



United Nations
Economic Commission for Africa

25th annual session of the Intergovernmental Committee of Senior Officials and Experts

Strengthening resilience for strong recovery and attracting investments to
foster economic diversification and long-term growth in Eastern Africa

26 – 28 October 2021



Burundi

Comoros

D.R Congo

Djibouti

Eritrea

Ethiopia

Kenya

Madagascar

Rwanda

Seychelles

Somalia

South Sudan

Tanzania

Uganda



United Nations
Economic Commission for Africa

“MADE IN AFRICA” IS NOT A DREAM

**A GLOBAL & REGIONAL VALUE CHAIN ASSESSEMENTS FOR DEVELOPING AN
AFRICAN SMARTPHONE VALUE CHAIN IN THE FRAMEWORK OF AfCFTA**

Andrea Vissol
Industrial Policy Consultant
B&S Europe / GOPA group

October 2021



- 01 INTRODUCTION**
GLOBAL & REGIONAL VALUE CHAIN ASSESSEMENTS
- 02 THE CELLPHONE VALUE CHAIN**
A TECHNICAL ANALYSIS : RAW MATERIAL TO FINAL GOOD
- 03 THE CELLPHONE GLOBAL VALUE CHAIN**
LEAD COUNTRIES TRADE ANALYSIS
- 04 AFRICAN CELLPHONE VALUE CHAIN**
LEAD COUNTRIES TRADE ANALYSIS
- 05 CONCLUSIONS AND POLICY SUGGESTIONS**

The Global & Regional Value Chain Assessments (GRVCA)

The Global & Regional Value Chain Assessment (GRVCA) is an **analytical toolkit for Industrial Policy Design** to provide decision makers and investors with **recommendations to support the productions, commercialization and distribution of a specific industry's products**. Its core objective is to study an industry by breaking down the its processes to position an enterprise and a country (or region) within the regional and global division of labor.

A Value Chain (VC) is the process that includes a full range of activities from raw materials extraction to good's production and assembly:

- A Global & Regional Value Chain (GRVC) is a VC that is divided among different firms and spread across different regions of the world
- It is the sequence of all functional activities required in the process of value creation involving more than one country



Industrial Policy Instruments for Regional & Global Value Chain Development

Industrial policy instruments designed through GRVCA aim at strengthening industrial and semi-industrial processes with high potential through the concept of **efficiency, technical and technological progress, concentration and reorganization through financing, investment, restructuring and support measures.**

Crosscutting by nature industrial policy instruments can be divided in two categories :

- ❖ Policies which are **horizontal** in nature and focus on the industrial and productive environment in general
- ❖ Policies whose field of intervention is market access and the conditions of production in the industry, both of which are **vertical** in nature and affect industrial activity internally

These policies act upon **transport, energy, and ICT infrastructure; R&D and education; taxation, customs and investment law; direct public participation** and the **financing of industries.**



Increased labour force participation



Increased NDIs & FDIs, Knowledge transfer and training



Higher productivity and stronger income growth



Increased Financial Resources for Sustainable improvements of living standards

AfCFTA, Fostering Free Trade and Industrial Development

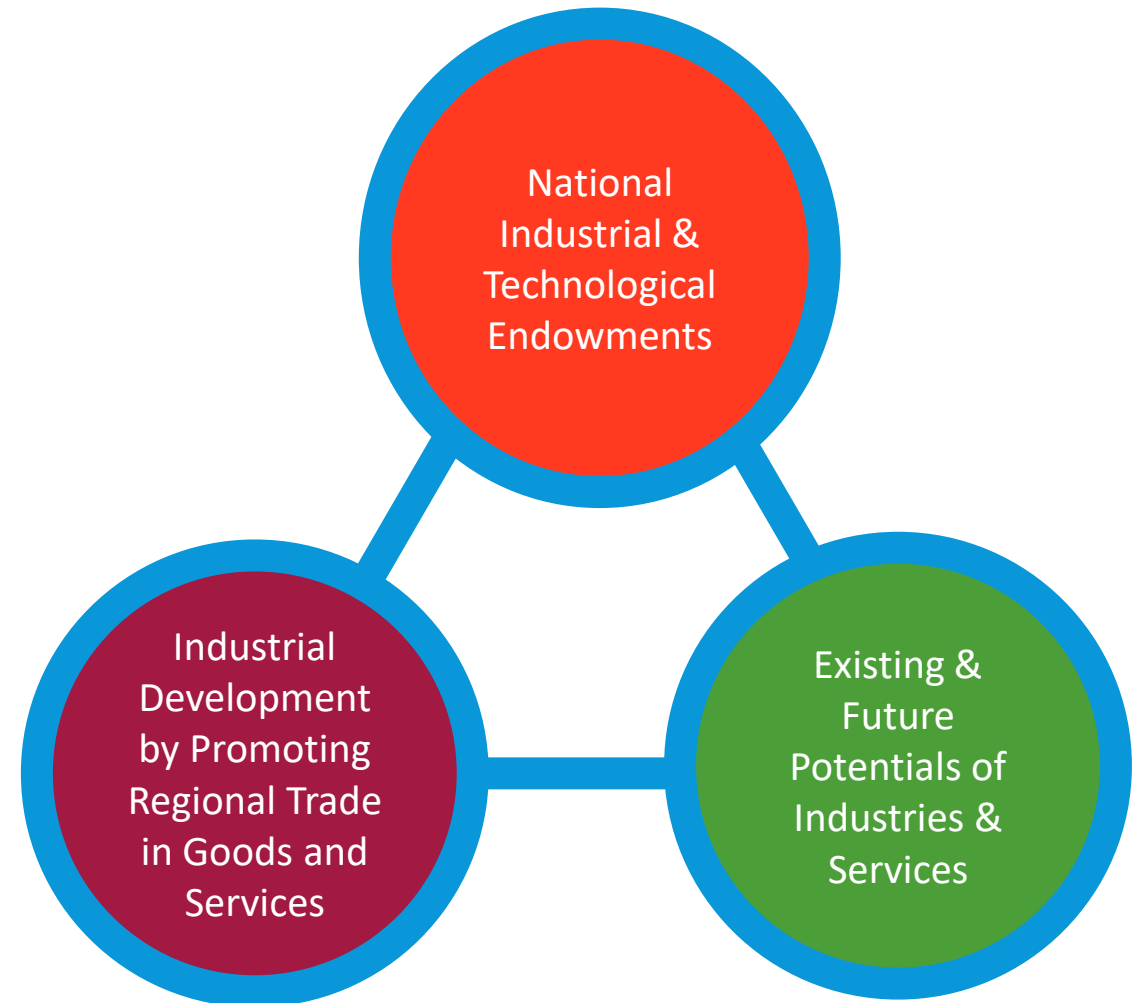
The operationalisation of the **AfCFTA provides an essential backbone to fostering industrialisation**, by promoting the development of integrated value chains (regional supply of inputs) on the African Continent.

Curtail Africa's vulnerability to current account deficits

Enhance employment, revenue collection and boost resource envelopes

Vertical and horizontal industrial development projects and interventions to promote and attract NDIs & FDIs

Improved Business and investment climate for accelerated industrialization and SMEs integration



