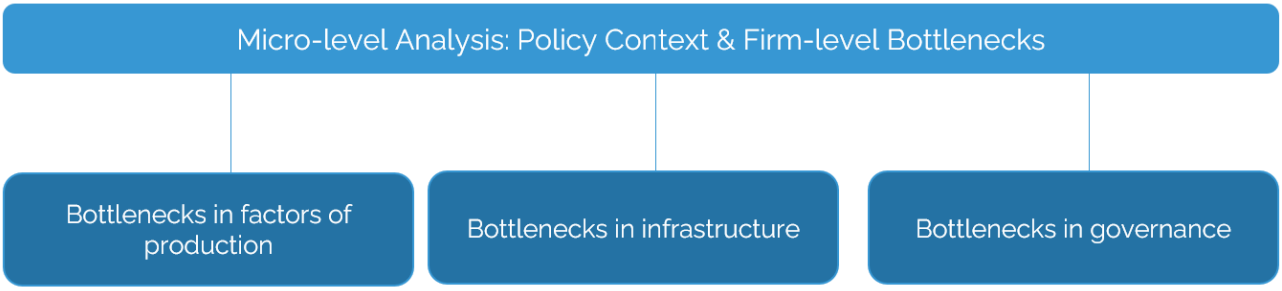
To foster the development of the mentioned industries, the Government must put forward a comprehensive and coordinated range of industrial policy interventions that can facilitate and stimulate the flourishing of more advanced industrial activities in the sectors. As important as the elaboration of coordinated and adequate strategies to achieve the country's concrete objectives is the process of designing and implementing the policies, as well as the establishment of monitoring and evaluation systems.

Within the policy package, it is crucial to address the country's bottlenecks by building production and technology capabilities and developing infrastructure, especially transport, energy access, and broadband connection. The role of foreign direct investment will probably remain crucial for the process; however, it needs to be ensured that investors comply with the country's development strategy and that their activities benefit Sudan's society.

3 Block 3: Bottlenecks for industrial development

This section is dedicated to assessing Sudan's governance and policymaking capabilities in general and identifying obstacles to developing the manufacturing sector in particular. Where possible, the report distinguishes characteristics of firms most vulnerable to the identified bottlenecks. Figure 74 illustrates the structure of the section. The following section provides an overview of the main identified bottleneck. The next sections analyze each of the key obstacles in greater detail.

Figure 74: Structure of the analysis



Elaboration: UNIDO - GPI.

3.1 Overall results

This section of the report identifies the key bottlenecks to the overall business activities of Sudanese manufacturers. Bottlenecks are defined as problems related to factors that negatively impact the performance of private enterprises and their ability to create value added and jobs. These may consist of limited access to required material inputs, capital, labor, or aspects of the general business environment like institutional shortcomings. Additionally, this section identifies - where possible - types of firms that are most affected by different bottlenecks. The analysis of bottlenecks is based on a combination of:

- An empirical analysis of separate data sets including firm-level data from the World Bank Enterprise Survey (WBES)
- Information from the World Bank Doing Business Report (World Bank, 2020a)
- Consultations with Sudanese stakeholders (ministries, and representatives of the private sector, academia, and media)
- Relevant online resources, academic literature, reports from local and international organizations, and statistic data from various sources.

Identifying the most critical bottlenecks is based on the following approach: First, the World Bank Enterprise Survey data is analyzed. Bottlenecks are being identified as those most frequently stated by the surveyed firms to be a severe or major concern.[9] Whenever possible and available, related follow-up questions from the survey are analyzed to provide further context. Second, given the very small size and the lack of representativeness of the sample for the Sudanese manufacturing sector, this analysis is supplemented by extensive desk research to (i) identify potentially additional major bottlenecks, (ii) enhance the contextualization by further evidence, and (iii) re-weight the relevance of the identified bottlenecks. Third, consultations with local stakeholders are conducted (see Section C.1). The consultations are based

[9] In the survey firms can answer with 'no obstacle', 'minor obstacle', 'moderate obstacle', 'major obstacle' or 'very severe obstacle' when asked if a particular issue constitutes an obstacle to their business(es). Key bottlenecks are defined as all obstacles listed as either a 'major obstacle' or a 'very severe obstacle' by the responding firm.

on a semi-structured interview design with an open session to ensure all relevant bottlenecks are being identified and confirmed, followed by an in-depth discussion of the respective topics. The combination of evidence from these different sources drives the identification of the key bottlenecks faced by firms in Sudan.

The applied three-staged approach has proven robust as it produced consistent results. The desk research and stakeholder consultation (i) confirmed the four major bottlenecks identified by the WBES, and (ii) added six additional bottlenecks that appeared to be of high relevance. The open collection of bottlenecks at the beginning of each consultation showed high consistency by revealing the same set of bottlenecks as identified in the desk research.

Starting point of the analysis is the latest survey conducted by the World Bank Group in their series of Enterprise Surveys in 2014. The sample is relatively small, as only 84 manufacturing firms in Sudan are included. Important to note is that only registered firms are surveyed, while the majority of manufactures still operate informally (see Section 3.2.1 on informality). This is in line with a bias towards companies located in the capital Khartoum, hence, misrepresenting potentially impediments companies in other areas, especially rural, face.

Where possible, data for Sudan is benchmarked against relevant comparators to highlight the relative importance for or performance of the manufacturing sector. The WBES data is compared to Sudanese non-manufacturing firms as well as to the average COMESA manufacturing firm. The chosen benchmark countries are part of the COMESA region. However, in this section, only countries with surveys not older than 2013 were considered to allow for a comparable time horizon (for more details, see C.2). Whenever data from the benchmark country group is available, one column in the tables ('Manufacturing COMESA') reports the results of manufacturing firms in COMESA countries as a group.

Table 5 identifies bottlenecks based on problems that the surveyed firms most frequently provided to either be a severe or major concern in the WBES.[10] According to the survey, manufacturing firms stated that **tax administration** (69%), **tax rates** (60%), **political instability** (58%), and **corruption** (50%) were the biggest obstacles to the manufacturing sector in Sudan in 2014. These numbers are all higher compared to the respective values for the average COMESA manufacturing firm. The top four key bottlenecks remain the same when considering all Sudanese firms (manufacturing and services). These obstacles were validated by the consultations as still major bottlenecks to businesses nowadays.

[10] In the WBES surveys, firms are asked if a particular issues constitutes an obstacle to their business(es) to which they can respond with *'no obstacle'*, *'minor obstacle'*, *'moderate obstacle'*, *'major obstacle'* or *'very severe obstacle'* when asked if a particular issue constitutes an obstacle to their business(es). *Key bottlenecks* are defined as all obstacles that were listed as being either a 'major obstacle' or a 'very severe obstacle' by the responding firm. For a comprehensive list of questions of WBES questions for this report, please see appendix C.2.

Table 5: WBES main bottlenecks

	Sudan		COMESA*	
Bottlenecks	Manufacturing	Non-manufacturing	Manufacturing	Non-manufacturing
Access to finance	20	14	27	**26**
Access to land	26	14	18	18
Busin. license and permits	30	23	17	13
Corruption	**50**	**66**	**31**	**31**
Courts	7	9	11	12
Crime	14	8	13	14
Customs	49	40	17	18
Electricity	12	7	**35**	**26**
Inadequ. skilled l.f.	25	14	16	12
Informal sector	33	16	**30**	**26**
Labor regulation	33	10	11	8
Political instability	**58**	**68**	**32**	**32**
Tax administration	**69**	**72**	20	19
Tax rates	**60**	**78**	27	**24**
Telecommunication	4	6	6	8
Transportation	33	19	19	15

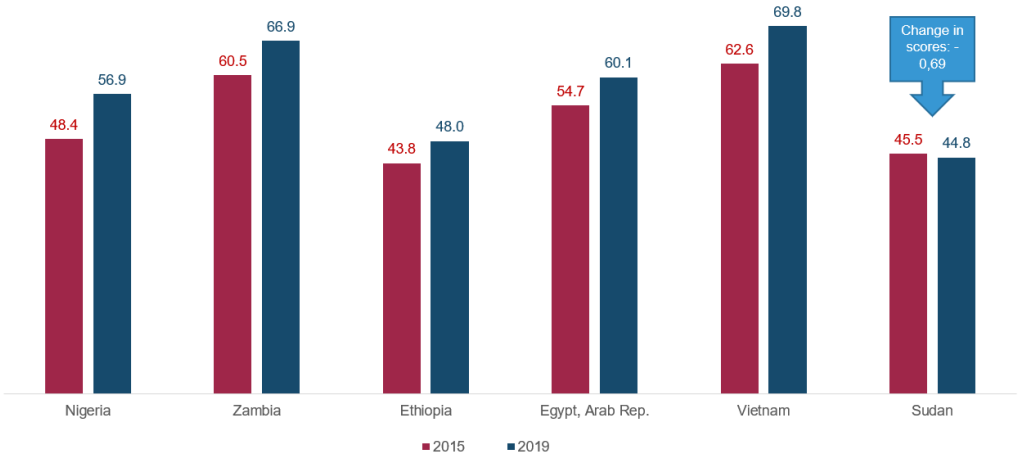
Note: Share of (non-)/manufacturing firms that identified a topic as either a 'very severe' or 'major' obstacle. Figures always refer to the respective subset (column). Firm classified as 'manufacturing' if main product/service according to ISIC (Rev. 3.1) is part of manufacturing; firms labelled 'non-manufacturing' otherwise. Only COMESA economies considered if WBES was conducted during or after 2013. 'COMESA*' aggregate excludes Sudan.
Data source: WBES.

All top four bottlenecks belong to the realm of governance. This fact underlines the significance of impediments to effective state-business relations in Sudan. The desk research and consultations revealed that the absence of a **strategic orientation of Industrial Policy** based on consultations with the private sector, and the low **capacities for effective Industrial Policy**, which can be broken down into policymaking and statistical capabilities of the government, constitute crucial hindrances. Therefore, they must be included as major governance bottlenecks.

Another important source of information to identify the barriers to industrial development in Sudan is the Doing Business Scores [11] developed by the World Bank as a proxy to measure the impact of regulations on businesses (World Bank, 2020a). Figure 75 informs that no improvements have been observed in this respect in Sudan between 2015 and 2019. In fact, the country's overall score had slightly decreased by 0.69 point, reaching the score of 44.8 out of 100 - below all benchmark countries. Moreover, in the same period, the country lost five positions and ranked 171 out of 190 economies in 2019.

[11] In 2021, the World Bank discontinued the publication Doing Business Report after data irregularities were found in the 2018 and 2020 reports. After an in-depth investigation, data manipulation was found for China, Saudi Arabia, UAE, and Azerbaijan. The irregularities resulted in changes in their placement in the Doing Business reports. Although it is a serious ethical situation, no irregularities were found in the data of Sudan and comparator countries and regions. Therefore, the data remain robust for the purpose of this report. More information on the Doing Business discontinuity is available at World Bank Board of Executive Directors (2021)

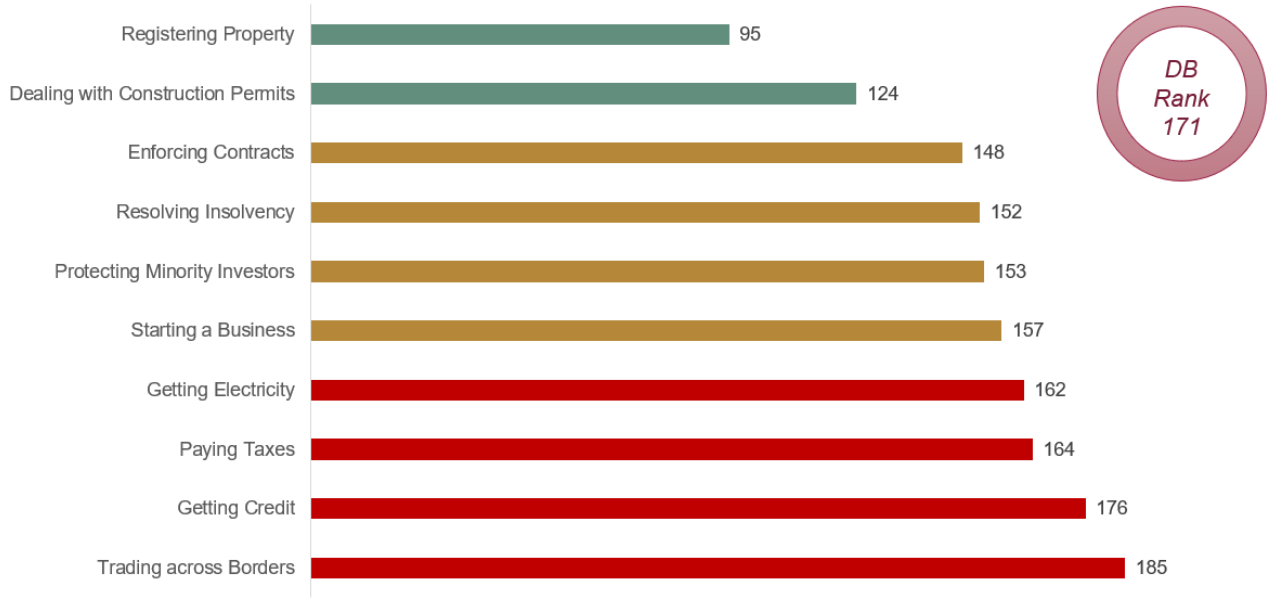
Figure 75: Doing Business Scores 2015-2019 (100= Best performance)



Data source: Doing Business 2020

Figure 76 shows the main ten topics for Sudan and its respective ranking among 190 economies. Trade Across Borders (185), Getting Credit (176), Paying Taxes (164), and Getting Electricity (162) are the most challenging issues for businesses in the country. Taxes were also highlighted by the WBES, as previously mentioned. **Access to finance** and **electricity** were validated by the consultations as severe hindrances for the country's industrial development and, therefore, included in this section.

Figure 76: Rankings of Sudan on Doing Business topics (out of 190 economies)



Data source: World Bank (2020a)

Besides electricity, the consultations also identified **transportation** as a major bottleneck in the country, which also impacts the component "trade across border" of the Doing Business Publications. Infrastructure in its entirety is a crucial external factor to successful industrial development. And, it is highly related to governance, as it shows the capability of the Government to create and sustain the infrastructural conditions needed to develop the manufacturing sector. Hence, electricity and transportation were included in this report and are being discussed in the section on infrastructure.

Finally, the consultations also revealed **informality** has a severe negative impact on manufacturing development in the country. For this reason, along with access to finance, it will discussed in the subsequent section on obstacles related to the factors of production.

3.2 Bottlenecks in factors of production

Industrial development is a dynamic process and can focus, among others, on improving product quality, increasing the efficiency of production, or establishing new industries in a country. In order to enhance industrial production changes in the underlying production factors (land, capital, labor, entrepreneurship, and technology), inputs into the production process are needed. Increasing the quality of a product may require the application of new technology. Establishing new factories requires investments. Lacking access to skilled labor, specific technologies, finance, raw materials, or any other factors of production may constitute significant bottlenecks to industrial development in a country. Depending on the country's respective development stage and the envisioned changes, these bottlenecks can be of different natures.

The level of industrial development, particularly in the manufacturing sector, is shallow in Sudan (see Section 1 and Section 2). The goal is to establish basic secondary industries that can process existing raw materials in the country. In the area of production factors, two major obstacles have been identified hindering industrial development: (i) informality and (ii) access to finance.

3.2.1 Informality

In many countries, particularly in developing ones, informal activities can play a significant role in the economy and labor markets by accounting for substantial production shares, employment creation, and income generation. However, if they occupy a dominant share of the overall economy, this can lead to severe impediments to development.

While some activities in the informal economy may offer reasonable livelihoods and incomes, most informal workers face higher risks of vulnerability and occupational hazards, lower income, and poorer health conditions. Informal businesses are characterized by their disregard of regulations and non-compliance to given administrative requirements. Informal production may ignore formal rules related to labor legislation, product quality and safety or environment protection. If informal suppliers occupy a significant market share, this may lead to a distortion of competition, where formal companies can barely offer their products at competitive prices. Moreover, informally operating firms do not contribute to public revenues, diminishing the state's capacity to establish appropriate public policies necessary to industrial development.

It is estimated that 60% of the total employment in Sudan is in the informal sector (Ministry of Investments and International Cooperation of Sudan, 2021). In the WBES 2014, the overwhelming majority of the Sudanese manufacturing companies (92%) stated the informal sector is a competitor to their businesses. This share is pronouncedly higher than the average percentage of COMESA's manufacturing firms (52%) (Table 6).[12] Consultations with the private sector confirmed that this finding is still valid and that informality has increased in the country over the past five years. Facing competition with informal companies is not automatically equal to being a significant obstacle to business development. The relative size of the informal sector defines the competitive pressure on formally operating firm, which is presumably higher in Sudan than in the overall region.

[12] For more details on this question, see Table 24.

Table 6: Share of firms that compete with the informal sector (%)

	Sudan		COMESA*	
	Manufacturing	Non-manufacturing	Manufacturing	Non-manufacturing
Responses				
No	7	10	44	42
Yes	92	88	52	55
Non-responses				
Do not know / NA	1	2	4	3

Note: Share of (non-)/manufacturing firms in Sudan and COMESA* responding to bottleneck; columns (n) and (%) sum up to 100% with rounding errors. Number of responses = (n) number of observations - (n) number of non-responses. Firm classified as 'manufacturing' if main product/service according to ISIC (Rev. 3.1) is part of manufacturing; firms labelled 'non-manufacturing' otherwise. Only COMESA economies considered if WBES was conducted during or after 2013. 'COMESA*' aggregate excludes Sudan. See Appendix C.2.4 for a more detailed analysis.
Data source: WBES.

According to the consultations, informality affects all manufacturing sectors. Nevertheless, it is more present in the gold production, agro-industry, fast-moving consumer goods such as foodstuffs, bottled water, soft drinks, packaging, confectionery, toiletries, over-the-counter pharmaceuticals, and household goods), recycling, electronics, textile, clothing, and plastics.

Evidence shows that most people enter the informal economy due to the lack of opportunities in the formal economy and other means of livelihood (Bonnet et al., 2019). One of the main reason for high informality in Sudan are the high costs of registration. Many companies lack sufficient efficiency and competitiveness and, therefore, do not earn enough revenues to bear the high costs of formalization. As mentioned in the consultations, manufacturing companies pay 47 types of taxes and fees (federal, state, and local). The financial burden is high and often impossible to be carried by firms. As stated in the consultations, it is also common practice that registered enterprises operate informally to benefit from cost advantages such as non-payment of taxes. Private sector representatives declared that not only micro and small firms operate in the regulatory shadow - by necessity - but also companies with a turnover up to US$ 50 million per year take advantage - by choice - of the lack of surveillance and law enforcement in the country.

This unfair competition can compel formal companies to closure or re-informalize their operation. Due to bottlenecks in transportation, energy, labor skills, high taxes, among other factors, manufacturing production costs are high in the country. To remain competitive, formalized firms reduce their profit margins, which often do not reach 15% - 20%. The value-added tax in the country is generally 17%. Informal companies do not pay this tax, among other fees, which makes competition with certain companies highly predatory. Besides the competition among local producers, another form of unfair competition arises from informal traders importing products to resell them at lower costs on the local market.

Going or remaining informal might be a short-term strategy that allows companies to compete in the market. However, from a long-term development perspective, the competitiveness of Sudanese manufactures has to be increased by controlling the costs of production. Persisting informality impedes this process from happening. Besides distortion of competition, informality causes other adverse effects on industrial development in Sudan. First, companies without proper registration lack access to finance through the banking system. Second, informal companies may create plenty of job opportunities. However, they often lack the social and safety benefits formal employments can offer. Third, local processing units have difficulties regarding product quality compared to registered ones. Informality also prevents companies from modernizing due to the lack of access to finance or the exclusion from governmental support schemes. Fourth, the size of the informal sector negatively impacts the tax base and the Government's fiscal room for maneuver due to forgone taxes.

Consultations indicate that the Government had not made significant efforts to reduce informal activities and promote the formalization of companies in the past ten years. The General Framework of Programme of the Transitional Government mentions the necessity of "creating a suitable environment for medium, small and micro enterprises and securing technical and financial support for them, thereby moving towards regulating the informal sector" (Cabinet Affairs, 2019, p.17). However, no clear policies, instruments, and goals have been set yet. Moreover, Government representatives stated during the consultations they do not think the informal sector competes with the formal sector. In their view, Sudan has such an abundance of natural resources, that the informal sector creates jobs and income in the country in addition to the formal economy. The size of the informal sector and its relevance for a large part of the Sudanese population that depends on the informal economy for their livelihood makes it challenging for policymakers to implement effective policies. However, the awareness for the negative impact of high informality on the industrial and socio-economic development should be raised and the Government's capacity be strengthened to effectively reduce the size of the informal economy.

3.2.2 Access to finance

The development of the financial sector and, thus, the availability of finance is a prerequisite for facilitating sustainable economic growth. In general, investments play an essential role in enhancing the productive capability of an economy through innovation, increasing efficiency, and expanding production capacities. Not only for investments but also day-to-day liquidity management, lines of credit are an essential facilitator for all sorts of business activities.

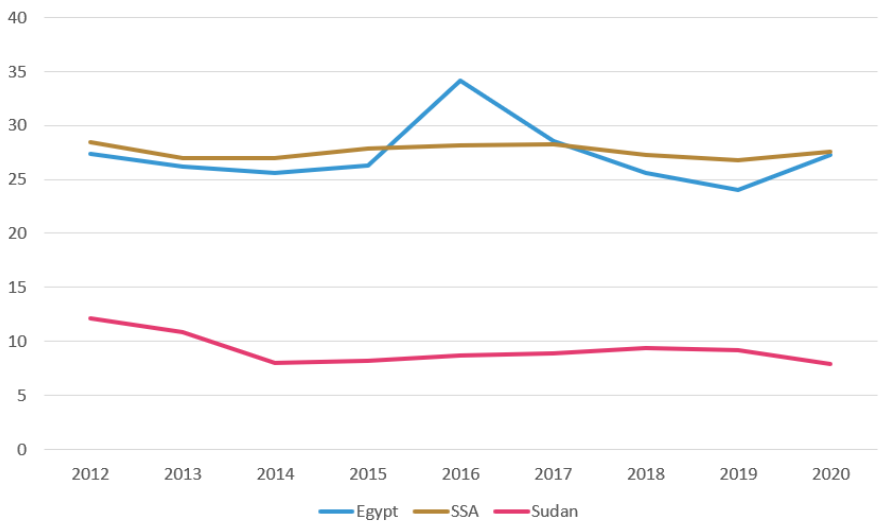
According to the consultations, the banking sector has been struggling for a long time in Sudan. Decades of international isolation and the sharp devaluation of the national currency in the past five years undercapitalized most of Sudan's 37 banks. Moreover, they lack proper accounting standards. All these factors combined result in a banking system incompatible with the country's development needs. Anecdotal evidence indicates that banking capital has shrunk by 99% in the past ten years, leading to loan shortages, liquidity crises, and public distrust in the banking system. The impact on the manufacturing sector is immense. There is virtually no long-term financing. The longest loans are up to 12 months, therefore incompatible with the capital expenditure's maturity term. In addition, due to the scarcity of resources, banks require highly valuable collateral, mainly land. Such practice imposes additional adversities on industrial companies, which are compelled to buy land to obtain loans. This practice does not increase the efficiency of manufacturing production, but has the opposite effect. Furthermore, the vast majority of companies in the country are micro and small-size firms and, therefore, are unable to make such acquisitions. Lastly, by raising loan interest rates to compensate for their losses commercial banks were adding another factor that hinders access to the financial system. As a result, in practice, access to credit is in particular limited for small manufacturing companies.

Besides the arguments mentioned above, banks created after 2000 also suffer from the Central Bank's requirement to have a capital equivalent of at least US$ 100 million, which has to be converted into Sudanese pounds. Due to series of devaluations of the national currency, it became extremely hard to meet this requirement. Furthermore, banks of which the State is a large stakeholder have been used by the Government to cover import payments, which led to a further reduction of their lending capacity to the public.

Unfortunately, there is only little data from international sources available on the financial system of Sudan. Regarding the Getting Credit indicator of the Doing Business 2020 publication, Sudan ranks 176 out of 190 economies, far below SSA (113) and Egypt (67). A study of the International Monetary Fund (IMF) shows that banks reduced the amount of credit to the private sector between 2012 and 2020 reaching just a share of 8% of GDP. Egypt and the average of Sub-Saharan Africa registered in the same year a share of

28% (Figure 77). Those numbers suggest that financial services in Sudan are underdeveloped compared with regional peers.

Figure 77: Domestic credit to private sector by banks (% of GDP)



Data source: International Monetary Fund

Additional IMF data on access to finance reveal interesting observations. The number of deposits relative to GDP increased in the period between 2015 and 2018 (last available data) (Table 7), which led to a slight recovery of domestic credits that were lost in the previous years (Figure 77). However, this was not enough to solidly strengthen the banking system. As the number of Automated Teller Machines (ATMs) per 100,000 adults and the number of commercial bank branches per 100,000 adults show, the banking system did not significantly change in the period. These last two indicators are particularly important to assess the capacity of domestic financial institutions to expand access to banking and financial services. Due to their relevance, these indicators were included in the monitoring of the Sustainable Development Goals (SDG). The numbers suggest that regaining people's trust in the banking system is not sufficient to create a large and sound pool of capital to back up private-sector lending needs. The government must also implement regulations and macroeconomic policies that support banks' capitalization. International cooperation, especially from International and Regional Development Banks, can also help to strengthen the country's financial capacity.

Table 7: Access to finance indicators

	2012	2013	1014	2015	2016	2017	2018
Number of ATMs per 100,000 adults	4.1	4.2	4.4	4.7	5.1	5.4	6.4
Number of commercial bank branches per 100,000 adults	3.1	3.2	3.2	3.3	3.3	3.3	3.4
Outstanding deposits with commercial banks (% of GDP)	.	.	.	5.9	24.3	34.4	67.0
Number of registered mobile money accounts per 1,000 adults	.	.	.	19.5	45.8	91.8	225
Value of mobile money transactions (during the reference year) (% of GDP)	.	.	.	0.0	0.0	0.1	0.2

Data source: IMF - Financial Access Survey.

Within the same period of observation, mobile banking has developed in the country. By 2018, almost 23% of all adults were registered as mobile money users. However, the value of mobile money transactions related to GDP was minimal. This means that despite people having opened digital accounts, mobile money has not been used as a financial transaction means yet. The transitional Government recognizes the potential these alternative financial structures may have to meet the investment and financial needs of

the manufacturing sector, in particular of SMEs, for which access to loans is more challenging. In 2020, the country joined the United Nations' "Better Than Cash Alliance" as part of its commitment to accelerate the transition from cash to digital payments. By joining the alliance, Sudan will be exposed to the knowledge and experience of other countries to support its pathway towards payment digitization. The Digital Transformation Agency was created to provide direct cash transfers via mobile phone to support vulnerable families in the same year. However, to be successful in this journey, the country must address its energy and telecommunication gaps.

Manufacturing stakeholders present in the consultation were moderately confident that the Sudanese financial sector would improve in the near future. Some recent Government initiatives have the potential to increase agents' confidence and boost bank capital. Among those achievements are the Investment Law and the Public-Private Partnership Law (PPPL), the current exchange rate stability and the commitment of the Central Bank to sell its stakes in 11 banks and to begin allowing them to practice non-Islamic banking for the first time in more than 30 years. Also the recent announcement by the IMF to cut the country's debt by half, and the Asset Quality Reviews of Sudanese banks with the support of Banque du France's have a positive impact. Nevertheless, stakeholders remain cautious as they are aware of Sudan's challenge to close its financial gap and the still high political instability that exists in the country.

3.3 Bottlenecks in infrastructure

Infrastructure is not seen as part of the immediate inputs required in the production process. However, infrastructure is not less critical, as it is the basic facilities that directly benefit production and product distribution in an economy. Roads, railways, telecommunication systems, waterways, airways, electricity, energy and water supply, waste management, and others are examples of economic infrastructure. Social infrastructure as the second type of infrastructure includes schools, housing, hospitals, and other facilities.

Infrastructure advancement is seen as a fundamental factor that fosters economic development as telecommunication, transportation, and energy are used in the operations of every household and enterprise. Better quality infrastructure contributes to raising productivity and lower costs in the productive activities of the economy. Therefore, infrastructure development is one of the most integral parts of public policies in developing countries.

The Government of Sudan has had limited capacities to implement effective public policies including the provision of infrastructure. According to the Ministry of Investments and International Cooperation of Sudan (2021), Sudan's infrastructure deficit widened significantly in the last decade due to the chronic under-investment. Consulted manufacturing stakeholders confirmed that infrastructure has not improved over the past years.

In the following section, the two identified bottlenecks, electricity and transportation, will be discussed in depth in the realm of infrastructure. The consultations pointed out both subjects as severely affecting business operations, production costs, efficiency and productivity, investment attraction, and manufacturing development in general.

3.3.1 Electricity

Without energy and reliable grids, capacity expansion (not only for the manufacturing sector) is hardly achievable. Electricity is a crucial input for almost all production processes. This is even more relevant for developing countries that aim to gain industrial competitiveness in a scenario where the widespread use of digital technologies, and therefore electricity, is increasingly common in manufacturing production chains. Hence, a reliable power supply and power grids are essential features for industrial upgrading, especially in African countries, where insufficient access to electricity is very much present (Andersen and Dalgaard, 2013).

