

**Title: The Challenges to Human Capital Development and
Work in the 4th Industrial Revolution
Ethiopia 2050 Grand Challenges & Opportunities
International Conference
Skylight Hotel, Addis Ababa, Ethiopia
Date: 19-20 December, 2019**

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Outline

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- **Concluding remarks**

Robots will displace 75 million jobs globally by 2020 but create 133 million new ones”(CEO Siemens Industry Software South Africa)

Inspiration

The world finds itself in what has been called the fourth industrial revolution, a technological revolution that is blurring the lines between the physical, digital and biological spheres, and that will change the way we work, socialise and learn.

~~Are we all becoming the 4th industrial revolutionaries? Who is gaining and who is losing? How to learn and what to learn, how to work and what to work are.~~

Human face in the mirror cannot reveal the machine acquired skills , as machine face in the mirror does not reveal the human skills it has captured at this time of the 4th IR

Inspiration

” ..the enire Encyclopa Britannica could be written on the head of a pin, and how all the world’s books could fit in a phamplet..done as a simple reproduction of the original pictures, engravings and everything else on a small scale without loss of resolution” Richard Feynman

Inspiration

The technological singularity occurs as “artificial intelligences” surpass human beings as the smartest and most capable life forms on the Earth. Technological development is taken over by the machines, who can “think”, act and communicate so quickly that normal humans cannot even comprehend what is going on. The machines enter into a “runaway reaction” of self-improvement cycles, with each new generation of A.I.s appearing faster and faster. From this point onwards, technological advancement is explosive, under the control of the machines, and thus cannot be accurately predicted (hence the term “Singularity”). – Ray Kurzweil

Inspiration

Our intuition about the future is linear. But the reality of information technology is exponential. If one takes 30 steps linearly, one gets 30 steps; If one takes 30 steps exponentially, one gets to a billion..

The fourth Industrial Revolution: A revolution that is changing the way we live, work and relate to one another (Klaus Schwab)

Inspiration

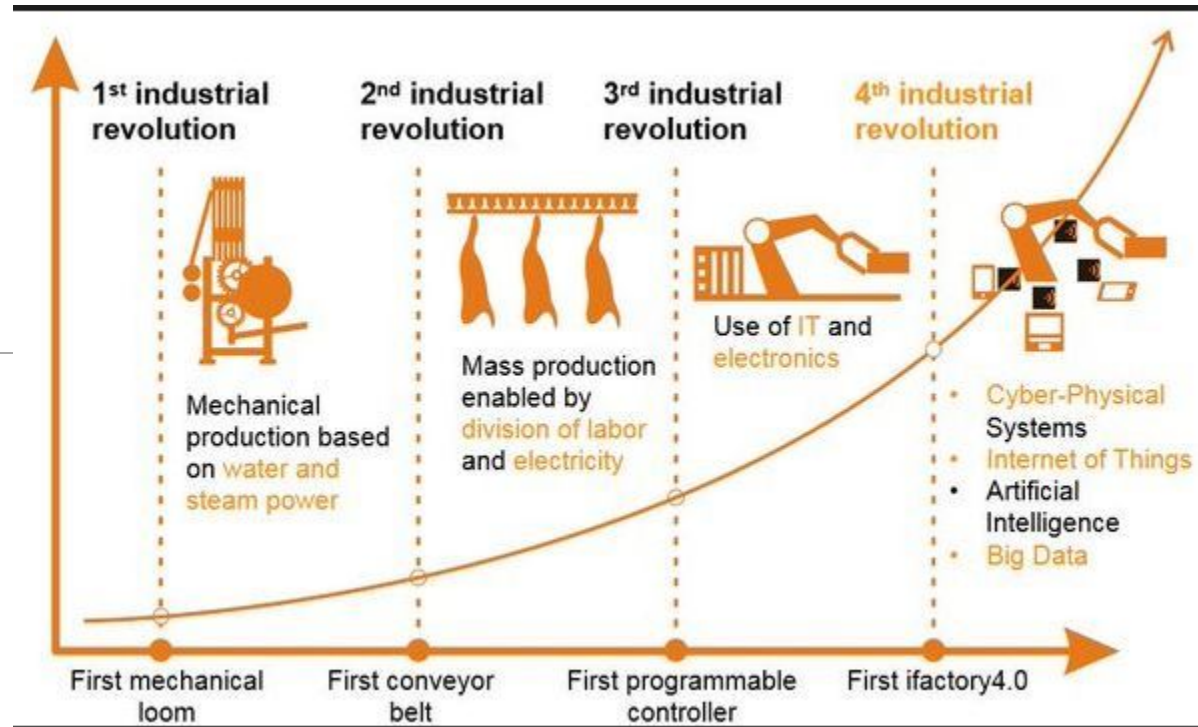
Technology has advanced more in the last 30 years than in the previous two thousand years. The exponential increase will continue

