

# WORLDS @ 2050

**Policy making  
for the better future**

**Towards 2050: Getting Africa Ready for the 4<sup>th</sup> Industrial Revolution**

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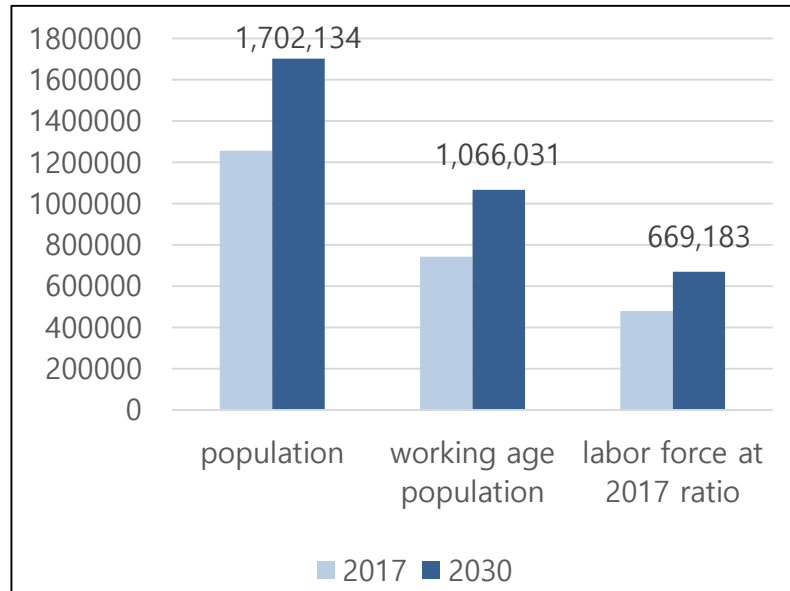
African Centre for Economic Transformation (ACET) and Maastricht School of Management (MSM)

# Job Prospects Are Bad - Poor Labour Market Indicators Amid Rapidly Growing Workforce

## African job indicators remain poor despite good growth

Labour Force Indicators	2000-2007	2008-2013	2014	2015	2016	2017
Labour Force Participation	69.8	69.9	70.0	70.2	70.3	70.4
Unemployment Rate	8.1	7.6	7.3	7.4	7.5	7.5
Employment Growth	3.0	3.0	3.4	3.0	3.0	3.1
Vulnerable Employment	72.9	71.4	69.8	69.9	69.7	69.6
Extreme Working Poverty (less than \$1.90 per day)	49.3	39.0	35.2	34.3	33.1	31.7
Working Poverty (between \$1.90 and \$3.10 per day)	23.8	27.7	29.6	29.7	30.0	30.4
Productivity Growth	2.9	1.8	1.5	0.5	1.2	1.7

## Africa's working age population (+15) will pass the one billion mark just before 2030



### Though Africa has shown good growth since 2000, this has not translated to good jobs

- Annual growth rates of 5.5% in GDP yielded 3.1 % in job growth during 2000 -08, while the figures were 4.5% and 2.8 %, respectively during 2009-14.
- Crucially some 90% of the jobs created were in the low productivity informal sector
- Only 40% of the workforce is in productive employment, 70% of workforce is in vulnerable employment
- Employment growth has stagnated at 3% while Africa's working age population will pass the 1 billion mark by 2030

## The youth job challenge

**Africa's youthful population either points towards a demographic dividend or represents a time-bomb**

- 2000-2008--73 million jobs created, only 22 percent filled by youth (AfDB, 2017)
- Youth unemployment rates double adult rates (AfDB, 2017)
- Ill-equipped for the few job openings -due to quality of education or choice of subjects

## ...Potential consequences

### Instability

- Lack of Econ Opportunity reason given by 40% who join rebel/terror groups.
- Arab spring was driven by educated unemployed youths (Sudan the latest casualty\_

