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COMMITTED TO  
IMPROVING THE STATE  
OF THE WORLD

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# Shaping the Future of Production in South Africa

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## Preliminary Country Readiness Results

- 
- **Shaping the Future of Production System Initiative Overview**
  - **Country Readiness for the Future of Production**
  - **Country Readiness Assessment – Preliminary Global Results and Insights**
  - Future of Production in South Africa – A Closer Look
  - Appendix



### **How can the transformation of production systems, from R&D to the consumer, drive innovation, sustainability and employment?**

We are at the threshold of a new industrial revolution, characterized by a confluence of emerging technology breakthroughs from **mobile connectivity, artificial intelligence, Internet of Things, next-generation robotics, 3D printing, wearables and genetic engineering to nanotechnology, advanced materials, biotechnology and others.**

These technologies, combined and connected, will transform manufacturing and production systems with unprecedented speed and scope, impacting business models, economic growth, employment and sustainability. Businesses in manufacturing and distribution sectors and policy-makers need new approaches and capabilities. They must work together to build truly innovative and sustainable production systems that benefit all people.

## Core Community

### Stewardship Board

**Technology and Innovation for the Future of Production**

1

**Employment and Skills for the Future of Production**

2

**Accelerating Sustainable Production**

3

**SMEs**

1

**Multinational corporations**

**Government**

**Country Readiness for the Future of Production**

4

**The Future of Production in ASEAN**

5

**South Asia**

**Countries of interest**

Global Future Council and other experts

Civil society experts and organizations

Partner companies (chief executives and deputies)

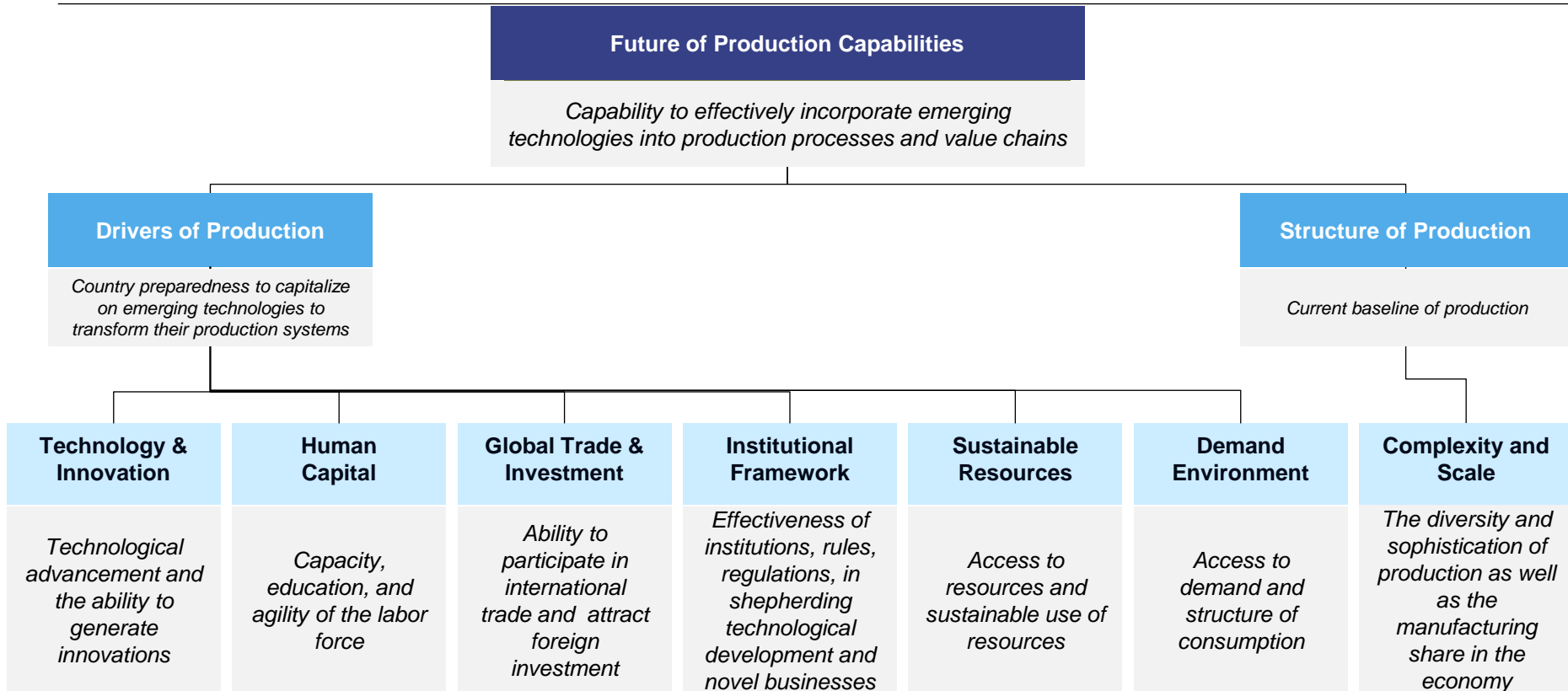
Senior ministers, international organization heads and deputies

Focus of today's workshop

# The Country Readiness project seeks to assess national readiness for the Future of Production and identify and catalyze joint actions to transform production systems

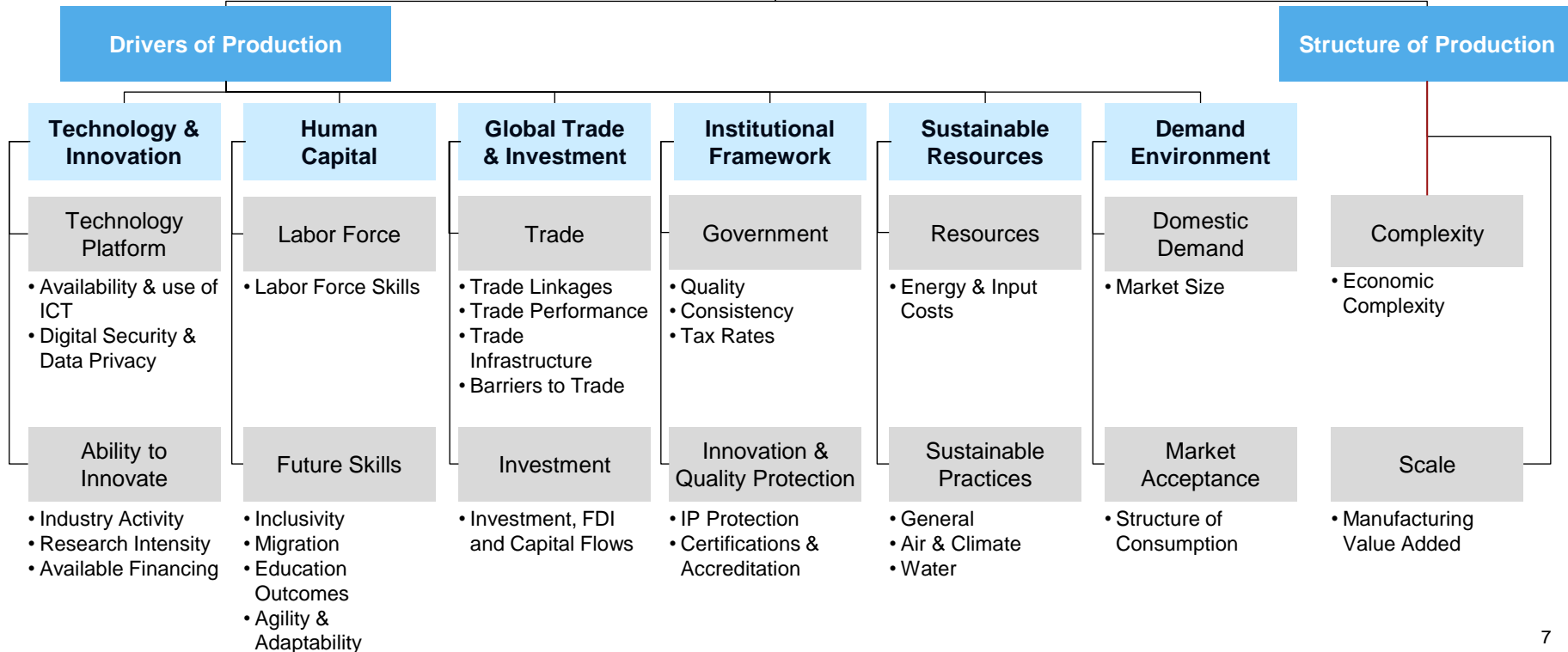
	Project Objectives	Key Research Questions
	<b>Establish common framework</b> with consistent, objective criteria to enable global leaders to speak a common language for an increasingly complex topic	<i>What are the key levers required to effectively transform production systems in light of rapidly emerging technologies?</i>
	Use a data-driven approach to help leaders <b>assess country readiness</b> for the future of production and learn from peer countries	<i>How well is a country positioned for the future and what are its relative strengths and areas of improvement?</i>
	<b>Identify policy and action levers</b> to help government leaders, industry, academia, and civil society define and implement joint actions to prepare and transition effectively to future realities	<i>What actions should countries prioritize to improve the conditions necessary to transform production systems and advance to the next stage of development?</i>
	<b>Accelerate engagement</b> by facilitating multiple stakeholder dialogue, monitoring, and agenda setting and build an enduring community	<i>What is the best way to catalyze structured dialogue and joint action between government and business leaders?</i>