Despite Sudan's great potential for domestic power production, both from thermal and renewable sources, the country lacks reliable power supply. In 2019, according to the Ministry of Investments and International Cooperation of Sudan (2021), the available electricity capacity was only 2,799MW, while the demand peaked at 3,800MW, leaving a shortfall of 1,000MW. The WBES of 2014 reported (Table 8) that striking 93% of the manufacturing sector was affected by power outages in the last fiscal year, significantly higher than COMESA average (57%). As a results, 69% of manufacturing companies in Sudan (vs. 34% in the COMESA average) buy or share generators for the purpose of power supply. Surprisingly, Sudan is performing significantly better compared to the region in the number and length of power outages. While on average, manufacturing firms in the COMESA region experienced nine power outages with a length of 5h per month, manufacturers in Sudan reported only four outages with a length of 3h on average.

Table 8: Bottleneck electricity

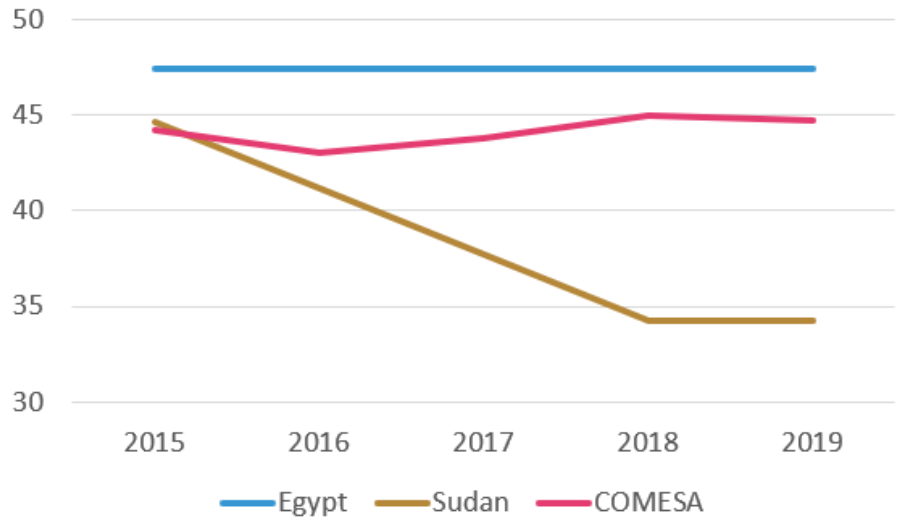
	Sudan		COMESA*	
	Manufacturing	Non-manufacturing	Manufacturing	Non-manufacturing
Experienced power outages (%)	93	94	57	66
Average number of power outages per month	4.0	3.8	9.2	9.5
Average duration of power outages (hours)	2.8	2.4	5.0	4.9
Own or shared generator (%)	69	51	34	41
Average share of electricity generated from generatiors (%)	8	8	25	25

Note: Share of (non-)/manufacturing firms in Sudan and COMESA* responding to bottleneck; columns (n) and (%) sum up to 100% with rounding errors. Number of responses = (n) number of observations - (n) number of non-responses. Firm classified as 'manufacturing' if main product/service according to ISIC (Rev. 3.1) is part of manufacturing; firms labelled 'non-manufacturing' otherwise. Only COMESA economies considered if WBES was conducted during or after 2013. 'COMESA*' aggregate excludes Sudan. See Appendix C.2.4 for a more detailed analysis.
Data source: WBES.

It is important to emphasize that the research portrays the situation in the country in 2014. The private sector representatives consulted highlighted that the power outages in the country are quite frequent, at different times during the day, and often lasting for long periods. Also, the Ministry of Investments and International Cooperation of Sudan (2021) affirms power rationing is severe during the summer months with customers receiving electricity for only 8 hours a day. Additionally, Figure 78 reports that satisfaction with electricity supply in Sudan has sharply decreased between 2015 and 2019 [13]. It is worth noting that the level of satisfaction is much lower than in COMESA. The gap is even more prominent when Sudan is compared to Egypt - as a role model country, and with whom Sudan has a forthcoming project to import electricity. Specifically, in relation to Egypt, it is important to highlight that the country has expanded its grid capacity very rapidly over the past few years, meaning that potentially the score gap between it and Sudan widened in 2020 and 2021. Data and information disclosed here indicate Sudan's electricity supply situation deteriorated between 2014 and 2021.

[13] The satisfaction score is a perception question. Therefore is does not necessarily reflect the factual supply.

Figure 78: Satisfaction with electricity supply, score (100= Best performance)



Note: The index is normalized, which means the score 100 is given to the highest percentage of satisfaction observed among all countries analyzed by the WGI.
Data source: Ibrahim Index of African Governance (IIAG) (2021)

Industrial policy stakeholders present in the consultations emphatically stated widespread access to reliable electricity is the leading hindrance to industrial progress in Sudan. As mentioned, the country suffers from frequent blackouts. As a result, industrial businesses find themselves in an inefficient production system and rely increasingly on diesel generation to overcome the lack of energy. However, diesel is a more costly energy carrier - especially after the Government has withdrawn diesel subsidy in June 2021 - which will lead to a further increase of production costs.

For opening and starting a business, it can be of equal importance to get electricity in an easy and timely manner. The World Bank Doing Business 2020 (World Bank, 2020a) reveals getting electricity is a severe obstacle in Sudan by ranking the country in the 167th position among all 190 economies, behind Sub-Saharan Africa and all benchmark countries except Nigeria (Table 9). The number of procedures required for businesses to obtain a new electrical connection, and the average duration to complete all procedures required to obtain a new electricity connection, are lower or in line with the averages observed for Sub-Saharan Africa (SSA) and the benchmark countries. However, Sudan exhibits the lowest reliability of supply possible, being lower than the average of SSA, and at strikingly higher costs associated with completing the procedures to connect a warehouse to electricity than the benchmark countries.

Table 9: Doing Business 2020 - Getting electricity sub-components

	Sudan	SSA	Ethiopia	Egypt	Zambia	Nigeria	Vietnam
Getting Electricity rank (out of 190)	162	146	137	77	129	169	27
Procedures (number)	5	5.2	4	5	5	7	4
Time (days)	70	109.6	95	53	117	110	31
Cost (% of income per capita)	3154.2	3187.5	768.5	180.2	2035.6	206.4	994.2
Reliability of supply and transparency of tariff index (0-8)	0	1.6	0	5	4	0	7

Data source: Doing Business 2020.

The consultations confirmed that the transitional Government has made improving the access to reliable energy a priority. The General Framework for the Programme of the Transitional Government clearly states the necessity of the maintenance and rehabilitation of the electricity sector and of investments in alternative and renewable energy. However, the document does not outline how this will be executed, what instruments will be used, and what are the concrete goals to be pursued (Cabinet Affairs, 2019).

One of the main factors preventing Sudan from closing the gap in infrastructure, in general, and in electricity supply, in particular, was the position of Sudan in international affairs. The sanctions made political, commercial and financial relations with international partners almost impossible. The situation dramatically changed after the transitional Government came into power, the trade embargo was lifted, the Sudanese assets were unfrozen, and the financial restrictions were abolished. This allowed the Sudanese Government to effectively source investors in infrastructure projects and to make needed public investments. Moreover, the Government has been trying to change regulations in order to allow for more participation of the private sector and also increase legal certainty related to their investments. The PPPL and Investment Law recently passed are important measures in that regard.

Sudan is actively looking for private partners to conduct its infrastructure projects. At the Heads of State and Government Conference held in Paris in May 2021, Sudan presented a set of energy projects to the international community, in which foreign investors are welcome to step in through public-private partnerships. Some of the opportunities are solar parks in different regions of Sudan, wind farms, hydropower plants, and the construction of transmission lines. The total costs of these projects are estimated at US$ 1.1 billion and aim at generating 1,000 MW.

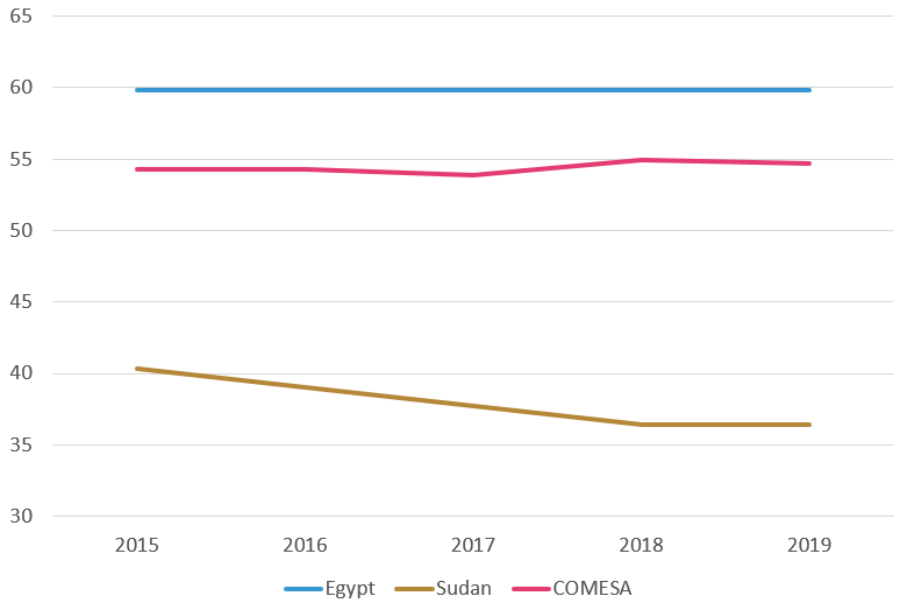
In March 2021, in partnership with Egypt, Sudan awarded Siemens Energy with a cross-border interconnection project contract that aims to build grid stabilization stations in Sudan and ensure a reliable flow of power from Egypt to Sudan. It will be the first grid stabilization of scale to be carried out in Sudan (Siemens Energy, 2021).

3.3.2 Transportation

Transportation is required to connect markets and boost factor mobility to increase the economic performance of a country. Sound transportation investments lower the costs of moving people and goods and, in doing so, increase economic productivity. Weakness in the transport network in Sudan is a critical bottleneck and, along with electricity, was pointed out by manufacturing stakeholders as the main reason for high production costs in the country. Hence, transportation as factor is negatively affecting productivity and the competitiveness of Sudanese products in domestic and international markets.

Sudan's transportation matrix is mainly based on roads. They are responsible for over 90% of in-land traffic (Ministry of Investments and International Cooperation of Sudan, 2021). Yet, Sudan's road network is underdeveloped and in bad condition due to decades of insufficient investment in expansion and maintenance. According to the Ministry of Investments and International Cooperation of Sudan (2021), 50% of the highways require rehabilitation. Moreover, the country lacks widespread well-developed internal corridors, and rural connectivity is still very poor. With 1.6 km per 100 km2, Sudan's national road density is very low compared with its regional peers (6.4 in Egypt and 21.1 in Nigeria 5.1 km), and even more compared to Vietnam (58.9) (CIA, 2021). Only about one-quarter of national roads are paved, in contrast to 31%, 74% and 76% in Nigeria, Egypt, and Vietnam, respectively. Also, the Ibrahim Index of African Governance (IIAG) (2021) reveals that the satisfaction of the public with road and bridge maintenance in Sudan has eroded over time. Moreover, the level of satisfaction is significantly lower than the average of COMESA and Egypt (Figure 79).

Figure 79: Satisfaction with road and bridge maintenance, score (100= Best performance)

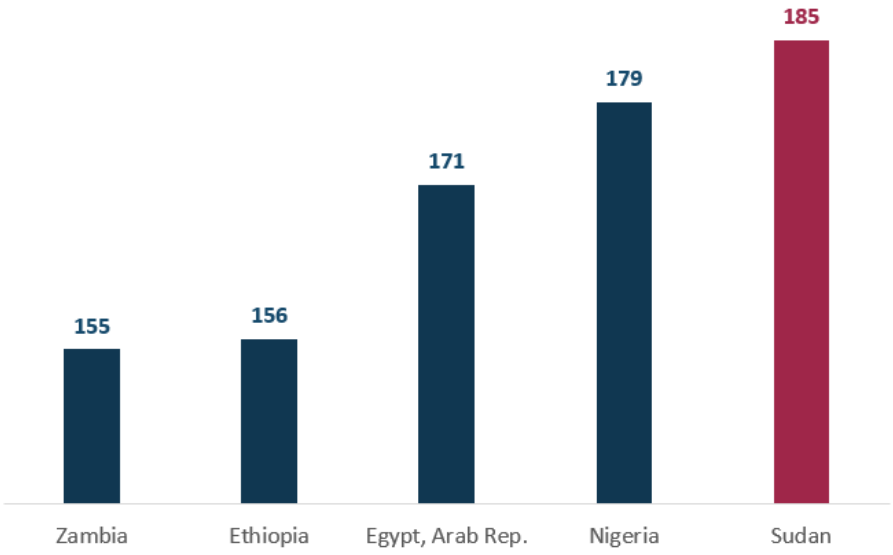


Data source: Ibrahim Index of African Governance (IIAG) (2021)

Relying on low-quality road matrix makes the cost of transport, and therefore production in Sudan, even higher. Railways usually offer cheap ground transportation for raw material as well as consumer and capital goods over long distances. The cost advantage of Sudan's railways has also been confirmed in the consultations. However, 80% of the rail network need to be restored and transitioned from narrow gauge track to wide gauge, allowing the system to be faster and safer. Moreover, the network needs to be expanded in order to connect more regions. Sudan's railway density registers 2.9 km per 1,000 km2, considerably lower than the benchmark countries Nigeria (4.1), Egypt (5.0), and Vietnam (7.8) (CIA, 2021). The former Government proposed infrastructure feasibility studies with its Railway Strategy (2013-2017) to rehabilitate the railways. However, no significant investment has been accomplished.

With 750 km of coastline, Sudan possesses two deep-sea ports. Port Sudan is the cornerstone of Sudan's maritime infrastructure, handling over 90% of the country's international trade. The port faces serious congestion problems, which leads to inefficiency and high costs to manufacturing firms to import and export. The urgency of improving Port Sudan, including dredging, surfacing of berths, rehabilitation of storage, and new cranes was also mentioned in the consultations. The insufficient maritime infrastructure is reflected in Figure 80, where Sudan ranks 185th among the 190 economies regarding "trading across border", below the benchmark countries Zambia (155), Ethiopia (156), Egypt (171), and Nigeria (179).

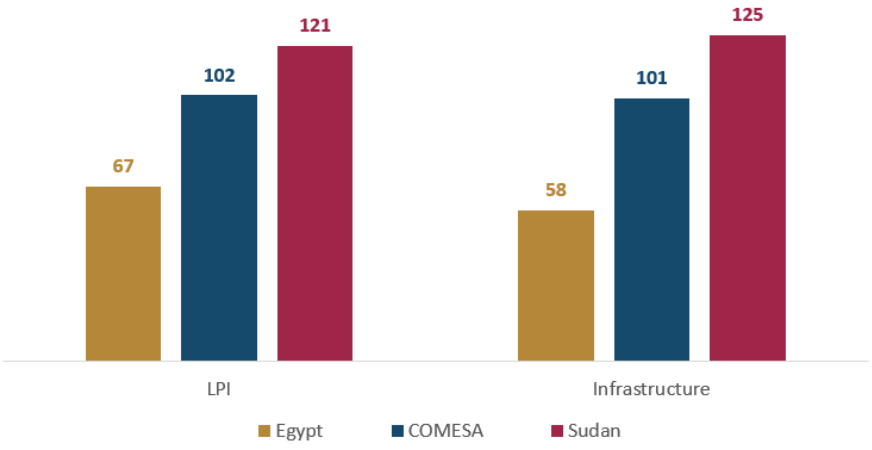
Figure 80: Trading across borders ranking (out of 190 economies)



Data source: World Bank (2020a).

The low level of overall infrastructure investment leads to significantly higher costs of transportation and is also reflected in the Logistics Performance Index (LPI) issued by the World Bank. The LPI measures the effectiveness of logistics across ports, railroads, and roads, taking into consideration: infrastructure, logistics quality, international shipments, tracing, and tracking. The higher the ranking of a country, the weaker the logistics performance. Figure 81 shows that, in 2018, overall logistics performance of Sudan is lower than of Egypt and the COMESA average. The same result can observed when only the infrastructure indicator is considered.

Figure 81: Sudan´s Logistics Performance Indicator (LPI) and infrastructure ranks, 2018



Data source: World Bank (2021a).

The poor infrastructure development, in particular, in rural areas leads to a concentration of economic activities in the capital region. The majority of large companies, ministries, and state agencies as well as International Organizations are located in and around Khartoum. The country aims at developing manufacturing and, in particular, agro-industries due to their potential to create positive linkages to local communities. The lack of sufficient logistics and infrastructure heavily affects the sector and regional industrial

development due to the need to connect the material inputs from rural areas to urban areas, where most of the manufacturing sector is located. This will be even more challenging if the country aims at developing the untouched arable lands of the Darfur region.

The transitional Government recognizes the central role infrastructure, especially the transport system plays in the industrial and economic development of the country. Cabinet Affairs (2019) highlights the need to revitalize and restructure the transport system. The Investment Law and the Public-Private Partnership Law focus especially on infrastructure projects by allowing a 30-year contracting period and explicitly protecting repatriation of profits and capital (Ministry of Investments and International Cooperation of Sudan, 2021). A few transport projects were already mapped and presented at the Heads of State and Government Conference in Paris in May 2021. Among them are: i) the construction of a new port as a continental new hub for trade in the country (Port Suakin), and ii) rehabilitation, construction, and modernization of railways and their equipment. Both of them rely on public-private partnerships for funding.

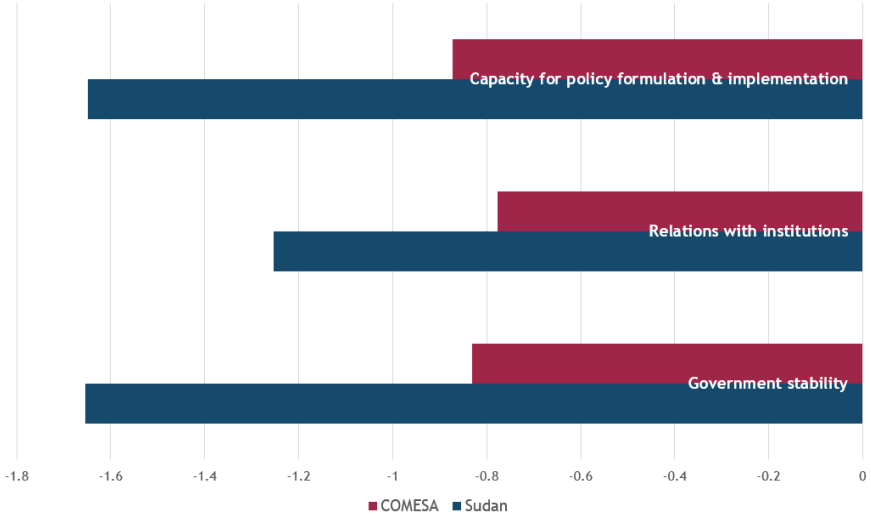
3.4 Bottlenecks in governance

The OECD (2011) defines public governance as "the formal and informal arrangements that determine how public decisions are made and how public actions are carried out". Good governance builds upon the principles of accountability, transparency, efficiency, effectiveness, responsiveness, and rule of law. Effective governance builds at the same time upon the capacity to conduct analyses, take strategic decisions and design interventions based on evidence, and efficiently implement those public policies. By providing the regulatory framework, stability, and conducive incentives for medium- and long-term manufacturing investments, good governance can support industrial development. Poor governance, instead, leads to corruption, political instability, inefficient systems, and the incapacity of designing and implementing effective policies to overcome socio-economic underdevelopment.

Six out of the ten topics that were identified as major bottlenecks to the manufacturing development in Sudan are related to governance. To provide an overall picture of the governance performance of Sudan, the World Bank Worldwide Governance Index (WGI) of 2019 is analyzed. This index uses a range of national and international sources of information such as multilateral organizations, think tanks, business, and firm surveys as well as non-governmental organizations. It is important to understand that these indicators are perception-based and therefore need to be interpreted cautiously. Allowing for a score between -2.5 (weak) to 2.5 (strong), the analysis is divided into three topics, each consisting of two indicators. To obtain a score for each topic, an average of the two indicators' scores was taken. Capacity for policy formulation and implementation corresponds to government effectiveness and regulatory quality indicators. Relations with institutions encompass rule of law and control of corruption. Government stability clusters political stability and absence of violence/terrorism, and voice and accountability indicators.

Figure 82 reveals that both COMESA and Sudan reported subzero scores in all indicators. However, Sudan's performance is by far below the average of COMESA in three indicators. The largest gaps is seen with respect to "Capacity for policy formulation and implementation", and "relations with institutions". Those are also the weakest indicators for Sudan with scores of -1.8.

Figure 82: Governance indicators Sudan vs. COMESA 2019



Data source: Worldwide Governance Index (World Bank, 2021b)

These three groups of indicators were pointed out as severe weaknesses of the country by the consultations.

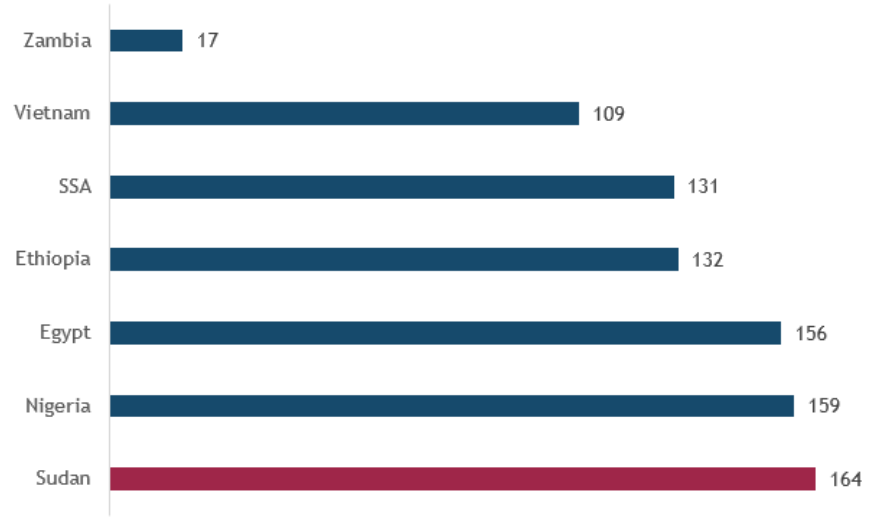
In the realm of governance, the following bottlenecks will be further discussed: Tax rates and tax administration, corruption, political instability, the strategic orientation of industrial policy, and capacities for effective industrial policy (policymaking and statistical capacities).

3.4.1 Tax rates and tax administration

The primary purpose of taxation is to generate revenues for the state. However, any taxation system affects at the same time business decisions in a fundamental manner and, thus, may shape the economic development of a country. By imposing and levying taxes, the government has been given an instrument to promote or impede certain economic activities and pursue desired development goals. Apart from the positive externalities taxation may exert, it can also present a major obstacle for a successful economic development for two reasons: First, as taxes are market interventions, taxation potentially leads to market distortions and a loss in competitiveness for firms affected by that tax (i.e., other firms not affected by that specific tax could produce cheaper). Second, if the taxation system is inefficient and its administration overly bureaucratic, firms need to allocate many resources (human capital) to settle their taxes, again with an efficiency-reducing effect.

Both tax rates (60%) and tax administration (68%) were mentioned as severe or major bottlenecks to manufacturing firms in the WBES 2014 (Table 5). The consultations confirmed this finding. Doing Business 2020 corroborates taxation being an obstacle to business by ranking Sudan 164 out of 190 economies with respect to Paying Taxes (Figure 83).

Figure 83: Doing Businesss 2020 - Paying taxes, rank (out of 190 economies)



Data source: World Bank (2020a)

Table 10 shows that, in 2019, the number of tax payments in Sudan surpasses all benchmark countries and the SSA average, except for Nigeria. Consultations report that, in 2021, manufacturing firms had to pay 47 types of taxes and contributions, which can explain the high number of payments. Interestingly, issuing these tax payments in Sudan requires only about half of the time (180 hours) than what it takes in Vietnam (384), which has only 6 payments per year. In Sudan, paying taxes requires also less time than the SSA average (280.6). This may be the consequence of measures taken by the Government to digitize the tax collection system, for example, through the adoption of the Electronic Receipt Voucher (E15). Last, and significantly important for business is the tax rate as a share of profit. In Sudan, an average business pays 45.4% of profits on taxes which is only slightly lower than the SSA average of 47.3%. However, compared to the direct benchmark countries, Sudan exhibits the highest tax burden for companies. Against this background and for the sake of a better understanding, it might be relevant to disaggregate tax payments in Sudan.

Table 10: Doing Business 2020 - Paying taxes indicators

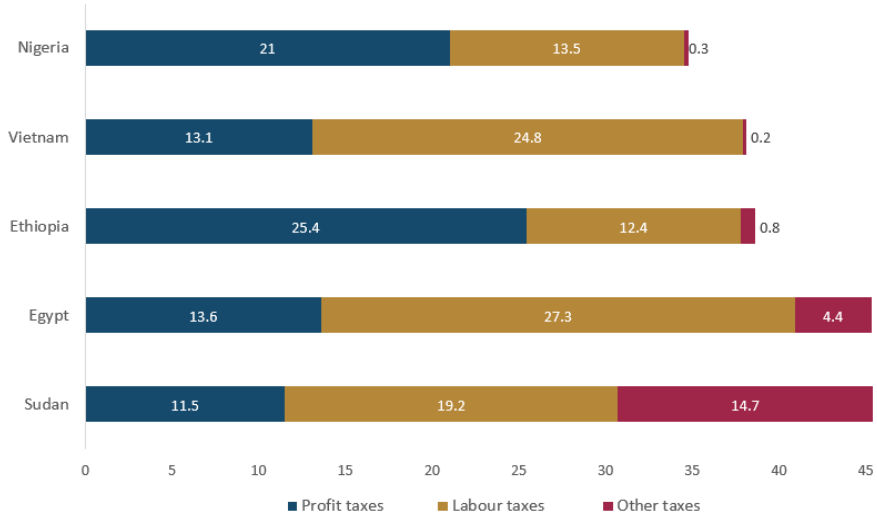
	Zambia	Vietnam	SSA	Ethiopia	Egypt	Nigeria	Sudan
Payments (number per year)	11	6	36.6	29	27	48	42
Time (hours per year)	158	384	280.6	300	370	343	180
Total tax and contribution rate (% of profit)	15.6	37.6	47.3	37.7	44.4	34.8	45.4

Data source: Doing Business 2020.

Over the years, the Government partially compensated for the loss of oil revenues after South Sudan's secession in 2011 by increasing taxes. The VAT rate increased from 15% to 17%, the development tax rate increased from 10% to 13%, and import tariffs were imposed on several products. Since 2018, the Government decreased the exchange rate used to calculate customs duties, and in 2021 it eliminated the customs exchange rate as the final step in a devaluation of its local currency (IPoA of the Republic of Sudan, 2019). According to the consultations, various Sudan's Government branches and departments are entitled to impose taxes, contributions, or fees to boost their revenues. As a result, firms have a myriad of different taxes that burden production cost. Manufactures mentioned in the consultations that, for instance, in the exporting sector taxes account for approximately 20% of the production cost on average. The multiplicity of taxes can be seen in Figure 84. Profit taxes (profit or corporate income taxes) and labor taxes (social

contributions, and labor taxes) as a share of profit are in line with or lower than benchmark countries. However, the share of the other taxes (property, dividend, capital gains, financial transactions, waste collection, vehicle, road, and others) are overwhelmingly higher than in the comparison economies.

Figure 84: Composition of total tax & contribution rate, 2018 (% of profit)



Data source: World Bank and PWC (2018).

Despite being significantly affected by informality, as seen in Section 3.2.1, the consultations suggest that the industrial sector is the most affected by taxes since it is still less informal than other sectors. Subsequently, manufacturing enterprises constitute the primary tax base in the country. However, high taxation can be counterproductive as it reduces the competitive capacity of manufactured products, leading long-term to an atrophy the industrial sector. This, in turn, may result in lower tax revenues generation for the state. Moreover, high taxes are a severe obstacle to business formalization. Despite the increasing number of taxes, state revenue collection increased only by 0.6 p.p. from 2015 to 2018, when it reached 9.7% of GDP (Ministry of Finance, 2019). This suggests that, due to the high informality in the country, strategies towards enlarging the tax base, such as business formalization, support to infant industries, and infrastructure improvements would be more efficient strategies to raise state revenues than heavily relying on taxing the industrial sector .

Besides the large number of taxes, manufacturing companies reported that the absence of a clear tax policy, proper transparency, and accountability is the most critical issue in tax administration. It results in an opaque tax system, which creates uncertainty and corruption. In addition, taxes are usually imposed without prior consultation with the private sector. According to the consultations, in the past, firms were not enjoying easy access to the Ministry of Finance to discuss issues such as taxation. Although this situation is improving, more efforts are needed to build up a trustworthy relationship.

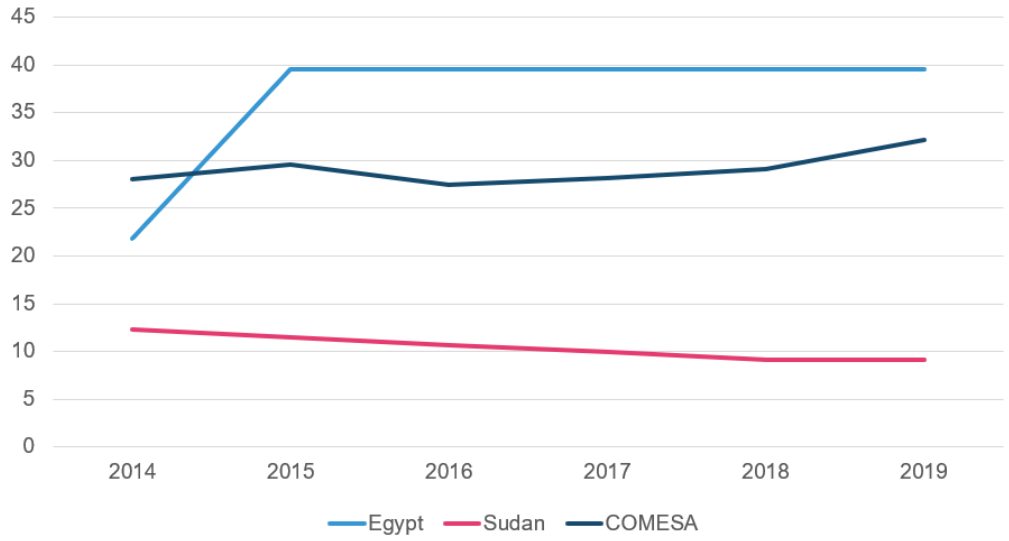
3.4.2 Corruption

From a macro-economic perspective, high levels of corruption are harmful for growth and development. Corruption leads to allocative inefficiency, diverting public resources for private gain, and inhibits direct foreign investment into the economy. From a micro-economic perspective, corruption acts as an inefficient tax on business, ultimately raising production costs and reducing profitability. The consultations confirmed that corruption hampers Sudan's industrial sector development and affects firms irrespective of their size.