### Immigration and human trafficking

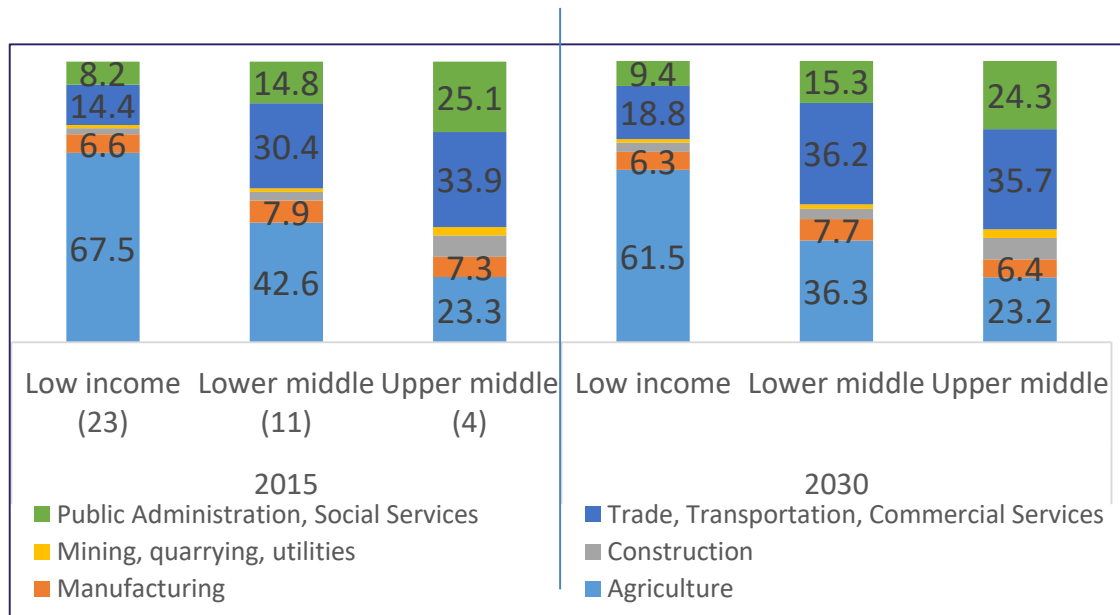
- Many youths, aided by criminal networks, are migrating to search for jobs, especially to Europe.
- Over 3,500 people, many of them young, died in the Mediterranean in 2015

### However, Demographic Dividend is within reach

- 4IR would facilitate realization
- More deliberate inclusive policies to absorb fast-growing labour force.

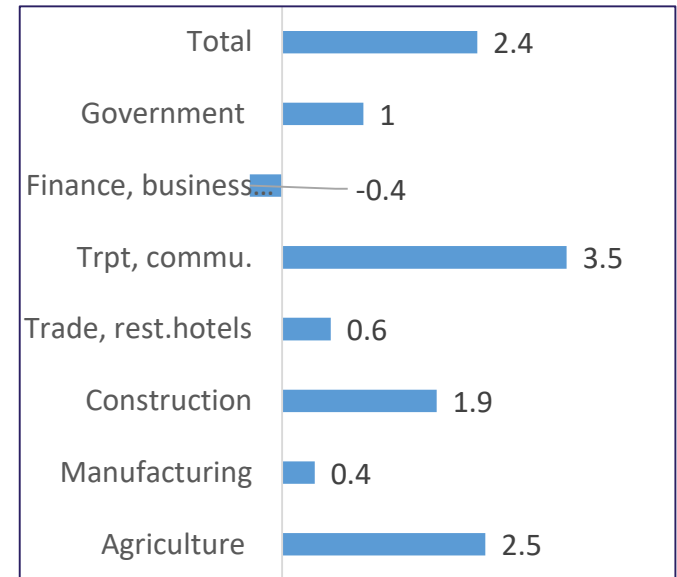
# Structural Transformation Has Been Slow

Share of employment, by economic activity and country income group, 2015 and 2030 (%)



Source: ILOSTAT modelled estimates and projections (November 2017)

Average annual growth of real value added per employee in Africa, 1995-2010 (%)



Source: Timmer et. al. 2014

- **Agriculture** will continue to dominate employment in the low and lower middle-income African economies
- **The services sector** dominates employment in the upper middle-income economies and ranks second in the two categories of low-income economies. It is also the most dynamic sector
- **The manufacturing sector** in all three country income categories provides the least employment and shows no dynamism in job creation potential

# Drivers of Future of Jobs in Africa – Key Megatrends

## Technology

- Technological change has launched societies on new trajectories or Industrial Revolutions (IRs) (Steam engine - 1st IR, AI and Internet – 4<sup>th</sup> IR?).
- IRs destroy old ways of working and see emergence of new ways of working and new industries. In past IRs job creation has been more than job destruction.
- Opportunity for leapfrogging??!

## Socio-Economic

- Demographics: Rising working age population, fast urbanization and a growing middle income segment. Rising aggregate demand especially for durable goods and infrastructure and thus manufacturing jobs.
- Societal values- sustainable consumption, social capital highly valued, changing role of women, work-life balance, inequality.