OUTLINE

01 INTRODUCTION
GLOBAL & REGIONAL VALUE CHAIN ASSESSEMENTS

02 THE CELLPHONE VALUE CHAIN
A TECHNICAL ANALYSIS : RAW MATERIAL TO FINAL GOOD

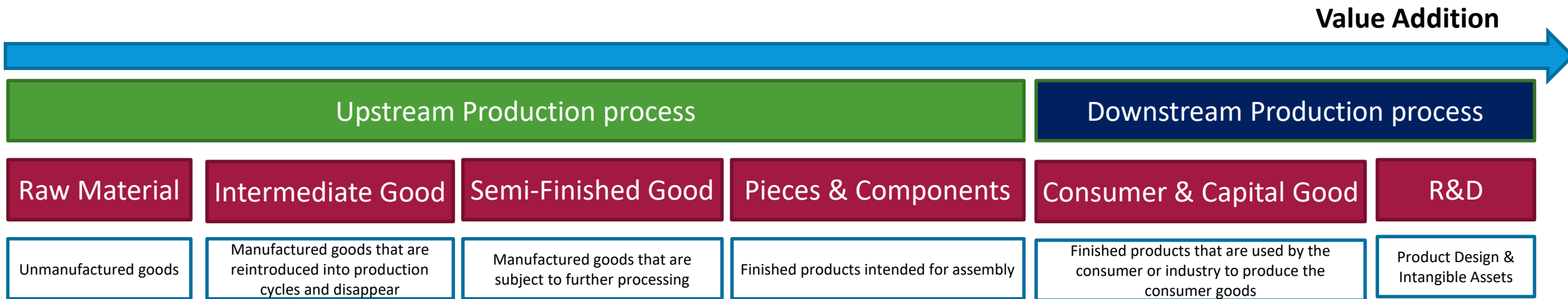
03 THE CELLPHONE GLOBAL VALUE CHAIN
LEAD COUNTRIES TRADE ANALYSIS

04 AFRICAN CELLPHONE VALUE CHAIN
LEAD COUNTRIES TRADE ANALYSIS

05 CONCLUSIONS AND POLICY SUGGESTIONS

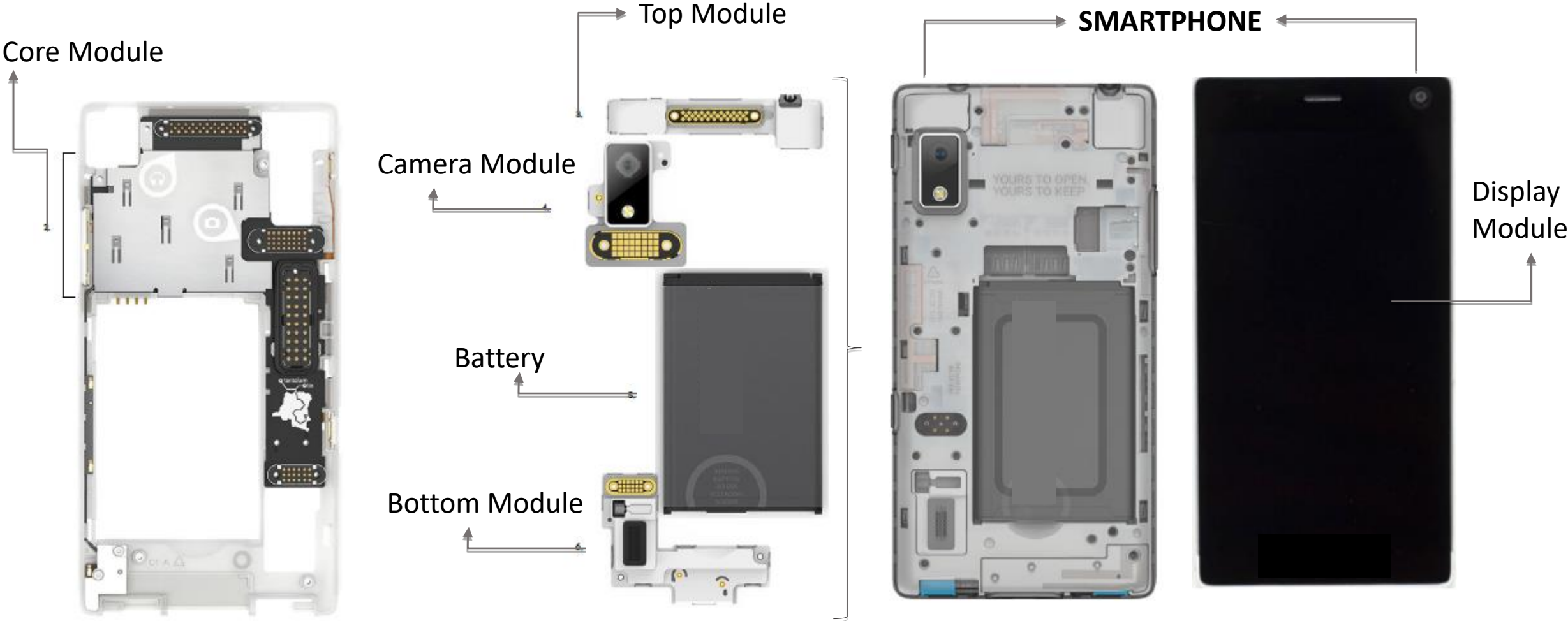
The Cellphone Value Chain : an Hardware Technical Analysis

A product's value chain are the different **production steps which provide an extra brut margin** (value add) and that lead up to the commercialization of final capital or consumer good



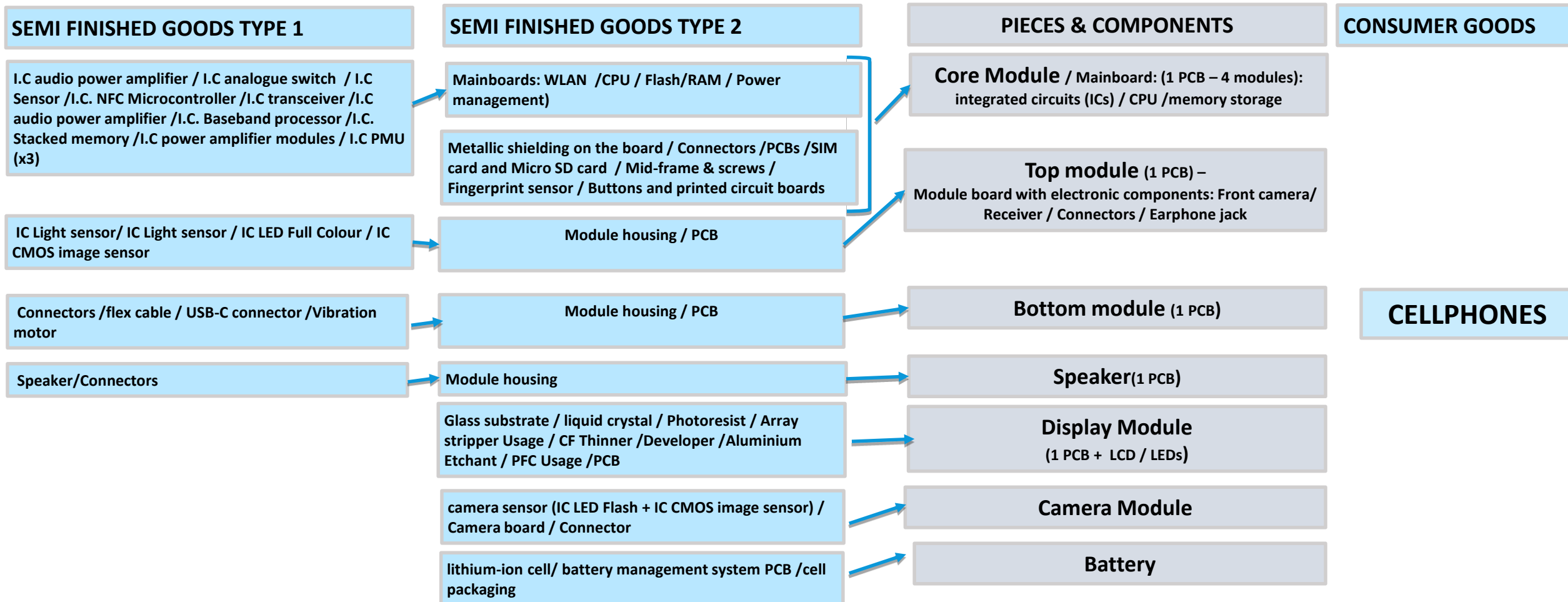
The use of the WTO HS nomenclature (an international convention providing standardised categorisation of goods to track their trade through customs procedures) is an essential part of the GRVCA, as it provides the quantitative framework to analyse trade and production data.

The Smartphone's Pieces & Components



Decomposing the smartphone's pieces and components : an analysis of its semi-finished goods

The wide variety of **components that make up the cellphone value chain** can be integrated in many other **strategic goods that make up the 4th Industrial Revolution's consumer goods** including satellites to portable computers and electric cars and wind turbines