According to the WBES, 50% of manufacturing firms named Corruption as a major bottleneck to business in Sudan, which is far above the average of 31% of the overall COMESA region. Figure 85 reveals that

the satisfaction level of the Sudanese people with the Government's efforts to combat corruption is much lower than the average score of COMESA. The difference to Egypt is even more striking. Moreover, the score decreased between 2014 and 2018, remaining stable in 2019, while COMESA's score increased in the same period. Round 7 (2016/2018) of the Afrobarometer perception survey corroborates the findings: 67% of respondents said that the level of corruption has increased a lot in the last year.

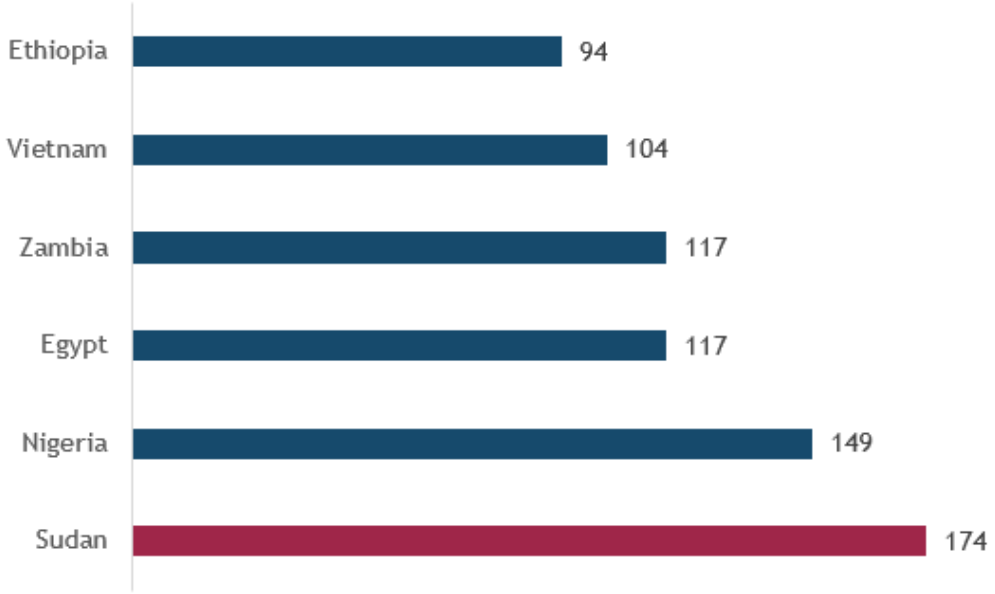
Figure 85: Satisfaction with fighting corruption, score (100= Best performance)



Data source: Ibrahim et al. (2014)

Sudan is located at the bottom of the Transparency International Corruption Perception Index 2020, raking 174th out of 180 countries (Figure 86) and is considered one of the 10 most corrupt countries in the world. With respect to "control of corruption" in the Worldwide Governance Indicators (WGI – World Bank), Sudan performed worse than 196 and better than 12 countries in 2018. Average COMESA performed worse than 144 countries and better than 64. In 2019, Sudan performed slightly better and ranks above 16 countries, but is still in a very low position.

Figure 86: Corruption perception Index 2020 - rank (out of 180 countries)



Data source: Transparance Internacional (2021)

Detailed data that could shed light on how different branches of Government and state agencies cope with corruption and which types of companies are more affected by corruption are unfortunately missing. There is only anecdotal evidence that the public procurement system has been very inefficient and endemically corrupt. According to the World Bank, the costly and inefficient single sourcing of the procurement system was vulnerable to corruption and frequently bypassed existing rules.

Narratives also indicate that corruption within public administration requiring firms to systematically pay bribes in order to receive public services is very present throughout the country. According to manufacturing stakeholders, there is no culture among Government institutions of combating corruption, and only superficial initiatives were taken. In 2016, a formal anti-corruption law was approved and an anti-corruption commission was established. However, no significant effort to fight corruption has been made.

There is some optimism that the transitional Government will do better since it made combating corruption and committing to transparency and accountability one of its top three priorities. Sudan's Draft Constitutional Declaration established an Anti-Corruption and Public Funds Recovery Commission which was formed in November 2019 (The Empowerment Elimination, Anti-Corruption, and Funds Recovery Committee), and is controlled by the Transitional Government. According to the Anti-Corruption and Governance Center, the Committee was able to already recover large amounts of money back into the State Treasury (CIPE, 2021) .

3.4.3 Political instability

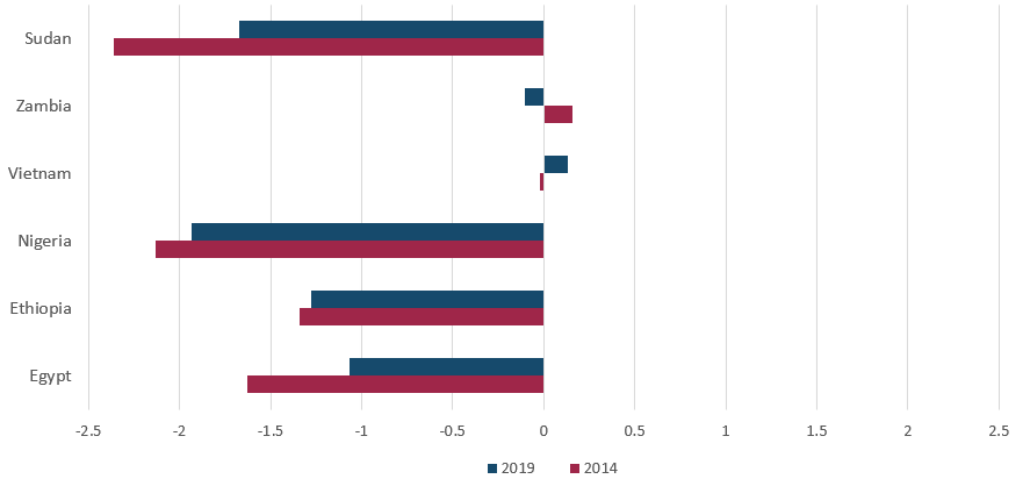
A stable political environment and predictability are prerequisites for a steady economic growth path. In general, uncertainty from political power changes, from altering policy directions, or from a weak institutional framework is a major obstacle for growth, business development, and investments. Political instability means that policy decisions are made on a short-term basis and do not provide the long-term legal certainty that industrial investments require. As a result, decisions may be postponed, reconsidered, or simply not taken. In the best case, this will result in an economic stagnation but most often into a decline of the economic activity. This, in turn, can potentially reinforce political instability. Domestic investors might

search for stable investment options in other countries and foreign investors will not enter the domestic market due to high potential business risks.

Sudan's recent history is marked by political and violent conflicts, and a civil war, which had significant impacts on manufacturing businesses. According to the WBES, 58% of manufacturing firms reported Political instability as a severe or major obstacle compared to only 32% in the COMESA region. The survey was conducted in 2014 and gives, hence, a snapshot of a moment when tensions between the government and opposition were high due to the protests in late 2013 against austerity measures and their violent repression.

The perception-based World Bank Worldwide Governance Index (WGI) shows that political instability in Sudan remains at high levels, despite being slightly reduced between 2014 and 2019. Compared to benchmark countries, Sudan received the lowest score among all except Nigeria (Figure 87). When compared to all 194 economies analyzed by the WGI, Sudan ranks 181st.

Figure 87: Political stability and absence of violence/conflicts Index



Note: Sore range: -2.5 weak; 2.5 strong.
Data source: Worldwide Governance Index (World Bank, 2021b)

The consultations confirmed that political instability is a severe obstacle to manufacturing businesses and Sudan still has a long path to create a solid democratic political system. Yet, some achievements have already been made since 2019. The transitional Government formed by military and civil-society representatives formally signed a Draft Constitution defending the rule of law and a pluralist democratic society where all people, bodies, and associations are subject to the rule of law (The Republic of Sudan, 2019). It also provides for multiparty elections in 2022. Moreover, Sudan passed the Investment Law (The Republic of Sudan: Investment Encouragement Act, 2021) and the Public-Private Partnership Act, which provide long-term legal guarantees for investment in the country. These new regulations, along with the suspension of the United States' sanctions, may open a new investment front in the country, not only in industrial sectors but also in infrastructure projects critical to the enhancement of the nation's competitiveness.

3.4.4 Strategic orientation of Industrial Policy

Sudan lacks strategic orientation in its efforts to develop the industrial sector. At the time of drafting this report, the authors did not have access to official documents that determine Sudan's industrial development strategy. In September 2020, the Transitional Government issued a general Vision entitled "Vision, challenges & development priorities of the governance of the transitional period" that included a "Five Development Belts" proposal. G. SHEIKHELDIN; M. ALNEEL (2021) claim "the belts reflect a logic of focusing

on existing competitive advantages of different geographical areas.[...] However, the proposed industrial activities within the same document in many cases do not clearly fit the belts' definition and no follow-up guidelines or details have been issued for implementation to date. Even talk from government figures about that proposal faded away, altogether confirming that serious strategic planning is yet to materialize." A proper vision that encompass the industrial development in a coherent manner is yet to be designed. Moreover, there is now a regular exchange between the government and private businesses; however, the process is not institutionalized and can be further improved. This is a bottleneck because industrial development needs (i) strategic focus, (ii) strong long-term commitment, and (iii) a productive collaboration and connection between the State and the private sector. Consultations not only reported that the Government lacks direction and a proper industrial policy process, but also that it does not fully recognize the role of the manufacturing sector in the country's socio-economic development.

Evidence shows that industrialization has been the engine of economic growth and development. Manufacturing activities have special characteristics that enhance productivity and, therefore, income generation, such as:

- Often higher productivity than in the agricultural and traditional service sectors.
- Larger opportunities for capital accumulation since it is capital intensive.
- Economies of scale that can either be linear (decreasing costs as production increases) or over-proportional (increasing productivity as production increases due to a cumulative process of learning-by-doing, learning-by-using, learning-by-interacting, and technological progress).
- Greater opportunities for embodied (in capital goods) and disembodied (knowledge transfer and diffusion) technological progress. The manufacturing sector often constitutes the locus of innovation generation and diffusion, with higher intensity of research, development, and innovation.
- More backward and forward linkages within the sector and between manufacturing and other sectors and spillover effects than in agriculture, mining, and traditional services. Thus, manufacturing has stronger pull and push forces upon the other sectors of the economy.
- Higher income-elasticity of demand, providing stronger opportunities for developing countries to capture the benefits from its growing domestic markets, since as the income grows, the share of agricultural expenditures in total expenditures declines, and the share of expenditures on manufactured goods increases. This also minimizes the usual balance-of-payment constraints imposed on developing countries as they advance in the development path.

Empirical evidence shows a strong correlation between manufacturing value added (MVA) growth and GDP growth among countries worldwide; and also between MVA share in GDP and income per capita in developing countries. Likewise, empirical data also shows that the more the manufacturing sector diversifies, the more production processes become technologically sophisticated and boost growth. History also confirms the importance of manufacturing to economic development as the current high-income countries built their development and sustainable growth on an industrial base. All these concepts demonstrate that economic development may be triggered by a sectoral-specific process in which manufacturing plays the main role.

Although the literature on the importance of manufacturing to economic development is consolidated, the consultations reported a lack of deep understanding among Sudanese officials of the mechanisms of interaction between the industrial sector and the other economic sectors and its implications for the country's socio-economic development process. Moreover, stakeholders affirmed that the Government almost exclusively focuses on exporting manufactured goods to obtain foreign currency, while other potential benefits remain largely unconsidered. The consultations also suggested an insufficient understanding on

part of the Government of the potential effects and interrelations of different policy instruments. This is also reflected in the mentioned absence of comprehensive and clear industrial policy documents.

Although in the recent past, the country had a few programs such as "The Five-Year Program for Economic Reform 2015-2019", which established several objectives for the industrial sector. However, there was no strategic plan outlining how to achieve them, which instruments would be used and which institutions would implement them. The transitional Government intends to overcome this gap. Although its General Framework Document (Ministry of Investments and International Cooperation of Sudan, 2021) sets manufacturing development as a priority to establish the foundations for sustainable development, no concrete action plan has been elaborated, so far.

Industrial development does not occur by free-market forces alone. It is the result of deliberate, appropriate and coordinated public policies, constituting an industrial policy package. An effective industrial policy package requires a long-term perspective (e.g., 5, 10, or 20 years), and a systematic implementation where experimentation, monitoring, evaluation, learning, and adaptation are essential steps of the process. Sudan now has the opportunity to craft a new industrial policy suited to the country's needs and objectives. For that, a set of policy documents are needed.

Global experience indicates that a successful industrial policy process starts with comprehensive and in-depth **industrial diagnoses** to map the country's current state of the manufacturing structure and its integration into global trade dynamics, the weaknesses and bottlenecks the country faces to develop its industrial base, and the opportunities it has considered existing conditions and global trends. In sum, the diagnosis sets the baseline for formulating the new industrial policy, and for future monitoring and evaluations. This report is a starting point in this regard. For the diagnosis to be as realistic and robust as possible, the country must conduct a series of surveys related to its manufacturing production and existing industrial capacities (e.g., energy supply, transport, and telecommunications infrastructure, etc) in order to produce a wide range of statistics to feed the studies. It is also necessary to conduct **assessments on the industrial policy instruments and institutions** in order to map the existing policies and institutions in the country related to manufacturing development, assess its effectiveness, and identify gaps.

In parallel, it is important to develop the overall **Development Vision of Sudan**, which sets the main long-term national development goals as a society, reflecting its needs and desires. In order to reflect the aspirations of society, it is crucial to have an inclusive and participatory process, with the active participation of all groups of civil society, political parties, and different economic sectors in the country.

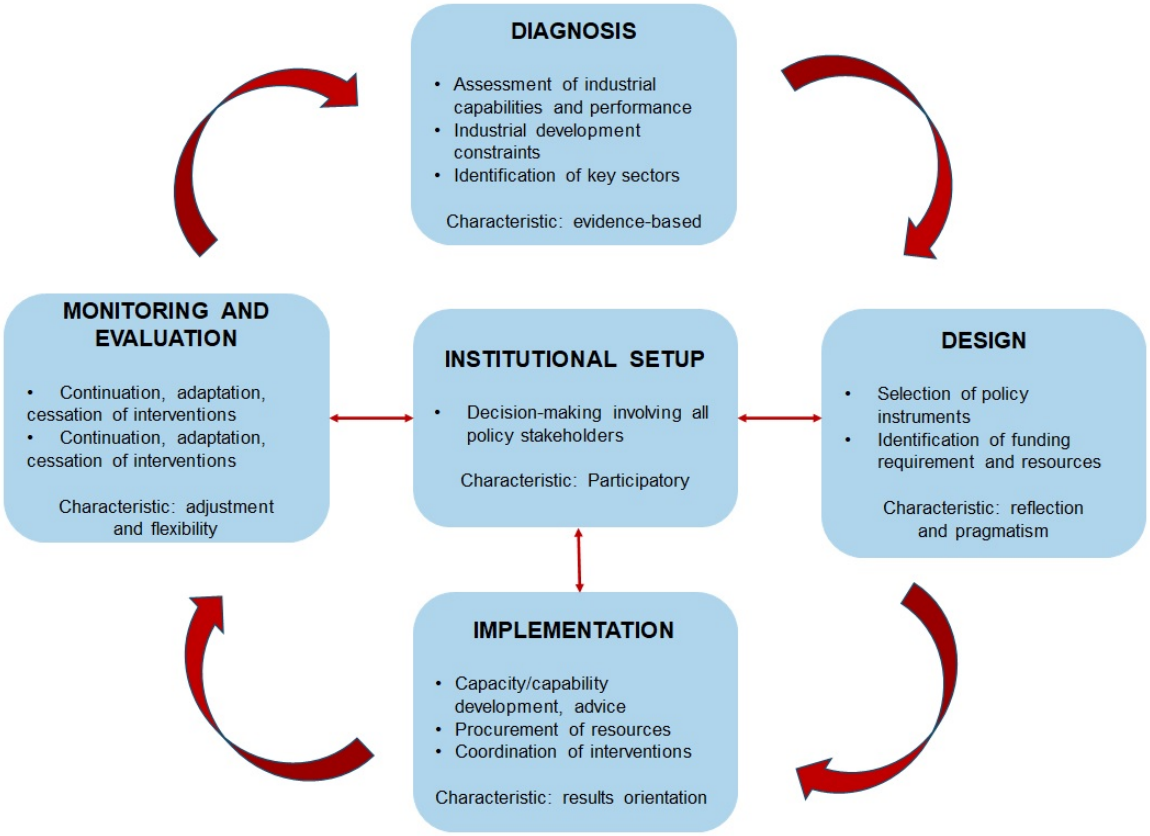
Taking into consideration the country's vision and the evidence created by the diagnoses, an **Industrial Strategy** can be developed. In this document, Sudan will set concrete short-, medium, and long-term goals related to its manufacturing structure, and the rationale and strategies to achieve them. At this moment, not only the targets are clarified, but also prioritized and quantified. It also defines the key sectors to be pursued and timelines.

The next step in the policy process is crafting the **Industrial Policy**, which is a package of selected and coordinated policy instruments to be implemented by the Government to foster certain economic activities in order to achieve the industrial policy specific objectives. The overall result of the industrial policy is to contribute to the country's structural change. An effective industrial policy requires a solid intervention logic that defines the specific policy objectives (which connect to the national development goals), the intervention areas, and the policy instruments, and describes how these dimensions interact with each other. Moreover, the specific objectives and the intervention areas need to be determined in a way that they can be measured, monitored, and evaluated over time. An **Implementation Plan** can be developed within the industrial policy or as an associated document. It defines how the policy will be implemented, which institutions will be responsible for it, the estimated budget, the communication tools, among other aspects of the project administration.

Finally, an effective industrial policy must be subject to adjustments as objectives are not achieved or its underlying framework changes. To this end, it is vital to develop an industrial policy **Monitoring and Evaluation System** (M&E), in which key performance indicators related to the objectives, areas of intervention, and policy instruments are defined, monitored, and assessed over time. The M&E system allows one to understand, if the industrial policy is going in the right direction and to make timely corrections. Moreover, it enhances government transparency and accountability. The M&E should be carried out as an indispensable part of the industrial policy, involving intense reflection, learning, and adaptation.

It is worth highlighting that the entire industrial policy process should follow a multi-stakeholder participatory approach, to ensure policy legitimation. To that end, setting up working groups, consultations, and exercises with stakeholders is paramount. The groups should bring together representatives from different spectra of the manufacturing sector, including SMEs, labor unions, think tanks, academia, independent media, among others. Moreover, the industrial policy package must be designed and executed in close cooperation with other government ministries, as it is impacted by several other public policies.

Figure 88: The strategic Industrial Policy process



Data source: Adapted from UNIDO (2011)

According to the consultations, Sudan is not yet in the position to independently manage an effective industrial policy process. Hence, international organizations and experts could support the country to enhances its capacity to conduct industrial analysis and policy formulation and implementation. The following activities could be supported by international parties:

- Mapping existing policy instruments and their effectiveness.
- Conducting or supporting regional analyses
- Support for setting up a local team to develop the new industrial policy.

- Providing capacity building activities (see Section 3.4.5).
- Support for setting up working groups with policy stakeholders.
- Support the writing of the new industrial policy.
- Support to developing the industrial policy monitoring and evaluation system.

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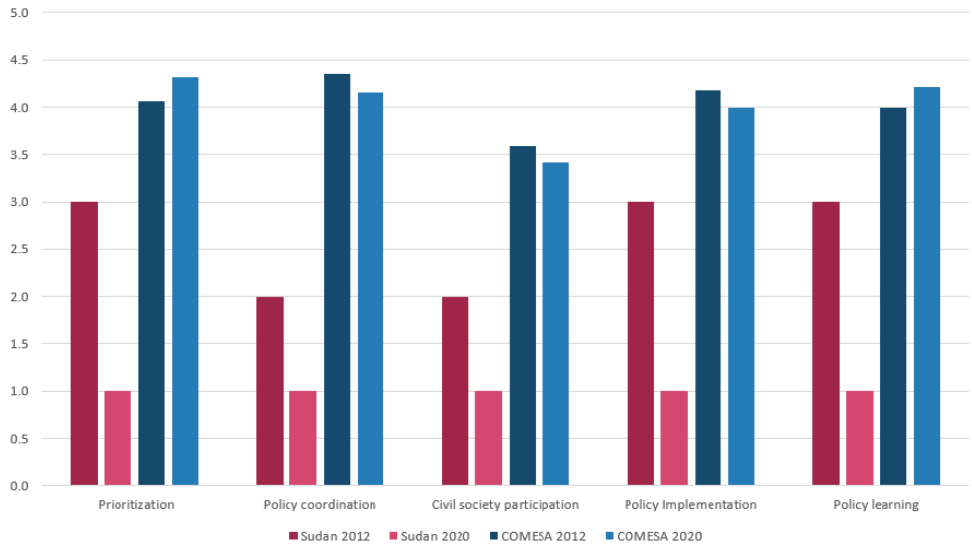
3.4.5 Capacities for effective Industrial Policy

Policymaking capacities

Policymakers are able to craft and implement strategic industrial policies that successfully address industrial development problems if they have solid policymaking capacities, which encompass analytical, operational, and political-level capacities. According to the consultations, the Sudanese public sector lacks policymaking capacities in multiple dimensions. However, the analytical and implementation dimensions were particularly highlighted, including by government representatives. Stakeholders reported that the public sector lacks the understanding of policy processes, economic development and industrial policy fundamentals. In addition, there is the need to significantly improve skills in qualitative and quantitative analysis, policy analysis and evaluation, policy planning and management, and communications within the government and with the private sector (especially with SMEs).

To assess the policy capacities of Sudan, the results from the Bertelsmann Transformation Index (BTI) are analyzed. BTI is developed based on the expertise of national professionals, which, through a systematic and standardized process, assesses 17 criteria in the country. These criteria aim at understanding whether or not the country is moving towards democracy and market improvement. Figure 89 shows a selection of the 5 most relevant indicators to assess policy capacities in 2012 and 2020 for Sudan and the COMESA average. Overall, Sudan deteriorated in all indicators dramatically over the period analyzed and shows a performance that is lower than the COMESA average. Sudan decreased from 3.0 points in 2012 to 1.0 point in 2020 in prioritization, policy implementation, and policy learning, whereas COMESA managed to remain at around 4.0. Policy coordination and civil society participation, which already registered lower scores than the other indicators in 2012 felt even more to also 1.0 in 2020.

Figure 89: Sudan's policy-making capacities (score 1=lowest 10=highest)



Data source: Bertelsmann Stiftung Transformation Index

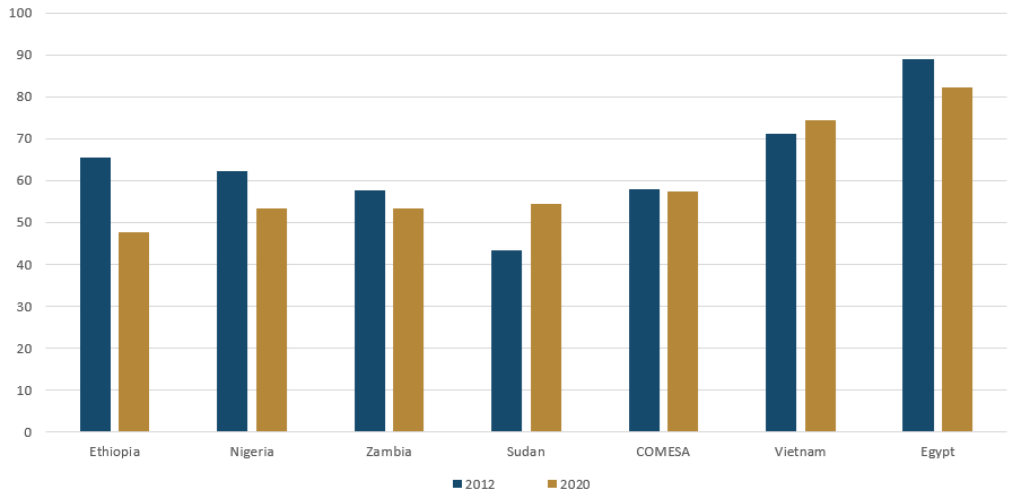
These findings indicate a significant decline of Sudan' already low policymaking capabilities. Given the significant gap of industrial policy design and management capacities, Sudan could largely benefit from the support of international industrial policy experts and relevant development partners to strengthen the national policy processes, especially through industrial policy capacity building activities and capacity assessments. On this basis, the following activities could be undertaken with the assistance of international organizations:

- Capacity building training on industrial development performance analysis, competitiveness assessments, regional analysis, industrial policy process, analysis and implementation, and industrial policy monitoring and evaluation.
- Assessment of capacity gaps and weaknesses in ministries (financial, technical, and organizational).
- Assessment of existing gaps and weaknesses in business associations for effective advocacy.
- Support to strengthen capacities and/or structures for effective public-private sector dialogue.
- Support to developing inter-ministerial cooperation capacities for effective policies.

Statistical capacities

Access to robust statistics is the basis for evidence-based decision-making and feeds strategic-oriented industrial policies. Statistical capacities tend to be a common challenge in developing countries as the collection process, management, and dissemination of data tend to require a considerable amount of resources. Figure 90 shows that Sudan's statistical capacities improved between 2012 and 2020, while those of COMESA average and benchmark countries, except Vietnam decreased. Despite the positive trend, Sudan exhibits very low statistical capacities compared to its peers. Consultations with country stakeholders revealed that the country lacks the capacity to collect and analyze data as well as develop and conduct surveys. The challenges related to statistical capabilities are mainly due to the lack of qualified human resources and financial and material support.

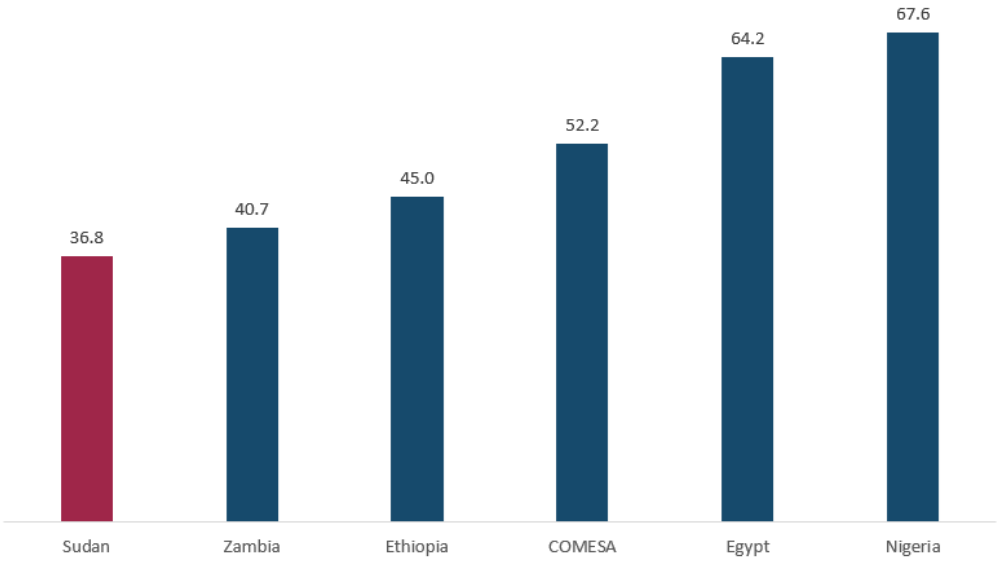
Figure 90: Sudan's statistical capacities (100 highest)



Data source: Bertelsmann Stiftung Transformation Index

The insufficiency of data coverage and availability is captured by Figure 91, where Sudan occupies the lowest position regarding data coverage and openness. The absence of updated relevant data regarding the industrial sector, as well as other country dimensions, constituted also a challenge for this report. The Central Bureau of Statistics does not provide a website with digital access to data. There are only few data reports available, most of which are not in English language. Most importantly, the low level of data coverage represents a serious obstacle to conducting an accurate diagnosis of the country's industrial structure and the obstacles to its development, which prevents designing effective industrial policies.

Figure 91: Statistical data coverage and openness ((100= Best performance)



Data source: Ibrahim Index of African Governance (IIAG) (2021)

Conducting an industrial census and annual industrial surveys should be seen as a key priority to facilitate the industrial policy process of Sudan. As mentioned in the consultation, the transitional Government is currently conducting a broad industrial survey. However, so far only the dimension of access to water was finalized. Household surveys and employment surveys should also be a priority as this will allow to

understand the nature of the labor market and will serve as a basis for strategically choosing appropriate policy instruments. Having access to environmental and climate change data is crucial for an agricultural country, as the impact of climate change needs to be addressed in an urgent manner, and to do so, reliable data and inventories need to be developed. Last but not least, any statistical work needs to carefully include the informal sector, which accounts for a large share of the economy and labor market today.