## Green Economy (Sustainable Consumption)

- Climate change concerns has seen shift to sustainable consumption and in the process creating many good jobs. Consumers demanding sustainable production (rise of traceability systems e.g. conflict free minerals)
- SDGs are the new development blue print. Will shape where development partners invest and thus the sectors that will grow

## Governance- Dissipation of Power

- Globalization shaping trade and investment flows. Global value chains determine where jobs are. Blowback from hyper-globalization being felt as people feel loss of control. Rise of regional trade
- The rise of Asia (and especially China) shaping investment and trade
- Emergence of networked society powered by social media is creating new centers of power at grassroots (Arab spring coming to SSA?)

# The world is now at the cusp of the 4<sup>th</sup> Industrial Revolution

## Key 4IR Technologies driving 4IR

- Computing/Processing Technologies
- Machine Learning /Artificial Intelligence/Robotics
- Internet Communication and Proliferation of Devices linked to the Internet (Internet of Things (IoT))
- Data Mining Technologies/Data Science
- 3D printing
- Blockchain or Trust Technologies
- Renewable Energy and related technologies

## Widespread impacts

- Increasingly, machines are available to replace or complement workers at all levels.
- Economic models are being disrupted, creating new industries and business models. Platform economies creating new bases for competition
- Societies getting transformed
  - Social capital becoming more valued
  - Potential for huge inequalities
  - As work disappears value of human being threatened
- Traditional Economic transformation pathways are for many Africa countries being challenged

# Africa's Transformation Pathways need rethinking – 4IR represents new challenges and new opportunities

			4IR technology		
Transformation Strategy	AI/Machine Learning	Internet of Things (IoT)	Big Data/Data Science	3D Printing	Blockchain Technologies
<b>Agricultural transformation</b>	<ul style="list-style-type: none"> <li>– Application in breeding to speed varietal selection</li> <li>– Intelligent robots are reducing inputs applications by over 90 percent</li> </ul>	<ul style="list-style-type: none"> <li>– Use of drones for crop monitoring</li> <li>– Internet-enabled irrigation systems</li> </ul>	<ul style="list-style-type: none"> <li>– Telephone farming</li> <li>– E-extension</li> <li>– Inputs-as-service business models</li> <li>– Big Data for credit scoring</li> </ul>	<ul style="list-style-type: none"> <li>– Locally fabricated agricultural machines</li> <li>–</li> </ul>	<ul style="list-style-type: none"> <li>– Food traceability system for international trade</li> <li>–</li> </ul>
<b>Modernized services</b>	<ul style="list-style-type: none"> <li>– Driverless cars will kill jobs in transportation</li> <li>– Potentially very many applications, e.g. credit scoring using non-standard data</li> </ul>	<ul style="list-style-type: none"> <li>– M-Kopa selling solar power as utility/service through internet-enabled cookers and solar panels</li> </ul>	<ul style="list-style-type: none"> <li>– Shared economy e.g. AirBnB</li> <li>– Financial inclusion e.g. Micro-insurance</li> <li>– E-commerce e.g. Jumia, iRoko</li> </ul>	<ul style="list-style-type: none"> <li>– Toll/contract manufacturing</li> <li>– Community workshops</li> </ul>	<ul style="list-style-type: none"> <li>– Numerous trust-based applications (land registries, contracting)</li> <li>– Cryptocurrency-based transactions</li> </ul>
<b>Local content</b>	<ul style="list-style-type: none"> <li>– Potential for development of sophisticated machine-learning algorithms for interpretation and/or exploration data</li> </ul>	<ul style="list-style-type: none"> <li>– Drone-based services, e.g. facilities inspection, mapping etc.</li> </ul>	<ul style="list-style-type: none"> <li>– Geological data mining may create new opportunities</li> <li>–</li> </ul>	<ul style="list-style-type: none"> <li>– Locally manufactured parts</li> </ul>	–
<b>Export-led manufacturing</b>	<ul style="list-style-type: none"> <li>– Advanced robots will kill cheap labour advantage</li> </ul>	–	<ul style="list-style-type: none"> <li>– Will enable fine-grained market segmentation and kill mass markets</li> </ul>	<ul style="list-style-type: none"> <li>– Will kill the factory manufacturing model</li> </ul>	–
<b>Infrastructure</b>	–	<ul style="list-style-type: none"> <li>– Alternative infrastructure e.g. drones</li> </ul>	<ul style="list-style-type: none"> <li>– Smart cities and other tools to help optimize infrastructure</li> </ul>	<ul style="list-style-type: none"> <li>– On site manufacture of part</li> </ul>	–
<b>Creative industries</b>	<ul style="list-style-type: none"> <li>– New tools</li> </ul>	–	<ul style="list-style-type: none"> <li>– Platforms for distribution</li> </ul>	<ul style="list-style-type: none"> <li>– Ability to convert designs to products</li> </ul>	–
<b>Tourism</b>	<ul style="list-style-type: none"> <li>– New tools to showcase e.g. virtual reality</li> </ul>	–	<ul style="list-style-type: none"> <li>– Better targeting of marketing efforts</li> <li>– new platforms e.g. AirBnB expanding potential tourist</li> </ul>	–	–