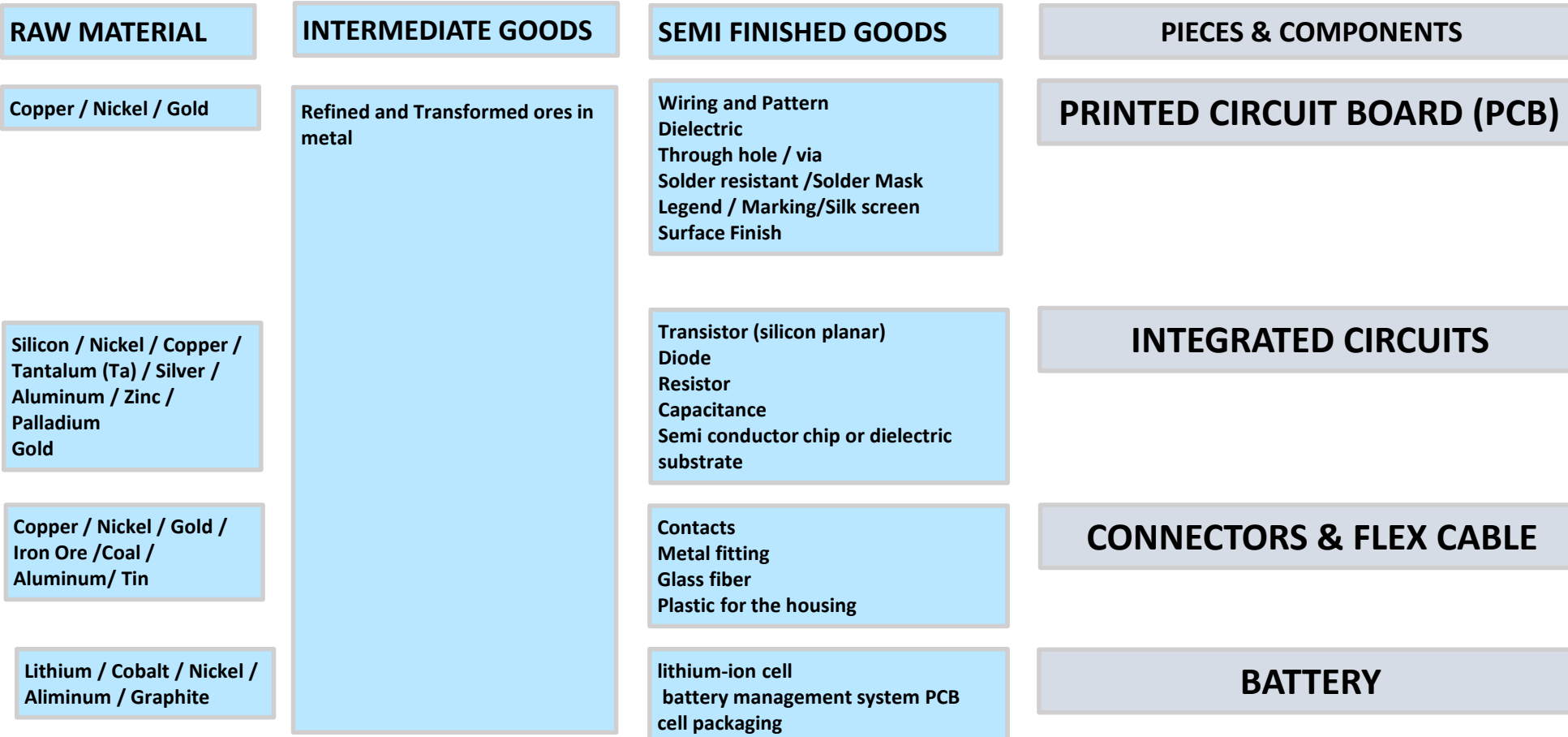


Smartphones' main components : printed circuit board on which are found integrated circuits, semiconductors and connectors



The Cellphone's Main Components : Integrated Circuits, the Printed Circuit Boards, Lithium Batteries & Connectors

We have selected for further analysis strategic goods that have a **high spillover potential** as they are **found in many different goods in the electronics value chain**, such as computers, screens etc.

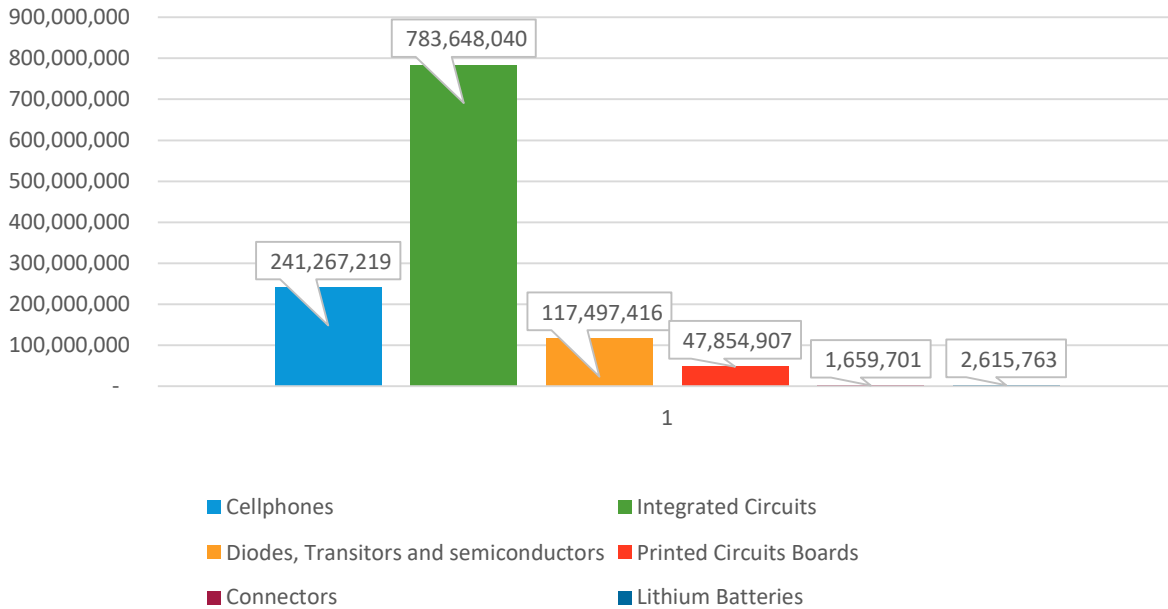


To Kick Start the Development of a Cellphone Industry at the Continental Level it is crucial to **understand the opportunities for African countries to increase their production capacities** in the listed components.

The world volume of exports for Cellphones, Integrated Circuits, Semiconductors, PCBs, Connectors & Lithium Batteries

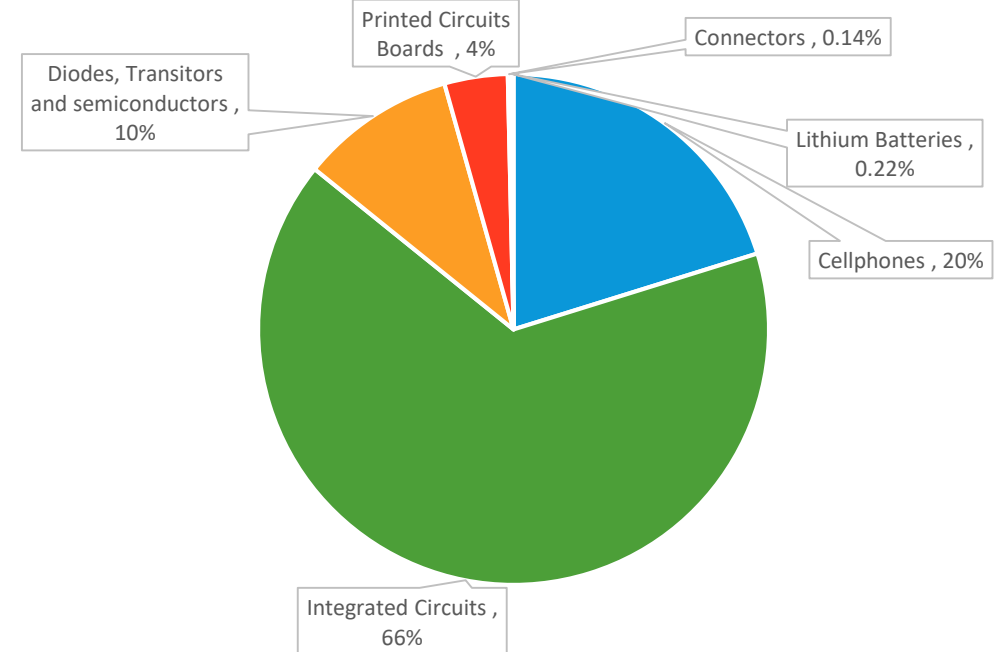
The **aggregated total world exports** for the selected electronics components of the cellphone, and of the cellphone per se, is **dominated by the world sale of integrated circuits**

World Exports in 2020 USD thousand



The world trade in the electronics value chain is dominated by the sale of integrated circuits which represent 66% of aggregated sale of the selected goods with an export value of 784 billion USD

% share of each good in the world aggregated volume of exports of 1,196 USD billion in 2020

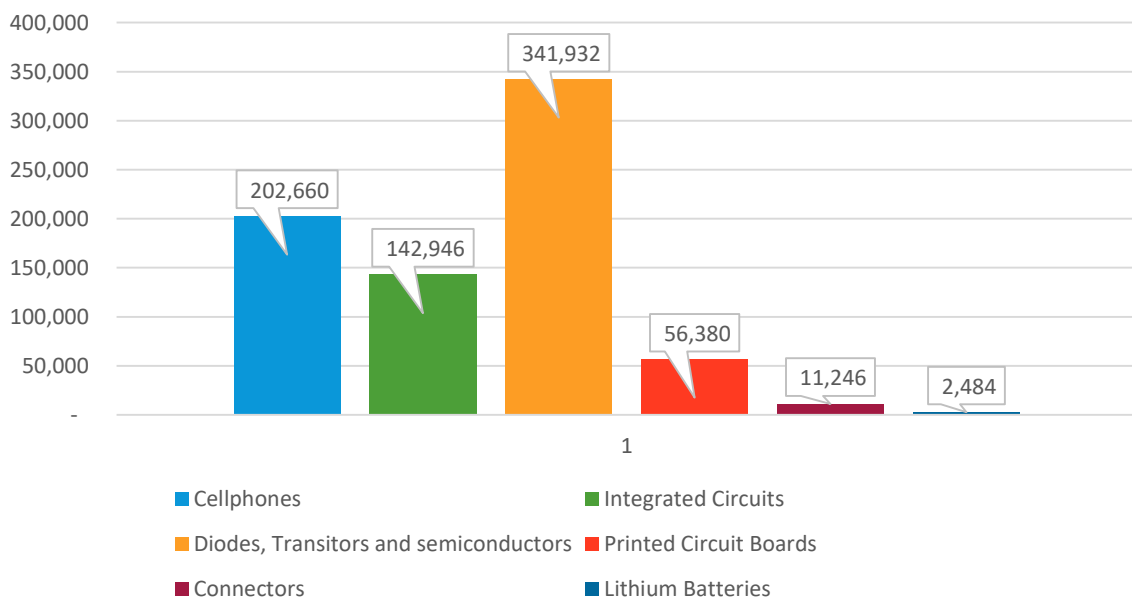


In 2020 the world exports of cellphones represents 22% of the aggregated sale of the selected components amounting to 241 billion USD compared to 783 US Billion for the sale of integrated circuits

The African volume of exports for Cellphones, Integrated Circuits, Semiconductors, PCBs, Connectors & Lithium Batteries

The African continent is **active in the production of cellphones, integrated circuits, semiconductors, PCBs, connectors & lithium batteries**. In 2020, Its total export market amounted to 0,06% of the global exports for the selected goods and was **dominated by the exports of diodes, transistors and semiconductors**.