The diagnostic model framework uses two main dimensions to assess country readiness and identify strengths and improvement opportunities by area



The country readiness assessment is conducted using a data-driven approach with 86 metrics distributed across the drivers, categories, and sub-categories

### Future of Production Capabilities Scorecard



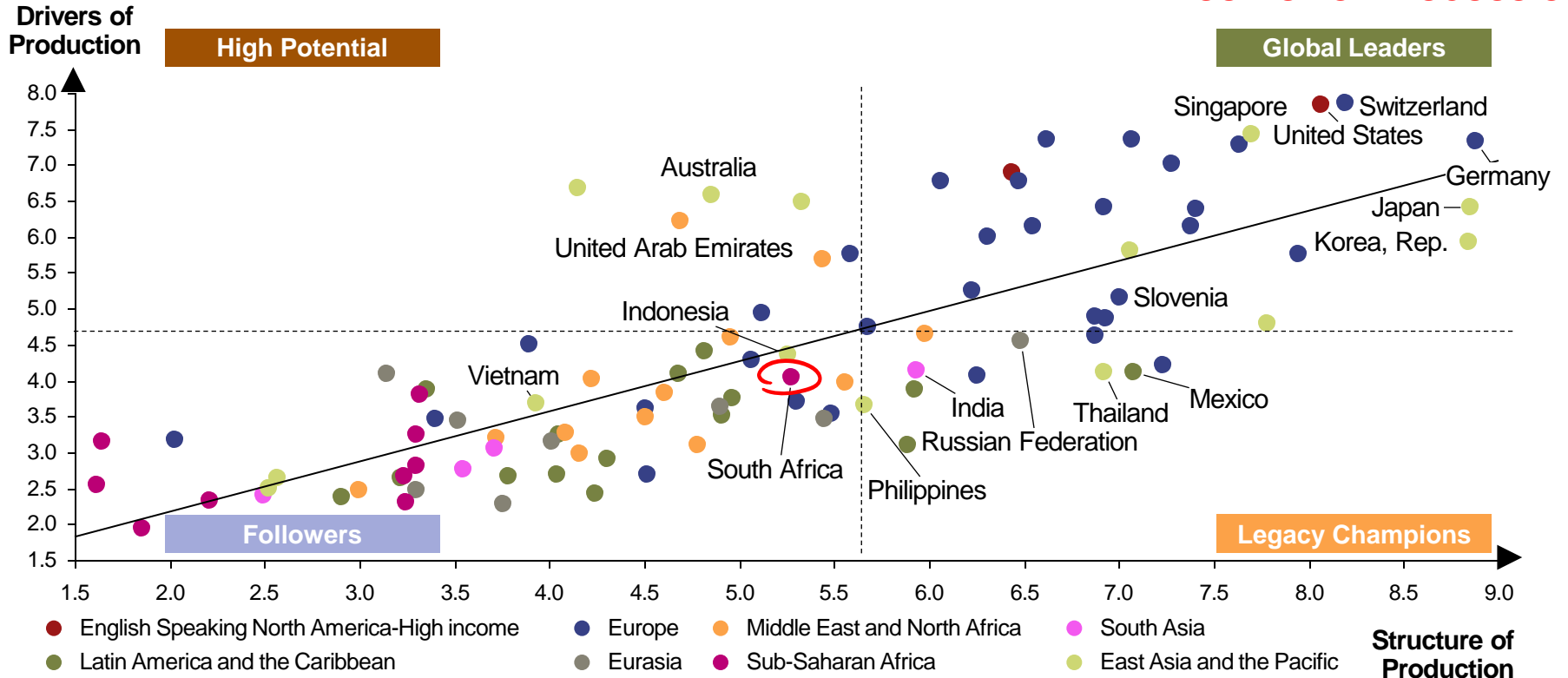
Rather than receiving a ranking, countries are assigned to one of the four country archetypes, which reflect relative positioning for the future





The country archetype framework has been applied to conduct analysis<sup>1</sup> of the 100 countries included in the beta model

**DRAFT RESULTS FOR DISCUSSION**



1. Axes are on a 10 point scale but have been zoomed to show variances between countries; country archetype lines drawn on average drive and structure scores for Top 80 countries

# Countries can learn from their archetype group as they develop their own unique strategies and target sectors and value chain segments for growth

## Transformation Journey

**PRELIMINARY – FOR DISCUSSION**

	Global Leaders	Legacy Champions	High Potential	Followers
Sectors <i>Where to target growth?</i>	Consolidate lead across sectors, edge out to <b>unique products</b> <sup>1</sup>	Expand into <b>adjacent sectors</b> , leveraging value chain strengths	Focus on a <b>few growth poles</b> to capitalize on competitive advantages	
Value Chain <i>Which segments to focus on?</i>	Full-spectrum of value chain; emphasize <b>highest value</b> segments	Move to <b>higher value</b> segments in existing sectors  Pursue <b>leapfrogging</b> <sup>2</sup> opportunities in emerging sectors leveraging tech convergence	Build bottom-up capabilities and seek to <b>strengthen areas of strength</b>	
Inclusive Growth <i>How to support SMEs and leverage MNCs?</i>	Co-invest with MNCs in <b>moonshots</b> and <b>international expansion</b>  Enable <b>SME-led growth</b>	Co-invest with MNCs to <b>expand SME networks</b>  Increase <b>SME productivity</b>	Co-invest with MNCs to <b>build SME networks</b>	Co-invest with MNCs to <b>anchor new clusters</b>  Formalize <b>SME base</b>

1. Hidalgo and Hausmann propose the concept of economic complexity – a measurement of knowledge in a society that gets translated into the products it makes (diversity, ubiquity)  
 2. Latecomers absorb what the technological leaders have to offer and leap to a new stage of development. See next page for more detail.

The transformation framework gives guidance on where different country archetypes should invest first across the drivers to advance to the next stage of development

## Transformation Framework: Follower Focus Areas

**PRELIMINARY – FOR DISCUSSION**

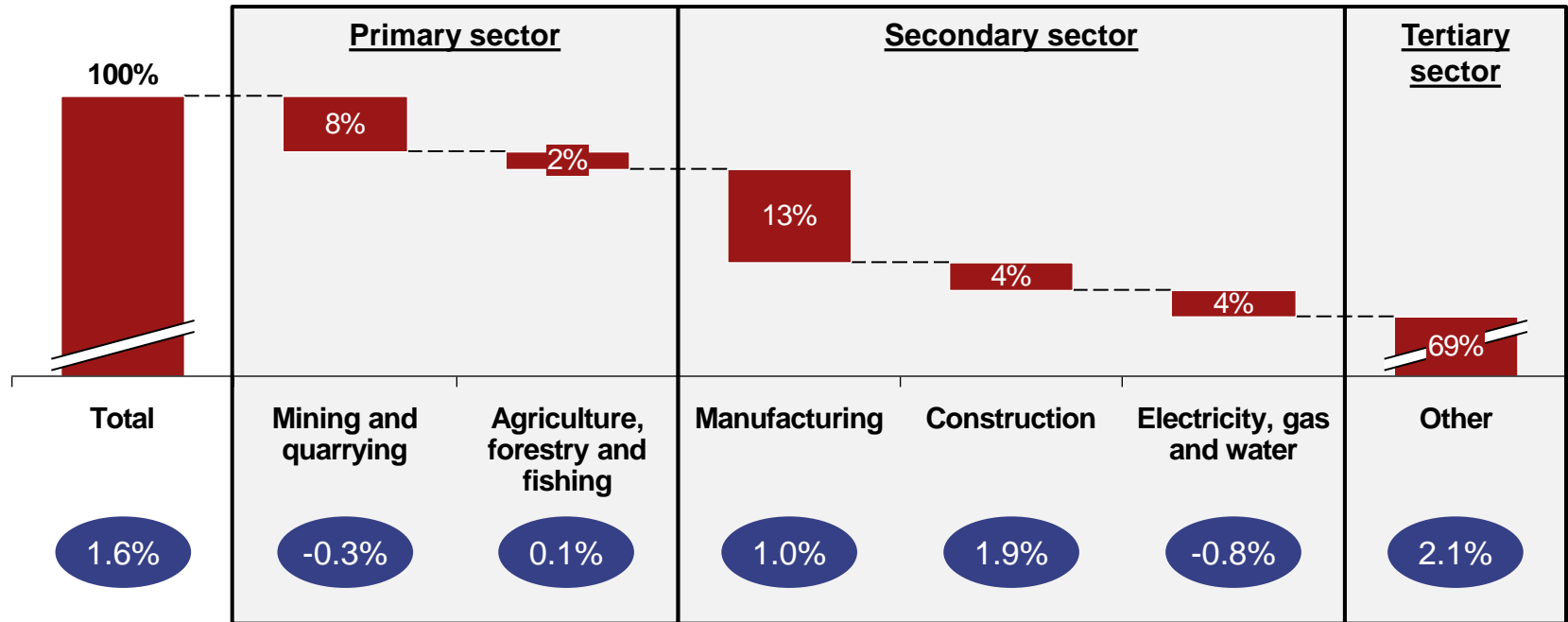
### Drivers of Production



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South Africa's primary and secondary sectors are experiencing slower growth rates than the tertiary sector