# Assessing Africa's Readiness for 4IR Methodology and Structure

## Data Collection

- I. Extensive desk review of Studies on 4IR
- II. Case study of 11 countries using Focus Group Discussion (FGD) and survey of key informants,

## Key questions

- i. What is the level of awareness of 4IR technologies?
- ii. What does 4IR mean for future job creation?
- iii. What is the level of preparedness for by government, private sectors, education sectors and young people themselves
- iv. What opportunities does 4IR provide
- v. What will it take

Country	Focus Group Discussion (FGD) No. of persons per group	Survey Questionnaire Received
Senegal	5	19
Morocco	17	Not done
Côte d'Ivoire	14	10
Ghana	13	14
Egypt	Not done	23
Kenya	18	9
Rwanda	Not done	12
Cameroon	20	13
Gabon	19	32
South Africa	21	9
Tunisia	9	Not done

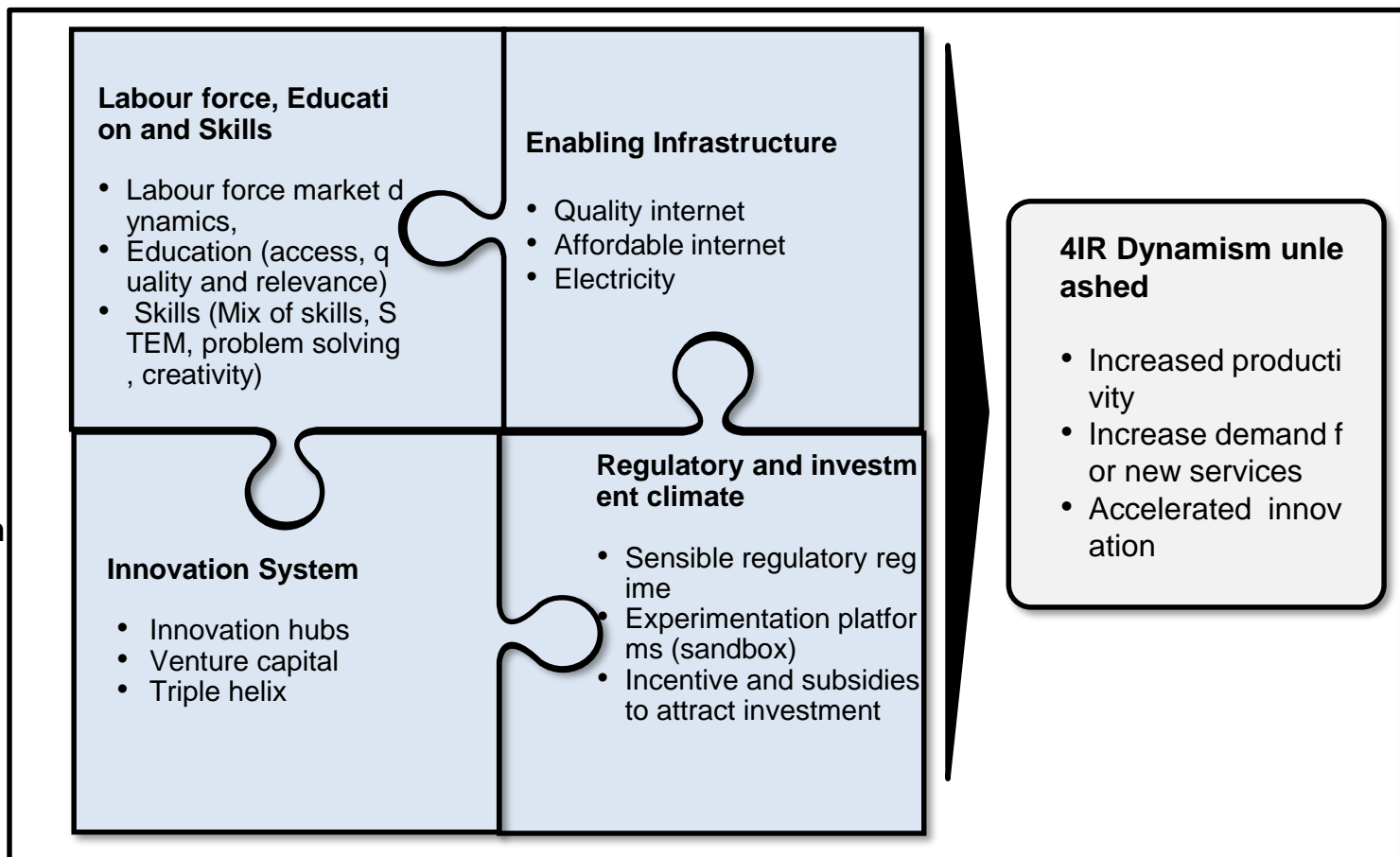
Type	%	Background of respondents
CEOs, Directors	40	Directors mainly from public sector institutions
Academic	15	Mainly professors and heads of departments
Specialists	45	Included economist, analysts, ICT experts and representatives from various industries