International organizations can also support Sudan to strengthen its statistical capacities by conducting the following activities:

- Capacity building of: industrial data collection; statistical production; survey methodology; and statistical analysis.
- Workshops with international experts to expose the country to global best practices and methodologies, e.g., the United Nations International Recommendations for Industrial Statistics.
- Public-private sector dialogue activities to facilitate the work of data collection.

3.5 Summary of results and implications for Industrial Policy in Sudan

This section was dedicated to identifying and discussing the key bottlenecks for the development of the manufacturing sector in Sudan. Bottlenecks are obstacles that prevent enterprises from unfolding their full growth potential. Bottlenecks are also impediments that may prevent exploiting the future growth and transformation potential that a country or sector has. The identification of major bottlenecks is hence of crucial importance for the design of effective state interventions, policies, and projects in cooperation with development partners. The assessment identified ten major bottlenecks for the development of the manufacturing sector in the three thematic areas of factors of production, infrastructure, and governance.

In the realm of factors of production, two bottlenecks could be identified: informality and access to finance.

i Informality dramatically affects the manufacturing sector in Sudan, either via the direct presence of informal manufacturers in the sector or due to informal traders who place products on the market at much lower prices, causing unfair competition with formal competitors. Beyond this immediate negative effect, informality has multiple implications for development such as impeding access to finance and modernization or limiting the tax base of the state. Informality is an economic survival strategy but prevents companies from becoming efficient and competitive by lowering factor costs. Any economic or industrial policy is highly recommended incorporating the informal sector and making targeted and attractive offers in order to overcome the vicious circle informal entrepreneurs are caught in.

ii Access to finance is the prerequisite for any kind of expanding or upgrading economic activities. Access to finance is a bottleneck, first, due to the underdeveloped financial sector, as most banks are undercapitalized, resulting in loan shortages. Second, there is no long-term finance available in Sudan. The longest loans are up to 12 months, incompatible with manufacturing investments. Moreover, banks require high collateral, mostly land, representing a serious challenge to firms, especially to micro and small companies. Moreover, to compensate for their losses, commercial banks raised the loan interest rates. As a result, access to credit is virtually non-existent to small manufacturing companies, which account for more than 90% of the manufacturing sector. The suspension of the international sanctions, the recent Investment Law, and the relative stability of the exchange rate may strengthen the banking system. The use of digital financial services could also play a significant role in the financial system, however, these services are still at an infant stage in the country.

In the area of infrastructure, transportation and access to electricity have been identified as major bottlenecks.

iii The bottleneck in transportation exists mainly due to Sudan's underdeveloped road network and the bad condition of roads as a result of decades of public underinvestment. At least 50% of the highways require rehabilitation. Moreover, the country lacks internal corridors, and rural connectivity is still very poor. Only about one-quarter of national roads are paved. This decreases the competitiveness of Sudanese products and hampers manufacturing development, especially the food-processing industry, which relies on connectivity with rural areas. About 80% of the rail network needs to be restored. And Port Sudan, which handles 90% of the country's international trade, faces serious congestion problems. The Investment Law and the (PPPL), passed in 2021, may help to attract foreign direct investments to infrastructure projects. However, the Government will need to resort to other tools to attract the necessary capital to close the existing gap.

iv Access to electricity was repeatedly pointed out as one of the most severe constraints to manufacturing development in Sudan. The bottleneck exists due to insufficient and unreliable electricity supply, with very poor penetration of the country outside urban areas. Around 47% of the population lack access to grid power at all. The government is granting high priority to this obstacle and is taking measures to increase the electricity supply. The Investment Law and the PPPL can also promote investments in this area. Moreover, Sudan is undertaking a partnership with Egypt to import power and build grid stabilization stations in the country via a private company.

Six of the top 10 bottlenecks (tax rates, tax administration, corruption, political instability, strategic orientation of industrial policy, and capacities for effective industrial policy) belong to the realm of governance, which underlines the necessity to improve the effectiveness of state-business relations in Sudan, and the policy capacities of Government's officials.

v This bottleneck is concerned with the high tax burden for manufacturing companies. According to the consultations, 47 types of taxes apply to manufactures. As a consequence, the overall tax rate is high, and the tax base remains small as taxes are levied only on formally registered firms. In doing so, the tax system fosters informal modes of production to avoid paying taxes. Moreover, other taxes, such as VAT, were increased over the years to compensate for the oil revenues loss after South Sudan's separation. Decreasing the level of informality in the country would be an effective form of raising the government's revenue without increasing tax rates.

vi The absence of a clear tax policy, transparency, and accountability is the most critical issue in tax administration. It results in an opaque tax system, boosting uncertainty of the future and corruption. In addition, taxes are imposed without prior consultation with the private sector. Making tax policies more transparent and strengthening communication channels with the private sector can improve the tax administration system significantly.

vii From a macro-economic perspective, corruption leads to allocative inefficiency, diverting public resources to private gains, and inhibiting foreign direct investment into the economy. From a micro-economic perspective, corruption acts as an inefficient tax on business, ultimately raising production costs and reducing profitability. Corruption is still widespread and endemic in Sudan and is seen as a significant bottleneck to manufacturing development in the country. Any reform that may strengthen transparency and merit-based allocation decisions will positively affect the efficiency of state administration and socio-economic development.

viii Political instability postpones business and investment decisions. Sudan's recent history is marked by political and violent conflicts, and civil war, which led to economic sanctions practically blocking

foreign investments in the country. After the takeover by the transition Government and the end of the sanctions, the new administration passed the Investment Law and the Public-Private Partnership Act, which provide long-term legal guarantees for investment in the country. Nonetheless, political instability in the country remains high, as the democratic process in the country is still at an early stage, and there are several conflicting forces still competing in the country.

ix Sudan lacks a strategic orientation of industrial policy. There have been no official documents available that determine in a comprehensive manner the strategy to develop the manufacturing sector. It is a bottleneck because industrial development needs (i) strategic focus, (ii) strong commitment over time, and (iii) a productive collaboration between the government and the private sector. A proper evidence-based, inclusive and participatory industrial policy process is vital to the elaboration of strategic policy documents.

x An effective industrial policy design, monitoring, and evaluation requires significant industrial policy capacities. Policy-makers are able to craft and implement strategic industrial policies that successfully address industrial development problems if they have solid analytical, policymaking and implementation capacities. Data shows significant degradation of Sudan's already low policymaking capabilities over time. Access to robust statistics is a foundation for evidence-based decision-making and for feeding strategic-oriented industrial policies. Despite improvements, Sudan's statistical capacities remains very low. Sudan could largely benefit from the experience of international industrial policy experts and relevant development organizations to strengthen its national policy process and the Government official's capabilities. Conducting capacity and needs assessments in the respective ministries, building up industrial policy capacity in the government, and facilitate effective public-policy dialogues are among those forms of support, Sudan's industrial development would benefit most from.

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Appendices

A Appendix to Section 1

A.1 Compound Annual Growth Rate

The Compound Annual Growth Rate (CAGR) is defined as

$$CAGR = (EV/BV)^{1/n} - 1,$$

where $EV = ending\ value$, $BV = beginning\ value$ and $n = number\ of\ year$.

B Appendix to Section 2

B.1 Trade data coverage COMESA

Table 11: COMESA trade data coverage H3

Country	Non-mirror data coverage (from/to)
Djibouti *	no data
Eritrea *	no data
Ethiopia *	12/18
Somalia *	no data
Egypt	12/19
Libya *	no data
Sudan *	12, 14/18
Tunisia	12/19
Comoros *	14/19
Madagascar	12/19
Mauritius	12/19
Seychelles *	13/19
Burundi *	13/19
Kenya *	13, 15/19
Malawi	12/19
Rwanda	12/19
Uganda *	12/18
Eswatini	12/19
Zambia	12/19
Zimbabwe	12/19
Dem. Rep. of the Congo *	15/19

Note: * Mirror data used to cover period 12/19.

B.2 Matching trade data to manufacturing sectors

The trade flows used in this analysis were obtained from UN Comtrade (2020) and follow the Harmonised System (HS) 2007 nomenclature at AG6 level, respectively. Correspondence between both the HS 2007 commodity classifications and the manufacturing sector classification following ISIC Revision 3 is established following official World Integrated Trade Solution (WITS)[14] concordance table which relate HS 2007 AG6 data to their respective ISIC Rev. 3 IV-digit manufacturing industries. Please see Table 12 for the complete concordance mapping. Aggregating sector information from the IV-digit to the II-digit level can then be performed by simply summing up all IV-digit industries that belong to a particular II-sector industry or, alternatively, any alternative ISIC sector combination. Throughout the report, only trade in commodities is considered. Consequently, whenever talking about trade import/exports related to manufacturing industries, we refer to *traded commodities that can be attributed to a certain manufacturing sector*.

Table 12: HS 2007 to ISIC Rev. 3 concordance table

Concordance		(continued)		(continued)		(continued)		(continued)		(continued)	
HS 2007	ISIC Rev. 3	HS 2007	ISIC Rev. 3	HS 2007	ISIC Rev. 3	HS 2007	ISIC Rev. 3	HS 2007	ISIC Rev. 3	HS 2007	ISIC Rev. 3
010110	0121	270750	2411	390529	2413	551599	1711	722592	2710	847190	3000
010190	0121	270791	2411	390530	2413	551611	1711	722599	2710	847210	3000
010210	0121	270799	2411	390591	2413	551612	1711	722611	2710	847230	3000
010290	0121	270810	2411	390599	2413	551613	1711	722619	2710	847290	3000
010310	0122	270820	2411	390610	2413	551614	1711	722620	2710	847310	3000
010391	0122	270900	1110	390690	2413	551621	1711	722691	2710	847321	3000
010392	0122	271011	2320	390710	2413	551622	1711	722692	2710	847329	3000
010410	0121	271019	2320	390720	2413	551623	1711	722699	2710	847330	3000
010420	0121	271091	2320	390730	2413	551624	1711	722710	2710	847340	3000

[14] See `https://wits.worldbank.org/product_concordance.html`.

Table 12: HS 2007 to ISIC Rev. 3 concordance table *(continued)*

Concordance		(continued)		(continued)		(continued)		(continued)		(continued)	
HS 2007	ISIC Rev. 3	HS 2007	ISIC Rev. 3	HS 2007	ISIC Rev. 3	HS 2007	ISIC Rev. 3	HS 2007	ISIC Rev. 3	HS 2007	ISIC Rev. 3
010511	0122	271099	2320	390740	2413	551631	1711	722720	2710	847350	3000
010512	0122	271111	1110	390750	2413	551632	1711	722790	2710	847410	2924
010519	0122	271112	2320	390760	2413	551633	1711	722810	2710	847420	2924
010594	0122	271113	2320	390770	2413	551634	1711	722820	2710	847431	2924
010599	0122	271114	2320	390791	2413	551641	1711	722830	2710	847432	2924
010611	0122	271119	2320	390799	2413	551642	1711	722840	2710	847439	2924
010612	0122	271121	1110	390810	2413	551643	1711	722850	2710	847480	2924
010619	0122	271129	2320	390890	2413	551644	1711	722860	2710	847490	2924
010620	0122	271210	2320	390910	2413	551691	1711	722870	2710	847510	2929
010631	0122	271220	2320	390920	2413	551692	1711	722880	2710	847521	2929
010632	0122	271290	2320	390930	2413	551693	1711	722920	2710	847529	2929
010639	0122	271311	2320	390940	2413	551694	1711	722990	2710	847590	2929
010690	0122	271312	2320	390950	2413	560110	1729	730110	2710	847621	2919
020110	1511	271320	2320	391000	2413	560121	1729	730120	2710	847629	2919
020120	1511	271390	2320	391110	2413	560122	1729	730210	2710	847681	2919
020130	1511	271410	1110	391190	2413	560129	1729	730230	2710	847689	2919
020210	1511	271490	1429	391211	2413	560130	1729	730240	2710	847690	2919
020220	1511	271500	2699	391212	2413	560210	1729	730290	2710	847710	2929
020230	1511	271600	4010	391220	2413	560221	1729	730300	2710	847720	2929
020311	1511	280110	2411	391231	2413	560229	1729	730411	2710	847730	2929
020312	1511	280120	2411	391239	2413	560290	1729	730419	2710	847740	2929
020319	1511	280130	2411	391290	2413	560311	1729	730422	2710	847751	2929
020321	1511	280200	2411	391310	2413	560312	1729	730423	2710	847759	2929
020322	1511	280300	2411	391390	2413	560313	1729	730424	2710	847780	2929
020329	1511	280410	2411	391400	2413	560314	1729	730429	2710	847790	2929
020410	1511	280421	2411	391510	9999	560391	1729	730431	2710	847810	2925
020421	1511	280429	2411	391520	9999	560392	1729	730439	2710	847890	2925
020422	1511	280430	2411	391530	9999	560393	1729	730441	2710	847910	2924
020423	1511	280440	2411	391590	9999	560394	1729	730449	2710	847920	2925
020430	1511	280450	2411	391610	2520	560410	1729	730451	2710	847930	2922
020441	1511	280461	2411	391620	2520	560490	1729	730459	2710	847940	2929
020442	1511	280469	2411	391690	2520	560500	1729	730490	2710	847950	2929
020443	1511	280470	2411	391710	2520	560600	1729	730511	2710	847960	2929
020450	1511	280480	2411	391721	2520	560721	1723	730512	2710	847981	2929
020500	1511	280490	2411	391722	2520	560729	1723	730519	2710	847982	2929
020610	1511	280511	2411	391723	2520	560741	1723	730520	2710	847989	2929
020621	1511	280512	2411	391729	2520	560749	1723	730531	2710	847990	2929
020622	1511	280519	2411	391731	2520	560750	1723	730539	2710	848010	2929
020629	1511	280530	2411	391732	2520	560790	1723	730590	2710	848020	2929
020630	1511	280540	2411	391733	2520	560811	1723	730611	2710	848030	2929
020641	1511	280610	2411	391739	2520	560819	1723	730619	2710	848041	2929
020649	1511	280620	2411	391740	2520	560890	1723	730621	2710	848049	2929
020680	1511	280700	2411	391810	2520	560900	1723	730629	2710	848050	2929
020690	1511	280800	2412	391890	2520	570110	1722	730630	2710	848060	2929
020711	1511	280910	2411	391910	2520	570190	1722	730640	2710	848071	2929
020712	1511	280920	2411	391990	2520	570210	1722	730650	2710	848079	2929
020713	1511	281000	2411	392010	2520	570220	1722	730661	2710	848110	2912
020714	1511	281111	2411	392020	2520	570231	1722	730669	2710	848120	2912
020724	1511	281119	2411	392030	2520	570232	1722	730690	2710	848130	2912
020725	1511	281121	2411	392043	2520	570239	1722	730711	2710	848140	2912
020726	1511	281122	2411	392049	2520	570241	1722	730719	2710	848180	2912
020727	1511	281129	2411	392051	2520	570242	1722	730721	2710	848190	2912
020732	1511	281210	2411	392059	2520	570249	1722	730722	2710	848210	2913
020733	1511	281290	2411	392061	2520	570250	1722	730723	2710	848220	2913
020734	1511	281310	2411	392062	2520	570291	1722	730729	2710	848230	2913
020735	1511	281390	2411	392063	2520	570292	1722	730791	2710	848240	2913
020736	1511	281410	2412	392069	2520	570299	1722	730792	2710	848250	2913
020810	1511	281420	2412	392071	2520	570310	1722	730793	2710	848280	2913
020830	1511	281511	2411	392073	2520	570320	1722	730799	2710	848291	2913
020840	1511	281512	2411	392079	2520	570330	1722	730810	2811	848299	2913
020850	1511	281520	2411	392091	2520	570390	1722	730820	2811	848310	2913
020890	1511	281530	2411	392092	2520	570410	1722	730830	2811	848320	2913
020900	1511	281610	2411	392093	2520	570490	1722	730840	2811	848330	2913
021011	1511	281640	2411	392094	2520	570500	1722	730890	2811	848340	2913
021012	1511	281700	2411	392099	2520	580110	1711	730900	2812	848350	2913
021019	1511	281810	2699	392111	2520	580121	1711	731010	2899	848360	2913
021020	1511	281820	2720	392112	2520	580122	1711	731021	2899	848390	2913
021091	1511	281830	2411	392113	2520	580123	1711	731029	2899	848410	2919
021092	1511	281910	2411	392114	2520	580124	1711	731100	2812	848420	2919
021093	1511	281990	2411	392119	2520	580125	1711	731210	2899	848490	2919
021099	1511	282010	2411	392190	2520	580126	1711	731290	2899	848610	2929
030110	0500	282090	2411	392210	2520	580131	1711	731300	2899	848620	3190
030191	0500	282110	2411	392220	2520	580132	1711	731412	2899	848630	2922
030192	0500	282120	2411	392290	2520	580133	1711	731414	2899	848640	2929

Table 12: HS 2007 to ISIC Rev. 3 concordance table *(continued)*

Concordance		(continued)		(continued)		(continued)		(continued)		(continued)	
HS 2007	ISIC Rev. 3	HS 2007	ISIC Rev. 3	HS 2007	ISIC Rev. 3	HS 2007	ISIC Rev. 3	HS 2007	ISIC Rev. 3	HS 2007	ISIC Rev. 3
030193	0500	282200	2411	392310	2520	580134	1711	731419	2899	848690	2929
030194	0500	282300	2411	392321	2520	580135	1711	731420	2899	848710	2899
030195	0500	282410	2411	392329	2520	580136	1711	731431	2899	848790	2919
030199	0500	282490	2411	392330	2520	580190	1711	731439	2899	850110	3110
030211	0500	282510	2411	392340	2520	580211	1711	731441	2899	850120	3110
030212	0500	282520	2411	392350	2520	580219	1711	731442	2899	850131	3110
030219	0500	282530	2411	392390	2520	580220	1711	731449	2899	850132	3110
030221	0500	282540	2411	392410	2520	580230	1711	731450	2899	850133	3110
030222	0500	282550	2411	392490	2520	580300	1711	731511	2913	850134	3110
030223	0500	282560	2411	392510	2520	580410	1729	731512	2913	850140	3110
030229	0500	282570	2411	392520	2520	580421	1729	731519	2913	850151	3110
030231	0500	282580	2411	392530	2520	580429	1729	731520	2899	850152	3110
030232	0500	282590	2411	392590	2520	580430	1729	731581	2899	850153	3110
030233	0500	282612	2411	392610	2520	580500	1721	731582	2899	850161	3110
030234	0500	282619	2411	392620	2520	580610	1729	731589	2899	850162	3110
030235	0500	282630	2411	392630	2520	580620	1729	731590	2899	850163	3110
030236	0500	282690	2411	392640	2520	580631	1729	731600	2899	850164	3110
030239	0500	282710	2412	392690	2520	580632	1729	731700	2899	850211	3110
030240	0500	282720	2411	400110	0111	580639	1729	731811	2899	850212	3110
030250	0500	282731	2411	400121	0111	580640	1729	731812	2899	850213	3110
030261	0500	282732	2411	400122	0111	580710	1729	731813	2899	850220	3110
030262	0500	282735	2411	400129	0111	580790	1729	731814	2899	850231	3110
030263	0500	282739	2411	400130	0200	580810	1729	731815	2899	850239	3110
030264	0500	282741	2411	400211	2413	580890	1729	731816	2899	850240	3110
030265	0500	282749	2411	400219	2413	580900	1729	731819	2899	850300	3110
030266	0500	282751	2411	400220	2413	581010	1729	731821	2899	850410	3110
030267	0500	282759	2411	400231	2413	581091	1729	731822	2899	850421	3110
030268	0500	282760	2411	400239	2413	581092	1729	731823	2899	850422	3110
030269	0500	282810	2411	400241	2413	581099	1729	731824	2899	850423	3110
030270	1512	282890	2411	400249	2413	581100	1729	731829	2899	850431	3110
030311	1512	282911	2411	400251	2413	590110	1729	731920	2899	850432	3110
030319	1512	282919	2411	400259	2413	590190	1729	731930	2899	850433	3110
030321	1512	282990	2411	400260	2413	590210	1729	731990	2899	850434	3110
030322	1512	283010	2411	400270	2413	590220	1729	732010	2899	850440	3110
030329	1512	283090	2411	400280	2413	590290	1729	732020	2899	850450	3110
030331	1512	283110	2411	400291	2413	590310	1729	732090	2899	850490	3110
030332	1512	283190	2411	400299	2413	590320	1729	732111	2930	850511	3190
030333	1512	283210	2411	400300	2519	590390	1729	732112	2930	850519	3190
030339	1512	283220	2411	400400	9999	590410	3699	732119	2930	850520	3190
030341	1512	283230	2411	400510	2519	590490	3699	732181	2930	850590	3190
030342	1512	283311	2411	400520	2519	590500	2109	732182	2930	850610	3140
030343	1512	283319	2411	400591	2519	590610	2519	732189	2930	850630	3140
030344	1512	283321	2411	400599	2519	590691	2519	732190	2930	850640	3140
030345	1512	283322	2411	400610	2511	590699	2519	732211	2812	850650	3140
030346	1512	283324	2411	400690	2519	590700	1729	732219	2812	850660	3140
030349	1512	283325	2411	400700	2519	590800	1729	732290	2930	850680	3140
030351	1512	283327	2411	400811	2519	590900	1729	732310	2899	850690	3140
030352	1512	283329	2411	400819	2519	591000	1729	732391	2899	850710	3140
030361	1512	283330	2411	400821	2519	591110	1729	732392	2899	850720	3140
030362	1512	283340	2411	400829	2519	591120	1729	732393	2899	850730	3140
030371	1512	283410	2412	400911	2519	591131	1729	732394	2899	850740	3140
030372	1512	283421	2412	400912	2519	591132	1729	732399	2899	850780	3140
030373	1512	283429	2411	400921	2519	591140	1729	732410	2899	850790	3140
030374	1512	283510	2411	400922	2519	591190	1729	732421	2899	850811	2930
030375	1512	283522	2411	400931	2519	600110	1730	732429	2899	850819	2930
030376	1512	283524	2411	400932	2519	600121	1730	732490	2899	850860	2929
030377	1512	283525	2411	400941	2519	600122	1730	732510	2899	850870	2930
030378	1512	283526	2411	400942	2519	600129	1730	732591	2899	850940	2930
030379	1512	283529	2411	401011	2519	600191	1730	732599	2899	850980	2930
030380	1512	283531	2411	401012	2519	600192	1730	732611	2899	850990	2930
030411	1512	283539	2411	401019	2519	600199	1730	732619	2899	851010	2930
030412	1512	283620	2411	401031	2519	600240	1730	732620	2899	851020	2930
030419	1512	283630	2411	401032	2519	600290	1730	732690	2899	851030	2930
030421	1512	283640	2411	401033	2519	600310	1730	740100	2720	851090	2930
030422	1512	283650	2411	401034	2519	600320	1730	740200	2720	851110	3190
030429	1512	283660	2411	401035	2519	600330	1730	740311	2720	851120	3190
030491	1512	283691	2411	401036	2519	600340	1730	740312	2720	851130	3190
030492	1512	283692	2411	401039	2519	600390	1730	740313	2720	851140	3190
030499	1512	283699	2411	401110	2511	600410	1730	740319	2720	851150	3190
030510	1512	283711	2411	401120	2511	600490	1730	740321	2720	851180	3190
030520	1512	283719	2411	401130	2511	600521	1730	740322	2720	851190	3190
030530	1512	283720	2411	401140	2511	600522	1730	740329	2720	851210	3190
030541	1512	283911	2411	401150	2511	600523	1730	740400	9999	851220	3190
030542	1512	283919	2411	401161	2511	600524	1730	740500	2720	851230	3190

Table 12: HS 2007 to ISIC Rev. 3 concordance table *(continued)*

Concordance		(continued)		(continued)		(continued)		(continued)		(continued)	
HS 2007	ISIC Rev. 3	HS 2007	ISIC Rev. 3	HS 2007	ISIC Rev. 3	HS 2007	ISIC Rev. 3	HS 2007	ISIC Rev. 3	HS 2007	ISIC Rev. 3
030549	1512	283990	2411	401162	2511	600531	1730	740610	2720	851240	3190
030551	1512	284011	2411	401163	2511	600532	1730	740620	2720	851290	3190
030559	1512	284019	2411	401169	2511	600533	1730	740710	2720	851310	3150
030561	1512	284020	2411	401192	2511	600534	1730	740721	2720	851390	3150
030562	1512	284030	2411	401193	2511	600541	1730	740729	2720	851410	2914
030563	1512	284130	2411	401194	2511	600542	1730	740811	2720	851420	2914
030569	1512	284150	2411	401199	2511	600543	1730	740819	2720	851430	2914
030611	1512	284161	2411	401211	2511	600544	1730	740821	2720	851440	2914
030612	1512	284169	2411	401212	2511	600590	1730	740822	2720	851490	2914
030613	1512	284170	2411	401213	2511	600610	1730	740829	2720	851511	2922
030614	1512	284180	2411	401219	2511	600621	1730	740911	2720	851519	2922
030619	1512	284190	2411	401220	9999	600622	1730	740919	2720	851521	2922
030621	0500	284210	2411	401290	2511	600623	1730	740921	2720	851529	2922
030622	0500	284290	2411	401310	2511	600624	1730	740929	2720	851531	2922
030623	0500	284310	2411	401320	2511	600631	1730	740931	2720	851539	2922
030624	0500	284321	2411	401390	2511	600632	1730	740939	2720	851580	2922
030629	0500	284329	2411	401410	2519	600633	1730	740940	2720	851590	2922
030710	0500	284330	2411	401490	2519	600634	1730	740990	2720	851610	2930
030721	0500	284390	2411	401511	2519	600641	1730	741011	2720	851621	2930
030729	1512	284410	2330	401519	2519	600642	1730	741012	2720	851629	2930
030731	0500	284420	2330	401590	2519	600643	1730	741021	2720	851631	2930
030739	1512	284430	2330	401610	2519	600644	1730	741022	2720	851632	2930
030741	0500	284440	2330	401691	2519	600690	1730	741110	2720	851633	2930
030749	1512	284450	4010	401692	2519	610120	1810	741121	2720	851640	2930
030751	0500	284510	2411	401693	2519	610130	1810	741122	2720	851650	2930
030759	1512	284590	2411	401694	2519	610190	1810	741129	2720	851660	2930
030760	0122	284610	2411	401695	2519	610210	1810	741210	2720	851671	2930
030791	0500	284690	2411	401699	2519	610220	1810	741220	2720	851672	2930
030799	1512	284700	2411	401700	2519	610230	1810	741300	2899	851679	2930
040110	1520	284800	2411	410120	1511	610290	1810	741510	2899	851680	2930
040120	1520	284910	2411	410150	1511	610310	1810	741521	2899	851690	2930
040130	1520	284920	2411	410190	1511	610322	1810	741529	2899	851711	3220
040210	1520	284990	2411	410210	1511	610323	1810	741533	2899	851712	3220
040221	1520	285000	2411	410221	1511	610329	1810	741539	2899	851718	3220
040229	1520	285200	2411	410229	1511	610331	1810	741811	2899	851761	3220
040291	1520	285300	2411	410320	0122	610332	1810	741819	2899	851762	3000
040299	1520	290110	2411	410330	0122	610333	1810	741820	2899	851769	3220
040310	1520	290121	2411	410390	0122	610339	1810	741910	2899	851770	2914
040390	1520	290122	2411	410411	1911	610341	1810	741991	2899	851810	3230
040410	1520	290123	2411	410419	1911	610342	1810	741999	2899	851821	3230
040490	1520	290124	2411	410441	1911	610343	1810	750110	2720	851822	3230
040510	1520	290129	2411	410449	1911	610349	1810	750120	2720	851829	3230
040520	1520	290211	2411	410510	1911	610413	1810	750210	2720	851830	3230
040590	1520	290219	2411	410530	1911	610419	1810	750220	2720	851840	3230
040610	1520	290220	2411	410621	1911	610422	1810	750300	9999	851850	3230
040620	1520	290230	2411	410622	1911	610423	1810	750400	2720	851890	3230
040630	1520	290241	2411	410631	1911	610429	1810	750511	2720	851920	3230
040640	1520	290242	2411	410632	1911	610431	1810	750512	2720	851930	3230
040690	1520	290243	2411	410640	1911	610432	1810	750521	2720	851950	3230
040700	0122	290244	2411	410691	1911	610433	1810	750522	2720	851981	3230
040811	1549	290250	2411	410692	1911	610439	1810	750610	2720	851989	3230
040819	1549	290260	2411	410711	1911	610441	1810	750620	2720	852110	3230
040891	1549	290270	2411	410712	1911	610442	1810	750711	2720	852190	3230
040899	1549	290290	2411	410719	1911	610443	1810	750712	2720	852210	3230
040900	0122	290311	2411	410791	1911	610444	1810	750720	2720	852290	3230
041000	0122	290312	2411	410792	1911	610449	1810	750810	2899	852321	2429
050100	9302	290313	2411	410799	1911	610451	1810	750890	2899	852329	2429
050210	9999	290314	2411	411200	1911	610452	1810	760110	2720	852340	2429
050290	9999	290315	2411	411310	1911	610453	1810	760120	2720	852351	2213
050400	9999	290319	2411	411320	1911	610459	1810	760200	9999	852352	3210
050510	9999	290321	2411	411330	1911	610461	1810	760310	2720	852359	2213
050590	9999	290322	2411	411390	1911	610462	1810	760320	2720	852380	2213
050610	9999	290323	2411	411410	1911	610463	1810	760410	2720	852550	3220
050690	9999	290329	2411	411420	1911	610469	1810	760421	2720	852560	3220
050710	9999	290331	2411	411510	1911	610510	1810	760429	2720	852580	3230
050790	9999	290339	2411	411520	9999	610520	1810	760511	2720	852610	3312
050800	0500	290341	2411	420100	1912	610590	1810	760519	2720	852691	3312
051000	9999	290342	2411	420211	1912	610610	1810	760521	2720	852692	3312
051110	0121	290343	2411	420212	1912	610620	1810	760529	2720	852712	3230
051191	1512	290344	2411	420219	1912	610690	1810	760611	2720	852713	3230
051199	9999	290345	2411	420221	1912	610711	1810	760612	2720	852719	3230
060110	0112	290346	2411	420222	1912	610712	1810	760691	2720	852721	3230
060120	0112	290347	2411	420229	1912	610719	1810	760692	2720	852729	3230
060210	0112	290349	2411	420231	1912	610721	1810	760711	2720	852791	3230