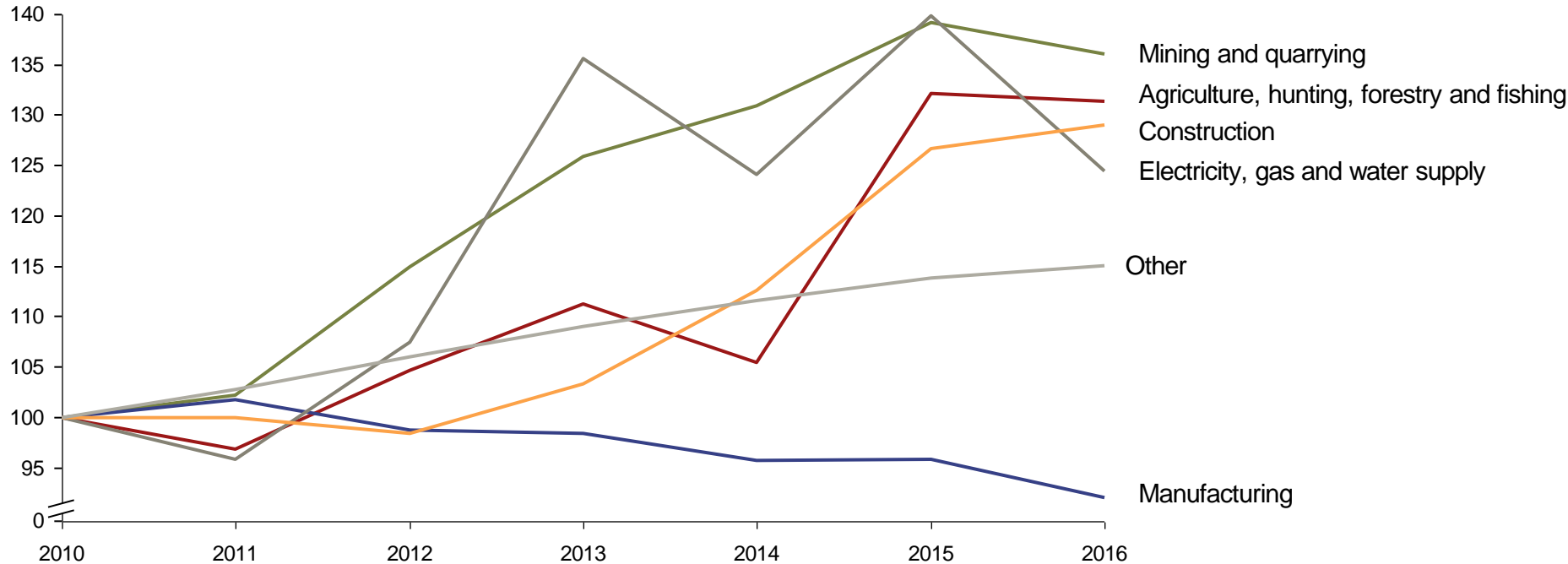
## Contribution to GDP per sector (2016)



X GDP CAGR since 2010 (at 2010 constant prices)

# South Africa's manufacturing sector has experienced a net reduction in employment since 2010

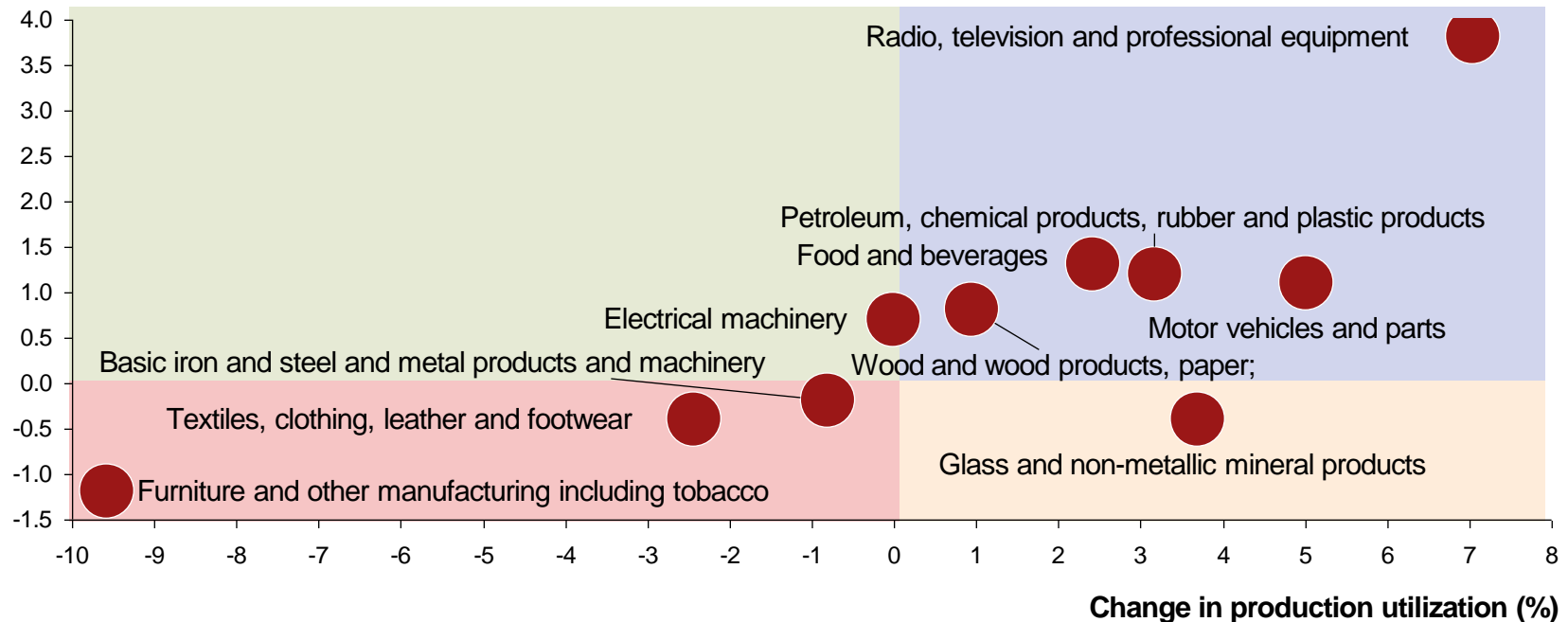
## Employment by sector (Base 2010 = 100)



# South Africa's production and utilization of metals, textiles and furniture have declined in recent years

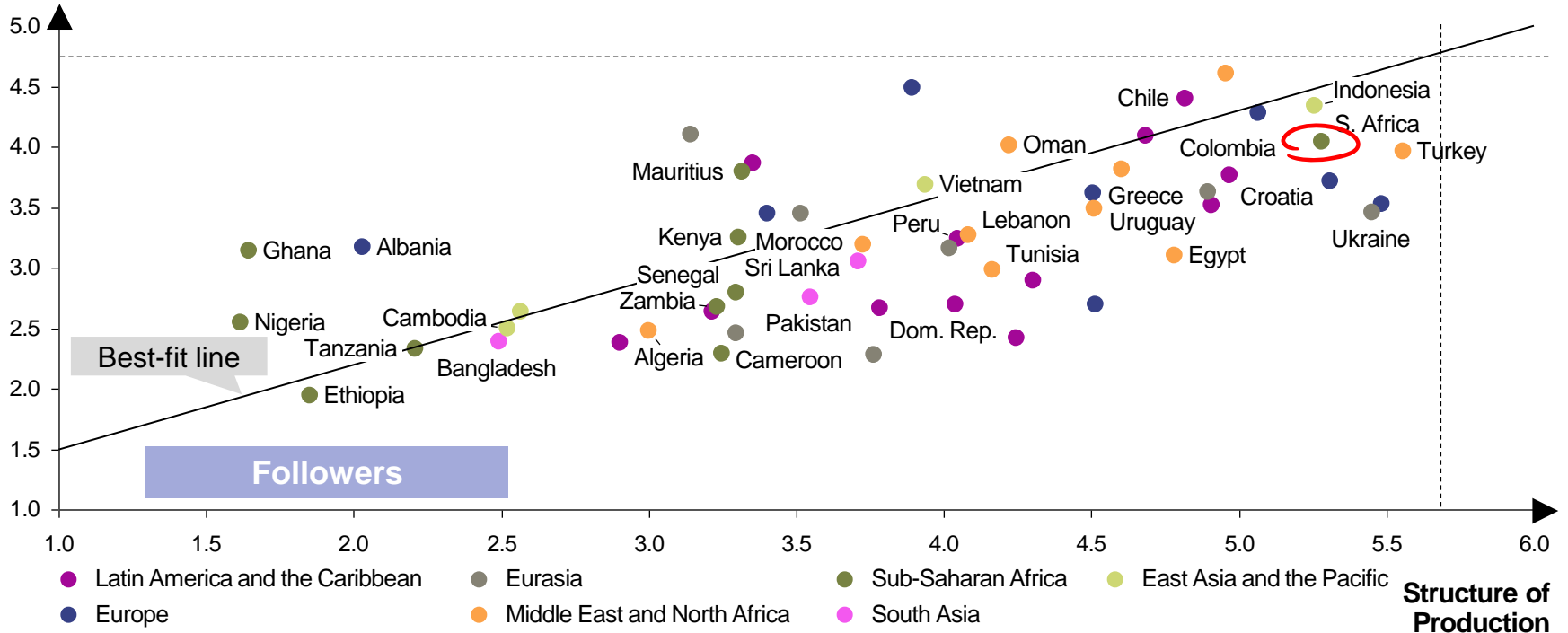
## Changes in production and utilization (2010 to 2016)