# Assessing Preparedness for 4IR (Conceptual Framework)

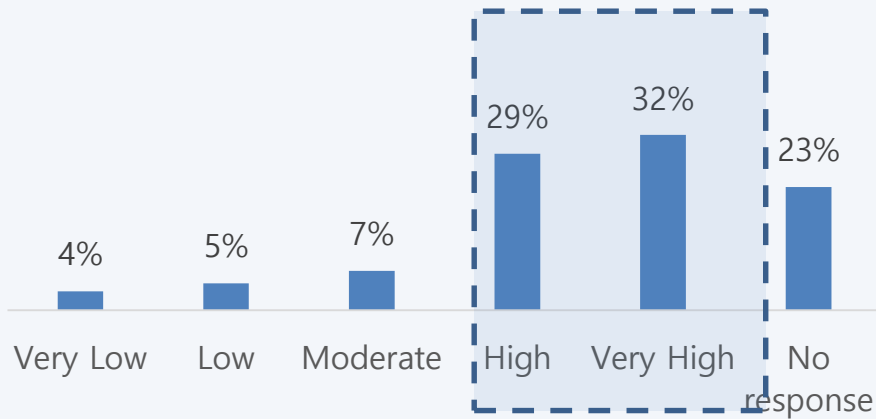
The study envisioned four key areas or domains through which the impact of the 4IR on job creation and inclusive growth can be achieved.