Inspiration

Technology advances at the exponential rates, and human institution and societies do not. There is thus a gap between technology and society. Imagine now a robot capable of treating Ebola patients or cleaning up nuclear waste.

“I fear the day that technology will surpass our human interaction. The world will have a generation of idiots.” Albert Einstein

The 4th industrial revolution

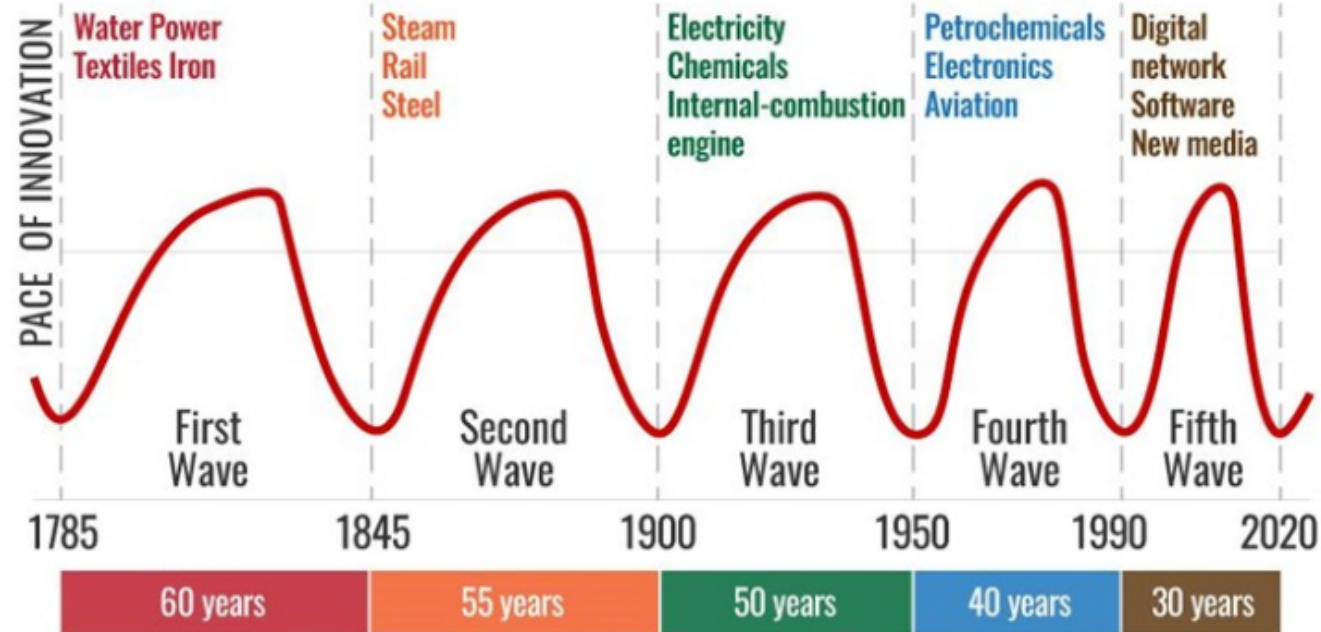


Cycles and waves

The Schumpeterian Cycle of Innovation and Entrepreneurship



SCHUMPETER'S WAVES ACCELERATE



4th Industrial Revolution and Africa

Time for Africa to join the transformational technology era, computational systems, networks and sensors, artificial intelligence, robotics, biotechnology, synthetic biology, bioinformatics, 3-D printing, human-machine interface, biomedical engineering and regenerative medicine; more computing power, speed, sensing, communication and conversation with machines and new inter-human relations and tolerance