Change in volume of production (CAGR, %)



# South Africa is one of the best positioned followers in the country readiness assessment and has clear potential to advance through investment in key drivers

## Drivers of Production



1. Axes are on a 10 point scale but have been zoomed to show variances between countries



South Africa has a unique set of challenging opportunities to capture as it navigates its transformation journey in this era of unprecedented change

## STRENGTHS

- Established and diversified manufacturing base
- Well developed and efficient supporting infrastructure (e.g. logistics infrastructure)
- Presence of a large number of multinational companies in South Africa
- Proximity to growing African markets

## OPPORTUNITIES

- Improved competitiveness due by harnessing of automation, optimisation and digitisation (incl. re-skilling of employees)
- Increased exports to fast growing African markets and recovery in commodity prices
- Increased exports of high margin and high growth technology products

## WEAKNESSES

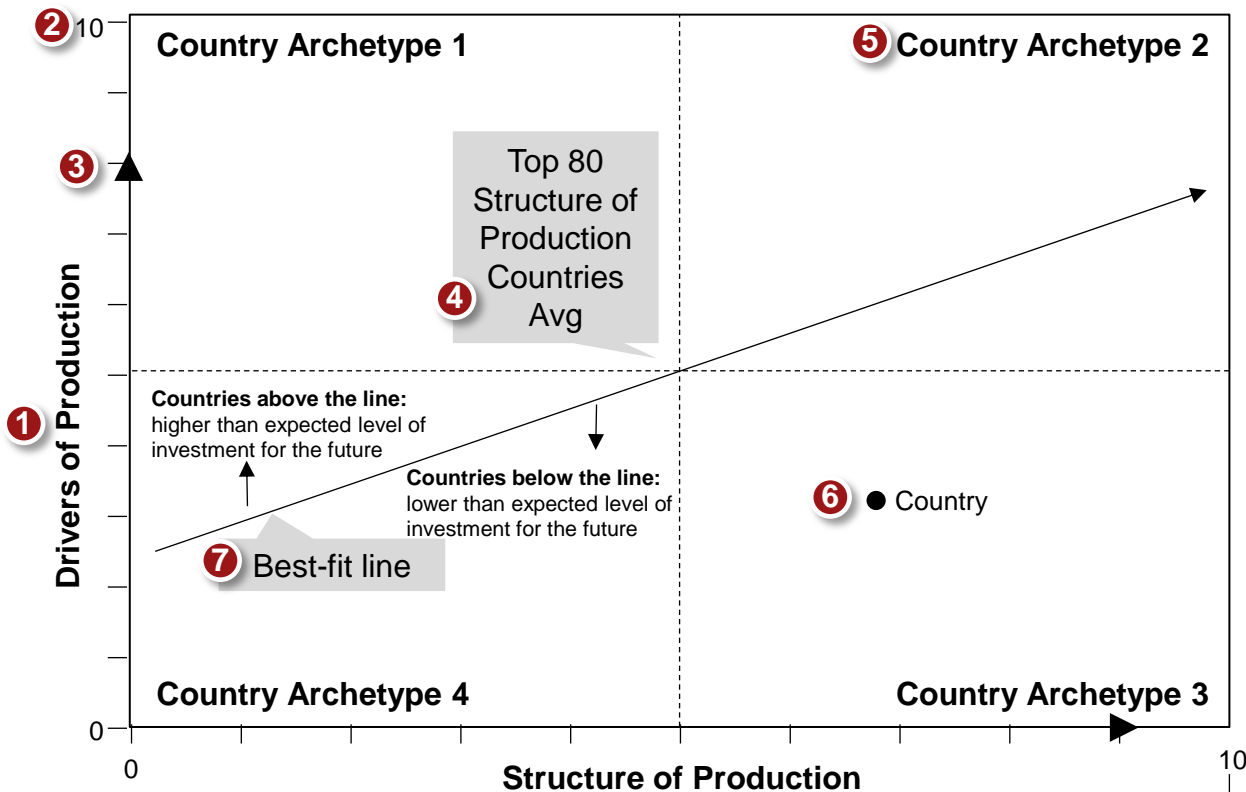
- Rising costs of production
- Relatively low productivity levels in comparison to other BRICS nations
- Lack of highly skilled labour
- Uncertainty of government policy

## THREATS

- Competition from low-wage high-productivity nations like China, India and Brazil
- Slowed domestic demand in South Africa's local and key export markets
- Labour unrest characterized by frequent labour strikes
- Political and currency volatility



# Understanding the Country Readiness for Future of Production Matrix



## Explanatory Notes

- 1** **Axes:** Drivers score (weighted average of six drivers) on y-axis; Structure score (weighted average of two metrics) on x-axis
- 2** **Scale:** 0 – 10 scale, with 10 being the best
- 3** **Zoom:** Graphs shown on smaller scale to show variances between countries
- 4** **Top 80 Structure of Production Countries Avg:** Dotted lines representing the average driver score and average structure score for the top 80 countries in structure of production score, included in the model divide the 2X2 matrix into four country archetypes
- 5** **Country Archetypes:** Four country archetypes provide different perspectives on a country's readiness for the future of production
- 6** **Country Plotting:** Every country plotted based on its weighted driver and structure scores and assigned to an archetype
- 7** **Best-fit line:** country position and distance from the line illustrate actual level of investment for the future compared to expected level of investment