The four domains characterized as the 4IR ecosystem

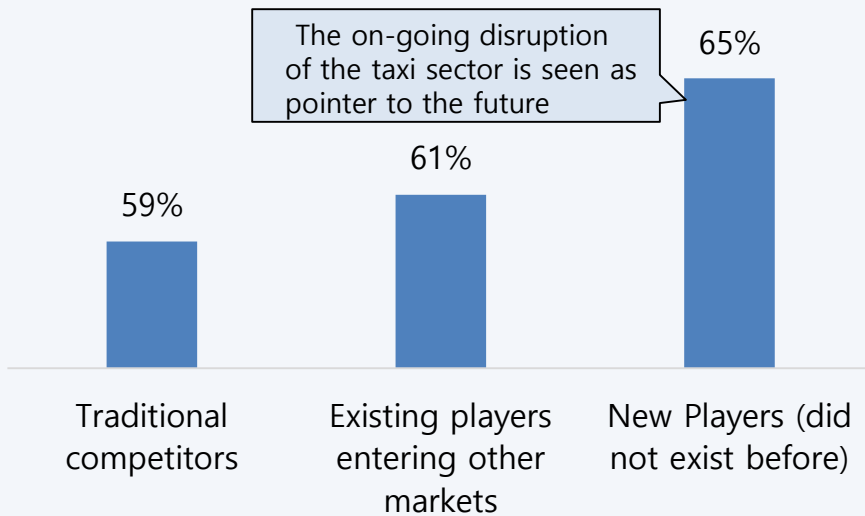


# Existing Businesses Unable to Compete in the 4IR World

## Perceived level of threat



## Source of threat

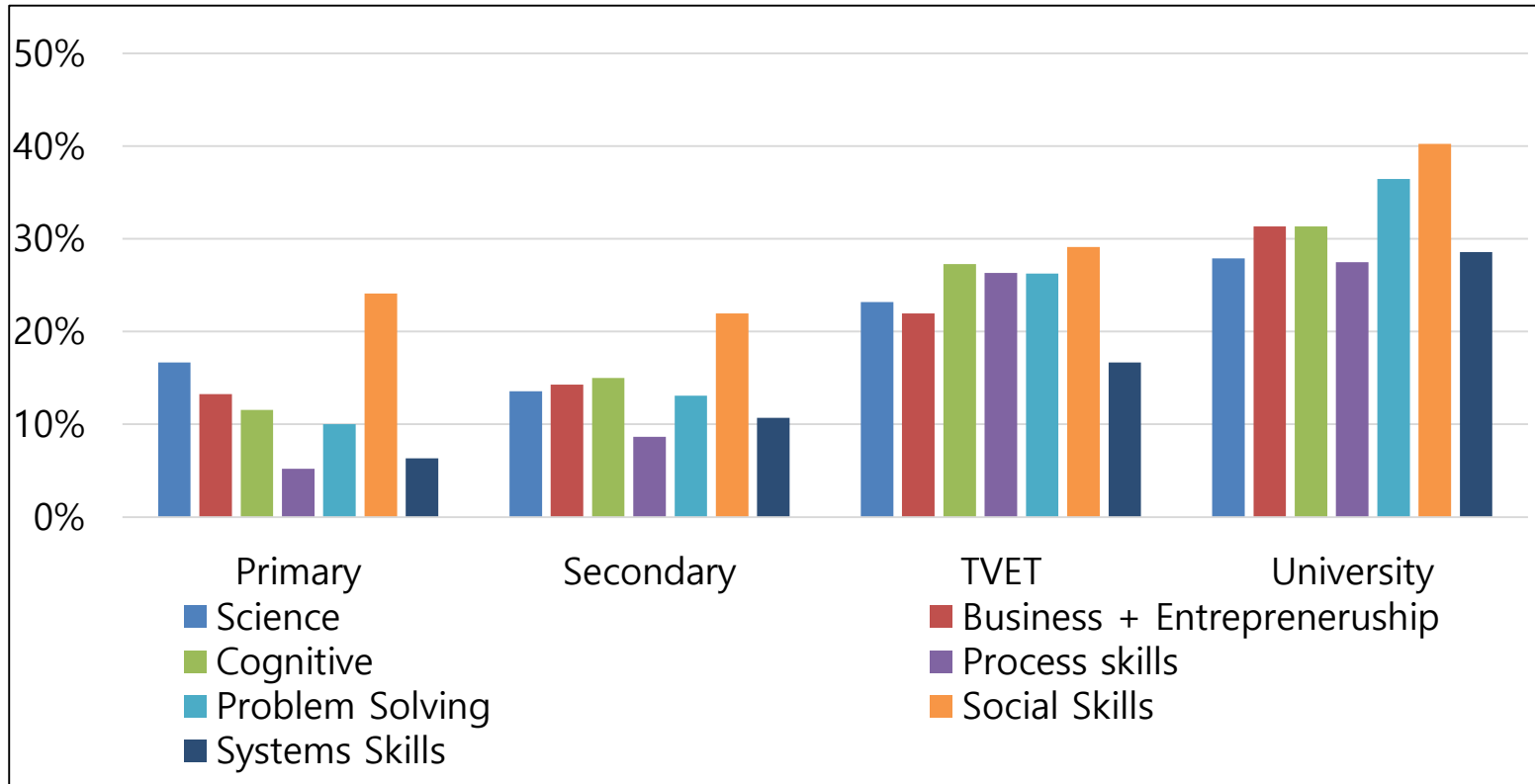


## Key challenges facing businesses



# Education System Misaligned with