Table 12: HS 2007 to ISIC Rev. 3 concordance table *(continued)*

Concordance		(continued)		(continued)		(continued)		(continued)		(continued)	
HS 2007	ISIC Rev. 3	HS 2007	ISIC Rev. 3	HS 2007	ISIC Rev. 3	HS 2007	ISIC Rev. 3	HS 2007	ISIC Rev. 3	HS 2007	ISIC Rev. 3
060220	0112	290351	2411	420232	1912	610722	1810	760719	2720	852792	3230
060230	0112	290352	2411	420239	1912	610729	1810	760720	2720	852799	3230
060240	0112	290359	2411	420291	1912	610791	1810	760810	2720	852841	3000
060290	0112	290361	2411	420292	1912	610799	1810	760820	2720	852849	3230
060311	0112	290362	2411	420299	1912	610811	1810	760900	2720	852851	3000
060312	0112	290369	2411	420310	1810	610819	1810	761010	2811	852859	3230
060313	0112	290410	2411	420321	3693	610821	1810	761090	2811	852861	3000
060314	0112	290420	2411	420329	1810	610822	1810	761100	2812	852869	3230
060319	0112	290490	2411	420330	1810	610829	1810	761210	2899	852871	3230
060390	0112	290511	2411	420340	1810	610831	1810	761290	2899	852872	3230
060410	0200	290512	2411	420500	1912	610832	1810	761300	2812	852873	3230
060491	0200	290513	2411	420600	3699	610839	1810	761410	2899	852910	3230
060499	0200	290514	2411	430110	0122	610891	1810	761490	2899	852990	3230
070110	0111	290516	2411	430130	0122	610892	1810	761511	2899	853010	3190
070190	0111	290517	2411	430160	0122	610899	1810	761519	2899	853080	3190
070200	0112	290519	2411	430180	0122	610910	1730	761520	2899	853090	3190
070310	0112	290522	2411	430190	0122	610990	1730	761610	2899	853110	3190
070320	0112	290529	2411	430211	1820	611011	1730	761691	2899	853120	3190
070390	0112	290531	2411	430219	1820	611012	1730	761699	2899	853180	3190
070410	0112	290532	2411	430220	1820	611019	1730	780110	2720	853190	3190
070420	0112	290539	2411	430230	1820	611020	1730	780191	2720	853210	3210
070490	0112	290541	2411	430310	1820	611030	1730	780199	2720	853221	3210
070511	0112	290542	2411	430390	1820	611090	1730	780200	9999	853222	3210
070519	0112	290543	2411	430400	1820	611120	1810	780411	2720	853223	3210
070521	0112	290544	2411	440110	0200	611130	1810	780419	2720	853224	3210
070529	0112	290545	2424	440121	2010	611190	1810	780420	2720	853225	3210
070610	0112	290549	2411	440122	2010	611211	1810	780600	2899	853229	3210
070690	0112	290551	2411	440130	9999	611212	1810	790111	2720	853230	3210
070700	0112	290559	2411	440210	2411	611219	1810	790112	2720	853290	3210
070810	0112	290611	2411	440290	2411	611220	1810	790120	2720	853310	3210
070820	0112	290612	2411	440310	2010	611231	1810	790200	9999	853321	3210
070890	0112	290613	2411	440320	0200	611239	1810	790310	2720	853329	3210
070920	0112	290619	2411	440341	0200	611241	1810	790390	2720	853331	3210
070930	0112	290621	2411	440349	0200	611249	1810	790400	2720	853339	3210
070940	0112	290629	2411	440391	0200	611300	1810	790500	2720	853340	3210
070951	0112	290711	2411	440392	0200	611420	1810	790700	2899	853390	3210
070959	0112	290712	2411	440399	0200	611430	1810	800110	2720	853400	3210
070960	0112	290713	2411	440410	0200	611490	1810	800120	2720	853510	3120
070970	0112	290715	2411	440420	0200	611510	1730	800200	9999	853521	3120
070990	0112	290719	2411	440500	2010	611521	1730	800300	2720	853529	3120
071010	1513	290721	2411	440610	2010	611522	1730	800700	2899	853530	3120
071021	1513	290722	2411	440690	2010	611529	1730	810110	2720	853540	3120
071022	1513	290723	2411	440710	2010	611530	1730	810194	2720	853590	3120
071029	1513	290729	2411	440721	2010	611594	1730	810196	2720	853610	3120
071030	1513	290811	2411	440722	2010	611595	1730	810197	2720	853620	3120
071040	1513	290819	2411	440725	2010	611596	1730	810199	2720	853630	3120
071080	1513	290891	2411	440726	2010	611599	1730	810210	2720	853641	3120
071090	1513	290899	2411	440727	2010	611610	1810	810294	2720	853649	3120
071120	1513	290911	2411	440728	2010	611691	1810	810295	2720	853650	3120
071140	1513	290919	2411	440729	2010	611692	1810	810296	2720	853661	3120
071151	1513	290920	2411	440791	2010	611693	1810	810297	2720	853669	3120
071159	1513	290930	2411	440792	2010	611699	1810	810299	2720	853670	2520
071190	1513	290941	2411	440793	2010	611710	1810	810320	2720	853690	3120
071220	1513	290943	2411	440794	2010	611780	1810	810330	2720	853710	3120
071231	1513	290944	2411	440795	2010	611790	1810	810390	2720	853720	3120
071232	1513	290949	2411	440799	2010	620111	1810	810411	2720	853810	3120
071233	1513	290950	2411	440810	2021	620112	1810	810419	2720	853890	3120
071239	1513	290960	2411	440831	2021	620113	1810	810420	2720	853910	3150
071290	1513	291010	2411	440839	2021	620119	1810	810430	2720	853921	3150
071310	0111	291020	2411	440890	2021	620191	1810	810490	2720	853922	3150
071320	0111	291030	2411	440910	2010	620192	1810	810520	2720	853929	3150
071331	0111	291040	2411	440921	2010	620193	1810	810530	2720	853931	3150
071332	0111	291090	2411	440929	2010	620199	1810	810590	2720	853932	3150
071333	0111	291100	2411	441011	2021	620211	1810	810600	2720	853939	3150
071339	0111	291211	2411	441012	2021	620212	1810	810720	2720	853941	3150
071340	0111	291212	2411	441019	2021	620213	1810	810730	2720	853949	3150
071350	0111	291219	2411	441090	2021	620219	1810	810790	2720	853990	3150
071390	0111	291221	2411	441112	2021	620291	1810	810820	2720	854011	3210
071410	0111	291229	2411	441113	2021	620292	1810	810830	2720	854012	3210
071420	0111	291230	2411	441114	2021	620293	1810	810890	2720	854020	3210
071490	0111	291241	2411	441192	2021	620299	1810	810920	2720	854040	3210
080111	0113	291242	2411	441193	2021	620311	1810	810930	2720	854050	3210
080119	0113	291249	2411	441194	2021	620312	1810	810990	2720	854060	3210
080121	0113	291250	2411	441210	2021	620319	1810	811010	2720	854071	3210

Table 12: HS 2007 to ISIC Rev. 3 concordance table *(continued)*

Concordance		(continued)		(continued)		(continued)		(continued)		(continued)	
HS 2007	ISIC Rev. 3	HS 2007	ISIC Rev. 3	HS 2007	ISIC Rev. 3	HS 2007	ISIC Rev. 3	HS 2007	ISIC Rev. 3	HS 2007	ISIC Rev. 3
080122	0113	291260	2411	441231	2021	620322	1810	811020	2720	854072	3210
080131	0113	291300	2411	441232	2021	620323	1810	811090	2720	854079	3210
080132	0113	291411	2411	441239	2021	620329	1810	811100	2720	854081	3210
080211	0113	291412	2411	441294	2021	620331	1810	811212	2720	854089	3210
080212	0113	291413	2411	441299	2021	620332	1810	811213	2720	854091	3210
080221	0113	291419	2411	441300	2021	620333	1810	811219	2720	854099	3210
080222	0113	291421	2411	441400	2029	620339	1810	811221	2720	854110	3210
080231	0113	291422	2411	441510	2023	620341	1810	811222	2720	854121	3210
080232	0113	291423	2411	441520	2023	620342	1810	811229	2720	854129	3210
080240	0113	291429	2411	441600	2023	620343	1810	811251	2720	854130	3210
080250	0113	291431	2411	441700	2029	620349	1810	811252	2720	854140	3210
080260	0113	291439	2411	441810	2022	620411	1810	811259	2720	854150	3210
080290	0113	291440	2411	441820	2022	620412	1810	811292	2720	854160	3210
080300	0113	291450	2411	441840	2022	620413	1810	811299	2720	854190	3210
080410	0113	291461	2411	441850	2022	620419	1810	811300	2720	854231	3210
080420	0113	291469	2411	441860	2022	620421	1810	820110	2893	854232	3210
080430	0113	291470	2411	441871	2022	620422	1810	820120	2893	854233	3210
080440	0113	291511	2411	441872	2022	620423	1810	820130	2893	854239	3190
080450	0113	291512	2411	441879	2022	620429	1810	820140	2893	854290	3210
080510	0113	291513	2411	441890	2022	620431	1810	820150	2893	854310	3190
080520	0113	291521	2411	441900	2029	620432	1810	820160	2893	854320	3190
080540	0113	291524	2411	442010	2029	620433	1810	820190	2893	854330	3190
080550	0113	291529	2411	442090	2029	620439	1810	820210	2893	854370	3190
080590	0113	291531	2411	442110	2029	620441	1810	820220	2893	854390	3190
080610	0113	291532	2411	442190	2029	620442	1810	820231	2893	854411	3130
080620	0113	291533	2411	450110	0200	620443	1810	820239	2893	854419	3130
080711	0113	291536	2411	450190	2029	620444	1810	820240	2893	854420	3130
080719	0113	291539	2411	450200	2029	620449	1810	820291	2893	854430	3190
080720	0113	291540	2411	450310	2029	620451	1810	820299	2893	854442	3130
080810	0113	291550	2411	450390	2029	620452	1810	820310	2893	854449	3130
080820	0113	291560	2411	450410	2029	620453	1810	820320	2893	854460	3130
080910	0113	291570	2411	450490	2029	620459	1810	820330	2893	854470	3130
080920	0113	291590	2411	460121	2029	620461	1810	820340	2893	854511	3190
080930	0113	291611	2411	460122	2029	620462	1810	820411	2893	854519	3190
080940	0113	291612	2411	460129	2029	620463	1810	820412	2893	854520	3190
081010	0113	291613	2411	460192	2029	620469	1810	820420	2893	854590	3190
081020	0113	291614	2411	460193	2029	620520	1810	820510	2893	854610	2610
081040	0113	291615	2411	460194	2029	620530	1810	820520	2893	854620	2691
081050	0113	291619	2411	460199	2029	620590	1810	820530	2893	854690	3190
081060	0113	291620	2411	460211	2029	620610	1810	820540	2893	854710	2691
081090	0113	291631	2411	460212	2029	620620	1810	820551	2893	854720	2520
081110	1513	291632	2411	460219	2029	620630	1810	820559	2893	854790	3190
081120	1513	291634	2411	460290	2029	620640	1810	820560	2893	854810	3140
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081210	1513	291636	2411	470200	2101	620711	1810	820580	2893	860110	3520
081290	1513	291639	2411	470311	2101	620719	1810	820590	2893	860120	3520
081310	0113	291711	2411	470319	2101	620721	1810	820600	2893	860210	3520
081320	0113	291712	2411	470321	2101	620722	1810	820713	2893	860290	3520
081330	0113	291713	2411	470329	2101	620729	1810	820719	2893	860310	3520
081340	0113	291714	2411	470411	2101	620791	1810	820720	2893	860390	3520
081350	0113	291719	2411	470419	2101	620799	1810	820730	2893	860400	3520
081400	1513	291720	2411	470421	2101	620811	1810	820740	2893	860500	3520
090111	0113	291732	2411	470429	2101	620819	1810	820750	2893	860610	3520
090112	1549	291733	2411	470500	2101	620821	1810	820760	2893	860630	3520
090121	1549	291734	2411	470610	2101	620822	1810	820770	2893	860691	3520
090122	1549	291735	2411	470620	2101	620829	1810	820780	2893	860692	3520
090190	1549	291736	2411	470630	2101	620891	1810	820790	2893	860699	3520
090210	1549	291737	2411	470691	2101	620892	1810	820810	2893	860711	3520
090220	0113	291739	2411	470692	2101	620899	1810	820820	2893	860712	3520
090230	1549	291811	2411	470693	2101	620920	1810	820830	2893	860719	3520
090240	0113	291812	2411	470710	9999	620930	1810	820840	2893	860721	3520
090300	0113	291813	2411	470720	9999	620990	1810	820890	2893	860729	3520
090411	0113	291814	2411	470730	9999	621010	1810	820900	2893	860730	3520
090412	0113	291815	2411	470790	9999	621020	1810	821000	2899	860791	3520
090420	0113	291816	2411	480100	2101	621030	1810	821110	2893	860799	3520
090500	0113	291818	2411	480210	2101	621040	1810	821191	2893	860800	3520
090611	0113	291819	2411	480220	2101	621050	1810	821192	2893	860900	3420
090619	0113	291821	2423	480240	2101	621111	1810	821193	2893	870110	2921
090620	0113	291822	2423	480254	2101	621112	1810	821194	2893	870120	3410
090700	0113	291823	2423	480255	2101	621120	1810	821195	2893	870130	2924
090810	0113	291829	2411	480256	2101	621132	1810	821210	2893	870190	2921
090820	0113	291830	2411	480257	2101	621133	1810	821220	2893	870210	3410
090830	0113	291891	2411	480258	2101	621139	1810	821290	2893	870290	3410
090910	0113	291899	2411	480261	2101	621141	1810	821300	2893	870310	3410

Table 12: HS 2007 to ISIC Rev. 3 concordance table *(continued)*

Concordance		(continued)		(continued)		(continued)		(continued)		(continued)	
HS 2007	ISIC Rev. 3	HS 2007	ISIC Rev. 3	HS 2007	ISIC Rev. 3	HS 2007	ISIC Rev. 3	HS 2007	ISIC Rev. 3	HS 2007	ISIC Rev. 3
090920	0113	291910	2411	480262	2101	621142	1810	821410	2893	870321	3410
090930	0113	291990	2411	480269	2101	621143	1810	821420	2893	870322	3410
090940	0113	292011	2411	480300	2101	621149	1810	821490	2893	870323	3410
090950	0113	292019	2411	480411	2101	621210	1810	821510	2893	870324	3410
091010	0113	292090	2411	480419	2101	621220	1810	821520	2893	870331	3410
091020	0113	292111	2411	480421	2101	621230	1810	821591	2893	870332	3410
091030	0113	292119	2411	480429	2101	621290	1810	821599	2893	870333	3410
091091	0113	292121	2411	480431	2101	621320	1810	830110	2893	870390	3410
091099	0113	292122	2411	480439	2101	621390	1810	830120	2893	870410	3410
100110	0111	292129	2411	480441	2101	621410	1810	830130	2893	870421	3410
100190	0111	292130	2411	480442	2101	621420	1810	830140	2893	870422	3410
100200	0111	292141	2411	480449	2101	621430	1810	830150	2893	870423	3410
100300	0111	292142	2411	480451	2101	621440	1810	830160	2893	870431	3410
100400	0111	292143	2411	480452	2101	621490	1810	830170	2893	870432	3410
100510	0111	292144	2411	480459	2101	621510	1810	830210	2899	870490	3410
100590	0111	292145	2411	480511	2101	621520	1810	830220	2899	870510	3410
100610	0111	292146	2411	480512	2101	621590	1810	830230	2899	870520	3410
100620	1531	292149	2411	480519	2101	621600	1810	830241	2899	870530	3410
100630	1531	292151	2411	480524	2101	621710	1810	830242	2899	870540	3410
100640	1531	292159	2411	480525	2101	621790	1810	830249	2899	870590	3410
100700	0111	292211	2411	480530	2101	630110	2930	830250	2899	870600	3410
100810	0111	292212	2411	480540	2101	630120	1721	830260	2899	870710	3420
100820	0111	292213	2411	480550	2101	630130	1721	830300	2899	870790	3420
100830	0111	292214	2411	480591	2101	630140	1721	830400	2899	870810	3430
100890	0111	292219	2411	480592	2101	630190	1721	830510	2899	870821	3430
110100	1531	292221	2411	480593	2101	630210	1721	830520	2899	870829	3430
110210	1531	292229	2411	480610	2101	630221	1721	830590	2899	870830	3430
110220	1531	292231	2411	480620	2101	630222	1721	830610	2899	870840	3430
110290	1531	292239	2411	480630	2101	630229	1721	830621	2899	870850	3430
110311	1531	292241	2423	480640	2101	630231	1721	830629	2899	870870	3430
110313	1531	292242	2423	480700	2101	630232	1721	830630	2899	870880	3430
110319	1531	292243	2411	480810	2102	630239	1721	830710	2899	870891	3430
110320	1531	292244	2411	480820	2101	630240	1721	830790	2899	870892	3430
110412	1531	292249	2411	480830	2101	630251	1721	830810	2899	870893	3430
110419	1531	292250	2411	480890	2101	630253	1721	830820	2899	870894	3430
110422	1531	292310	2423	480920	2101	630259	1721	830890	2899	870895	3430
110423	1531	292320	2423	480990	2101	630260	1721	830910	2899	870899	3430
110429	1531	292390	2423	481013	2101	630291	1721	830990	2899	870911	2915
110430	1531	292411	2423	481014	2101	630293	1721	831000	2899	870919	2915
110510	1513	292412	2423	481019	2101	630299	1721	831110	2899	870990	2915
110520	1513	292419	2423	481022	2101	630312	1721	831120	2899	871000	2927
110610	1531	292421	2411	481029	2101	630319	1721	831130	2899	871110	3591
110620	1531	292423	2423	481031	2101	630391	1721	831190	2899	871120	3591
110630	1531	292424	2423	481032	2101	630392	1721	840110	2813	871130	3591
110710	1553	292429	2423	481039	2101	630399	1721	840120	2929	871140	3591
110720	1553	292511	2411	481092	2101	630411	1721	840130	2330	871150	3591
110811	1532	292512	2411	481099	2101	630419	1721	840140	2813	871190	3591
110812	1532	292519	2411	481110	2101	630491	1721	840211	2813	871200	3592
110813	1532	292521	2411	481141	2101	630492	1721	840212	2813	871310	3592
110814	1532	292529	2411	481149	2101	630493	1721	840219	2813	871390	3592
110819	1532	292610	2411	481151	2101	630499	1721	840220	2813	871411	3591
110820	1532	292620	2411	481159	2101	630510	1721	840290	2813	871419	3591
110900	1532	292630	2411	481160	2101	630520	1721	840310	2930	871420	3592
120100	0111	292690	2411	481190	2101	630532	1721	840390	2930	871491	3592
120210	0111	292700	2411	481200	2109	630533	1721	840410	2813	871492	3592
120220	0111	292800	2411	481310	2109	630539	1721	840420	2813	871493	3592
120300	0111	292910	2411	481320	2109	630590	1721	840490	2813	871494	3592
120400	0111	292990	2411	481390	2101	630612	1721	840510	2919	871495	3592
120510	0111	293020	2411	481410	2109	630619	1721	840590	2919	871496	3592
120590	0111	293030	2411	481420	2109	630622	1721	840610	2911	871499	3592
120600	0111	293040	2411	481490	2109	630629	1721	840681	2911	871500	3699
120720	0111	293050	2411	481620	2109	630630	1721	840682	2911	871610	3420
120740	0111	293090	2411	481690	2109	630640	1721	840690	2911	871620	2921
120750	0111	293100	2411	481710	2109	630691	1721	840710	3530	871631	3420
120791	0111	293211	2411	481720	2109	630699	1721	840721	2911	871639	3420
120799	0111	293212	2411	481730	2109	630710	1721	840729	2911	871640	3420
120810	1514	293213	2411	481810	2109	630720	1721	840731	3410	871680	3599
120890	1514	293219	2411	481820	2109	630790	1721	840732	3410	871690	3420
120910	0111	293221	2411	481830	2109	630800	1721	840733	3410	880100	3530
120921	0111	293229	2423	481840	2109	630900	9999	840734	3410	880211	3530
120922	0111	293291	2411	481850	2109	631010	9999	840790	2911	880212	3530
120923	0111	293292	2411	481890	2109	631090	9999	840810	2911	880220	3530
120924	0111	293293	2411	481910	2102	640110	1920	840820	3410	880230	3530
120925	0111	293294	2411	481920	2102	640192	1920	840890	2911	880240	3530

Table 12: HS 2007 to ISIC Rev. 3 concordance table *(continued)*

Concordance		(continued)		(continued)		(continued)		(continued)		(continued)	
HS 2007	ISIC Rev. 3	HS 2007	ISIC Rev. 3	HS 2007	ISIC Rev. 3	HS 2007	ISIC Rev. 3	HS 2007	ISIC Rev. 3	HS 2007	ISIC Rev. 3
120929	0111	293295	2411	481930	2102	640199	1920	840910	3530	880260	3530
120930	0112	293299	2411	481940	2102	640212	1920	840991	3430	880310	3530
120991	0112	293311	2423	481950	2102	640219	1920	840999	3430	880320	3530
120999	0112	293319	2423	481960	2102	640220	1920	841011	2911	880330	3530
121010	0111	293321	2423	482010	2221	640291	1920	841012	2911	880390	3530
121020	0111	293329	2411	482020	2221	640299	1920	841013	2911	880400	1721
121120	0111	293331	2411	482030	2221	640312	1920	841090	2911	880510	3530
121130	0111	293332	2411	482040	2221	640319	1920	841111	3530	880521	3530
121140	0111	293333	2411	482050	2221	640320	1920	841112	3530	880529	3530
121190	0111	293339	2411	482090	2221	640340	1920	841121	3530	890110	3511
121220	0500	293341	2411	482110	2109	640351	1920	841122	3530	890120	3511
121291	0111	293349	2411	482190	2109	640359	1920	841181	2911	890130	3511
121299	0111	293352	2423	482210	2109	640391	1920	841182	2911	890190	3511
121300	0111	293353	2423	482290	2109	640399	1920	841191	3530	890200	3511
121410	0111	293354	2423	482320	2109	640411	1920	841199	2911	890310	3512
121490	0111	293355	2423	482340	2109	640419	1920	841210	3530	890391	3512
130120	0200	293359	2423	482361	2109	640420	1920	841221	2912	890392	3512
130190	0200	293361	2423	482369	2109	640510	1920	841229	2912	890399	3512
130211	0200	293369	2423	482370	2109	640520	1920	841231	2912	890400	3511
130212	0200	293371	2411	482390	2109	640590	1920	841239	2912	890510	3511
130213	0200	293372	2411	490110	2211	640610	1920	841280	2912	890520	3511
130219	0200	293379	2411	490191	2211	640620	1920	841290	2912	890590	3511
130220	0200	293391	2411	490199	2211	640691	1920	841311	2912	890610	3511
130231	0200	293399	2411	490210	2212	640699	1920	841319	2912	890690	3511
130232	0200	293410	2411	490290	2212	650100	1810	841320	2912	890710	3511
130239	0200	293420	2411	490300	2211	650200	1810	841330	2912	890790	3511
140110	0200	293430	2423	490400	2211	650400	1810	841340	2912	890800	9999
140120	0200	293491	2411	490510	2211	650510	1810	841350	2912	900110	3320
140190	0200	293499	2411	490591	2211	650590	1810	841360	2912	900120	3320
140420	1514	293500	2423	490599	2211	650610	2520	841370	2912	900130	3320
140490	0200	293621	2423	490600	7421	650691	2520	841381	2912	900140	3320
150100	1511	293622	2423	490700	2219	650699	1810	841382	2912	900150	3320
150200	1511	293623	2423	490810	2219	650700	1810	841391	2912	900190	3320
150300	1514	293624	2423	490890	2219	660110	3699	841392	2912	900211	3320
150410	1514	293625	2423	490900	2219	660191	3699	841410	2912	900219	3320
150420	1514	293626	2423	491000	2219	660199	3699	841420	2912	900220	3320
150430	1514	293627	2423	491110	2221	660200	3699	841430	2912	900290	3320
150500	1711	293628	2423	491191	2219	660320	3699	841440	2912	900311	3320
150600	1514	293629	2423	491199	2219	660390	3699	841451	2930	900319	3320
150710	1514	293690	2423	500100	0122	670100	3699	841459	2919	900390	3320
150790	1514	293711	2423	500200	1711	670210	3699	841460	2930	900410	3320
150810	1514	293712	2423	500300	1711	670290	3699	841480	2912	900490	3320
150890	1514	293719	2423	500400	1711	670300	3699	841490	2912	900510	3320
150910	1514	293721	2423	500500	1711	670411	3699	841510	2919	900580	3320
150990	1514	293722	2423	500600	1711	670419	3699	841520	2919	900590	3320
151000	1514	293723	2423	500710	1711	670420	3699	841581	2919	900610	3320
151110	1514	293729	2423	500720	1711	670490	3699	841582	2919	900630	3320
151190	1514	293731	2423	500790	1711	680100	2696	841583	2919	900640	3320
151211	1514	293739	2423	510111	0121	680210	2696	841590	2919	900651	3320
151219	1514	293740	2423	510119	1511	680221	2696	841610	2914	900652	3320
151221	1514	293750	2423	510121	1711	680223	2696	841620	2914	900653	3320
151229	1514	293790	2423	510129	1711	680229	2696	841630	2914	900659	3320
151311	1514	293810	2423	510130	1711	680291	2696	841690	2914	900661	3320
151319	1514	293890	2423	510211	0122	680292	2696	841710	2914	900669	3320
151321	1514	293911	2423	510219	0122	680293	2696	841720	2925	900691	3320
151329	1514	293919	2423	510220	0122	680299	2696	841780	2914	900699	3320
151411	1514	293920	2423	510310	1711	680300	2696	841790	2914	900711	3320
151419	1514	293930	2423	510320	9999	680410	2699	841810	2930	900719	3320
151491	1514	293941	2423	510330	9999	680421	2699	841821	2930	900720	3320
151499	1514	293942	2423	510400	9999	680422	2699	841829	2930	900791	3320
151511	1514	293943	2423	510510	1711	680423	2699	841830	2930	900792	3320
151519	1514	293949	2423	510521	1711	680430	2699	841840	2930	900810	3320
151521	1532	293951	2423	510529	1711	680510	2699	841850	2919	900820	3320
151529	1532	293959	2423	510531	1711	680520	2699	841861	2919	900830	3320
151530	1514	293961	2423	510539	1711	680530	2699	841869	2919	900840	3320
151550	1514	293962	2423	510540	1711	680610	2699	841891	2919	900890	3320
151590	1514	293963	2423	510610	1711	680620	2699	841899	2919	901010	3320
151610	1514	293969	2423	510620	1711	680690	2699	841911	2930	901050	3320
151620	1514	293991	2423	510710	1711	680710	2699	841919	2930	901060	3320
151710	1514	293999	2423	510720	1711	680790	2699	841920	3311	901090	3320
151790	1514	294000	2423	510810	1711	680800	2695	841931	2925	901110	3320
151800	2429	294110	2423	510820	1711	680911	2695	841932	2929	901120	3320
152000	2424	294120	2423	510910	1711	680919	2695	841939	2929	901180	3320
152110	1514	294130	2423	510990	1711	680990	2695	841940	2919	901190	3320