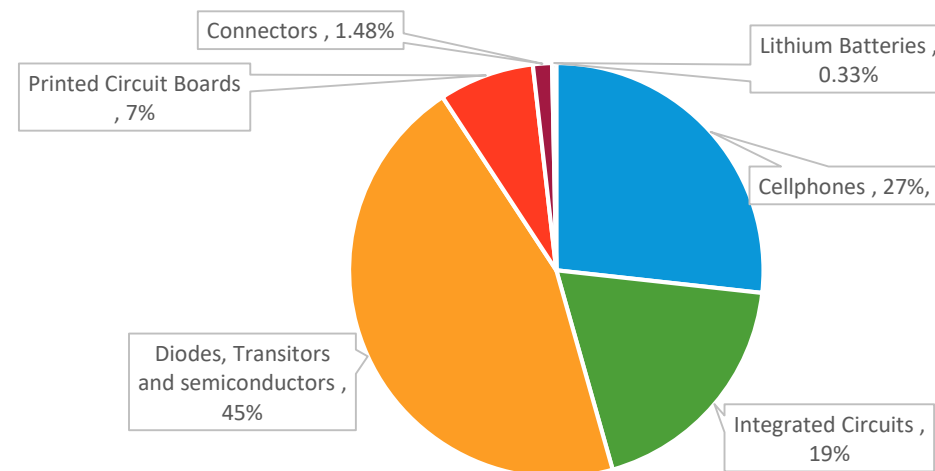
African Exports in USD thousand



In 2020 the African exports of cellphones represented 27% of the aggregated sale of the selected components amounting to \$202 million compared to \$341 million for the sale of diodes, transistors and semiconductors

The African trade in the electronics value chain is dominated by the sale of diodes, transistors and semiconductors which represent 45% of aggregated sale of the selected goods with an export value of \$341 million USD

% share of each good in their total aggregated volume of african export, 2020 USD thousand



OUTLINE

01 INTRODUCTION
GLOBAL & REGIONAL VALUE CHAIN ASSESSEMENTS

02 THE CELLPHONE VALUE CHAIN
A TECHNICAL ANALYSIS : RAW MATERIAL TO FINAL GOOD

03 THE CELLPHONE GLOBAL VALUE CHAIN
LEAD COUNTRIES TRADE ANALYSIS


04 AFRICAN CELLPHONE VALUE CHAIN
LEAD COUNTRIES TRADE ANALYSIS

05 CONCLUSIONS AND POLICY SUGGESTIONS

Cellphone & Electronics Global Value Chain

Africa is remains under represented in the global trade. All along the cellphone and electronics GVC the 2020 exports market is **governed by China, Taipei China, Korea, Vietnam and the USA** which possess the most integrated VC and dominant part in the world market.

2020 Top 10 World exporters along the cellphone & electronics value chain, in % of world exports per selected goods

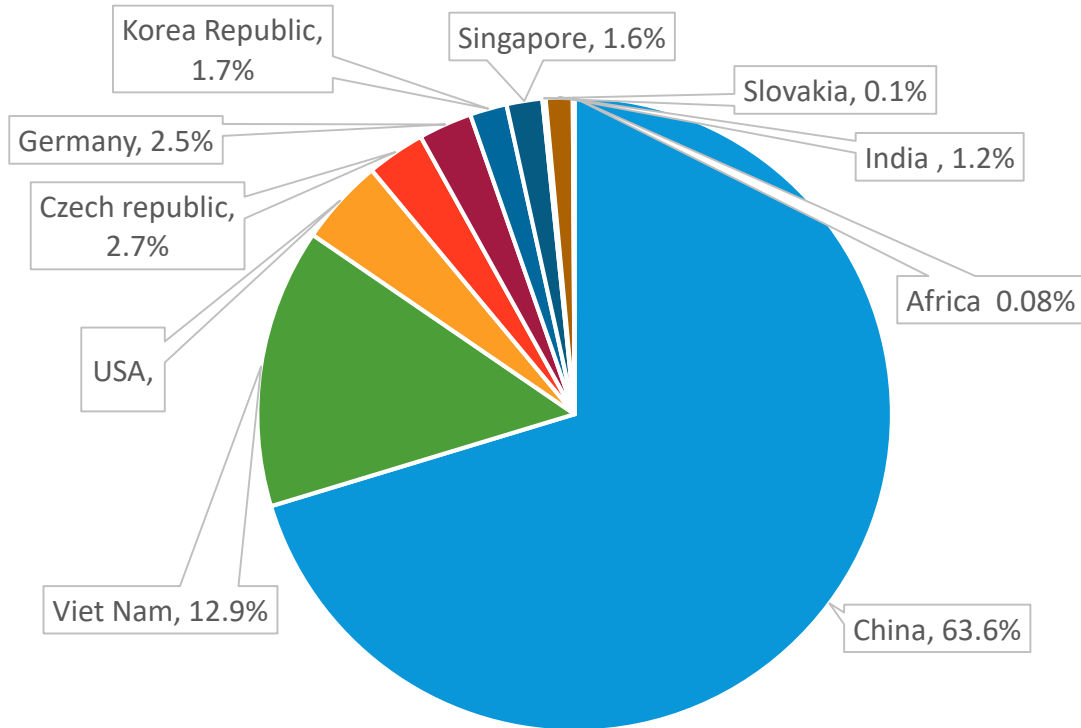


LITHIUM BATTERIES		CONNECTORS		SEMICONDUCTORS		PRINTED CIRCUIT BOARDS		INTEGRATED CIRCUITS		CELLPHONES	
China	24%	China	34.4%	China	42.4%	China	50.9%	China	34.6%	China	63.6%
USA	16%	USA	19.3%	Singapore	7.9%	Taipei, Chinese	11.8%	Taipei China	15.7%	Viet Nam	12.9%
Singapore	10%	Thailand	6.9%	Japan	7.6%	Korea Republic	10.5%	Singapore	11.0%	USA	4.0%
Indonesia	7%	Mexico	4.3%	Malaysia	6.5%	Japan	5.8%	Korea Republic	10.6%	Czech republic	2.7%
Japan	6%	Japan	4.1%	Germany	5.5%	Thailand	2.7%	Malaysia	6.3%	Germany	2.5%
Germany	6%	Taipei, C	2.9%	USA	5.2%	USA	2.6%	USA	5.6%	Korea Republic	1.7%
France	4%	Germany	2.7%	Korea, R.	4.1%	Viet Nam	2.3%	Japan	3.7%	Singapore	1.6%
Korea, R	3%	Singapore	2.4%	Taipei, C.	4.1%	Germany	2.2%	Philippines	2.6%	Slovakia	0.1%
Poland	3%	UK	2.4%	Viet Nam	3.9%	Malaysia	1.4%	Viet Nam	1.8%	India	1.2%
Netherlands	3%	Netherlands	2.3%	Thailand	2.1%	Singapore	1.4%	Germany	1.6%	Africa	0,08%
Africa	0.1%	Africa	0.7%	Africa	0.3%	Africa	0.1%	Africa	0.02%	Others	9,7%
Others	17%	Other	17.6%	Others	10.3%	Others	8.2%	Others	6.5%		

The Global Export of Cellphones in 2020

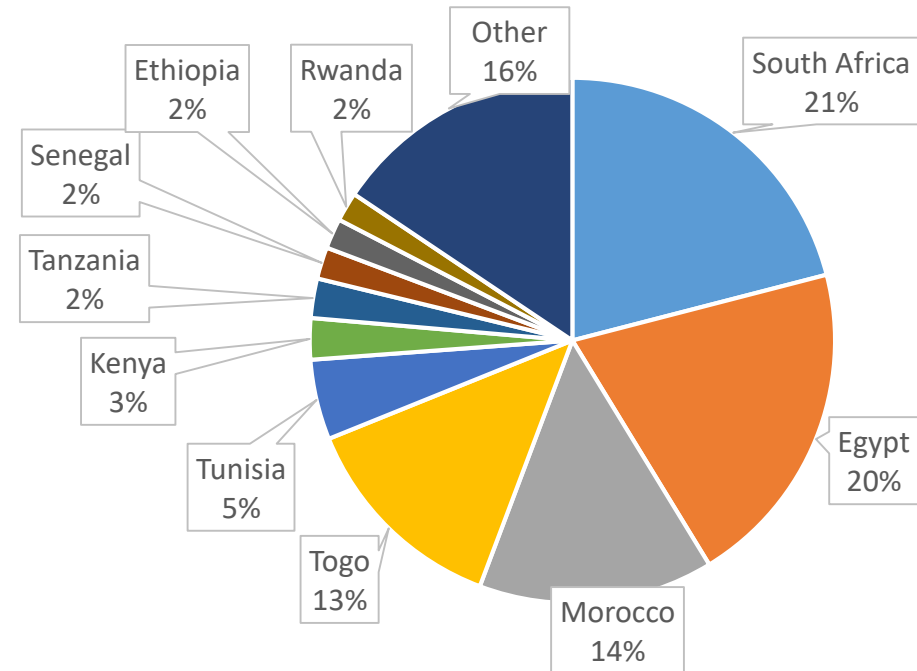
Africa represents 0,08% exports and 1.8% imports of global cellphones exports. The worldwide production of cellphones is dominated by China with 63.4% of the overall export of value of 241 Billion USD.