Requirements of 4IR

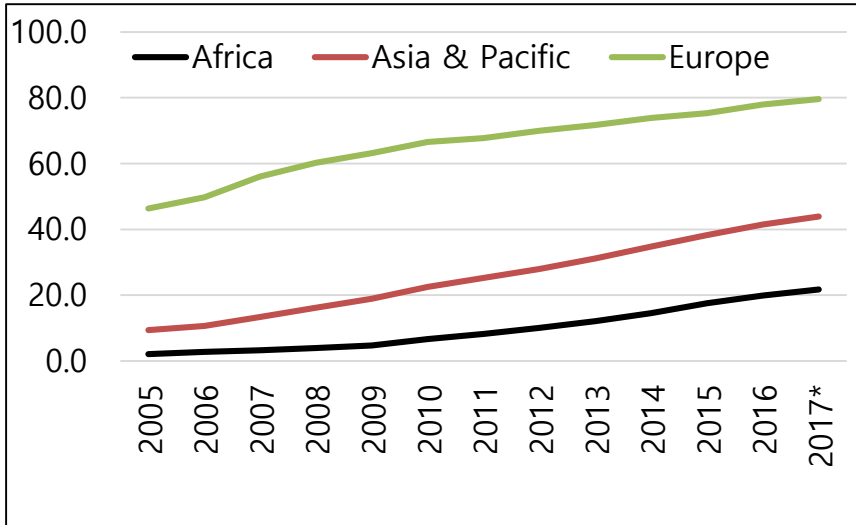
Responses regarding level of preparedness, %



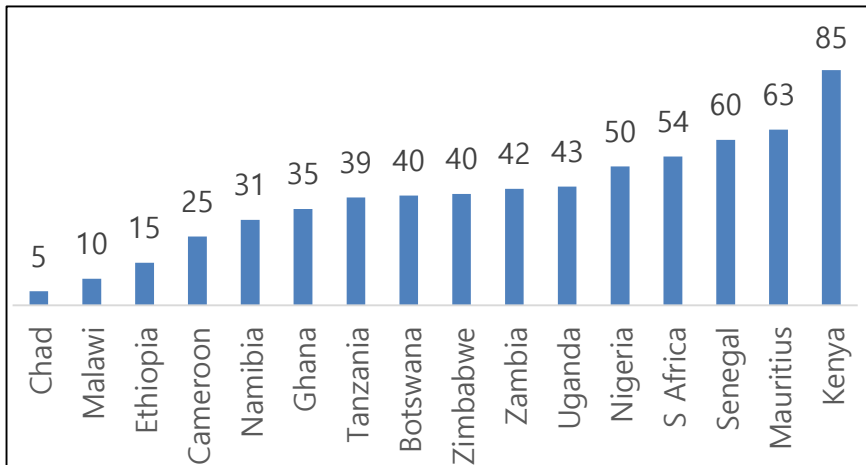
- Survey participants felt that all levels of education are ill prepared
- The primary and secondary school systems are seen as particularly poor in preparing students