# Data Collection by Country for Sub-Saharan Africa

Sub-Saharan Africa			Not included in model											
Rank	Country	Metric	Rank	Country	Metric	Rank	Country	Metric	Rank	Country	Metric	Rank	Country	Metric
1	Bosnia & Herz.	100%	35	Czech Republic	99%	69	Switzerland	98%	103	Montenegro	93%	137	Chad	79%
2	Brazil	100%	36	Denmark	99%	70	United States	98%	104	Mozambique	93%	138	Seychelles	79%
3	Colombia	100%	37	Ecuador	99%	71	Azerbaijan	97%	105	Nigeria	93%	139	Gabon	78%
4	Estonia	100%	38	Finland	99%	72	Bangladesh	97%	106	Uganda	93%	140	Cape Verde	77%
5	Georgia	100%	39	France	99%	73	Egypt	97%	107	Madagascar	92%	141	Swaziland	77%
6	Greece	100%	40	Germany	99%	74	El Salvador	97%	108	Malawi	92%	142	Barbados	74%
7	Hungary	100%	41	Japan	99%	75	Ghana	97%	109	Nicaragua	92%	143	Libya	73%
8	Indonesia	100%	42	Latvia	99%	76	Iceland	97%	110	Oman	92%	144	Suriname	73%
9	Italy	100%	43	Lithuania	99%	77	India	97%	111	Macedonia, FYR	92%	145	Guyana	72%
10	Kazakhstan	100%	44	Netherlands	99%	78	Israel	97%	112	UAE	91%	146	Angola	71%
11	Malaysia	100%	45	New Zealand	99%	79	Kenya	97%	113	Zimbabwe	91%	147	Belize	71%
12	Mexico	100%	46	Norway	99%	80	Lebanon	97%	114	Benin	90%	148	Myanmar	71%
13	Philippines	100%	47	Pakistan	99%	81	Luxembourg	97%	115	Bolivia	90%	149	Puerto Rico	71%
14	Poland	100%	48	Korea, Rep.	99%	82	Mauritius	97%	116	Trinidad & Tob.	90%	150	Syria	69%
15	Portugal	100%	49	Sweden	99%	83	Saudi Arabia	97%	117	Yemen	90%	151	Timor-Leste	67%
16	Moldova	100%	50	Tunisia	99%	84	Senegal	97%	118	Bahrain	88%	152	Taiwan, China	66%
17	Romania	100%	51	United Kingdom	99%	85	Serbia	97%	119	Mali	88%	153	Belarus	60%
18	Russia	100%	52	Uruguay	99%	86	Vietnam	97%	120	Tajikistan	88%	154	Togo	56%
19	Singapore	100%	53	Algeria	98%	87	Zambia	97%	121	Hong Kong SAR	88%	155	Uzbekistan	52%
20	Slovenia	100%	54	Argentina	98%	88	Cambodia	95%	122	Bhutan	87%	156	Niger	51%
21	South Africa	100%	55	Armenia	98%	89	Dominican Rep.	95%	123	Congo, DR	87%	157	Sudan	49%
22	Spain	100%	56	Belgium	98%	90	Ethiopia	95%	124	Guinea	86%	158	Congo	48%
23	Sri Lanka	100%	57	Canada	98%	91	Kuwait	95%	125	Rwanda	86%	159	Iraq	48%
24	Thailand	100%	58	China	98%	92	Kyrgyz Republic	95%	126	Brunei Dar.	85%	160	Afghanistan	45%
25	Turkey	100%	59	Guatemala	98%	93	Paraguay	95%	127	Burundi	85%	161	Maldives	45%
26	Ukraine	100%	60	Ireland	98%	94	Tanzania	95%	128	Lesotho	85%	162	Turkmenistan	45%
27	Albania	99%	61	Jordan	98%	95	Venezuela	95%	129	Sierra Leone	84%	163	Bahamas	44%
28	Australia	99%	62	Malta	98%	96	Botswana	94%	130	Côte d'Ivoire	83%	164	Cuba	44%
29	Austria	99%	63	Mongolia	98%	97	Cameroon	94%	131	Haiti	83%	165	Cent. Afr. Rep.	42%
30	Bulgaria	99%	64	Morocco	98%	98	Honduras	94%	132	Burkina Faso	81%	166	Comoros	42%
31	Chile	99%	65	Panama	98%	99	Iran, Islamic Rep.	94%	133	Gambia, The	81%	167	Eritrea	42%
32	Costa Rica	99%	66	Peru	98%	100	Namibia	94%	134	Lao PDR	81%	168	Fiji	42%
33	Croatia	99%	67	Qatar	98%	101	Nepal	94%	135	Liberia	80%	169	Guinea-Bissau	42%
34	Cyprus	99%	68	Slovak Republic	98%	102	Jamaica	93%	136	Mauritania	80%	170	Papua N. Guinea	41%
												171	Solomon Islands	41%
												172	Dominica	40%
												173	Saint Lucia	40%
												174	Samoa	40%
												175	Djibouti	38%
												176	Equatorial Guinea	38%
												177	Sao Tome and Principe	38%
												178	Antigua and Barbuda	36%
												179	Grenada	36%
												180	Kiribati	36%
												181	Saint Vincent and the Grenadines	36%
												182	Tonga	36%
												183	Somalia	35%
												184	Vanuatu	35%
												185	Saint Kitts and Nevis	31%
												186	South Sudan	30%
												187	Marshall Islands	26%
												188	Micronesia (Federated States of)	26%
												189	Andorra	24%
												190	D.P.R.K	24%
												191	Palau	24%
												192	Liechtenstein	23%
												193	Monaco	21%
												194	San Marino	20%
												195	Tuvalu	19%
												196	Nauru	15%

# Future of Production Capabilities Scorecard Metrics

Total # of Technology & Innovation Metrics in Beta Model = 27

	Metric
Technology & Innovation	Mobile-cellular telephone connections per 100 inhabitants
	% of population using internet
	Firm-level technology absorption
	Fixed (wired)-broadband speed; Mbit/s
	Fixed broadband Internet monthly cost (US\$)
	ICT enabled new business model generation
	Secure internet servers per 1,000 internet users
	Number of new businesses registered
	State of cluster development
	Number of university affiliated incubators / accelerators
	Extent to which companies embrace disruptive ideas
	University-industry collaboration in R&D
	High and medium-high tech manufactures
	Production process sophistication

	Metric
Technology & Innovation	Company investment in emerging technologies
	Government procurement of advanced technology products
	Capacity for innovation
	R&D, % spend of GDP
	Number of researchers, FTE per population
	Number of scientific and technical journal articles per GDP PPP
	Triadic patents (volume, log base of 10)
	Number of PCT patents, applications / population
	Three year value of venture capital deals (value, log base of 10)
	Number of venture capital deals per GDP PPP
	Number of joint ventures / strategic alliances per GDP PPP
	Availability of risk capital

# Future of Production Capabilities Scorecard Metrics

Total # of Human Capital Metrics in Beta Model = 17

	Metric
Human Capital	Pop. with tertiary degree, % of pop. age 25+
	Pop. with secondary education, % of pop. age 25+
	Manufacturing employment, % of total pop. age 15+
	Availability of engineers and scientists
	Knowledge-intensive employment, % of total employed
	Availability of digital skills
	Female labor market participation rate
	Unemployment rate, 10 year average
	Tertiary inbound mobility ratio, % of tertiary enrollment
	Migration, net (inflows and outflows)
	Number of universities in QS World University rankings
	Quality of math and science education
	Quality of primary education
	Adult literacy rates, % of pop. age 15+
	On-the job training
	Hiring and firing practices
	Support for reskilling

Total # of Global Trade & Invest. Metrics in Beta Model = 13

	Metric
Global Trade & Investment	Net trade of intermediate goods
	Value chain connectivity
	Trade, % of GDP
	Goods exports, % of GDP
	Infrastructure quality
	Logistics performance
	AON terrorism and political risk
	Burden of customs procedures
	Applied tariff rate
	Non-tariff barriers
	Greenfield investments (value, log base of 10)
	FDI stocks and flows, % GDP 10 year average (value, log base of 10)
	FDI Inflows, % GDP 10 year average (value, log base of 10)

# Future of Production Capabilities Scorecard Metrics

Total # of Institutional Framework Metrics in Beta Model = 12

	Metric
Institutional Framework	Efficiency of government spending
	Regulatory efficiency
	Efficiency of legal framework in settling disputes
	Corruption Perceptions Index
	Legal system adaptability
	Rule of Law Index
	Government ensuring policy stability
	Total tax rate, % of profits
	IP protection regulation
	Software piracy rate, % of software installed
	Number of ISO 9000 certified sites per GDP PPP
	Number of ISO certificates in industrial sectors (number, log base of 10)

Total # of Sustainable Resources Metrics in Beta Model = 10

	Metric
Sustainable Resources	Energy intensity- level of primary energy, % GDP PPP
	Energy imports, % of energy use
	Alternative and nuclear energy, % of total energy use
	Environmental risk exposure
	ISO 14000 applicants per GDP PPP
	Trend in carbon intensity per kWh
	Fine particulate matter exceedance
	Average exposure to fine particulate matter
	Baseline water stress
	Wastewater treatment

# Future of Production Capabilities Scorecard Metrics



Total # of Demand Environment Metrics in Beta Model = 4

	Metric
Demand Environment	Domestic market size index
	Foreign market size index
	Exposure to new ideas from the outside
	Intensity of local competition

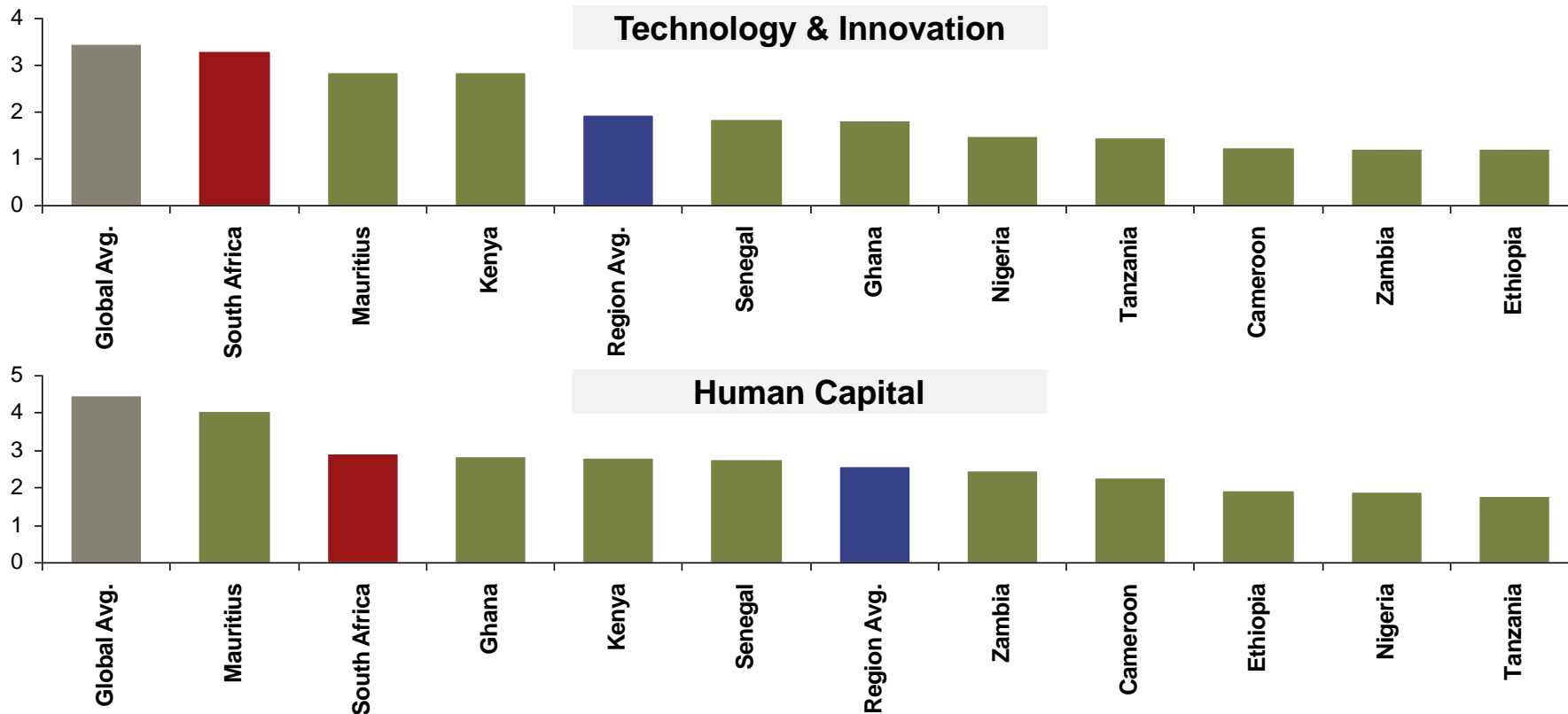
Total # of Structure of Production Metrics in Beta Model = 3