Table 12: HS 2007 to ISIC Rev. 3 concordance table *(continued)*

Concordance		(continued)		(continued)		(continued)		(continued)		(continued)	
HS 2007	ISIC Rev. 3	HS 2007	ISIC Rev. 3	HS 2007	ISIC Rev. 3	HS 2007	ISIC Rev. 3	HS 2007	ISIC Rev. 3	HS 2007	ISIC Rev. 3
152190	0122	294140	2423	511000	1711	681011	2695	841950	2919	901210	3312
152200	1514	294150	2423	511111	1711	681019	2695	841960	2919	901290	3312
160100	1511	294190	2423	511119	1711	681091	2695	841981	2925	901310	3320
160210	1549	294200	2411	511120	1711	681099	2695	841989	2919	901320	3320
160220	1511	300120	2423	511130	1711	681140	2695	841990	2919	901380	3320
160231	1511	300190	2423	511190	1711	681181	2695	842010	2919	901390	3320
160232	1511	300210	2423	511211	1711	681182	2695	842091	2919	901410	3312
160239	1511	300220	2423	511219	1711	681183	2695	842099	2919	901420	3312
160241	1511	300230	2423	511220	1711	681189	2695	842111	2925	901480	3312
160242	1511	300290	2423	511230	1711	681280	2699	842112	2929	901490	3312
160249	1511	300310	2423	511290	1711	681291	2699	842119	2919	901510	3312
160250	1511	300320	2423	511300	1711	681292	2699	842121	2919	901520	3312
160290	1511	300331	2423	520100	0111	681293	2699	842122	2919	901530	3312
160300	1511	300339	2423	520210	9999	681299	2699	842123	2919	901540	3312
160411	1512	300340	2423	520291	9999	681320	2699	842129	2919	901580	3312
160412	1512	300390	2423	520299	9999	681381	2699	842131	2919	901590	3312
160413	1512	300410	2423	520300	1711	681389	2699	842139	2919	901600	3312
160414	1512	300420	2423	520411	1711	681410	2699	842191	2919	901710	3312
160415	1512	300431	2423	520419	1711	681490	2699	842199	2919	901720	3312
160416	1512	300432	2423	520420	1711	681510	2699	842211	2930	901730	3312
160419	1512	300439	2423	520511	1711	681520	2699	842219	3190	901780	3312
160420	1512	300440	2423	520512	1711	681591	2692	842220	2919	901790	3312
160430	1512	300450	2423	520513	1711	681599	2699	842230	2919	901811	3311
160510	1512	300490	2423	520514	1711	690100	2692	842240	2919	901812	3311
160520	1512	300510	2423	520515	1711	690210	2692	842290	2919	901813	3311
160530	1512	300590	2423	520521	1711	690220	2692	842310	2919	901814	3311
160540	1512	300610	2423	520522	1711	690290	2692	842320	2919	901819	3311
160590	1512	300620	2423	520523	1711	690310	2692	842330	2919	901820	3311
170111	1542	300630	2423	520524	1711	690320	2692	842381	2919	901831	3311
170112	1542	300640	2423	520526	1711	690390	2692	842382	2919	901832	3311
170191	1542	300650	2423	520527	1711	690410	2693	842389	2919	901839	3311
170199	1542	300660	2423	520528	1711	690490	2693	842390	2919	901841	3311
170211	1520	300670	2429	520531	1711	690510	2693	842410	2919	901849	3311
170219	1520	300691	2520	520532	1711	690590	2693	842420	2919	901850	3311
170220	1542	300692	2423	520533	1711	690600	2693	842430	2919	901890	3311
170230	1532	310100	2412	520534	1711	690710	2693	842481	2921	901910	3311
170240	1532	310210	2412	520535	1711	690790	2693	842489	2919	901920	3311
170250	1532	310221	2412	520541	1711	690810	2693	842490	2919	902000	3311
170260	1532	310229	2412	520542	1711	690890	2693	842511	2915	902110	3311
170290	1532	310230	2412	520543	1711	690911	2691	842519	2915	902121	3311
170310	1542	310240	2412	520544	1711	690912	2691	842531	2915	902129	3311
170390	1542	310250	2412	520546	1711	690919	2691	842539	2915	902131	3311
170410	1543	310260	2412	520547	1711	690990	2691	842541	2915	902139	3311
170490	1543	310280	2412	520548	1711	691010	2691	842542	2915	902140	3311
180100	0113	310290	2412	520611	1711	691090	2691	842549	2915	902150	3311
180200	9999	310310	2412	520612	1711	691110	2691	842611	2915	902190	3311
180310	1543	310390	2412	520613	1711	691190	2691	842612	2915	902212	3311
180320	1543	310420	2412	520614	1711	691200	2691	842619	2915	902213	3311
180400	1543	310430	2412	520615	1711	691310	2691	842620	2915	902214	3311
180500	1543	310490	2412	520621	1711	691390	2691	842630	2915	902219	3311
180610	1543	310510	2412	520622	1711	691410	2691	842641	2915	902221	3311
180620	1543	310520	2412	520623	1711	691490	2691	842649	2915	902229	3311
180631	1543	310530	2412	520624	1711	700100	2610	842691	2915	902230	3311
180632	1543	310540	2412	520625	1711	700210	2610	842699	2915	902290	3311
180690	1543	310551	2412	520631	1711	700220	2610	842710	2915	902300	3699
190110	1549	310559	2412	520632	1711	700231	2610	842720	2915	902410	3312
190120	1531	310560	2412	520633	1711	700232	2610	842790	2915	902480	3312
190190	1549	310590	2412	520634	1711	700239	2610	842810	2915	902490	3312
190211	1544	320110	2411	520635	1711	700312	2610	842820	2915	902511	3312
190219	1544	320120	2411	520641	1711	700319	2610	842831	2924	902519	3312
190220	1544	320190	2411	520642	1711	700320	2610	842832	2915	902580	3312
190230	1544	320210	2411	520643	1711	700330	2610	842833	2915	902590	3312
190240	1544	320290	2411	520644	1711	700420	2610	842839	2915	902610	3312
190300	1532	320300	2411	520645	1711	700490	2610	842840	2915	902620	3312
190410	1531	320411	2411	520710	1711	700510	2610	842860	2915	902680	3312
190420	1531	320412	2411	520790	1711	700521	2610	842890	2915	902690	3312
190430	1531	320413	2411	520811	1711	700529	2610	842911	2924	902710	3312
190490	1531	320414	2411	520812	1711	700530	2610	842919	2924	902720	3312
190510	1541	320415	2411	520813	1711	700600	2610	842920	2924	902730	3312
190520	1541	320416	2411	520819	1711	700711	2610	842930	2924	902750	3312
190531	1541	320417	2411	520821	1711	700719	2610	842940	2924	902780	3312
190532	1541	320419	2411	520822	1711	700721	2610	842951	2924	902790	3312
190540	1541	320420	2411	520823	1711	700729	2610	842952	2924	902810	3312
190590	1541	320490	2411	520829	1711	700800	2610	842959	2924	902820	3312

Table 12: HS 2007 to ISIC Rev. 3 concordance table *(continued)*

Concordance		(continued)		(continued)		(continued)		(continued)		(continued)	
HS 2007	ISIC Rev. 3	HS 2007	ISIC Rev. 3	HS 2007	ISIC Rev. 3	HS 2007	ISIC Rev. 3	HS 2007	ISIC Rev. 3	HS 2007	ISIC Rev. 3
200110	1513	320500	2411	520831	1711	700910	2610	843010	2924	902830	3312
200190	1513	320611	2411	520832	1711	700991	2610	843020	2924	902890	3312
200210	1513	320619	2411	520833	1711	700992	2610	843031	2924	902910	3312
200290	1513	320620	2411	520839	1711	701010	2610	843039	2924	902920	3312
200310	1513	320641	2411	520841	1711	701020	2610	843041	2924	902990	3312
200320	1513	320642	2411	520842	1711	701090	2610	843049	2924	903010	3312
200390	1513	320649	2411	520843	1711	701110	2610	843050	2924	903020	3312
200410	1513	320650	2411	520849	1711	701120	2610	843061	2924	903031	3312
200490	1513	320710	2422	520851	1711	701190	2610	843069	2924	903032	3312
200510	1549	320720	2422	520852	1711	701310	2610	843110	2915	903033	3312
200520	1513	320730	2422	520859	1711	701322	2610	843120	2915	903039	3312
200540	1513	320740	2422	520911	1711	701328	2610	843131	2915	903040	3312
200551	1513	320810	2422	520912	1711	701333	2610	843139	2915	903082	3312
200559	1513	320820	2422	520919	1711	701337	2610	843141	2915	903084	3312
200560	1513	320890	2422	520921	1711	701341	2610	843142	2924	903089	3312
200570	1513	320910	2422	520922	1711	701342	2610	843143	2924	903090	3312
200580	1513	320990	2422	520929	1711	701349	2610	843149	2924	903110	3312
200591	1513	321000	2422	520931	1711	701391	2610	843210	2921	903120	3312
200599	1513	321100	2422	520932	1711	701399	2610	843221	2921	903141	3312
200600	1543	321210	2422	520939	1711	701400	2610	843229	2921	903149	3312
200710	1549	321290	2422	520941	1711	701510	2610	843230	2921	903180	3312
200791	1513	321310	2422	520942	1711	701590	2610	843240	2921	903190	3312
200799	1513	321390	2422	520943	1711	701610	2610	843280	2921	903210	3313
200811	1513	321410	2422	520949	1711	701690	2610	843290	2921	903220	3313
200819	1513	321490	2422	520951	1711	701710	2610	843311	2921	903281	3313
200820	1513	321511	2422	520952	1711	701720	2610	843319	2921	903289	3313
200830	1513	321519	2422	520959	1711	701790	2610	843320	2921	903290	3313
200840	1513	321590	2429	521011	1711	701810	2610	843330	2921	903300	3312
200850	1513	330112	2429	521019	1711	701820	2610	843340	2921	910111	3330
200860	1513	330113	2429	521021	1711	701890	2610	843351	2921	910119	3330
200870	1513	330119	2429	521029	1711	701911	2610	843352	2921	910121	3330
200880	1513	330124	2429	521031	1711	701912	2610	843353	2921	910129	3330
200891	1513	330125	2429	521032	1711	701919	2610	843359	2921	910191	3330
200892	1513	330129	2429	521039	1711	701931	2610	843360	2921	910199	3330
200899	1513	330130	2429	521041	1711	701932	2610	843390	2921	910211	3330
200911	1513	330190	2429	521049	1711	701939	2610	843410	2921	910212	3330
200912	1513	330210	2429	521051	1711	701940	1711	843420	2925	910219	3330
200919	1513	330290	2429	521059	1711	701951	1711	843490	2925	910221	3330
200921	1513	330300	2424	521111	1711	701952	1711	843510	2925	910229	3330
200929	1513	330410	2424	521112	1711	701959	1711	843590	2925	910291	3330
200931	1513	330420	2424	521119	1711	701990	2610	843610	2921	910299	3330
200939	1513	330430	2424	521120	1711	702000	2610	843621	2921	910310	3330
200941	1513	330491	2424	521131	1711	710110	0500	843629	2921	910390	3330
200949	1513	330499	2424	521132	1711	710121	0500	843680	2921	910400	3330
200950	1513	330510	2424	521139	1711	710122	3691	843691	2921	910511	3330
200961	1513	330520	2424	521141	1711	710210	1429	843699	2921	910519	3330
200969	1513	330530	2424	521142	1711	710221	1429	843710	2921	910521	3330
200971	1513	330590	2424	521143	1711	710229	3691	843780	2925	910529	3330
200979	1513	330610	2424	521149	1711	710231	1429	843790	2925	910591	3330
200980	1513	330620	2430	521151	1711	710239	3691	843810	2925	910599	3330
200990	1513	330690	2424	521152	1711	710310	1429	843820	2925	910610	3330
210111	1549	330710	2424	521159	1711	710391	3691	843830	2925	910690	3330
210112	1549	330720	2424	521211	1711	710399	3691	843840	2925	910700	3330
210120	1549	330730	2424	521212	1711	710410	2411	843850	2925	910811	3330
210130	1549	330741	2424	521213	1711	710420	2411	843860	2925	910812	3330
210210	1549	330749	2424	521214	1711	710490	3691	843880	2925	910819	3330
210220	1549	330790	2424	521215	1711	710510	3691	843890	2925	910820	3330
210230	1549	340111	2424	521221	1711	710590	3691	843910	2929	910890	3330
210310	1549	340119	2424	521222	1711	710610	2720	843920	2929	910911	3330
210320	1549	340120	2424	521223	1711	710691	2720	843930	2929	910919	3330
210330	1549	340130	2424	521224	1711	710692	2720	843991	2929	910990	3330
210390	1549	340211	2424	521225	1711	710700	2720	843999	2929	911011	3330
210410	1549	340212	2424	530110	0111	710811	2720	844010	2929	911012	3330
210420	1549	340213	2424	530121	1711	710812	2720	844090	2929	911019	3330
210500	1520	340219	2424	530129	1711	710813	2720	844110	2929	911090	3330
210610	1549	340220	2424	530130	1711	710820	2720	844120	2929	911110	3330
210690	1549	340290	2424	530210	0111	710900	2720	844130	2929	911120	3330
220110	1554	340311	2429	530290	1711	711011	2720	844140	2929	911180	3330
220190	1554	340319	2429	530310	0111	711019	2720	844180	2929	911190	3330
220210	1554	340391	2429	530390	1711	711021	2720	844190	2929	911220	3330
220290	1554	340399	2429	530500	0111	711029	2720	844230	2929	911290	3330
220300	1553	340420	2424	530610	1711	711031	2720	844240	2929	911310	3330
220410	1552	340490	2424	530620	1711	711039	2720	844250	2222	911320	3330
220421	1552	340510	2424	530710	1711	711041	2720	844311	2929	911390	1912

Table 12: HS 2007 to ISIC Rev. 3 concordance table *(continued)*

Concordance		(continued)		(continued)		(continued)		(continued)		(continued)	
HS 2007	ISIC Rev. 3	HS 2007	ISIC Rev. 3	HS 2007	ISIC Rev. 3	HS 2007	ISIC Rev. 3	HS 2007	ISIC Rev. 3	HS 2007	ISIC Rev. 3
220429	1552	340520	2424	530720	1711	711049	2720	844312	3000	911410	3330
220430	1552	340530	2424	530810	1711	711100	2720	844313	2929	911420	3330
220510	1552	340540	2424	530820	1711	711230	9999	844314	2929	911430	3330
220590	1552	340590	2424	530890	1711	711291	9999	844315	2929	911440	3330
220600	1552	340600	3699	530911	1711	711292	9999	844316	2929	911490	3330
220710	1551	340700	2429	530919	1711	711299	9999	844317	2929	920110	3692
220720	1551	350110	1520	530921	1711	711311	3691	844319	2929	920120	3692
220820	1551	350190	2429	530929	1711	711319	3691	844331	3000	920190	3692
220830	1551	350211	1549	531010	1711	711320	3691	844332	3000	920210	3692
220840	1551	350219	1549	531090	1711	711411	3691	844339	3000	920290	3692
220850	1551	350220	2429	531100	1711	711419	3691	844391	2929	920510	3692
220860	1551	350290	2429	540110	1711	711420	3691	844399	3000	920590	3692
220870	1551	350300	2429	540120	1711	711510	3691	844400	2926	920600	3692
220890	1551	350400	2429	540211	2430	711590	3691	844511	2926	920710	3692
220900	1549	350510	1532	540219	2430	711610	3691	844512	2926	920790	3692
230110	1511	350520	2429	540220	2430	711620	3691	844513	2926	920810	3692
230120	1512	350610	2429	540231	2430	711711	3699	844519	2926	920890	3692
230210	9999	350691	2429	540232	2430	711719	3699	844520	2926	920930	3692
230230	9999	350699	2429	540233	2430	711790	3699	844530	2926	920991	3692
230240	9999	350710	2411	540234	2430	711810	3691	844540	2926	920992	3692
230250	9999	350790	2411	540239	2430	711890	3691	844590	2926	920994	3692
230310	9999	360100	2429	540244	2430	720110	2710	844610	2926	920999	3692
230320	9999	360200	2429	540245	2430	720120	2710	844621	2926	930111	2927
230330	9999	360300	2429	540246	2430	720150	2710	844629	2926	930119	2927
230400	1514	360410	2429	540247	2430	720211	2710	844630	2926	930120	2927
230500	1514	360490	2429	540248	2430	720219	2710	844711	2926	930190	2927
230610	1514	360500	3699	540249	2430	720221	2710	844712	2926	930200	2927
230620	1514	360610	3699	540251	2430	720229	2710	844720	2926	930310	2927
230630	1514	360690	3699	540252	2430	720230	2710	844790	2926	930320	2927
230641	1514	370110	2429	540259	2430	720241	2710	844811	2926	930330	2927
230649	1514	370120	2429	540261	1711	720249	2710	844819	2926	930390	2927
230650	1514	370130	2429	540262	1711	720250	2710	844820	2926	930400	2927
230660	1514	370191	2429	540269	1711	720260	2710	844831	2926	930510	2927
230690	1514	370199	2429	540310	2430	720270	2710	844832	2926	930521	2927
230700	9999	370210	2429	540331	2430	720280	2710	844833	2926	930529	2927
230800	9999	370231	2429	540332	2430	720291	2710	844839	2926	930591	2927
230910	1533	370232	2429	540333	2430	720292	2710	844842	2926	930599	2927
230990	1533	370239	2429	540339	2430	720293	2710	844849	2926	930621	2927
240110	0111	370241	2429	540341	1711	720299	2710	844851	2926	930629	2927
240120	0111	370242	2429	540342	1711	720310	2710	844859	2926	930630	2927
240130	9999	370243	2429	540349	1711	720390	2710	844900	2926	930690	2927
240210	1600	370244	2429	540411	2430	720410	9999	845011	2930	930700	2899
240220	1600	370251	2429	540412	2430	720421	9999	845012	2930	940110	3610
240290	1600	370252	2429	540419	2430	720429	9999	845019	2930	940120	3610
240310	1600	370253	2429	540490	2430	720430	9999	845020	2926	940130	3610
240391	1600	370254	2429	540500	2430	720441	9999	845090	2926	940140	3610
240399	1600	370255	2429	540600	1711	720449	9999	845110	2926	940151	3610
250100	1422	370256	2429	540710	1711	720450	9999	845121	2930	940159	3610
250200	1421	370291	2429	540720	1711	720510	2710	845129	2926	940161	3610
250300	1421	370293	2429	540730	1711	720521	2710	845130	2926	940169	3610
250410	1429	370294	2429	540741	1711	720529	2710	845140	2926	940171	3610
250490	1429	370295	2429	540742	1711	720610	2710	845150	2926	940179	3610
250510	1410	370310	2429	540743	1711	720690	2710	845180	2926	940180	3610
250590	1410	370320	2429	540744	1711	720711	2710	845190	2926	940190	3610
250610	1429	370390	2429	540751	1711	720712	2710	845210	2926	940210	3311
250620	1429	370400	7494	540752	1711	720719	2710	845221	2926	940290	3311
250700	1410	370510	7494	540753	1711	720720	2710	845229	2926	940310	3610
250810	1410	370590	7494	540754	1711	720810	2710	845230	2926	940320	3610
250830	1410	370610	9211	540761	1711	720825	2710	845240	2926	940330	3610
250840	1410	370690	9211	540769	1711	720826	2710	845290	2926	940340	3610
250850	1410	370710	2429	540771	1711	720827	2710	845310	2926	940350	3610
250860	1410	370790	2429	540772	1711	720836	2710	845320	2926	940360	3610
250870	1410	380110	2699	540773	1711	720837	2710	845380	2926	940370	3610
250900	1410	380120	2699	540774	1711	720838	2710	845390	2926	940381	3610
251010	1421	380130	2699	540781	1711	720839	2710	845410	2923	940389	3610
251020	1421	380190	2699	540782	1711	720840	2710	845420	2923	940390	3610
251110	1421	380210	2429	540783	1711	720851	2710	845430	2923	940410	3610
251120	1421	380290	2411	540784	1711	720852	2710	845490	2923	940421	3610
251200	1429	380300	2411	540791	1711	720853	2710	845510	2923	940429	3610
251310	1429	380400	9999	540792	1711	720854	2710	845521	2923	940430	1721
251320	1429	380510	2411	540793	1711	720890	2710	845522	2923	940490	1721
251400	1410	380590	2411	540794	1711	720915	2710	845530	2923	940510	3150
251511	1410	380610	2411	540810	1711	720916	2710	845590	2923	940520	3150
251512	1410	380620	2411	540821	1711	720917	2710	845610	2922	940530	3150

Table 12: HS 2007 to ISIC Rev. 3 concordance table *(continued)*

Concordance		(continued)		(continued)		(continued)		(continued)		(continued)	
HS 2007	ISIC Rev. 3	HS 2007	ISIC Rev. 3	HS 2007	ISIC Rev. 3	HS 2007	ISIC Rev. 3	HS 2007	ISIC Rev. 3	HS 2007	ISIC Rev. 3
251520	1410	380630	2411	540822	1711	720918	2710	845620	2922	940540	3150
251611	1410	380690	2411	540823	1711	720925	2710	845630	2922	940550	3150
251612	1410	380700	2411	540824	1711	720926	2710	845690	2922	940560	3150
251620	1410	380850	2421	540831	1711	720927	2710	845710	2922	940591	2610
251690	1410	380891	2421	540832	1711	720928	2710	845720	2922	940592	2520
251710	1410	380892	2421	540833	1711	720990	2710	845730	2922	940599	3150
251720	1410	380893	2421	540834	1711	721011	2710	845811	2922	940600	2811
251730	1410	380894	2421	550110	2430	721012	2710	845819	2922	950300	3694
251741	1410	380899	2421	550120	2430	721020	2710	845891	2922	950410	3694
251749	1410	380910	2429	550130	2430	721030	2710	845899	2922	950420	3694
251810	1410	380991	2429	550140	2430	721041	2710	845910	2922	950430	3694
251820	1410	380992	2429	550190	2430	721049	2710	845921	2922	950440	3694
251830	1410	380993	2429	550200	2430	721050	2710	845929	2922	950490	3694
251910	1429	381010	2429	550311	2430	721061	2710	845931	2922	950510	3699
251990	1429	381090	2429	550319	2430	721069	2710	845939	2922	950590	3699
252010	1410	381111	2429	550320	2430	721070	2710	845940	2922	950611	3693
252020	2694	381119	2429	550330	2430	721090	2710	845951	2922	950612	3693
252100	1410	381121	2429	550340	2430	721113	2710	845959	2922	950619	3693
252210	2694	381129	2429	550390	2430	721114	2710	845961	2922	950621	3693
252220	2694	381190	2429	550410	2430	721119	2710	845969	2922	950629	3693
252230	2694	381210	2429	550490	2430	721123	2710	845970	2922	950631	3693
252310	2694	381220	2429	550510	9999	721129	2710	846011	2922	950632	3693
252321	2694	381230	2429	550520	9999	721190	2710	846019	2922	950639	3693
252329	2694	381300	2429	550610	1711	721210	2710	846021	2922	950640	3693
252330	2694	381400	2422	550620	1711	721220	2710	846029	2922	950651	3693
252390	2694	381511	2429	550630	1711	721230	2710	846031	2922	950659	3693
252410	1429	381512	2429	550690	1711	721240	2710	846039	2922	950661	3693
252490	1429	381519	2429	550700	1711	721250	2710	846040	2922	950662	3693
252510	1429	381590	2429	550810	1711	721260	2710	846090	2922	950669	3693
252520	1429	381600	2692	550820	1711	721310	2710	846120	2922	950670	3693
252530	1429	381700	2429	550911	1711	721320	2710	846130	2922	950691	3693
252610	1429	381800	2429	550912	1711	721391	2710	846140	2922	950699	3693
252620	1429	381900	2429	550921	1711	721399	2710	846150	2922	950710	3693
252810	1421	382000	2429	550922	1711	721410	2710	846190	2922	950720	3693
252890	1421	382100	2429	550931	1711	721420	2710	846210	2922	950730	3693
252910	1429	382200	2429	550932	1711	721430	2710	846221	2922	950790	3693
252921	1421	382311	2411	550941	1711	721491	2710	846229	2922	950810	3699
252922	1421	382312	2411	550942	1711	721499	2710	846231	2922	950890	3699
252930	1429	382313	2411	550951	1711	721510	2710	846239	2922	960110	3699
253010	1429	382319	2411	550952	1711	721550	2710	846241	2922	960190	3699
253020	1421	382370	2411	550953	1711	721590	2710	846249	2922	960200	3699
253090	1421	382410	2429	550959	1711	721610	2710	846291	2922	960310	3699
260111	1310	382430	2429	550961	1711	721621	2710	846299	2922	960321	3699
260112	1310	382440	2429	550962	1711	721622	2710	846310	2922	960329	3699
260120	2411	382450	2695	550969	1711	721631	2710	846320	2922	960330	3699
260200	1320	382460	2429	550991	1711	721632	2710	846330	2922	960340	3699
260300	1320	382471	2429	550992	1711	721633	2710	846390	2922	960350	3699
260400	1320	382472	2429	550999	1711	721640	2710	846410	2922	960390	3699
260500	1320	382473	2429	551011	1711	721650	2710	846420	2922	960400	3699
260600	1320	382474	2429	551012	1711	721661	2710	846490	2922	960500	1912
260700	1320	382475	2429	551020	1711	721669	2710	846510	2922	960610	3699
260800	1320	382476	2429	551030	1711	721691	2710	846591	2922	960621	3699
260900	1320	382477	2429	551090	1711	721699	2710	846592	2922	960622	3699
261000	1320	382478	2429	551110	1711	721710	2710	846593	2922	960629	3699
261100	1320	382479	2429	551120	1711	721720	2710	846594	2922	960630	3699
261210	1200	382481	2429	551130	1711	721730	2710	846595	2922	960711	3699
261220	1200	382482	2429	551211	1711	721790	2710	846596	2922	960719	3699
261310	1320	382483	2429	551219	1711	721810	2710	846599	2922	960720	3699
261390	1320	382490	2429	551221	1711	721891	2710	846610	2922	960810	3699
261400	1320	382510	2429	551229	1711	721899	2710	846620	2922	960820	3699
261510	1320	382520	2429	551291	1711	721911	2710	846630	2922	960831	3699
261590	1320	382530	2429	551299	1711	721912	2710	846691	2922	960839	3699
261610	1320	382541	2429	551311	1711	721913	2710	846692	2922	960840	3699
261690	1320	382549	2429	551312	1711	721914	2710	846693	2922	960850	3699
261710	1320	382550	2429	551313	1711	721921	2710	846694	2922	960860	3699
261790	1320	382561	2429	551319	1711	721922	2710	846711	2922	960891	3699
261800	9999	382569	2429	551321	1711	721923	2710	846719	2922	960899	3699
261900	9999	382590	2429	551323	1711	721924	2710	846721	2922	960910	3699
262011	9999	390110	2413	551329	1711	721931	2710	846722	2922	960920	3699
262019	9999	390120	2413	551331	1711	721932	2710	846729	2922	960990	3699
262021	9999	390130	2413	551339	1711	721933	2710	846781	2922	961000	3699
262029	9999	390190	2413	551341	1711	721934	2710	846789	2922	961100	3699
262030	9999	390210	2413	551349	1711	721935	2710	846791	2922	961210	3699
262040	9999	390220	2413	551411	1711	721990	2710	846792	2922	961220	3699

Table 12: HS 2007 to ISIC Rev. 3 concordance table *(continued)*

Concordance		(continued)		(continued)		(continued)		(continued)		(continued)	
HS 2007	ISIC Rev. 3	HS 2007	ISIC Rev. 3	HS 2007	ISIC Rev. 3	HS 2007	ISIC Rev. 3	HS 2007	ISIC Rev. 3	HS 2007	ISIC Rev. 3
262060	9999	390230	2413	551412	1711	722011	2710	846799	2922	961310	3699
262091	9999	390290	2413	551419	1711	722012	2710	846810	2922	961320	3699
262099	9999	390311	2413	551421	1711	722020	2710	846820	2922	961380	3699
262110	1429	390319	2413	551422	1711	722090	2710	846880	2922	961390	3699
262190	1429	390320	2413	551423	1711	722100	2710	846890	2922	961400	3699
270111	1010	390330	2413	551429	1711	722211	2710	846900	3000	961511	3699
270112	1010	390390	2413	551430	1711	722219	2710	847010	3000	961519	3699
270119	1010	390410	2413	551441	1711	722220	2710	847021	3000	961590	3699
270120	1010	390421	2413	551442	1711	722230	2710	847029	3000	961610	3699
270210	1020	390422	2413	551443	1711	722240	2710	847030	3000	961620	3699
270220	1020	390430	2413	551449	1711	722300	2710	847050	3000	961700	3699
270300	1030	390440	2413	551511	1711	722410	2710	847090	3000	961800	3699
270400	2310	390450	2413	551512	1711	722490	2710	847130	3000	970110	9214
270500	4020	390461	2413	551513	1711	722511	2710	847141	3000	970190	9214
270600	2310	390469	2413	551519	1711	722519	2710	847149	3000	970200	9214
270710	2411	390490	2413	551521	1711	722530	2710	847150	3000	970300	9214
270720	2411	390512	2413	551522	1711	722540	2710	847160	3000	970400	9214
270730	2411	390519	2413	551529	1711	722550	2710	847170	3000	970500	9214
270740	2411	390521	2413	551591	1711	722591	2710	847180	3000	970600	9214

Note: Concordance between HS 2007 AG6 and ISIC Rev. 3 IV-digit product codes according to World Integrated Trade Solution (WITS); see `https://wits.worldbank.org/product_concordance.html`.

B.3 Manufacturing industry classification

The industry sector level classification used in this section follows the *International Standard Industrial Classification* (ISIC), Revision 3 database by the United Nations Statistics Division (INDSTAT, 2020). The ISIC combinations chosen for this report are presented in Table 13 and were defined with the objective of having a straight-forward correspondence between different data sources and classification standards in order to guarantee a consistent definition of manufacturing sectors throughout this report that can also be applied easily to different classification formats. With regard to the technology classification of the industries, all manufacturing industries are further classified by their technology intensity following the technology classification of the *Organisation for Economic Co-operation and Development* (OECD) which is based on research and development (R&D) intensity relative to value-added and gross production statistics (OECD, 2011). The OECD classifies manufacturing industries into four categories of high technology, medium high technology, medium-low technology and low technology industries.

Table 13: Manufacturing industry classification

		ISIC Industry Combination		
Abbreviation	ISIC Rev.3 Industry Description	Revision 3	Revision 4	Technology Group
Food, beverages and tobacco	Manufacture of food products and beverages	15 + 16	10 + 11 + 12	Low
Food, beverages and tobacco	Manufacture of tobacco products	15 + 16	10 + 11 + 12	Low
Textiles	Manufacture of textiles	17	13	Low
Wearing apparel	Manufacture of wearing apparel; dressing and dyeing of fur + Tanning and dressing of leather; manufacture of luggage, handbags, saddlery, harness and footwear	18 + 19	14 + 15	Low
Wood products	Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials	20	16	Low
Paper and paper products	Manufacture of paper and paper products	21	17	Low
Printing and publishing	Publishing, printing and reproduction of recorded media	22	18	Low

Table 13: Manufacturing industry classification *(continued)*

Abbreviation	ISIC Rev.3 Industry Description	Revision 3	Revision 4	Technology Group
Coke, petroleum and nuclear	Manufacture of coke, refined petroleum products and nuclear fuel	23	19	Medium-low
Chemicals	Manufacture of chemicals and chemical products	24	20 + 21	Medium-high
Rubber and plastic	Manufacture of rubber and plastics products	25	22	Medium-low
Non-metallic minerals	Manufacture of other non-metallic mineral products	26	23	Medium-low
Basic metals	Manufacture of basic metals	27	24	Medium-low
Fabricated metals	Manufacture of fabricated metal products, except machinery and equipment	28	25	Medium-low
Machinery	Manufacture of machinery and equipment n.e.c.	29	28 + 33	Medium-high
Computer and electronics	Manufacture of office, accounting and computing machinery + Manufacture of radio, television and communication equipment and apparatus + Manufacture of medical, precision and optical instruments, watches and clocks	30 + 32 + 33	26	High
Electrical machinery	Manufacture of electrical machinery and apparatus n.e.c.	31	27	Medium-high
Motor vehicles	Manufacture of motor vehicles, trailers and semi-trailers	34	29	Medium-high
Transport equipment	Manufacture of other transport equipment	35	30	Medium-high
Furniture and n.e.c.	Manufacture of furniture; manufacturing n.e.c.	36	31 + 32	Low

Note: Abbreviations chosen by authors for the purpose of this analysis. Data taken from INDSTAT (2020). Technology classification based on OECD (2011). The ISIC combination presented in this table was defined with the objective of having a straight-forward correspondence between different data sourced and to guarantee a consistent definition of manufacturing sectors throughout this report.