Global Top 10 Cellphone Exporter 2020, % share of 241.2 USD billion total global exports



China dominates the African cellphone market supplying 87% of Africa's top 5 cellphone importers (SA, Morocco, Egypt, Togo & Tunisia) that together represent 73% of Africa's import market.

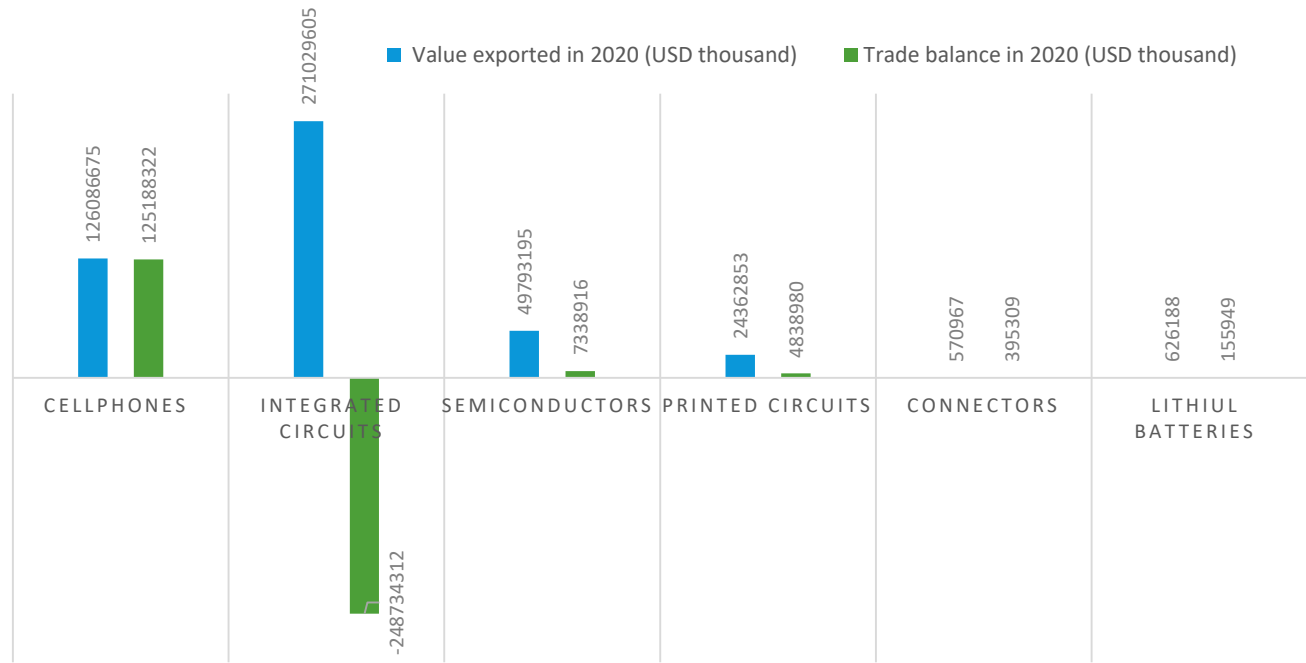
Africa's top 10 cellphone Importers 2020, % of import value of 4.4 USD billion



A focus on China position in the Cellphone and Electronics GVC

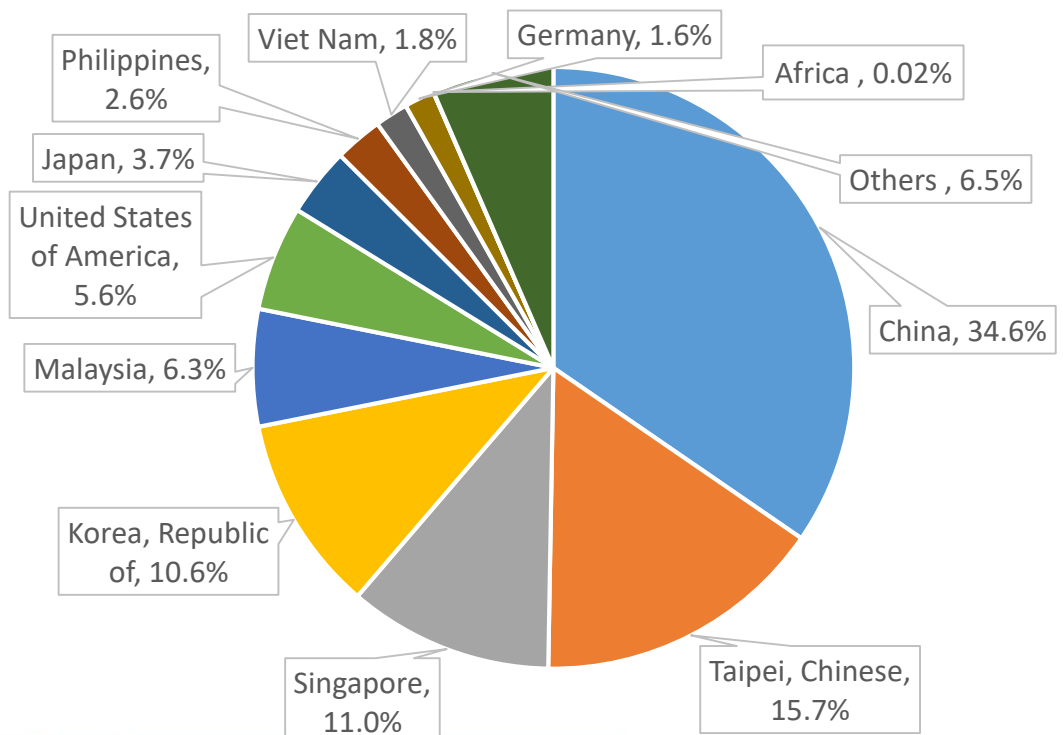
China's dominance on the Cellphone and Electronics GVC is governed by its **dependence on foreign supply of integrated circuits** with a trade deficit of 249 USD billions

CHINA'S TRADE BALANCE ALONG THE CELLPHONE & ELECTRONICS VALUE CHAIN, 2020 USD THOUSAND



China's leading position in the export of integrated circuits is followed by Taipei China and Singapore

Global Top 10 Integrated Circuits Exporters 2020, % share of 783.6 USD billion total global exports



While China dominates the global production of integrated circuits with 34,6% of the world exports, it still shows significant dependence in the international supply with a trade deficit almost as big as its export value.

OUTLINE

01 INTRODUCTION
GLOBAL & REGIONAL VALUE CHAIN ASSESSEMENTS

02 THE CELLPHONE VALUE CHAIN
A TECHNICAL ANALYSIS : RAW MATERIAL TO FINAL GOOD

03 THE CELLPHONE GLOBAL VALUE CHAIN
LEAD COUNTRIES TRADE ANALYSIS

04 AFRICAN CELLPHONE VALUE CHAIN
LEAD COUNTRIES TRADE ANALYSIS

05 CONCLUSIONS AND POLICY SUGGESTIONS

Cellphone & Electronics African Value Chain, a high potential for regional integration

In 2020, the African continent shows signs of **production capacities all along the cellphone and electronics value chain** with a export market value of 758 million USD for the selected goods dominated by South Africa, Morocco and Tunisia.

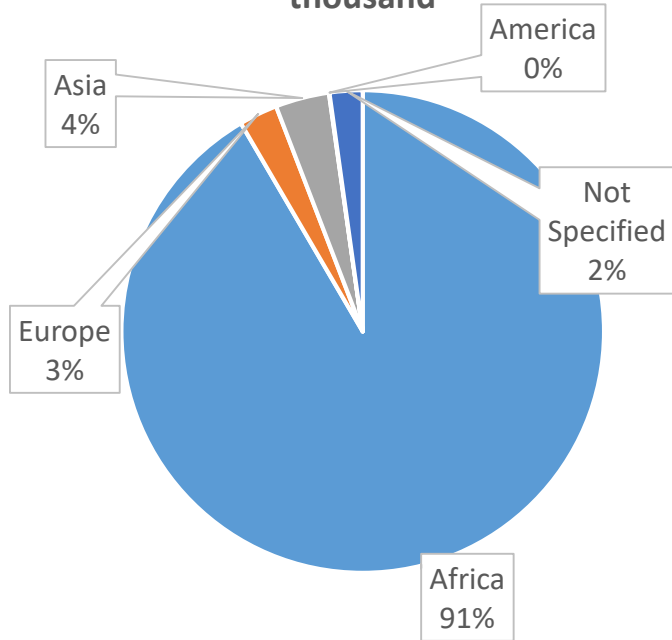
2020 Top 10 African exporters along the cellphone & electronics value chain, in % of total African exports per selected goods