Africa in the 4th IR

- Africa loser in the 1st Industrial Revolution
 - Africa loser in the 2nd Industrial Revolution
 - Africa loser in the 3rd Industrial Revolution
 - Africa must not be a loser in the 4th Industrial Revolution
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Africa Can Catch Up & Leapfrog

- **The Knowledge economy is borderless**
 - **It combines the agriculture, industry and service economies**
 - **It combines the experience, creative and imagination economies**
 - **Africa can now reach through AI,robotics, IoT, blockchain and big data**
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- the knowledge economy global value chain**

The African Digital Marthon Race

- Africa needs to engage and win the Marthon Race of the digital technology
- Must stop losing and failing in 4IR
- Time to perform, transform, change and reform Africa
- ~~Apply intelligently now digital technology to make integrated, united, smart, green, innovative and social entrepreneurial Africa~~
- Need to transform digital technology into a social digital technology where mere commercial success is changed

Africa to win the Marathon Race

- Digital technology is creating surveillance capitalism and digital gangsters
 - We do not need to make economic validation to digital technology only by one variable
 - We must add also social wellbeing, environmental security and new knowledge creation
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Winning the Marathon Race

-AU Agenda 2063

- **SDGs 2030**
 - **The AU Science, Technology and Innovation(STI) Strategy for Africa(STISA-2024)**
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- **STI to drive the process to realise fully for Africa SDGs**
 - **Digital technologies to address their priorities**

Joining the Digital Age

- Let Africa join the digital age by doing the things that have never been done before
- Africa has mobile miracle now
- Internet penetration growing by more than 20 % compared to 2017

- Africa has its own Afrinic(African Centre headquartered in Ebene City, Mauritius)

Mobile Miracle in Africa

- In 2016 mobile devices said to have generated \$110 billion in economic value in much of Africa
 - Expected to contribute overall 7.7% GDP for Africa
 - Expected to create 3.5 million jobs
 - 15 billion said to be raised in taxation
 - Global Mobility Engagement Index (GMEI) in Africa is said to be rising)
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Internet of Things(ToT)

- **Global market value of ToT to reach \$7.1 trillion by 2020**
 - **ToT is now defining our time as the age of machines to machines for inter-human interactions**
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Time Now to reach the Digital Global Value Chain

- Time for Africa to know how to deal with and respond to the 4th Industrial revolution
 - Reach the knowledge, digital, disruptive and exponential technology time
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- Africa is becoming home to many tech-start ups

Applying Digital Technology positively

- Time to use digital technology to solve African Problems
 - Delayed unity can be fast-tracked digitally
 - Create renascent Africa
 - Remove divide and rule
 - Promote African spirituality, philosophy, history, culture and knowledge and struggle heritages
 - Promote the wisdom of the people
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Artificial Intelligence

- Is AI now surpassing human beings as the smartest and most capable life forms on this planet?
 - Machines now can think, act, communicate so quickly
 - Each new generation of AI moves faster
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Explosive Technology

- Technology that is explosive is unpredictable
 - Technological advancement under the control of machines cannot be accurately predicted
 - Block chain is powering the future
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Block chain uses

Storing identity details

Verification of identity

Ownership records

Block chain wallet

Digital assets

Smart contracts

Digital contracts

Block chain can replace

Lawyers

Banks

**By undertaking legal and financial
transactions**

Block chain can help elections in Africa

Promote digital voting

Clean up the stealing in voting

Deal with vote tampering digitally

Facilitating

Health

Travel

Prevention of illicit financial flows

Digital Disruption

New digital technologies change business models

Change business value and market position

Disruptive technologies, taxi, hotel, bookstore print advertising,
uber, car airbus and so on