B.4 Industrial Export Spezialisation indicator (IES)

The industry export specialization (IES) draws from the Revealed Comparative Advantage, isolating the manufacturing industry from the rest of the economy in order to capture properly the movements of this dimension, since it is significantly lower than the agricultural and mining industries in Sudan. Following Balassa (1965)'s Revealed Comparative Advantage (RCA), the IES for country i in good j is given by:

$$IES_j^i = \frac{X_j^i / X^i}{X_j / X}$$

where X_j^i is country i's export of good j, $X^i = \sum_j X_j^i$ is country i's aggregate exports, X_j is world exports of good j, and $X = \sum_j X_j$ is world aggregate exports.

Typically, when mapping trade data to manufacturing sectors, many traded commodities are assigned to one particular manufacturing aggregate. Therefore, in order to get from commodity-level data to industry-level data aggregation is necessary which is done as follows: Suppose good j belongs to ISIC sector s; calculate the weighted average IES of sector s for country i (where N_s denotes the number of goods j in sector s) as

$$IES_s^i = \frac{1}{N_s} \sum_{j \in s} w_j^i \times IES_j^i, \quad w_j^i = \frac{X_j^i}{\sum_{j \in s} X_j^i}.$$

Conversely, for any *un-weighted* IES, $w_j^i = 1$ for any j and i.

B.5 Econometric model

B.5.1 Construction of database

The two databases constructed for the econometric modelling combine *nominal gross exports* data from UN Comtrade (2020) as well as employment data from INDSTAT (2020)). Correspondence between both HS commodity classifications and the manufacturing sector classification following the procedure outlined in Section B.2 and allows for a separate II-digit as well as IV-digit ISIC Rev. 3 sector aggregation of the gross export data. For employment, different INDSTAT (2020) data for the II- and IV-digit sector analysis are sourced. In a next step, the sector level data is merged with macroeconomic variables taken from Feenstra et al. (2015) and income group classifications data is taken from World Bank (2019c).

B.5.2 Econometric model

We estimate a panel fixed effects model in order to analyse the development patterns for j industry aggregates of manufacturing, of which the group of X industries is discussed in greater depth. For each industry aggregate, j we estimate

$$y_{cjt} = \alpha_{cj} + \boldsymbol{\beta}_j \mathbf{X}_{cjt} + \tau_{jt} + \epsilon_{cjt}$$

where y_{cjt}, is the log of *nominal gross exports* or *manufacturing employment relative to the population* of country c's industry aggregate j in period t, respectively. Please note that this model is estimated separately for all j individual industries, and we retain subscript j to highlight this feature of our model. The explanatory variables in **X** contain the logs of real GDP per capita (Expenditure-side real GDP at chained PPPs) and are added in their linear, quadratic and cubic representation. Furthermore, α_{cj} and τ_{jt} denote country and time effects. GDP[15] and population data is taken from Penn World Table version 9.1 Feenstra et al. (2015) while income group data is taken from World Bank Country and Lending Groups.[16] Since the last available year of INDSTAT data is 2017 we also use the World Bank income group classification for 2017 for country classifications.

B.6 Sector-level imports (IMX)

Complementing the use of simple import growth rates the analysis introduces the concept of the 'Import index' which is, given the base year in $t = 2012$, is given by

$$IMX_t = \frac{Import_t}{Import_{t=2005}}$$

and its relationship to growth rates is straightforward:

$$\begin{aligned} Simple\ growth\ rate := gr(t, t-1) + 1 &= \frac{Import_t}{Import_{t-1}} \\ &= \frac{Import_t / Import_{t=2005}}{Import_{t-1} / Import_{t=2005}} \\ &= \frac{IMX_t}{IMX_{t-1}} \end{aligned}$$

[15] Variable `rgdpe`: Expenditure-side real GDP at chained PPPs (in mil. 2011US$), to compare relative living standards across countries and over time.

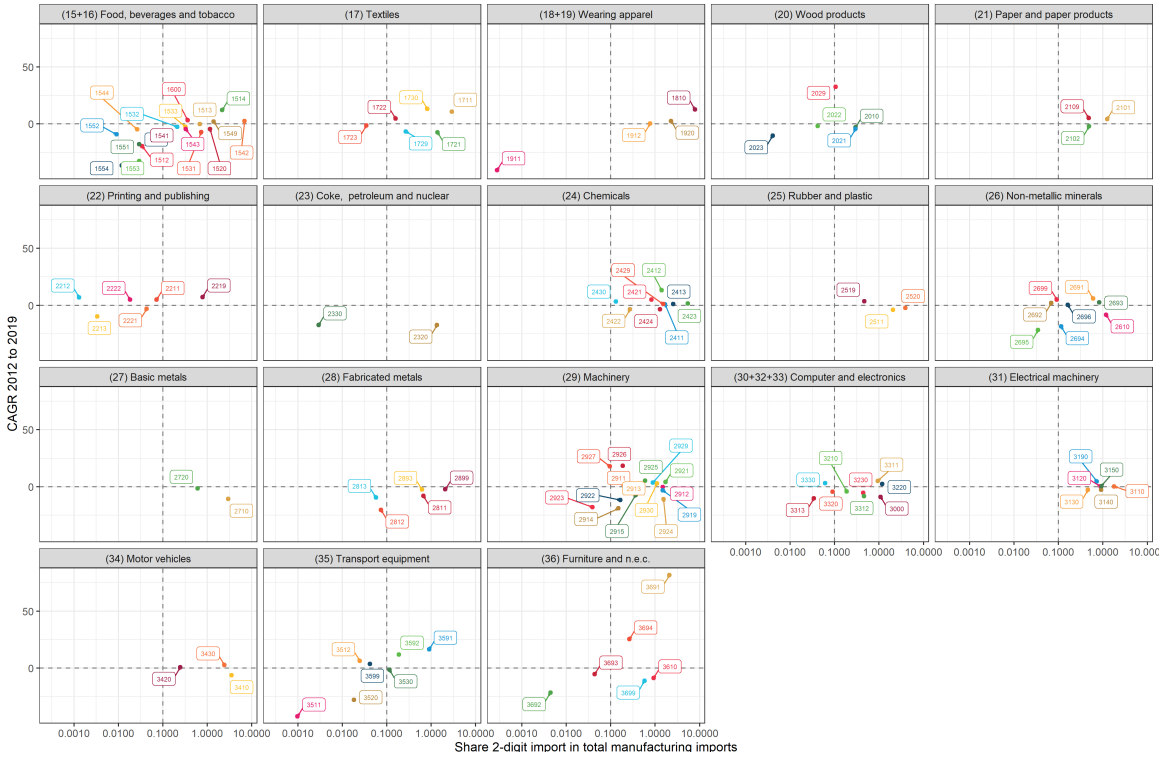
[16] See `https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups`; last visit September 2020.

$$
\begin{aligned}
CAGR := cagr(t+n, t=2005)+1 &= \left(\frac{Import_{t+n}}{Import_{t=2005}}\right)^{1/n} \\
&= \left(\frac{Import_{t+n}/Import_{t=2005}}{Import_{t=2005}/Import_{t=2005}}\right)^{1/n} \\
&= (IMX_{t+n})^{1/n}
\end{aligned}
$$

Please note that $Import_t$ refers to the aggregated imports of commodities that can be attributed to a specific manufacturing aggregate (either ISIC Rev.~3 2-digit or 4-digit level) in period t.

B.7 Supplemental results for the assessment of the sector-level integration process of Sudan

Figure 92: Country-level import CAGR (2012-2019) vs. sector share, ISIC Rev. 3 IV-digits



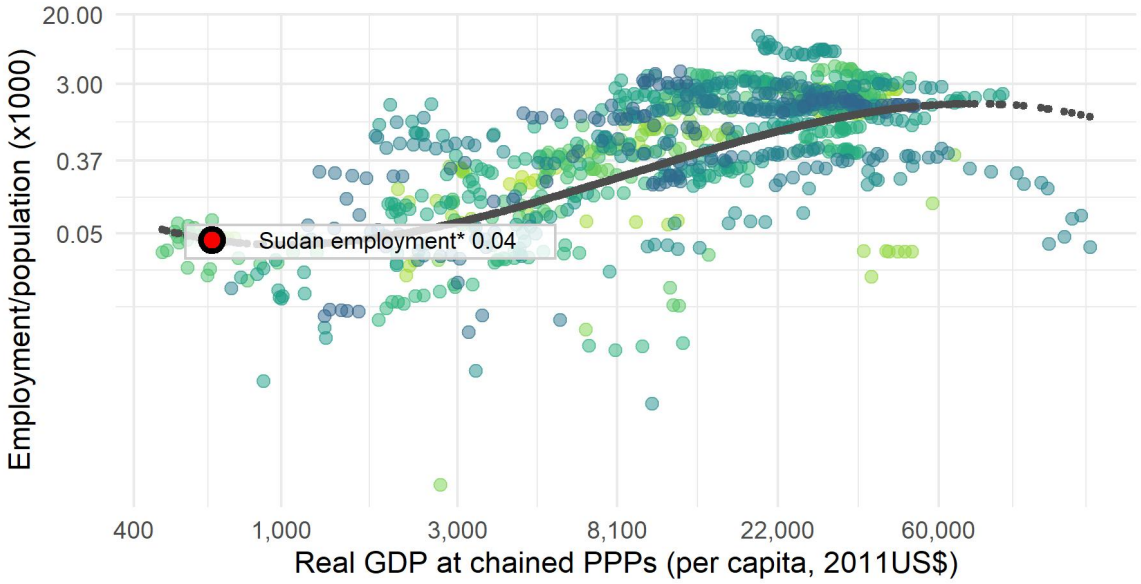
Note: Vertical dashed line identifies sector-level import share of 0.1%.
Data source: United Nations UN Comtrade (2020) database; see appendix B.2 and B.3 for more information on the concordance of traded commodities and ISIC Rev. 3 sector classification, respectively.

B.8 Employment projections

The *Employment projections* criterion provides projected national employment level based on an econometric model, which is described in Section B.5. The results of the LCA analysis for sub-sector *(1511) processing/preserving of meat* is provided in Figure 93 for illustrative purposes. The figure plots the employment-to-population ratio obtained from INDSTAT (2020) against per capita GDP figures taken from Feenstra et al. (2015), with the purpose of visualizing realized employment population across all global economies for the particular sub-sector in question. On the basis of these data, an econometric model as discussed in Section B.5 is employed with the objective of obtaining sector-level employment per capita trajectories conditional on the level of per capita GDP. The results for the global average trend are shown by the grey

line and indicates that sector *(1511) processing/preserving of meat* becomes somewhat less employment intensive at higher income levels, i.e., the curve starts to flatten out from a GDP per capita level of approximately 22,000 USD while still retaining robust growth up to that point. The red point corresponds to the employment-population ratio based on the model estimates of an average global economy at similar per capita GDP levels, with a similar endowment structure and a similar point of time as the latest available observation for Sudan. Similar patterns are estimated for all ISIC Rev. 3 II- and IV-digit industries and rank-ordered accordingly with the purpose of identifying the set of most employment-intensive manufacturing sectors. Global instead of LMI patterns are estimated in order to capture the full and comprehensive employment generation capability of each sector aggregate along the income trajectory.

Figure 93: Employment projection for sub-sector (1511) processing/preserving of meat.



Note: Axis in log-scale. No country-level observations for Sudan available. * Sudan employment: Projected employment/population ration ($\times 1000$) for Sudan of approximately 0.04 based on pooled cross-country data for up to 153 countries between 1963 and 2015 (grey line), and a projected country-level real GDP per capita of 2017 (red point). Income group cut-offs identified by the dashed vertical lines at USD 995, USD 3,896 and USD 12,375 as defined by World Bank Country and Lending Groups (World Bank, 2019c). Projected employment/population ratio(x1000) based on 2017 real GDP per capita.
Source: Calculations based on INDSTAT (2020) and Penn World Tables 9.1 (Feenstra et al., 2015) and following methodology described in Section B.5.

B.9 Index of Industrial Production (IIP)

In order to assess industrial production and capacity levels, the *Index of Industrial Production (IIP)* illustrates the performance of the manufacturing sector based on an index level relative to a base year (which is set to 2018). In other words, the IIP does not indicate absolute production outputs (volumes or values) but shows percentage change relative to the base year. More explicitly, the IIP which is, given the base year in $t = 2018$, is defined as

$$IIP_t = \frac{Industrial\ Production_t}{Industrial\ Production_{t=2018}}$$

and its relationship to the simple as well as Compound Annual Growth Rate (CAGR, see Appendix A.1) is straightforward:

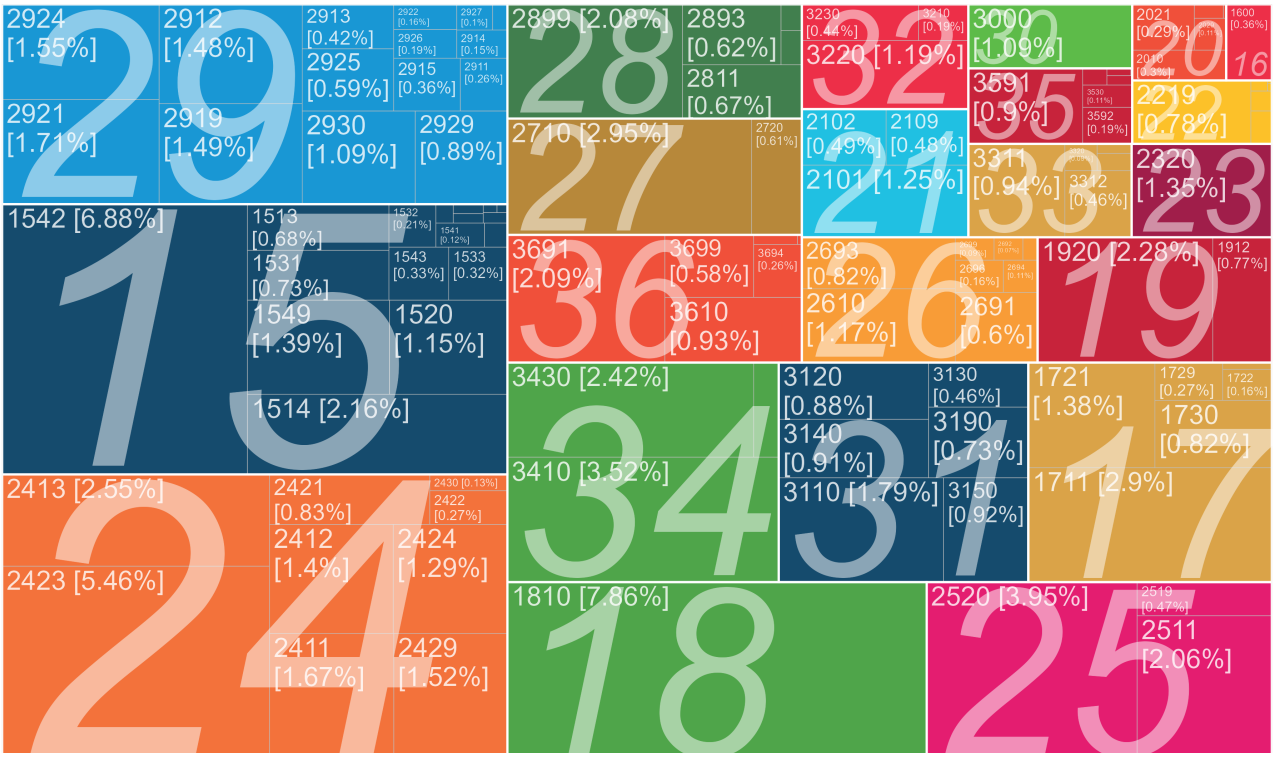
$$
\begin{aligned}
\textit{Simple growth rate} := gr(t, t-1) + 1 &= \frac{\textit{Industrial Production}_t}{\textit{Industrial Production}_{t-1}} \\
&= \frac{\textit{Industrial Production}_t / \textit{Industrial Production}_{t=2018}}{\textit{Industrial Production}_{t-1} / \textit{Industrial Production}_{t=2018}} \\
&= \frac{IIP_t}{IIP_{t-1}}
\end{aligned}
$$

$$
\begin{aligned}
CAGR := cagr(t+n, t=2018) + 1 &= \left(\frac{\textit{Industrial Production}_{t+n}}{\textit{Industrial Production}_{t=2018}} \right)^{1/n} \\
&= \left(\frac{\textit{Industrial Production}_{t+n} / \textit{Industrial Production}_{t=2018}}{\textit{Industrial Production}_{t=2018} / \textit{Industrial Production}_{t=2018}} \right)^{1/n} \\
&= (IIP_{t+n})^{1/n}
\end{aligned}
$$

The IIP series analysed in this report is taken from INDSTAT (2020) and follows the ISIC Rev. 3.

B.10 Supplementary results for: Trade composition of sector (15) Food and beverages and the potential of the agro-processing industry

Figure 94: Sudan's manufacturing import structure, 2019



Note: Traded USD in manufacturing by ISIC Rev. 3 IV-digit industry. For a particular ISIC Rev. 3 IV-digit industry, shares correspond to commodities' contributions to total imports in relation to each II-digit industry. Area drawn proportionally to traded volumes.
Data source: United Nations UN Comtrade (2020) database; see appendix B.2 and B.3 for more information on the concordance of traded commodities and ISIC Rev. 3 sector classification, respectively.

C Appendix to Section 3

C.1 Consultations

Consultations are interviews with local stakeholders such as interest groups, representatives from the private sector, academia, independent media, academia or the government. First, the interview partner is encouraged to name topics that are viewed as obstacles and to pose their opinion on general questions. Further, we ask opinions on specific subjects and bottlenecks identified from the (WBES) and other sources that were not discussed before. Summaries of their views are included in the text. If views from consultations contradict the findings from the Enterprise Survey, evidence from other sources is taken into account in the final identification of the main bottlenecks.

C.2 World Bank Enterprise Survey analysis

This appendix provides additional information on the analysis of the World Bank Enterprise Survey (WBES) conducted for Section 3.

C.2.1 Data and coverage

For the analysis, the most recent, pre-compiled World Bank Enterprise Survey for Sudan and the COMESA member countries are used. For a list of all included countries and the WBES survey year, please see Table 14. In order to guarantee that the results of the analysis draw a comprehensive and most accurate picture of the most recent developments in the respective countries, only COMESA economies are considered where the respective WBES was conducted during or after 2013. This group is referred to as COMESA* whenever Sudan is excluded (as will be the case for the analysis).

Table 14: WBES Firm sample by country and sector

		Number of firms	
	WBES survey year	Manufacturing	Non-manufacturing
Burundi	2014	60	97
Djibouti	2013	62	204
DRC	2013	241	288
Egypt	2020	1992	1083
Eswatini	2016	75	75
Ethiopia	2015	383	465
Kenya	2018	455	546
Madagascar	2013	263	269
Malawi	2014	197	326
Rwanda	2019	120	240
Sudan	2014	84	578
Tunisia	2020	365	250
Uganda	2013	378	384
Zambia	2019	180	421
Zimbabwe	2016	289	311

Note: Data taken from comprehensive WBES database. Firm classified as 'manufacturing' if main product/service according to ISIC (Rev. 3.1) is part of manufacturing; firms labelled 'non-manufacturing' otherwise. Only COMESA economies considered if WBES was conducted during or after 2013.
Data source: WBES.

The WBES data is further classified as follows: The **manufacturing industry classification** follows the ISIC Rev.3.1 classification and allows for a further sub-classification to map (i) *priority sectors* and (ii) *technology aggregates* as presented in Appendix B.3. The following additional sub-classifications are introduced:

- *'Domestic vs. foreign'*: % owned by private foreign individuals, companies or organisations smaller/larger 50%.
- *'Large vs. SME'*: Micro, Small and Medium enterprises with <100 employees classified as 'SMEs'; 'large' otherwise.
- *'Exporter vs. non-exporter'*: % of sales as direct or indirect exports larger than 0 constitute 'exporters'; 'non-exporters' otherwise.

Table 15 provides a more detailed summary of the WBES firm sample by characteristics available for the set of countries analysed. Because of the low data coverage for the majority of sub-aggregates, the analysis of the WBES is not conducted at a more granular level.

Table 15: WBES Firm sample by characteristics

		Technology		Market		Size	
Number of manufacturing firms		LT	MHT	Exporter	Non-exporter	SMEs	Large
Sudan	**84**	.	.	.	.	.	.
... by technology							
LT	*32*	.	.	.	.	.	.
MHT	*52*	.	.	.	.	.	.
... by ownership							
domestic	*83*	31	52	.	.	.	.
foreign	*1*	1	.	.	.	.	.
... by size							
large	*13*	4	9	13	.	.	.
SME	*71*	28	43	70	1	.	.
... by market							
Exporter	*8*	5	3	7	1	4	4
Non-exporter	*75*	27	48	75	.	66	9
COMESA*	**5060**	.	.	.	.	.	.
... by technology							
LT	*3154*	.	.	.	.	.	.
MHT	*1894*	.	.	.	.	.	.
... by ownership							
domestic	*4487*	2790	1690	.	.	.	.
foreign	*502*	312	185	.	.	.	.
... by size							
large	*1021*	539	478	805	189	.	.
SME	*3775*	2408	1362	3493	240	.	.
... by market							
Exporter	*1271*	789	478	976	272	675	510
Non-exporter	*3755*	2342	1405	3495	228	3077	503

Note: Firm classified as 'manufacturing' if main product/service according to ISIC (Rev. 3.1) is part of manufacturing; firms labelled 'non-manufacturing' otherwise. Only COMESA economies considered if WBES was conducted during or after 2013. 'Mnf.': Manufacturing.'LT vs. MHT'; Low-tech and medium-high tech; see Appendix B.3 for more information. 'Domestic vs. foreign': % owned by private foreign individuals, companies or organisations smaller/larger 50%. 'Large vs. SME': Micro, Small and Medium enterprises with <100 employees classified as 'SMEs'; 'large' otherwise. 'Exporter vs. non-exporter': % of sales as direct or indirect exports larger than 0 constitute 'exporters'; 'non-exporters' otherwise. 'COMESA*' aggregate excludes Sudan.
Data source: WBES.

C.2.2 Description of analysis

The analysis of the WBES data is purely descriptive (e.g., counting firms that gave a specific answer) unless otherwise stated. The types of responses available in WBES fall under the following categories: Some are

simple closed questions (respondent can either answer with *'yes'* or *'no'*), while others are single choice questions, where respondent can select one answer option from a list of available predefined answers. WBES also incorporates open questions, which require more than a fixed response. A typical example is the number of employees of an establishment. Finally, there are also a set of *non-response* options per question, typically if a respondent refuses to answer a particular question, or if a particular question does not apply in the context of the surveyed firm. These *non-responses* are summaries under the label *does not apply/NA* for the purpose of the analysis. Table 16 and Table 17 provide examples on how to interpret the tables in the main text of Section 3: For the manufacturing and non-manufacturing group of firms available in the WBES for Sudan and the COMESA* (excluding Sudan) aggregate, column (n) corresponds to the number of times a particular response or non-response is counted. Column (%) provide the corresponding shares of each sub-population, where each column sums up to 100% (with rounding errors). For example, in Table 16, 77 Sudanese manufacturing firms respond with *'no'* to this particular question, which corresponds to 92% of the 84 Sudanese manufacturing firms available in the WBES; see Table 15. Furthermore, five Sudanese manufacturing firms (6%) do not provide a response to this particular question. Table 17 illustrates that for any open question, the mean and median are provided as additional summary statistics.

Table 16: Example closed question

	Sudan				COMESA*			
	Manufacturing		Non-manufacturing		Manufacturing		Non-manufacturing	
	n	%	n	%	n	%	n	%
Responses								
No	77	92	505	87	2930	58	2712	55
Yes	2	2	15	3	300	6	328	7
Non-responses								
Do not know / NA	5	6	54	10	1760	35	1815	37
Refuse to answer	0	0	4	1	70	1	104	2

Note: Share of (non-)/manufacturing firms in Sudan and COMESA* responding to bottleneck; columns (n) and (%) sum up to 100% with rounding errors. Number of responses = (n) number of observations - (n) number of non-responses. Firm classified as 'manufacturing' if main product/service according to ISIC (Rev. 3.1) is part of manufacturing; firms labelled 'non-manufacturing' otherwise. Only COMESA economies considered if WBES was conducted during or after 2013. 'COMESA*' aggregate excludes Sudan.

Table 17: Example open question

	Sudan								COMESA*							
	Manufacturing				Non-manufacturing				Manufacturing				Non-manufacturing			
	Mean	Med.	n	%	Mean	Med.	n	%	Mean	Med.	n	%	Mean	Med.	n	%
Responses																
Summary	2	2	5	5	4	2	15	3	14	10	82	2	14	10	115	3
Non-responses																
Other non-response	.	.	39	46	.	.	92	16	.	.	673	13	.	.	613	12
Do not know / NA	.	.	32	39	.	.	469	81	.	.	4244	84	.	.	4164	84
Refuse to answer	.	.	8	10	.	.	2	0	.	.	61	1	.	.	67	1

Note: Share of (non-)/manufacturing firms in Sudan and COMESA* responding to bottleneck; columns (n) and (%) sum up to 100% with rounding errors. Number of responses = (n) number of observations - (n) number of non-responses. 'Med.': Median. 'NA': Not available. Firm classified as 'manufacturing' if main product/service according to ISIC (Rev. 3.1) is part of manufacturing; firms labelled 'non-manufacturing' otherwise. Only COMESA economies considered if WBES was conducted during or after 2013. 'COMESA*' aggregate excludes Sudan.

C.2.3 Questions bottleneck analysis

Table 18 provides a complete list of all WBES questions analysed in this report.

Table 18: WBES question catalogue

Question ID	Description
k30	How Much Of An Obstacle: Access To Finance
g30a	How Much Of An Obstacle: Access To Land?
j30c	How Much Of An Obstacle: Business Licensing And Permits
j30f	How Much Of An Obstacle: Corruption
h30	How Much Of An Obstacle: Courts
i30	How Much Of An Obstacle: Crime, Theft And Disorder?
d30b	How Much Of An Obstacle: Customs And Trade Regulations?
c30a	How Much Of An Obstacle: Electricity To Operations Of This Establishment?
l30b	How Much Of An Obstacle: Inadequately Educated Workforce?
e30	How Much Of An Obstacle: Practices Of Competitors In Informal Sector?
l30a	How Much Of An Obstacle: Labor Regulations?
j30e	How Much Of An Obstacle: Political Instability
j30b	How Much Of An Obstacle: Tax Administrations
j30a	How Much Of An Obstacle: Tax Rates
c30b	How Much Of An Obstacle: Telecommunications To Operations Of This Establishment?
d30a	How Much Of An Obstacle: Transport?
c6	Over Last Fy, Did This Establishment Experience Power Outages?
c7	Number Of Power Outages Experienced In A Typical Month In Last Fiscal Year
c8a	Average Duration Of Power Outages (Hours; Minutes)
c10	Generator Shared Or Owned Over The Course Of Last Fiscal Year?
c11	% Electricity From Generator Owned/Shared By The Establishment In Last Fiscal Yr
e11	Does This Establishment Compete Against Unregistered Or Informal Firms?
j14	How Many Days Did It Take To Obtain Your Operating License?

Data source: WBES.

C.2.4 WBES analysis in detail

This section provides a set of comprehensive summary statistics of all WBES questions analysed in this report.

Table 19: Summary table WBES question [c6]: "Over last fiscal year, did this establishment experience power outages?"

	Sudan				COMESA*			
	Manufacturing		Non-manufacturing		Manufacturing		Non-manufacturing	
	n	%	n	%	n	%	n	%
Responses								
No	6	7	34	6	2144	42	1670	34
Yes	78	93	544	94	2895	57	3259	66
Non-responses								
Do not know / NA	0	0	0	0	21	0	30	1

Note: Share of (non-)/manufacturing firms in Sudan and COMESA* responding to bottleneck; columns (n) and (%) sum up to 100% with rounding errors. Number of responses = (n) number of observations - (n) number of non-responses. Firm classified as 'manufacturing' if main product/service according to ISIC (Rev. 3.1) is part of manufacturing; firms labelled 'non-manufacturing' otherwise. Only COMESA economies considered if WBES was conducted during or after 2013. 'COMESA*' aggregate excludes Sudan.
Data source: WBES, question: *'[c6] Over Last Fy, Did This Establishment Experience Power Outages?'*.

Table 20: Summary table WBES question [c7]: "Number of power outages experienced in a typical month in last fiscal year."