LITHIUM BATTERIES		CONNECTORS		SEMICONDUCTORS		PRINTED CIRCUIT BOARDS		INTEGRATED CIRCUITS		CELLPHONES	
South Africa	92%	Tunisia	41%	Morocco	87,5%	Tunisia	90,7%	Morocco	53,2%	Morocco	56,5%
Namibia	3%	Morocco	33%	SA	6,6%	SA	6,9%	Tunisia	22,1%	South Africa	33,0%
Zambia	1,2%	South Africa	25%	Tunisia	2,8%	Cameroon	1,2%	Egypt	11,1%	Ethiopia	4,1%
Seychelles	1%	Kenya	0,38%	Namibia	1,2%	Morocco	0,3%	South Africa	10,3%	Mauritius	1,3%
Angola	0,4%	Zambi	0,22%	Kenya	0,7%	Zimbabwe	0,2%	Mali	0,7%	Zambia	0,7%
Botswana	0,4%	Mauritius	0,13%	Egypt	0,3%	Sierra Leone	0,2%	Tanzania	0,4%	Namibia	0,6%
Senegal	0,4%	Cameroon	0,09%	Mauritius	0,2%	Kenya	0,1%	Saint Helena	0,4%	Kenya	0,6%
Uganda	0,4%	Angola	0,04%	Uganda	0,1%	Rwanda	0,1%	Algeria	0,3%	Côte d'Ivoire	0,5%
Kenya	0,4%	Tanzania	0,04%	Burkina	0,1%	Mauritius	0,1%	Cameroon	0,3%	Cabo Verde	0,5%
Tunisia	0,3%	Senegal	0,03%	Mali	0,1%	Sudan	0,0%	Somalia	0,2%	Others	2,2%
		Other	0,09%	Others	0,4%	Others	0,2%	Others	1,1%		

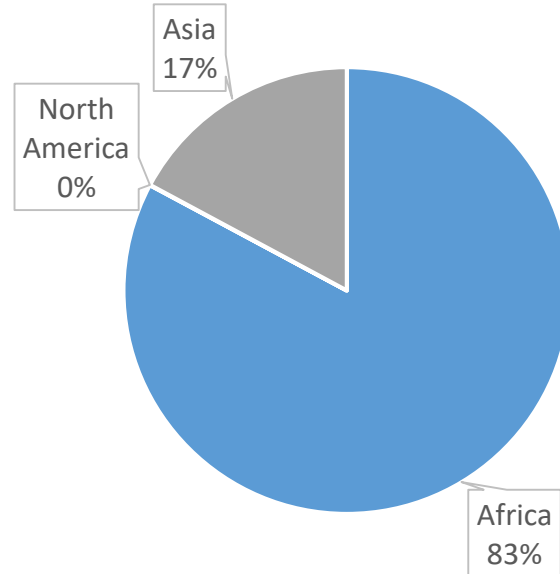
Inter continental Trade of Cellphones: The case of Ethiopia & South Africa

African Cellphone production is driven by the the African Market. Africa's top 3 producers represent 93.6% of the continents' total exports and **80% of their international sales are made on the African Market.**

South Africa's main 2020 export destinations in % of 66.860 USD thousand

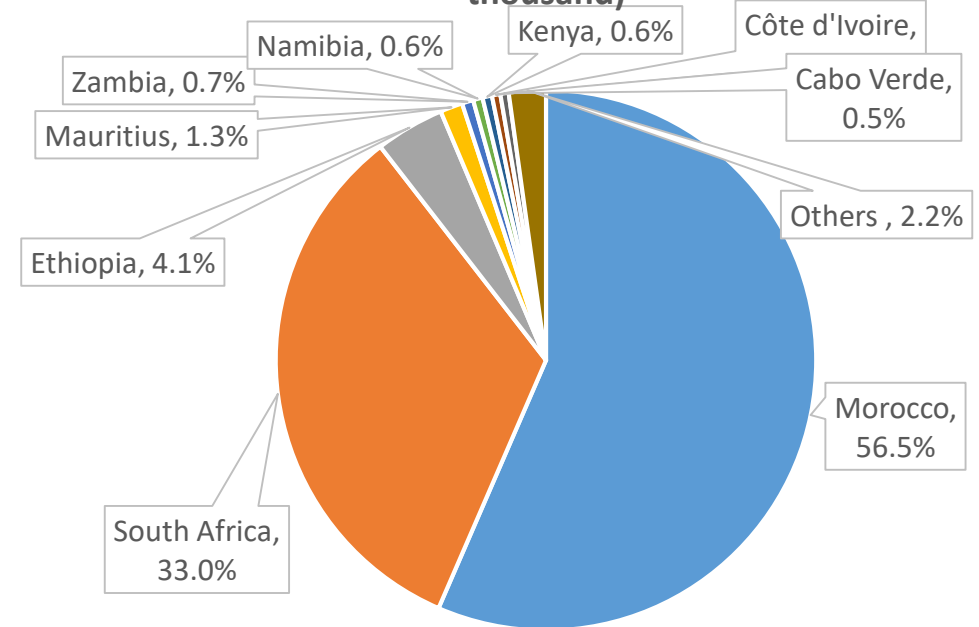


Ethiopia's main 2020 export destinations in % of 8.366 USD thousand



The African Cellphone export market is dominated by Morocco, South Africa and Ethiopia.

Africa's Top Cell Phone Exporters in 2020 (202.660 USD thousand)



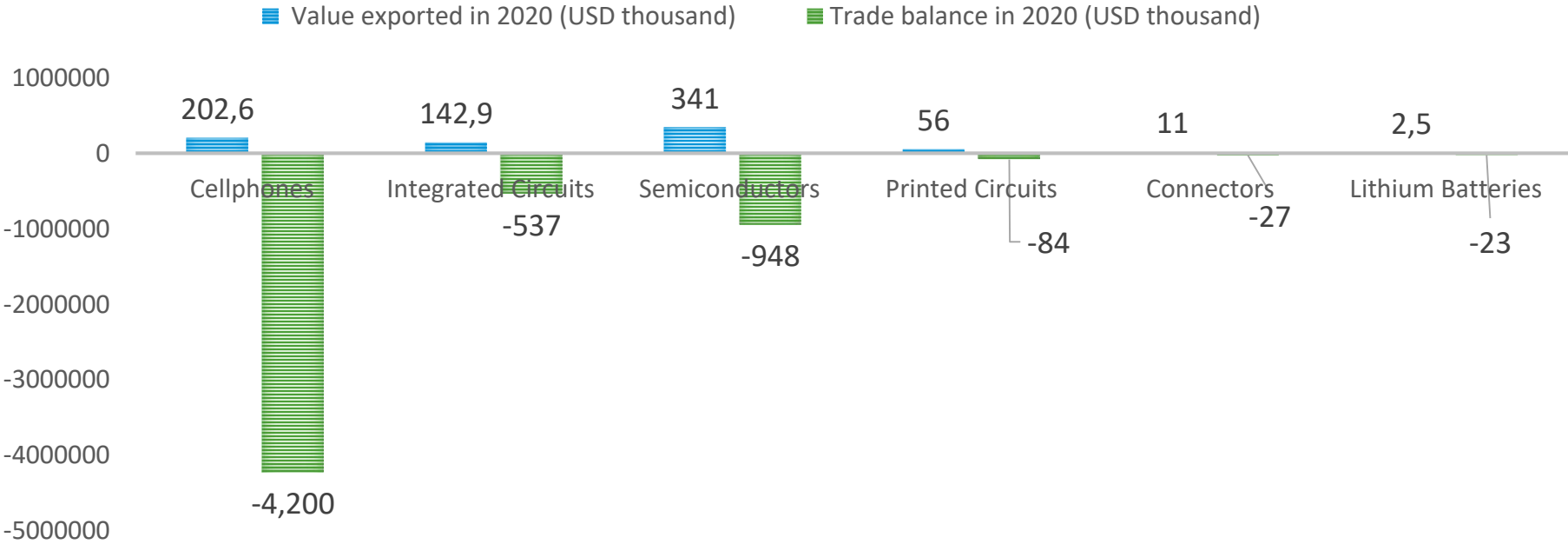
South Africa and Ethiopia respectively exported \$67 million and \$8 million worth of cellphone in 2020.

African continent's untapped potential for developing its industrial base along the cellphone and electronics value chain

With production capacities all along the value chain there are **opportunities for developing an integrated cellphone value chain in Africa**

The African continent shows potentiality for developing its industrial base through continental demand for goods along the cellphone value chain. With a cumulated trade deficit of 6 billion USD the African market remains largely uncovered by continental production.

AFRICA'S TRADE BALANCE ALONG THE CELLPHONE & ELECTRONICS VALUE CHAIN, 2020 USD MILION



The continental market for smartphone: opportunities created by untapped demand

There is **US 15 billion untapped demand in Africa** for the continent lowest national importers to reach the international consumption levels of Africa's top 5 importers

Average Import amount of cellphones per capita across Africa's top 5 importing countries (17% of continental population)	14.8 USD
Average Import amount of cellphones per capita across Africa's remaining 50 countries (83% of continental population)	1.08 USD
Market gap per capita for Africa's 50 lowest cellphone importers to meet international consumption levels of Africa's top 5	13.71 USD
Overall market gap for Africa's 50 lowest importers to meet international consumption levels of Africa's top 5 cellphones importers	15,109,629,785 USD

The continental demand for smartphones remains largely untapped, 27% of the continental imports are made by 50 countries. The remaining imports (73%) are made by South Africa, Morocco, Egypt, Togo & Tunisia.