	Metric
Structure of Production	Economic complexity
	Manufacturing value add as % of GDP
	Manufacturing value add (value, log base of 10)



# Drivers of Production<sup>1</sup> – Sub-Saharan Africa

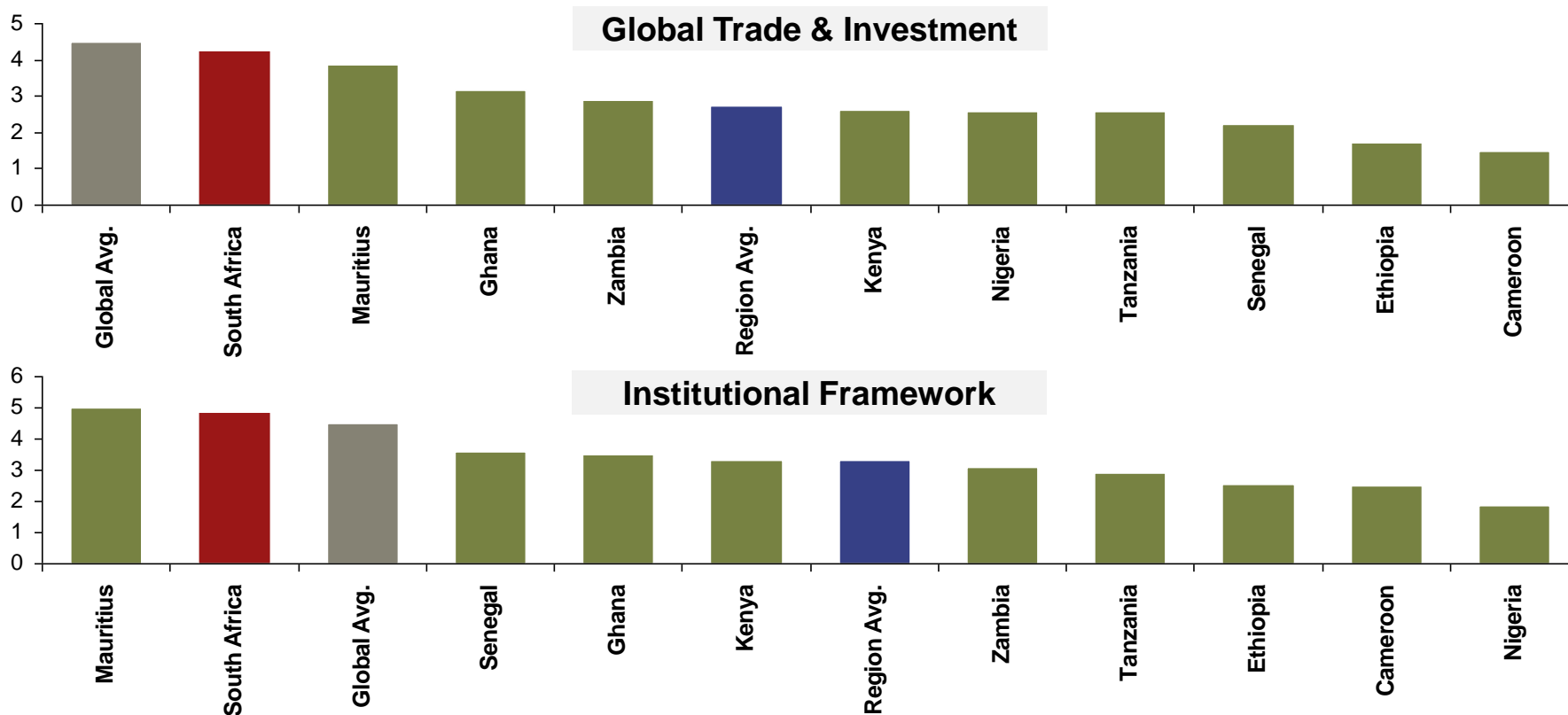
## DRAFT RESULTS FOR DISCUSSION



1. Axes are on a 10 point scale but have been zoomed to show variances between countries