	Sudan								COMESA*							
	Manufacturing				Non-manufacturing				Manufacturing				Non-manufacturing			
	Mean	Med.	n	%	Mean	Med.	n	%	Mean	Med.	n	%	Mean	Med.	n	%
Responses																
Summary	4	4	77	92	3.8	4	543	94	9.2	5	2640	52	9.5	5	2944	60
Non-responses																
Do not know / NA	.	.	7	8	.	.	35	6	.	.	2420	48	.	.	2015	40

Note: Share of (non-)/manufacturing firms in Sudan and COMESA* responding to bottleneck; columns (n) and (%) sum up to 100% with rounding errors. Number of responses = (n) number of observations - (n) number of non-responses. 'Med.': Median. 'NA': Not available. Firm classified as 'manufacturing' if main product/service according to ISIC (Rev. 3.1) is part of manufacturing; firms labelled 'non-manufacturing' otherwise. Only COMESA economies considered if WBES was conducted during or after 2013. 'COMESA*' aggregate excludes Sudan.
Data source: WBES, question: *'[c7] Number Of Power Outages Experienced In A Typical Month In Last Fiscal Year'*.

Table 21: Summary table WBES question [c8a]: "Average duration of power outages."

	Sudan								COMESA*							
	Manufacturing				Non-manufacturing				Manufacturing				Non-manufacturing			
	Mean	Med.	n	%	Mean	Med.	n	%	Mean	Med.	n	%	Mean	Med.	n	%
Responses																
Summary	2.8	2	77	92	2.4	2	542	94	5	2	2131	42	4.9	2	2330	47
Non-responses																
Do not know / NA	.	.	7	8	.	.	36	6	.	.	2929	58	.	.	2629	53

Note: Share of (non-)/manufacturing firms in Sudan and COMESA* responding to bottleneck; columns (n) and (%) sum up to 100% with rounding errors. Number of responses = (n) number of observations - (n) number of non-responses. 'Med.': Median. 'NA': Not available. Firm classified as 'manufacturing' if main product/service according to ISIC (Rev. 3.1) is part of manufacturing; firms labelled 'non-manufacturing' otherwise. Only COMESA economies considered if WBES was conducted during or after 2013. 'COMESA*' aggregate excludes Sudan.
Data: WBES, question: *'[c8a] Average Duration Of Power Outages'*.

Table 22: Summary table WBES question [c10]: "Generator shared or owned over the course of last fiscal year?"

	Sudan				COMESA*			
	Manufacturing		Non-manufacturing		Manufacturing		Non-manufacturing	
	n	%	n	%	n	%	n	%
Responses								
No	26	31	262	45	3338	66	2873	58
Yes	58	69	293	51	1716	34	2039	41
Non-responses								
Do not know / NA	0	0	23	4	6	0	47	1

Note: Share of (non-)/manufacturing firms in Sudan and COMESA* responding to bottleneck; column (n) and (%) sum up to 100% with rounding errors. Number of responses = (n) number of observations - (n) number of non-responses. Firm classified as 'manufacturing' if main product/service according to ISIC (Rev. 3.1) is part of manufacturing; firms labelled 'non-manufacturing' otherwise. Only COMESA economies considered if WBES was conducted during or after 2013. 'COMESA*' aggregate excludes Sudan.
Data source: WBES, question: *'[c10] Generator Shared Or Owned Over The Course Of Last Fiscal Year?'*.

Table 23: Summary table WBES question [c11]: "Share electricity from generator owned/shared by the establishment in last fiscal year."

	Sudan								COMESA*							
	Manufacturing				Non-manufacturing				Manufacturing				Non-manufacturing			
	Mean	Med.	n	%	Mean	Med.	n	%	Mean	Med.	n	%	Mean	Med.	n	%
Responses																
Summary	8.4	5	57	68	8.5	5	286	50	24.7	15	1551	31	24.9	15	1817	37
Non-responses																
Do not know / NA	.	.	27	32	.	.	292	50	.	.	3509	69	.	.	3142	63

Note: Share of (non-)/manufacturing firms in Sudan and COMESA* responding to bottleneck; columns (n) and (%) sum up to 100% with rounding errors. Number of responses = (n) number of observations - (n) number of non-responses. 'Med.': Median. 'NA': Not available. Firm classified as 'manufacturing' if main product/service according to ISIC (Rev. 3.1) is part of manufacturing; firms labelled 'non-manufacturing' otherwise. Only COMESA economies considered if WBES was conducted during or after 2013. 'COMESA*' aggregate excludes Sudan.
Data source: WBES, question: *'[c11] Share Electricity From Generator Owned/Shared By The Establishment In Last Fiscal Yr'*.

Table 24: [e11] Does this establishment compete against unregistered or informal firms?

	Sudan				COMESA*			
	Manufacturing		Non-manufacturing		Manufacturing		Non-manufacturing	
	n	%	n	%	n	%	n	%
Responses								
No	6	7	57	10	2245	44	2103	42
Yes	77	92	507	88	2625	52	2709	55
Non-responses								
Do not know / NA	1	1	14	2	190	4	147	3

Note: Share of (non-)/manufacturing firms in Sudan and COMESA* responding to bottleneck; columns (n) and (%) sum up to 100% with rounding errors. Number of responses = (n) number of observations - (n) number of non-responses. Firm classified as 'manufacturing' if main product/service according to ISIC (Rev. 3.1) is part of manufacturing; firms labelled 'non-manufacturing' otherwise. Only COMESA economies considered if WBES was conducted during or after 2013. 'COMESA*' aggregate excludes Sudan.
Data source: WBES, question: *'[e11] Does This Establishment Compete Against Unregistered Or Informal Firms?'*.

Table 25: Summary table WBES question [j14]: "How many days did it take to obtain your operating license?"

	Sudan								COMESA*							
	Manufacturing				Non-manufacturing				Manufacturing				Non-manufacturing			
	Mean	Med.	n	%	Mean	Med.	n	%	Mean	Med.	n	%	Mean	Med.	n	%
Responses																
Summary	6.3	3	46	55	5.5	4	377	66	20.4	7	694	14	19.9	7	985	20
Non-responses																
Application denied	.	.	0	0	.	.	0	0	.	.	2	0	.	.	1	0
One day or less	.	.	4	5	.	.	8	1	.	.	215	4	.	.	269	5
Still in process	.	.	0	0	.	.	1	0	.	.	24	0	.	.	35	1
Do not know / NA	.	.	34	40	.	.	192	33	.	.	4125	82	.	.	3669	74

Note: Share of (non-)/manufacturing firms in Sudan and COMESA* responding to bottleneck; columns (n) and (%) sum up to 100% with rounding errors. Number of responses = (n) number of observations - (n) number of non-responses. 'Med.': Median. 'NA': Not available. Firm classified as 'manufacturing' if main product/service according to ISIC (Rev. 3.1) is part of manufacturing; firms labelled 'non-manufacturing' otherwise. Only COMESA economies considered if WBES was conducted during or after 2013. 'COMESA*' aggregate excludes Sudan.
Data source: WBES, question: *'[j14] How Many Days Did It Take To Obtain Your Operating License?'*.

C.3 UNIDO Firm-level survey 2021

The UNIDO Sudan firm-level Survey 2021 was conducted between June 2021 and **STILL ONGOING** by UNIDO by means of an online questionnaire as well as in-person interviews, the latter of which was coordinated by UNIDO's Sudan field office. The questionnaire contains at most 44 questions and was answered by a total of **STILL ONGOING** establishments; see Table 26 for a list of questions as well as corresponding responses by question. The current composition of firm-level responses is summarised in Figure 95.

Please kindly note that the UNIDO Sudan firm-level survey is still ongoing, and response patterns as well as the sample composition may still change depending on future survey turnout.

Table 26: UNIDO Firm-level survey: summary of responses by question

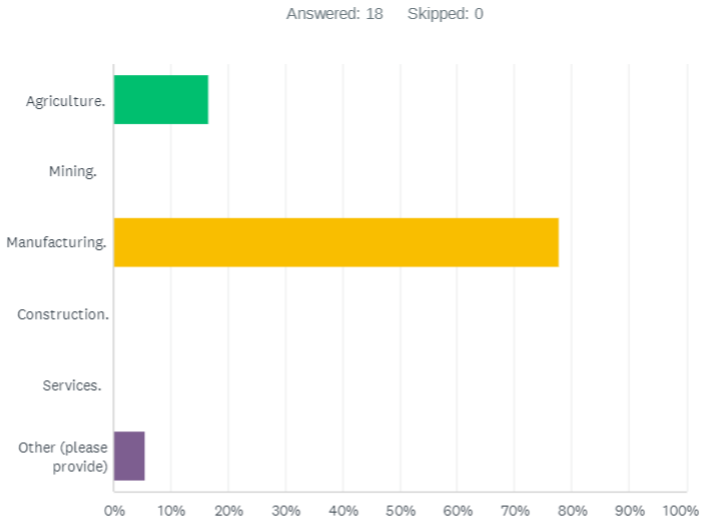
Question	Answered	Skipped
Q1 - Legal form:	18	0
Q2 - Country region:	18	0
Q3 - Number of employees (national and foreign):	18	0
Q4 - Share of female employees in total employment (in %):	18	0
Q5 - Financial information:	18	0
Q6 - Share of foreign ownership:	18	0
Q7 - Further information:	18	0
Q8 - Economic sector:	18	0
Q9 - Please specify manufacturing sector of opperation:	14	4
Q10 - How has revenue changed due to COVID-19 compared to 2019?	17	1
Q11 - How has employment changed due to COVID-19 compared to 2019?	17	1
Q12 - How has female employment changed because of COVID-19 compared to 2019?	17	1
Q13 - What is the business outlook for 2021?	17	1
Q14 - Does your country need an industrial policy?	17	1
Q15 - To what extent is the private manufacturing sector involved in the formulation of industrial policy?	17	1
Q16 - What should the new industrial policy target? Please comment, how relevant each of the listed item is for new industrial policy:	17	1
Q17 - Looking at the next 5-10 years, please select the top-5 manufacturing industries that you think will be the most important ones for the country's development for each of the four following reasons: Creation of added value; Creation of jobs; Creation of links with key strategic countries; Creation of business support For each of the top-5 selected sectors, please indicate only one corresponding reason why you think a sector will be important.	11	7
Q18 - Apart from specific manufacturing industries, what topics do you think are important for the future of your economy that would bring you special opportunities? What is "Industry 4.0"?Industry 4.0 refers to those advanced digital technologies that concern the realization of smart factories such as artificial intelligence, 3D printing, the Internet of things, etc. or, if we take into consideration a broader definition of Industry 4.0, which concerns more elementary forms of digitalization (email, computer etc.).What is "Circular Economy"?Circular Economy refers to the activities undertaken by the firm aimed at consuming less materials to produce the same good (efficiency), at recycling/repair/remanufacturing raw materials, at using renewable sources of energy (e.g., solar panels) or at using energy more efficiently.What is a "Global Value Chain"?A Global Value Chain is a production process in which the different stages are located across different countries.	12	6
Q19 - Which industry 4.0 or less advanced digitalization technologies is your company adopting?	12	6

Table 26: UNIDO Firm-level survey: summary of responses by question *(continued)*

Question	Answered	Skipped
Q20 - What is preventing your company from adopting or partially adopting Industry 4.0 technology? Please indicate how severe each of the following obstacles is for you:	12	6
Q21 - Does your company participate in circular economy activities?	12	6
Q22 - What is the main reason why your company does not participate or does only partially participate in the activities of the circular economy? Please indicate how severe each of the following obstacles is for you:	12	6
Q23 - Is your company part of the Global Value Chain?	12	6
Q24 - What is the main reason why your business is not or only partially integrates into Global Value Chains? Please indicate how severe each of the following obstacles is for you:	12	6
Q25 - Is "access to finance" a bottleneck for your business?	12	6
Q26 - Please note the seriousness of the potential causes of this bottleneck below	12	6
Q27 - For this bottleneck, do you see any improvements or deterioration over time in the last 3 years?	12	6
Q28 - Is "access to land" a bottleneck for your business?	12	6
Q29 - Are "business licences and permits" a bottleneck for your business?	12	6
Q30 - Is "corruption" a bottleneck for your business?	12	6
Q31 - Are "court proceedings" a bottleneck for your business?	12	6
Q32 - Is "crime" (other than corruption) a bottleneck for your business?	12	6
Q33 - Are "customs" a bottleneck for your business?	12	6
Q34 - Is electricity a bottleneck for your business?	12	6
Q35 - Are skills a bottleneck for your business?	12	6
Q36 - Is the informal sector a bottleneck for your business?	12	6
Q37 - Please rate below the seriousness of the potential causes of this bottleneck[a].	6	12
Q38 - Please rate below the seriousness of the potential causes of this bottleneck[b].	0	18
Q39 - Are "labor regulations" a bottleneck for your business?	12	6
Q40 - Is "political instability" a bottleneck for your business?	12	6
Q41 - Is "tax administration" a bottleneck for your business?	12	6
Q42 - Is the tax rate a bottleneck for your business?	12	6
Q43 - Is "telecommunication" a bottleneck for your business?	12	6
Q44 - Is transportation a bottleneck for your business?	12	6

Note:
Work in progress. Response patterns as well as the sample composition may still change depending on future survey turnout. For all questions relating to 'bottlenecks to business', i.e. starting with Q 25, two follow up questions 'Please note the seriousness of the potential causes of this bottleneck.' and 'For this bottleneck, do you see any improvements or deterioration over time in the last 3 years?' are also querried.

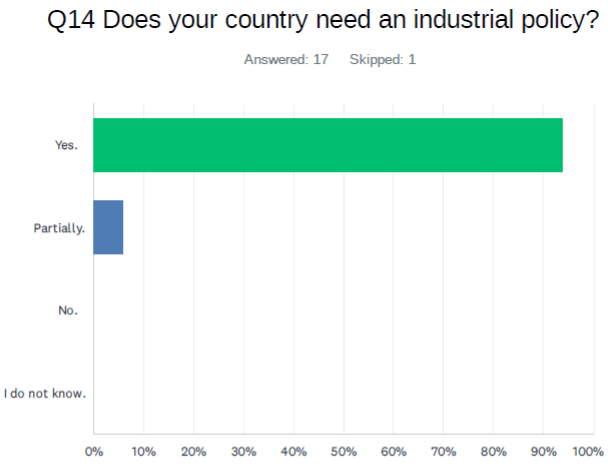
Figure 95: UNIDO Firm-level survey: Sample composition



ANSWER CHOICES	RESPONSES	
Agriculture.	16.67%	3
Mining.	0.00%	0
Manufacturing.	77.78%	14
Construction.	0.00%	0
Services.	0.00%	0
Other (please provide)	5.56%	1
TOTAL		18

Note: Work in progress. Response patterns as well as the sample composition may still change depending on future survey turnout.

Figure 96: UNIDO Firm-level survey: Q14



ANSWER CHOICES	RESPONSES	
Yes.	94.12%	16
Partially.	5.88%	1
No.	0.00%	0
I do not know.	0.00%	0
TOTAL		17

Note: Work in progress. Response patterns as well as the sample composition may still change depending on future survey turnout.

Figure 97: UNIDO Firm-level survey: Q17a

Question 17a: *"Looking at the next 5-10 years, please select the top-5 manufacturing industries that you think will be the most important ones for the country's development for each of the four following reasons: Creation of added value. For each of the top-5 selected sectors, please indicate only one corresponding reason why you think a sector will be important."*

1. Creation of added value	TOP 1	TOP 2	TOP 3	TOP 4	TOP 5	TOTAL
Sector 15: Food and Beverage	66.67% 6	11.11% 1	0.00% 0	0.00% 0	22.22% 2	9
Sector 16: Tobacco	0.00% 0	0.00% 0	50.00% 1	0.00% 0	50.00% 1	2
Sector 17: Textiles	71.43% 5	14.29% 1	14.29% 1	0.00% 0	0.00% 0	7
Sector 18: Clothing; fur dressing and dyeing	40.00% 2	20.00% 1	0.00% 0	40.00% 2	0.00% 0	5
Sector 19: Leather tanning and dressing	42.86% 3	28.57% 2	0.00% 0	28.57% 2	0.00% 0	7
Sector 20: Wood and articles of wood and cork	0.00% 0	0.00% 0	50.00% 1	0.00% 0	50.00% 1	2
Sector 21: Paper and paper products	0.00% 0	0.00% 0	66.67% 2	33.33% 1	0.00% 0	3
Sector 22: Editing, printing and publishing	0.00% 0	0.00% 0	50.00% 1	0.00% 0	50.00% 1	2
Sector 23: Coke, petroleum and nuclear fuel	20.00% 1	60.00% 3	0.00% 0	20.00% 1	0.00% 0	5
Sector 24: Chemicals	0.00% 0	40.00% 2	20.00% 1	0.00% 0	40.00% 2	5
Sector 25: Rubber and plastic	0.00% 0	50.00% 1	0.00% 0	50.00% 1	0.00% 0	2
Sector 26: Other non-metallic mineral products	50.00% 2	50.00% 2	0.00% 0	0.00% 0	0.00% 0	4
Sector 27: Base Metal	0.00% 0	0.00% 0	0.00% 0	50.00% 1	50.00% 1	2
Sector 28: Metal products	50.00% 2	25.00% 1	0.00% 0	0.00% 0	25.00% 1	4
Sector 29: Machinery and equipment	0.00% 0	0.00% 0	33.33% 1	0.00% 0	66.67% 2	3
Sector 30: Office, accounting and computers	33.33% 1	33.33% 1	33.33% 1	0.00% 0	0.00% 0	3
Sector 31: Electrical machinery and apparatus	50.00% 1	0.00% 0	0.00% 0	0.00% 0	50.00% 1	2
Sector 32: Communication equipment and apparatus	33.33% 1	33.33% 1	0.00% 0	33.33% 1	0.00% 0	3
Sector 33: Medical and precision instruments	50.00% 1	0.00% 0	50.00% 1	0.00% 0	0.00% 0	2
Sector 34: Motor vehicles	0.00% 0	0.00% 0	0.00% 0	50.00% 1	50.00% 1	2
Sector 35: Transport equipment	33.33% 1	0.00% 0	33.33% 1	33.33% 1	0.00% 0	3
Sector 36: Furniture	0.00% 0	0.00% 0	50.00% 1	0.00% 0	50.00% 1	2
Sector 37: Recycling	66.67% 2	33.33% 1	0.00% 0	0.00% 0	0.00% 0	3

Note: Work in progress. Response patterns as well as the sample composition may still change depending on future survey turnout.

Figure 98: UNIDO Firm-level survey: Q17b

Question 17b: *"Looking at the next 5-10 years, please select the top-5 manufacturing industries that you think will be the most important ones for the country's development for each of the four following reasons: Creation of jobs. For each of the top-5 selected sectors, please indicate only one corresponding reason why you think a sector will be important."*

2. Creation of jobs	TOP 1	TOP 2	TOP 3	TOP 4	TOP 5	TOTAL
Sector 15: Food and Beverage	50.00% 3	0.00% 0	33.33% 2	16.67% 1	0.00% 0	6
Sector 16: Tobacco	50.00% 2	25.00% 1	25.00% 1	0.00% 0	0.00% 0	4
Sector 17: Textiles	60.00% 3	20.00% 1	0.00% 0	20.00% 1	0.00% 0	5
Sector 18: Clothing; fur dressing and dyeing	0.00% 0	0.00% 0	33.33% 1	33.33% 1	33.33% 1	3
Sector 19: Leather tanning and dressing	16.67% 1	33.33% 2	0.00% 0	33.33% 2	16.67% 1	6
Sector 20: Wood and articles of wood and cork	33.33% 1	0.00% 0	33.33% 1	0.00% 0	33.33% 1	3
Sector 21: Paper and paper products	0.00% 0	0.00% 0	66.67% 2	33.33% 1	0.00% 0	3
Sector 22: Editing, printing and publishing	0.00% 0	0.00% 0	0.00% 0	0.00% 0	100.00% 2	2
Sector 23: Coke, petroleum and nuclear fuel	0.00% 0	40.00% 2	0.00% 0	40.00% 2	20.00% 1	5
Sector 24: Chemicals	0.00% 0	0.00% 0	0.00% 0	0.00% 0	100.00% 3	3
Sector 25: Rubber and plastic	0.00% 0	50.00% 1	0.00% 0	50.00% 1	0.00% 0	2
Sector 26: Other non-metallic mineral products	66.67% 2	33.33% 1	0.00% 0	0.00% 0	0.00% 0	3
Sector 27: Base Metal	0.00% 0	50.00% 1	0.00% 0	50.00% 1	0.00% 0	2
Sector 28: Metal products	50.00% 2	25.00% 1	25.00% 1	0.00% 0	0.00% 0	4
Sector 29: Machinery and equipment	0.00% 0	0.00% 0	66.67% 2	0.00% 0	33.33% 1	3
Sector 30: Office, accounting and computers	0.00% 0	50.00% 1	0.00% 0	0.00% 0	50.00% 1	2
Sector 31: Electrical machinery and apparatus	50.00% 1	0.00% 0	0.00% 0	0.00% 0	50.00% 1	2
Sector 32: Communication equipment and apparatus	66.67% 2	0.00% 0	0.00% 0	0.00% 0	33.33% 1	3
Sector 33: Medical and precision instruments	50.00% 1	0.00% 0	50.00% 1	0.00% 0	0.00% 0	2
Sector 34: Motor vehicles	0.00% 0	0.00% 0	0.00% 0	0.00% 0	100.00% 1	1
Sector 35: Transport equipment	50.00% 1	0.00% 0	0.00% 0	0.00% 0	50.00% 1	2
Sector 36: Furniture	0.00% 0	0.00% 0	50.00% 1	50.00% 1	0.00% 0	2
Sector 37: Recycling	50.00% 1	50.00% 1	0.00% 0	0.00% 0	0.00% 0	2

Note: Work in progress. Response patterns as well as the sample composition may still change depending on future survey turnout.

Figure 99: UNIDO Firm-level survey: Q17c

Question 17c: *"Looking at the next 5-10 years, please select the top-5 manufacturing industries that you think will be the most important ones for the country's development for each of the four following reasons: Creation of links with key strategic countries. For each of the top-5 selected sectors, please indicate only one corresponding reason why you think a sector will be important."*

3. Creation of links with key strategic countries	TOP 1	TOP 2	TOP 3	TOP 4	TOP 5	TOTAL
Sector 15: Food and Beverage	71.43% 5	0.00% 0	14.29% 1	14.29% 1	0.00% 0	7
Sector 16: Tobacco	50.00% 1	0.00% 0	50.00% 1	0.00% 0	0.00% 0	2
Sector 17: Textiles	40.00% 2	0.00% 0	20.00% 1	20.00% 1	20.00% 1	5
Sector 18: Clothing; fur dressing and dyeing	0.00% 0	0.00% 0	33.33% 1	33.33% 1	33.33% 1	3
Sector 19: Leather tanning and dressing	0.00% 0	40.00% 2	0.00% 0	20.00% 1	40.00% 2	5
Sector 20: Wood and articles of wood and cork	0.00% 0	0.00% 0	0.00% 0	50.00% 1	50.00% 1	2
Sector 21: Paper and paper products	0.00% 0	0.00% 0	33.33% 1	66.67% 2	0.00% 0	3
Sector 22: Editing, printing and publishing	0.00% 0	0.00% 0	0.00% 0	0.00% 0	100.00% 1	1
Sector 23: Coke, petroleum and nuclear fuel	0.00% 0	50.00% 3	33.33% 2	16.67% 1	0.00% 0	6
Sector 24: Chemicals	0.00% 0	0.00% 0	0.00% 0	50.00% 1	50.00% 1	2
Sector 25: Rubber and plastic	0.00% 0	50.00% 1	0.00% 0	50.00% 1	0.00% 0	2
Sector 26: Other non-metallic mineral products	33.33% 1	0.00% 0	66.67% 2	0.00% 0	0.00% 0	3
Sector 27: Base Metal	0.00% 0	0.00% 0	50.00% 1	50.00% 1	0.00% 0	2
Sector 28: Metal products	0.00% 0	25.00% 1	50.00% 2	25.00% 1	0.00% 0	4
Sector 29: Machinery and equipment	0.00% 0	33.33% 1	0.00% 0	0.00% 0	66.67% 2	3
Sector 30: Office, accounting and computers	0.00% 0	0.00% 0	0.00% 0	50.00% 1	50.00% 1	2
Sector 31: Electrical machinery and apparatus	0.00% 0	0.00% 0	0.00% 0	50.00% 1	50.00% 1	2
Sector 32: Communication equipment and apparatus	0.00% 0	0.00% 0	50.00% 1	0.00% 0	50.00% 1	2
Sector 33: Medical and precision instruments	0.00% 0	0.00% 0	100.00% 1	0.00% 0	0.00% 0	1
Sector 34: Motor vehicles	50.00% 1	0.00% 0	0.00% 0	0.00% 0	50.00% 1	2
Sector 35: Transport equipment	0.00% 0	0.00% 0	100.00% 2	0.00% 0	0.00% 0	2
Sector 36: Furniture	0.00% 0	0.00% 0	0.00% 0	100.00% 1	0.00% 0	1
Sector 37: Recycling	100.00% 1	0.00% 0	0.00% 0	0.00% 0	0.00% 0	1

Note: Work in progress. Response patterns as well as the sample composition may still change depending on future survey turnout.

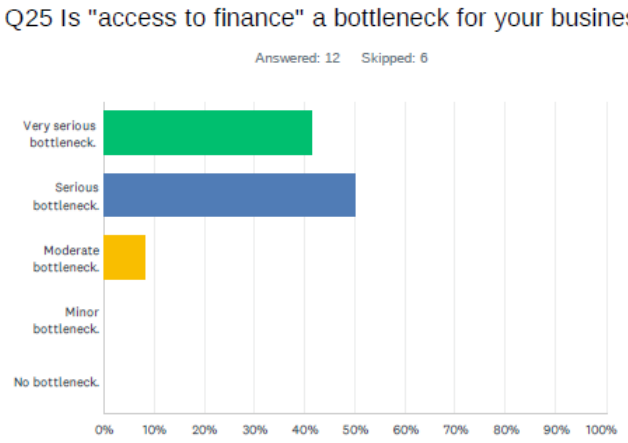
Figure 100: UNIDO Firm-level survey: Q17d

Question 17d: *"Looking at the next 5-10 years, please select the top-5 manufacturing industries that you think will be the most important ones for the country's development for each of the four following reasons: Creation of business support. For each of the top-5 selected sectors, please indicate only one corresponding reason why you think a sector will be important."*

4. Creation of business support	TOP 1	TOP 2	TOP 3	TOP 4	TOP 5	TOTAL
Sector 15: Food and Beverage	28.57% 2	14.29% 1	14.29% 1	28.57% 2	14.29% 1	7
Sector 16: Tobacco	0.00% 0	50.00% 1	50.00% 1	0.00% 0	0.00% 0	2
Sector 17: Textiles	50.00% 2	0.00% 0	0.00% 0	25.00% 1	25.00% 1	4
Sector 18: Clothing; fur dressing and dyeing	0.00% 0	0.00% 0	33.33% 1	33.33% 1	33.33% 1	3
Sector 19: Leather tanning and dressing	0.00% 0	40.00% 2	0.00% 0	40.00% 2	20.00% 1	5
Sector 20: Wood and articles of wood and cork	33.33% 1	0.00% 0	0.00% 0	33.33% 1	33.33% 1	3
Sector 21: Paper and paper products	25.00% 1	25.00% 1	25.00% 1	25.00% 1	0.00% 0	4
Sector 22: Editing, printing and publishing	50.00% 1	0.00% 0	0.00% 0	0.00% 0	50.00% 1	2
Sector 23: Coke, petroleum and nuclear fuel	20.00% 1	40.00% 2	20.00% 1	20.00% 1	0.00% 0	5
Sector 24: Chemicals	0.00% 0	0.00% 0	0.00% 0	0.00% 0	100.00% 2	2
Sector 25: Rubber and plastic	0.00% 0	50.00% 1	0.00% 0	50.00% 1	0.00% 0	2
Sector 26: Other non-metallic mineral products	33.33% 1	0.00% 0	66.67% 2	0.00% 0	0.00% 0	3
Sector 27: Base Metal	0.00% 0	0.00% 0	0.00% 0	100.00% 2	0.00% 0	2
Sector 28: Metal products	0.00% 0	33.33% 1	33.33% 1	33.33% 1	0.00% 0	3
Sector 29: Machinery and equipment	33.33% 1	0.00% 0	0.00% 0	0.00% 0	66.67% 2	3
Sector 30: Office, accounting and computers	33.33% 1	0.00% 0	0.00% 0	33.33% 1	33.33% 1	3
Sector 31: Electrical machinery and apparatus	33.33% 1	0.00% 0	33.33% 1	0.00% 0	33.33% 1	3
Sector 32: Communication equipment and apparatus	33.33% 1	0.00% 0	33.33% 1	0.00% 0	33.33% 1	3
Sector 33: Medical and precision instruments	0.00% 0	0.00% 0	100.00% 1	0.00% 0	0.00% 0	1
Sector 34: Motor vehicles	0.00% 0	0.00% 0	0.00% 0	0.00% 0	100.00% 1	1
Sector 35: Transport equipment	33.33% 1	0.00% 0	66.67% 2	0.00% 0	0.00% 0	3
Sector 36: Furniture	50.00% 1	0.00% 0	0.00% 0	50.00% 1	0.00% 0	2
Sector 37: Recycling	66.67% 2	0.00% 0	0.00% 0	0.00% 0	33.33% 1	3

Note: Work in progress. Response patterns as well as the sample composition may still change depending on future survey turnout.

Figure 101: UNIDO Firm-level survey: Q25



ANSWER CHOICES	RESPONSES	
Very serious bottleneck.	41.67%	5
Serious bottleneck.	50.00%	6
Moderate bottleneck.	8.33%	1
Minor bottleneck.	0.00%	0
No bottleneck.	0.00%	0
TOTAL		12

Note: Work in progress. Response patterns as well as the sample composition may still change depending on future survey turnout.

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