Smartphones “Made in Africa” from the raw material extraction to manufacturing its pieces and components

Africa retains the leading positions in the world export of Cobalt, Aluminium, Silver and Nickel and its aggregated exports amount to 7% of the US 675 billion global trade of 16 of the most important minerals used in the electronics VC.

% of the African share in the global export of each mineral

Cobalt	Aluminium	Silver	Nickel	Palladium	Zinc	Gold	Graphite	Iron	Copper	Silicon	Tantalum	Gallium	Tin	Lithium Oxide & Carbonate
85%	56%	38%	22%	11%	8%	7%	5%	5%	3%	0,1%	0,04%	0,02%	0,02%	0,01%

With an **aggregated global market of US 675 Billion in 2020**, of the selected 16 minerals **Gold, Iron, Copper and Palladium** are the key value drivers of this grouping of products.

% share of each mineral in the aggregated 2020 global trade of US 675 billion for the selected minerals

Gold	Iron	Copper	Palladium	Zinc	Aluminium	Nickel	Silicon	Silver	Gallium	Tin	Lithium Carbonate	Lithium oxide	Tantalum	Graphite	Cobalt
63%	21%	9%	4%	1.1%	0.9%	0.5%	0.4%	0.3%	0.16%	0.16%	0.14%	0.12%	0.10%	0.07%	0.002%

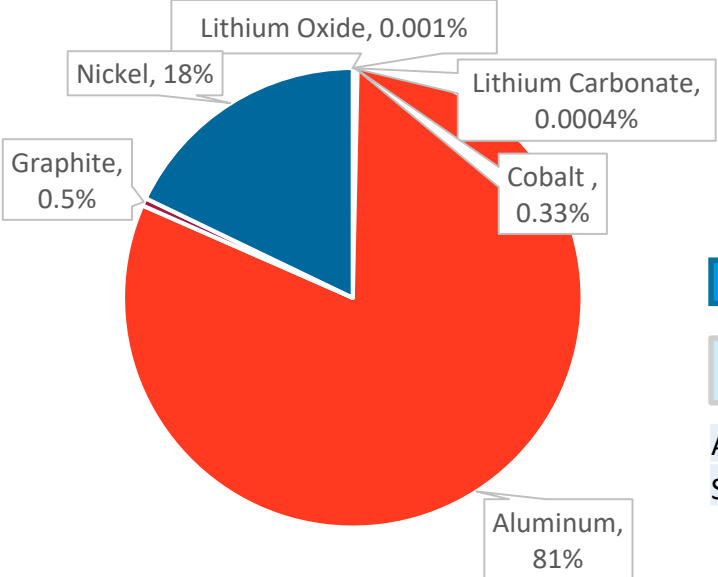
African Potentiality for Mineral Transformation: the Lithium Battery VC

Africa is the **world leader in the Cobalt, Aluminum and Nickel Ore Value Chains**, driving world exports respectively at 85%, 56% and 22% with markets dominated by Guinea, DRC and Zimbabwe

African exports amount to 38,8% of the US\$ 11,8 billion Global Export Market for Lithium, Cobalt, Aluminum, Graphite & Nickel.

Africa's % share in the world exports of minerals used in the Lithium Battery Value Chain & Africa's leading producers of selected minerals in % of the African Exports, 2020

% share of each mineral in their African Aggregated Exports, 2020



BATTERY



Lithium Carbonate		Lithium Oxide		Cobalt		Aluminum		Graphite		Nickel	
Africa	0.002%	Africa	0.008%	Africa	85%	Africa	56%	Africa	4.7%	Africa	22%
South Africa	0.002%	SA	86%	DRC	98%	Guinea	96%	Madagascar	68.8%	Zimbabwe	81%
		Uganda	14%					Mozambique	22.3%	Côte d'Ivoire	13%

Aluminum is Africa's key value driver as it amounts to 81% of the aggregated exports of the mineral composing the **Lithium Battery Mineral VC**.

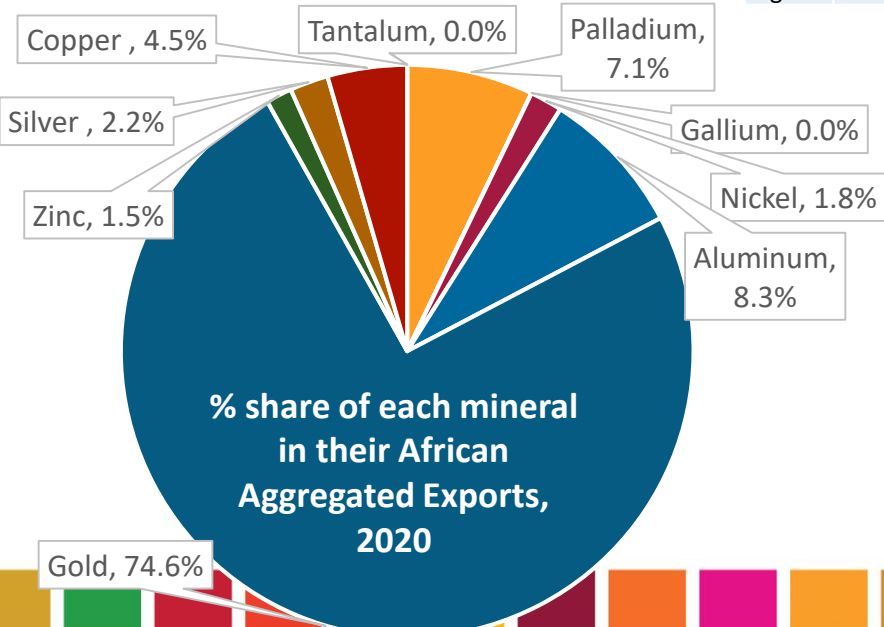
African Potentiality for Mineral Transformation: the integrated circuits VC

Africa is the **world leader in the Aluminum , Nickel and Silver Value Chains**, driving world exports respectively at 56% and 38% with markets dominated by Guinea, Zimbabwe & South Africa.

Africa's % share in the world exports of minerals used in the Integrated Circuits Value Chain & Africa's leading producers of selected minerals in % of the African Exports , 2020

INTEGRATED CIRCUITS

Silicon	Tantalum	Palladium	Gallium	Nickel	Aluminum	Gold	Zinc	Silver
Africa: 0.1%	Africa: 0.04%	Africa: 11%	Africa: 0.02%	Africa: 22%	Africa: 56%	Africa: 8%	Africa: 8.4%	Africa: 38%
South Africa: 81%	Ethiopia: 0.04%	South Africa: 100%	Libya: 51%	Zimbabwe: 81%	Guinea: 96%	South Africa: 22%	South Africa: 33.6%	South Africa: 99%
Zambia: 19%			Nigeria: 32%	Côte d'Ivoire: 13%		Ghana: 14%	Eritrea: 28.1%	
						Burkina Faso: 12%	Burkina Faso: 17.3%	
						Egypt: 9%	Namibia: 9.6%	



African exports amount to 8% of the US\$ 531,9 Billion global export market of the minerals part of the integrated circuits's VC.

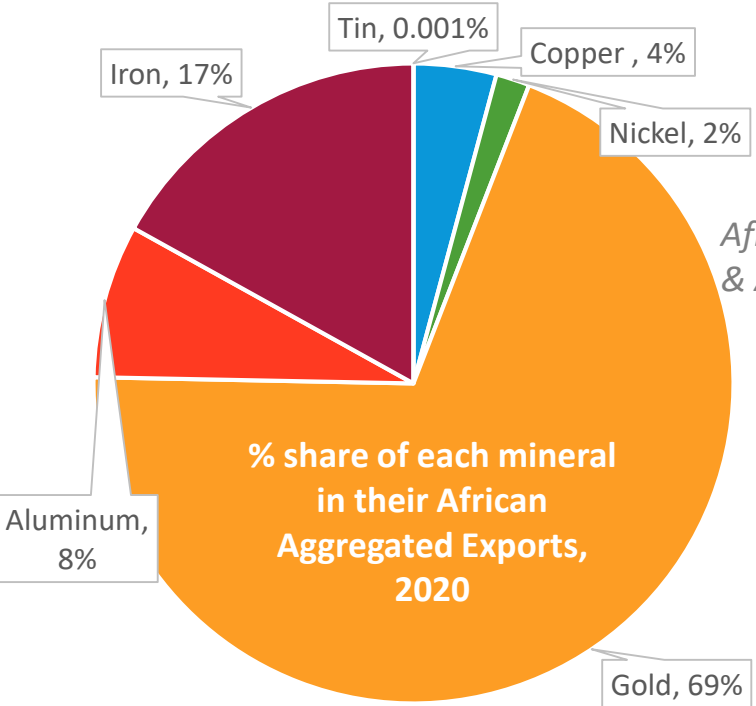
Gold is Africa's key value driver as it amounts to 75% of the the aggregated exports of the selected minerals.

Copper	
Africa	3%
DRC	44%
South Africa	16%

African Potentiality for Mineral Transformation: the printed circuit VC

Africa is the world leader the Aluminum , Nickel ore Value Chains, driving world exports respectively at 56% and 22% with markets dominated by Guinea and Zimbabwe

African exports amount to 7% of the US\$ 632,5 Billion global export market of the minerals part of the printed circuits VC.