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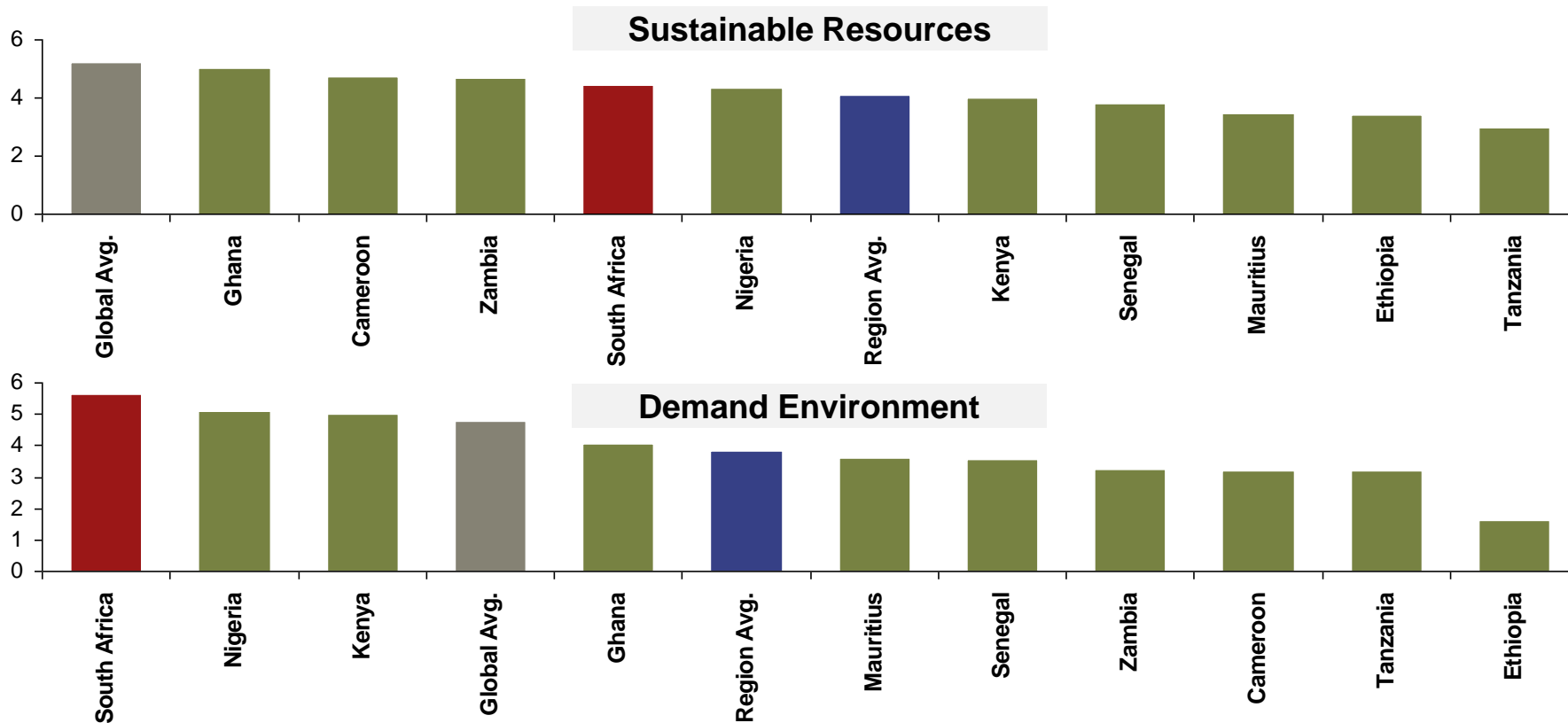
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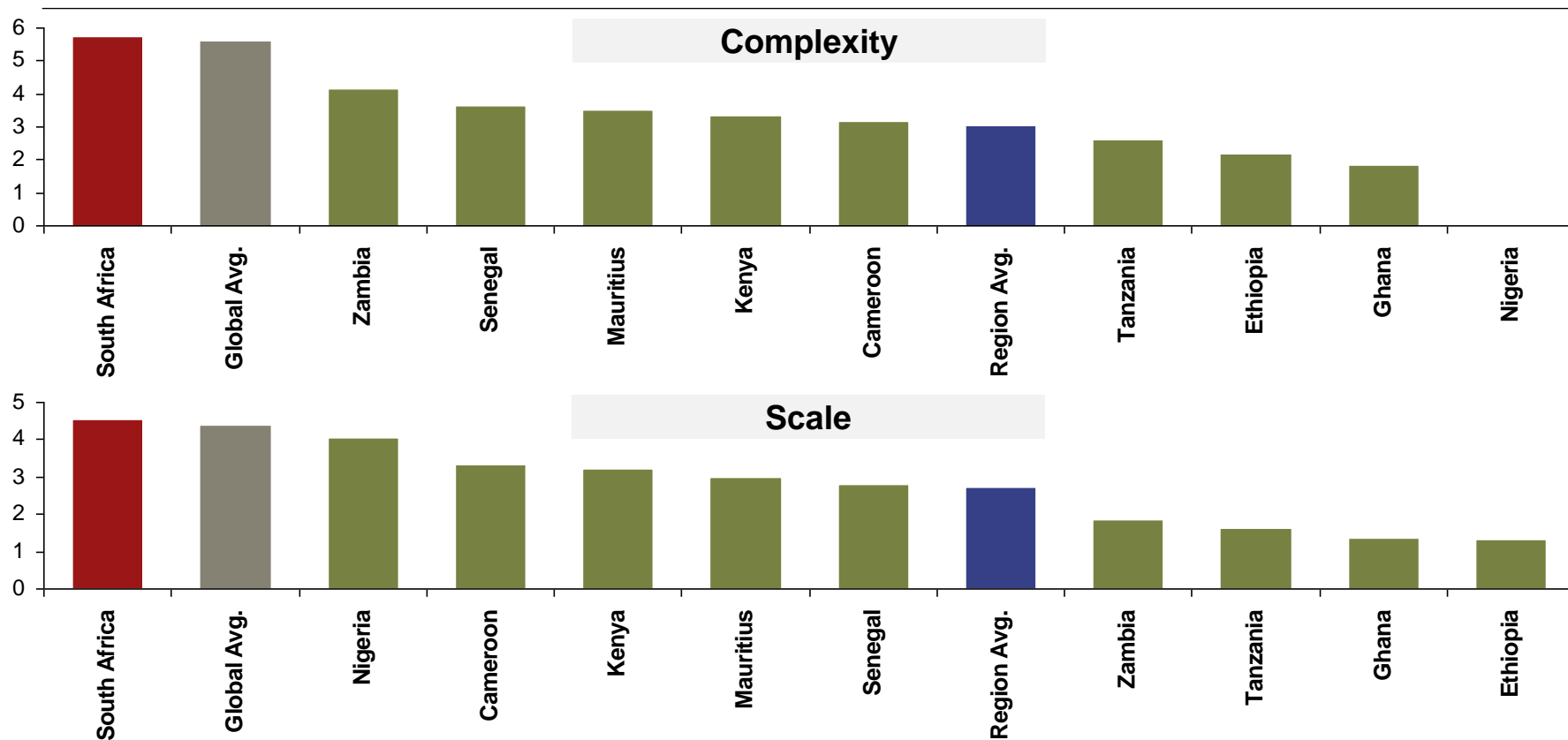
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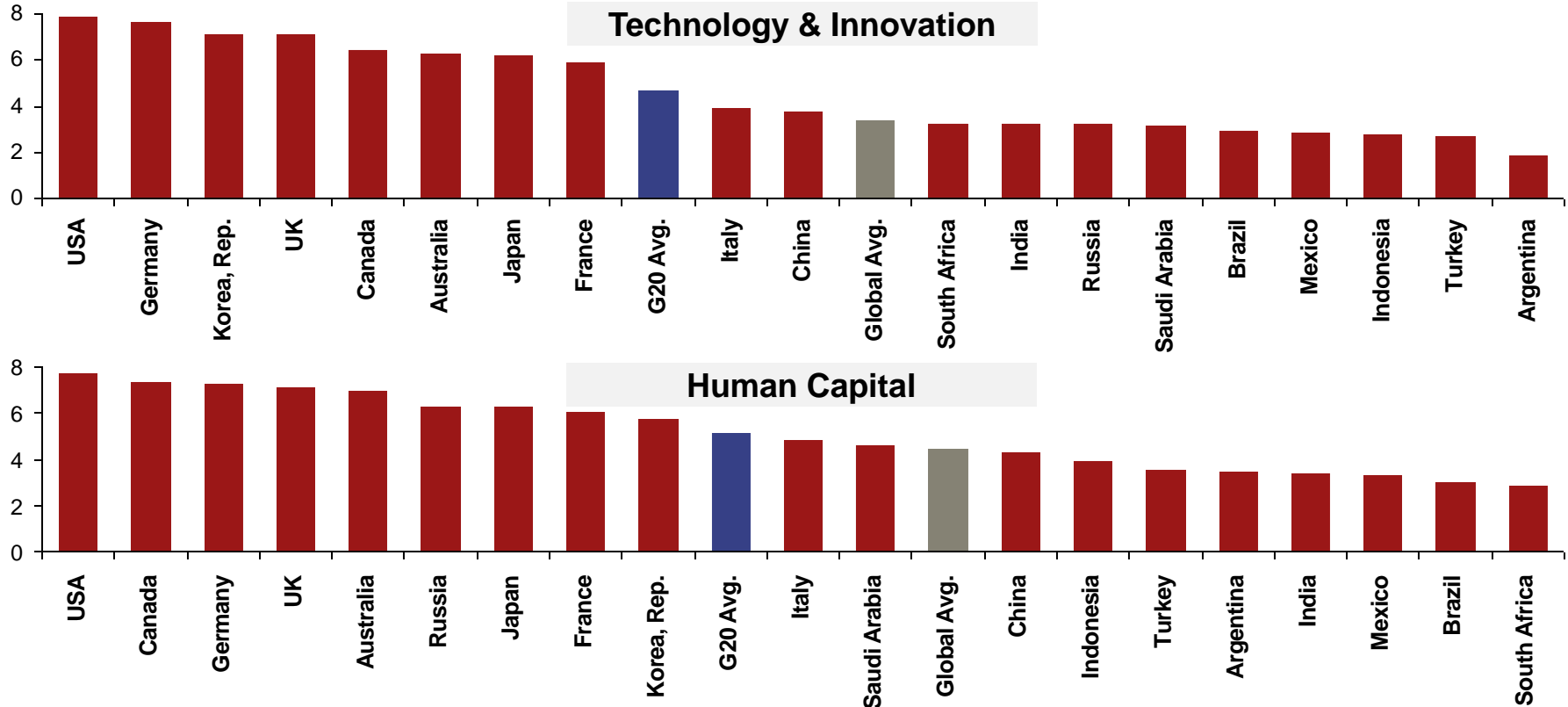
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# Drivers of Production<sup>1</sup> – G20