# Enabling 4IR Infrastructure Weak

**Internet Penetration, %**



**Internet Penetration by country, %**



## 4IR infrastructure

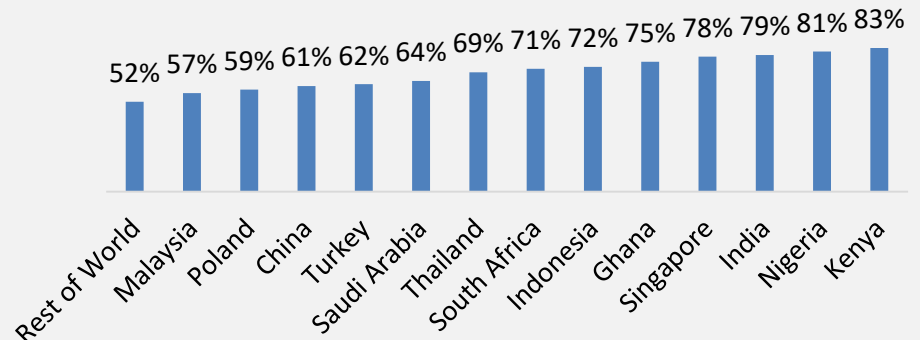
### Internet Access – Key issues

- Low levels of access, Africa lags all regions
- Poor quality
- High cost

### Policies to improve

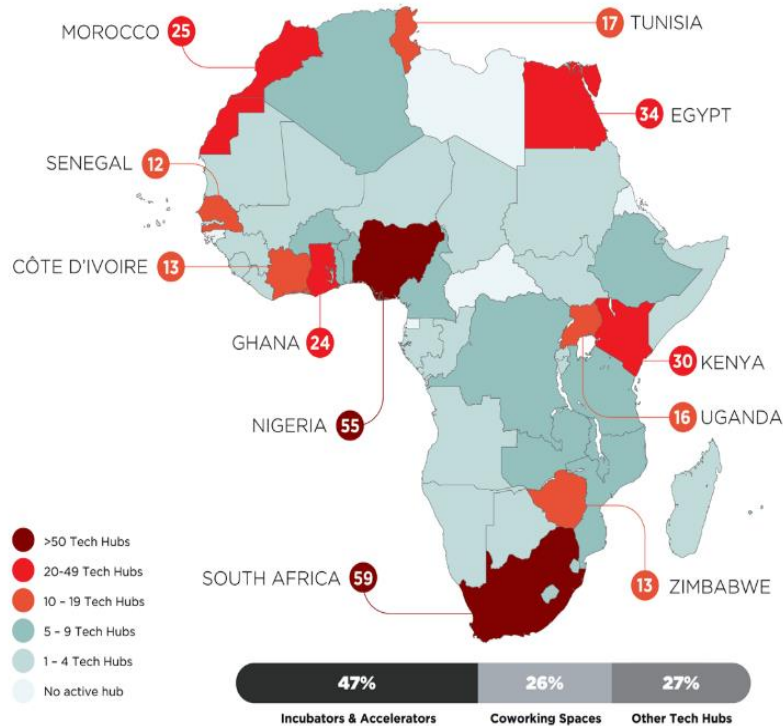
- Incentivize private sector investment in infrastructure especially rollout of 4G and 5G networks.
- Public investment especially in key backbone infrastructure and in remote areas

### Proportion of Internet Traffic coming from Mobile Platform



# While There Has Been a High Growth in Tech Hubs, A Strong Innovation System is Yet to Emerge

## Tech Hubs in Africa



- Dynamic innovation systems rapidly growing
- 442 active technology hubs and over US\$1 billion investment in venture capital
- Many countries have a well articulated science technology and innovation policy

## However a strong innovation system is yet to emerge

### Innovation system challenges

- Many have become “perfect pitchers” running from one competition to another
- The triple helix (coordinated actions by entrepreneurs, researcher and the state) is yet to be fully formed
- Lack of independence of innovation institutions also seen as sectoral institutions rather than cross-cutting
- Missing Elements e.g. R&D tax incentives
- Underfunding e.g. in Kenya funding at 0.05% of GDP compared to 2% target under the STI Act.

### Policies needed

- Investment by government in science and technology parks e.g. Kigali Innovation City
- Institutional framework for innovation e.g. Kenya Innovation Agency (KENIA)

# Policies, Regulations and Investment Key in Fostering 4IR Adoption and innovation

## Regulation challenges

- **4IR** technologies are new—Policies and Regulations lag behind innovations
- Countries are slow to develop needed regulations
- Limited knowledge of risks and opportunities may create stifling regulation
- Institutional capacity weak
- Some examples of regulation challenges include
  - Kenya has very restrictive regulations on drones based on fears of terrorism
  - Uganda has severely restricted social media and is now taxing it. This is to curtail political speech

## Some promising approaches include

- South Africa's Reserve Bank adopting a Sandbox environment that will allow experimentation with blockchain technologies in the banking sector before devising appropriate regulatory regime
- Fiscal incentives: Facilitation of importation of relevant equipment: Kenya and Rwanda consider ICT equipment as capital goods, zero rated for Customs duties. Rwanda has also reduced corporate tax from 30 percent to 15 percent for ICT investors

## Focus on building Skills

- Improve quality and skills development:
  - Focus on lower education should be to learn good foundational skills and TVET skills
  - Upper secondary should focus on increasing uptake STEM skills
- Quality apprenticeships are key
- Lifelong learning will key to keep with change

## Digitalization (especially informal sector)

- Leverage platforms to digitize informal work key:
  - Embedding trust in systems allowing reach beyond personal connections
  - Upskilling and quality incentive as quality can be signaled and paid for.
  - Specialization as platform facilitates matching by aggregating large number of people
  - Facilitate worker services provision-

## Leapfrogging

- Leverage ICTs and the 4IR: Technology can help African education systems **to** leapfrog by improving efficiency, creativity, and access to learning opportunities
- Rapidly deploy 5G mobile networks and become a leader in deploying Internet-of-things (IoT) that are going to be vastly energized with 5G.

## Policies to strengthen 4IR ecosystem

- Incentives: Treating ICTs as capital investment and tax incentives to attract Investment
- Sensible Regulation: To take a wait, observe learn attitude in regulating new technologies (Kenya drones policy is highly restrictive)
- Public investment: Government should seek to complement private sector investment especially to close digital divide