Africa's % share in the world exports of minerals used in the Printed Circuits Value Chain & Africa's leading producers of selected minerals in % of the African Exports , 2020

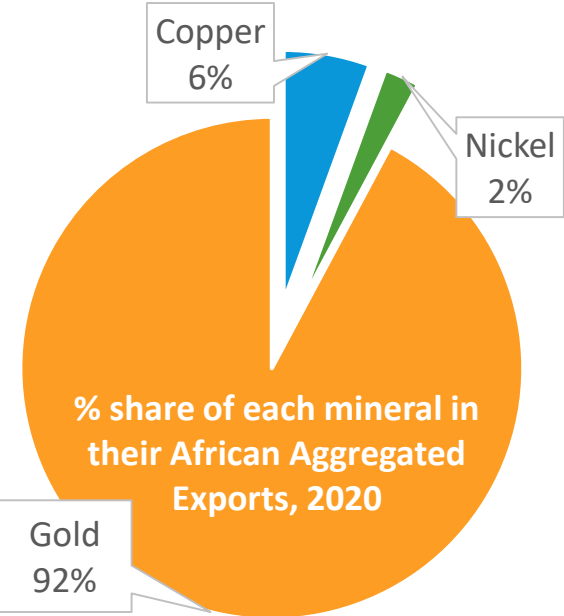
PRINTED CIRCUITS

Copper		Nickel		Gold		Aluminum		Iron Ore		Tin	
Africa	3%	Africa	22%	Africa	8%	Africa	56%	Africa	5%	Africa	0.1%
DRC	44%	Zimbabwe	81%	South Africa	22%	Guinea	96%	South Africa	81%	South Africa	81%
South Africa	16%	Côte d'Ivoire	13%	Ghana	14%			Mauritania	13%	Zambia	19%
				Burkina Faso	12%			Liberia	5%		
				Egypt	9%						

Gold and Iron are Africa's key value driver as they amount respectively to 69% and 17% of the aggregated exports of the selected minerals.

African Potentiality for Mineral Transformation: the connectors VC

DRC is the leading African producer of copper, with exports amounting to 44% of Africa’s total. South Africa leads the gold production with 22% of Africa’s export and Zimbabwe Nickel exports with 81% of Africa’s exports



African exports amount to 7% of the US\$ 485,4 Billion global export market of the minerals which make part of the connectors VC.

CONNECTORS →

Copper		Nickel		Gold	
Africa	3%	Africa	22%	Africa	8%
DRC	44%	Zimbabwe	81%	South Africa	22%
South Africa	16%	Côte d'Ivoire	13%	Ghana	14%
				Burkina Faso	12%
				Egypt	9%

Gold is Africa’s key value driver as it amounts to 92% of the aggregated exports of the selected minerals.

OUTLINE

01 INTRODUCTION
GLOBAL & REGIONAL VALUE CHAIN ASSESSEMENTS

02 THE CELLPHONE VALUE CHAIN
A TECHNICAL ANALYSIS : RAW MATERIAL TO FINAL GOOD

03 THE CELLPHONE GLOBAL VALUE CHAIN
LEAD COUNTRIES TRADE ANALYSIS

04 AFRICAN CELLPHONE VALUE CHAIN
LEAD COUNTRIES TRADE ANALYSIS

05 CONCLUSIONS AND POLICY SUGGESTIONS

Smart Phone & Electronics Value Chains : Opportunities for operationalizing the AfCFTA through regional & continental industrial integration

OPPORTUNITIES

STRENGTHS

International Market	Global Demand	Continental Demand	NDIS & FDIs Attraction	Continental Trade	Large scale Capital Ex.	African Supply	African processing	Comparative advantage	Untapped markets	Consumer Good Production
O1 Market for Smartphones & Selected Electronic Components amounts to \$ 1,196 Billion	O2 Smartphones & integrated circuits amount to 22% and 66% of global sales in the selected market	O3 Africa cellphones imports amount to \$4,4 billion, 1,8% of global trade	O4 There is a high demand for integrated circuits (China trade deficit of \$ 248 billion)	O5 Continental purchase is above 80% of African production of smartphones	O6 Inelastic demand for minerals is a long term opportunity for large scale investments in the mining sector	01 African countries are present in the different steps of the selected value chain exporting \$341 million	02 Africa countries are active in the production of semi conductors & integrated circuits	03 Africa possesses minerals of the electronic value chain. Its aggregated exports amount to 7% of world trade	04 Africa has an estimated current consumption gap of 15 Billion USD	05 Start up industrial activities in the production of consumer goods drives demand and investments along the VC

STRATEGY:

Establishment of cross-border industrial cooperation for enterprises to take advantage of regional sourcing of manufactured inputs within the framework of value chains

TACTIC: Establishment of African Smart Phone Corridors



Policy Suggestion 1 :
Facilitation of joint public & private cross-border industrial investments and technology transfers to foster intra-regional trade to increase local value addition



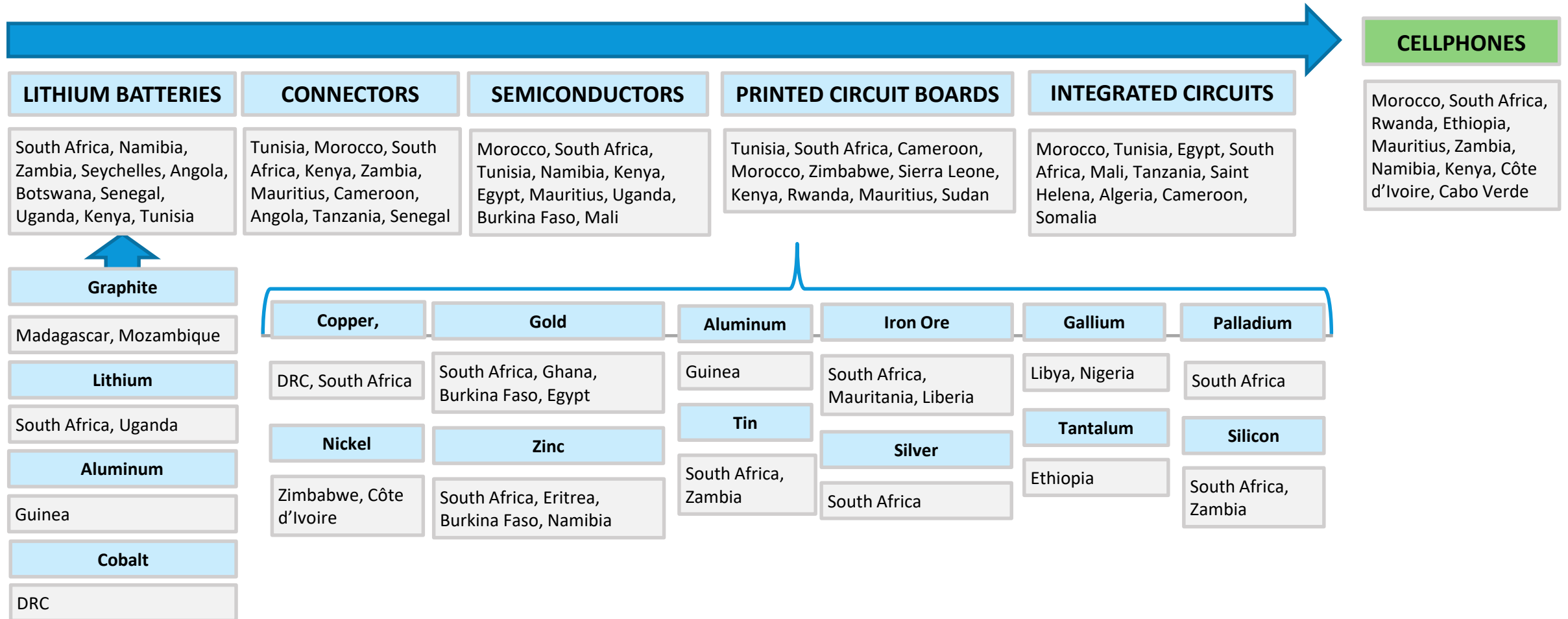
Policy Suggestion 2:
Establishment of an industrial & technology development fund for small, medium and large scale enterprises active along the value chain



Policy Suggestion 3:
Strengthening of Regional Centers and Laboratory Facilities for R&D, standards setting, quality control, assurance and certification to assist African products

The African Smart Phone Corridors – High Potential for Value Chain Development

Development of a Regional Industrial Strategy to foster the use of local inputs and upscale local productive capacities and, adding value to them and increase the local processing of the abundant natural resources



THE STUDY'S NEXT STEPS



- 1 A **behavioral and systemic analysis of the actors along the value chain**
- 2 A analysis of productive structures to **identify critical constraints to upscale & expand production**
- 3 An **assessment of the policy & legal instruments** put in place at a regional and national level to support industrial development



INDUSTRIAL
UPGRADING
STRATEGY DESIGN

IDENTIFICATION OF
FINANCIAL & FISCAL
POLICY INSTRUMENTS

PROGRAMME &
PROJECT DESIGN



THANK YOU!

www.uneca.org/ea-icsoe25

Ideas
to
Action