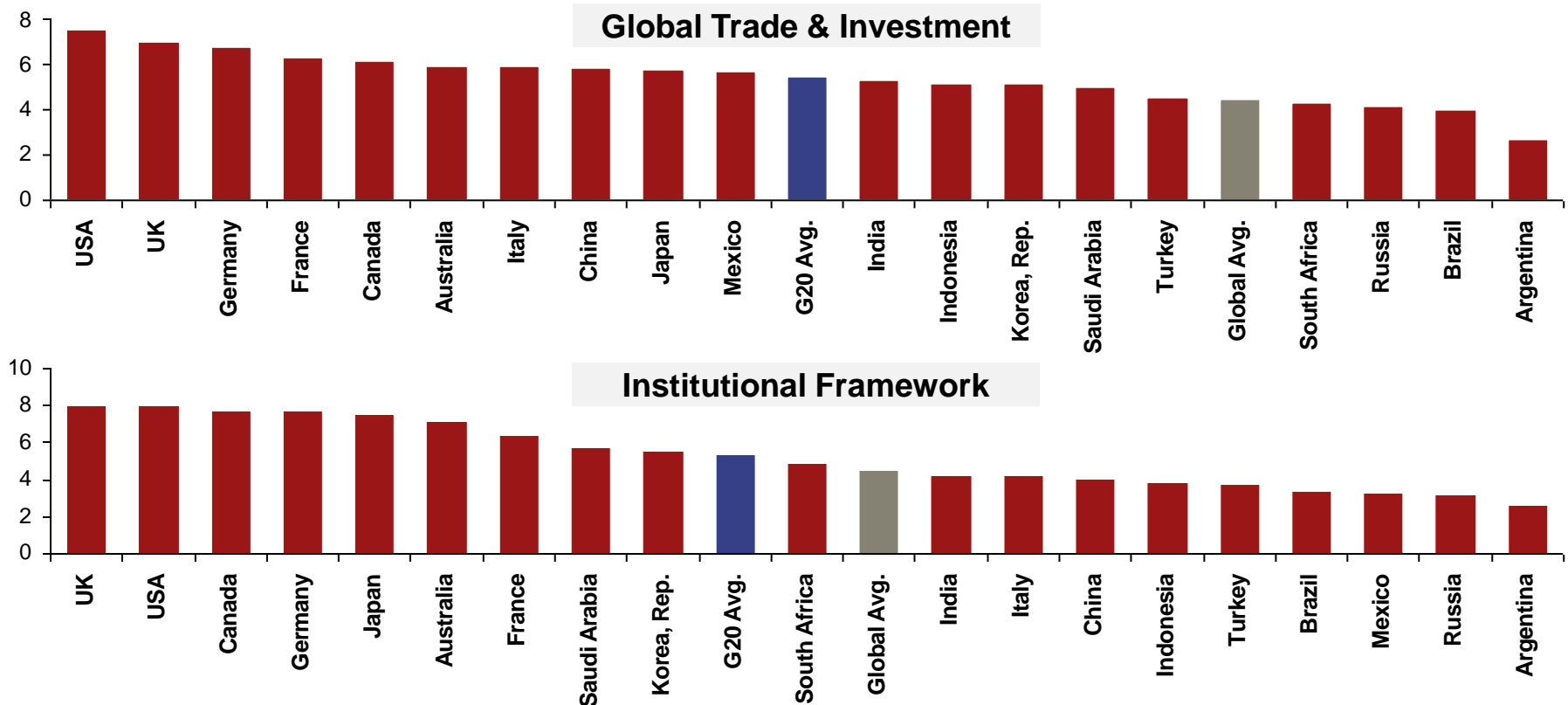
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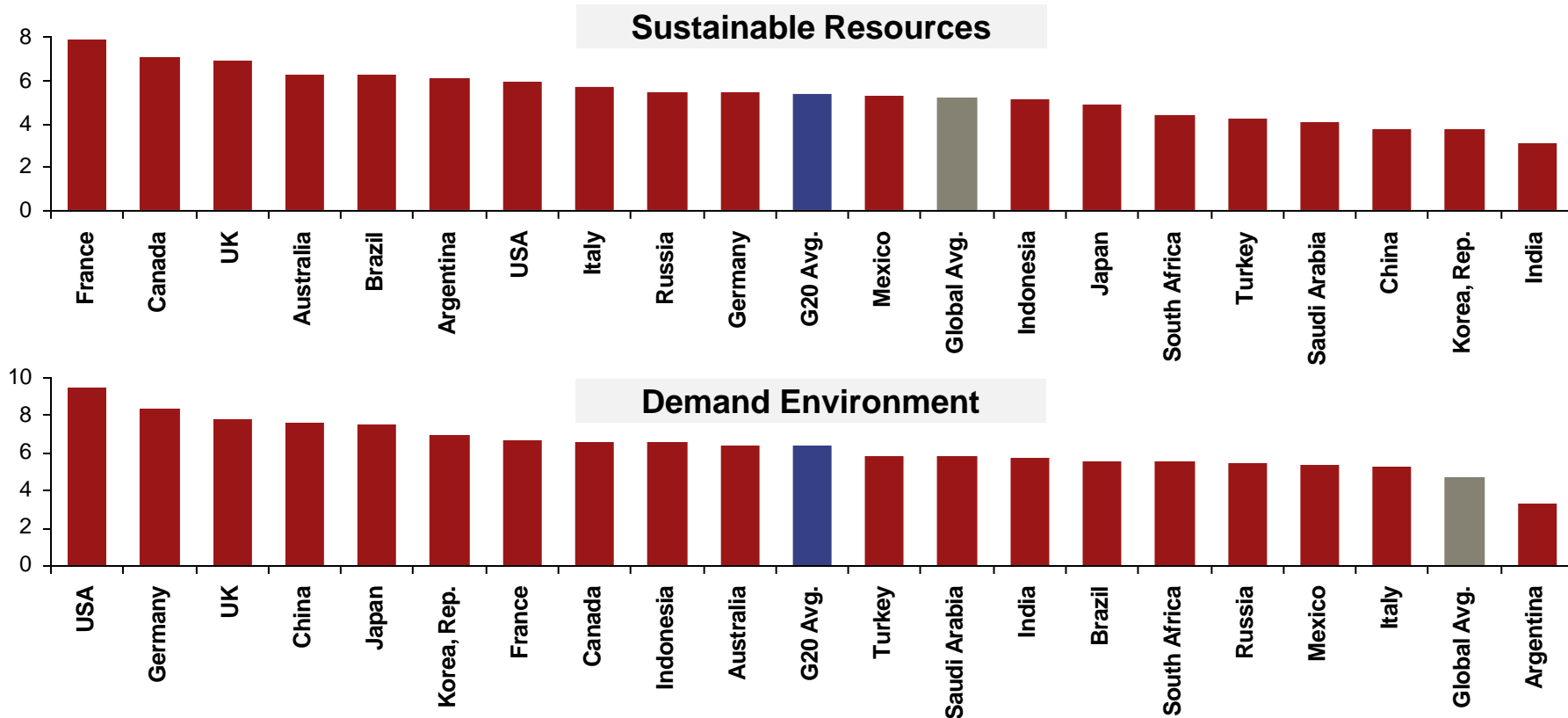
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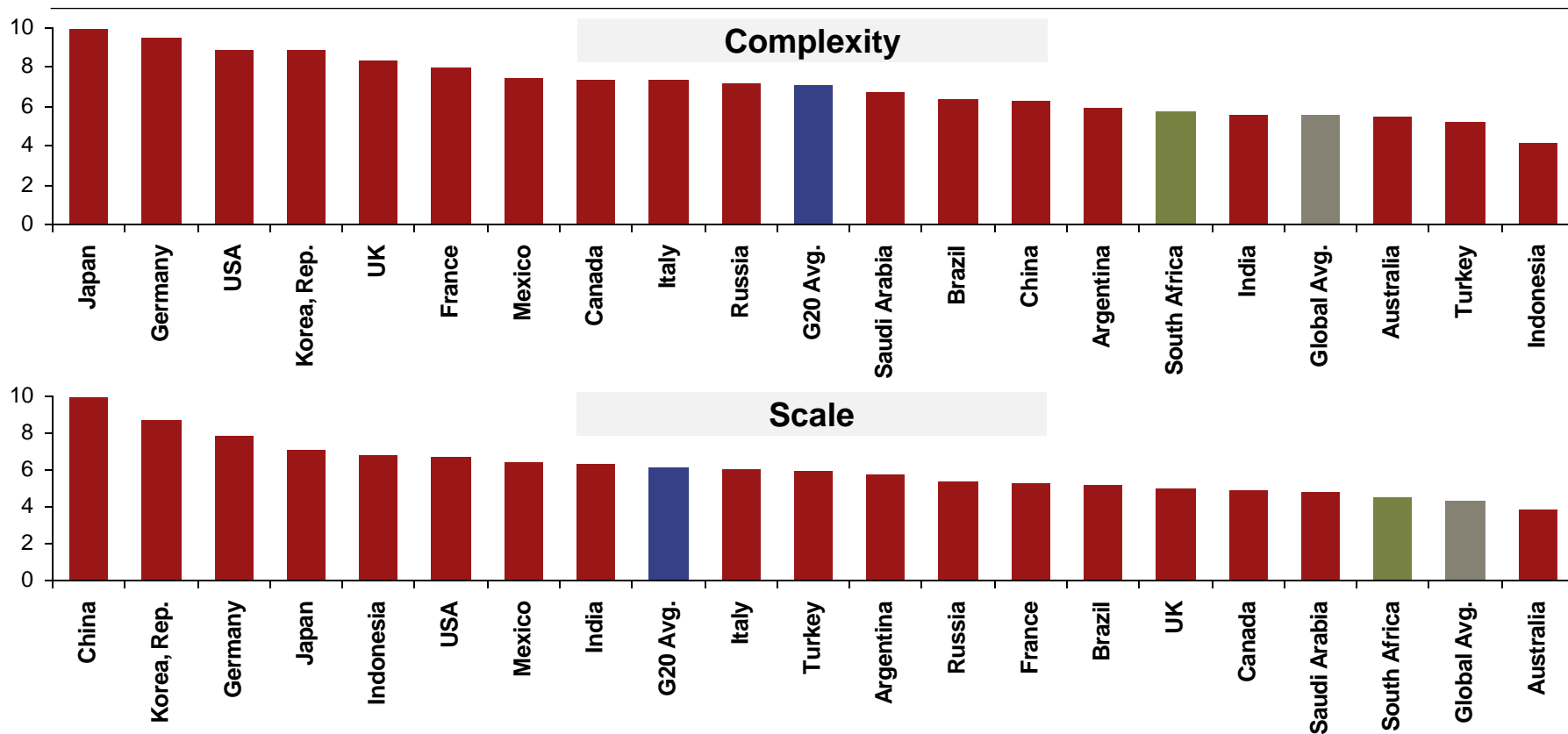
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