Smart cities for Africa

- Smart grids
- Smart urban farms
- Food security
- Health care
- Tourism hospitality

- E-economy
- E-agriculture
- E-minerals
- E-raw materials
- Facility management
- Building services

Fair Data

- Digital age
 - Big data
 - Digital transfer
 - Knowledge economy value chain
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- Shift to mobile and cloud computing
 - Scientific business machine learning to advance science and engineering
 - Big data time

Impact to change physical Universe

- E-education
 - E-health
 - E-Government
 - E-agriculture
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- Citizens science on our life journey
 - Digital data.. Must be findable, accurate, interoperable and re-useable
 - Machine learning and deep learning

Digital Application for E-Agriculture

- Weather prediction
 - Soil monitoring
 - Irrigation automation crop monitoring
 - Harvesting
 - Pest, disease and weed prediction
 - Farmers can use drones and cameras attached to farming machinery to capture data
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Digital Drive to fulfil Africa's SDGs Achievement

- End poverty
 - Zero hunger
 - Gender equality
 - Decent work and Economic Growth
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- Reduced inequalities
- Full employment and decent work for all
 - Apply digital technology to bring African solutions to African problems

Opportunities

- Explosive technology for alternative energy
 - For agriculture
 - Water treatment
 - Diseases diagnosis and screening
 - Drug delivery
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- Food security: processing and storage
 - Construction
 - Health
 - Pest detection and control
 - Air pollution remediation

Learn to Deal with Dangers

- Cyber crime
 - Digital gangsters
 - Soldier enhancement (e.g. Institute for Soldier Nanotechnologies at MIT)
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- Surveillance capabilities through digital sensors
 - Chemical weapons
 - Erosion of civil liberties
 - Exacerbating the primary export economy of the South
 - Weak regulation

Synergise the physical with the digital

- Social technology
 - Social physics
 - Social innovation
 - Social Entrepreneurship
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- Synergise associational values from Africa with the 4IR
 - To catch up and leapfrog from the agriculture, mineral and raw material stage to reach the knowledge and imagination economy level for Africa as a whole!

Innovate Innovation

Apply digital transformation to create not technology but social technology

Not merely innovation but social innovation

Not just enterprises but social enterprises

The fourth Industrial revolution can change the way we live, work and interact with one another

Applying and aligning the digital technologies to create wellbeing for people and nature is much needed to innovate now

A new social innovation system has to be innovated!

Inclusive Innovation

- innovation system needs a broad approach that includes all the stakeholders from the informal to the formal economic structures that shape knowledge, learning, innovation, capacity building (KLICs).
- It should bring an integrated approach to economic development by overcoming the fragmented policy fractionalisations and polarisations (e.g. on poverty, inequality and so on)
- It should shun fragmented policy formulations such as pro-poor. The poor must concern all, not only the poor.
- It integrates both the quality of demand as well as of the supply of knowledge for STI

Inclusive Transformation

Increasing the focus on inclusivity, transformation and linkages in the STI system.

Enhancing the innovation culture in society and government.

Improving policy coherence and budget coordination across government.

Developing a more enabling environment for innovation.

Developing local innovation systems.

Supporting social and grassroots innovation.

Expanding the research system.

Developing high-level and high quality of human capital/ productive power

Endorsing intelligently global collaboration

Increasing the investment in the Innovation system.

Add Informal Innovation

Innovation the standard meaning

Frugal innovation

Disruptive innovation

Sustaining innovation

Broad-Based innovation

Grassroots innovation

BOP innovation

Inclusive innovation

Catalytic innovation

Reverse innovation

Ghandian or Jugaad(Hindi word) instead of frugal!

Concluding remark: Africans unite and make a difference

- **There is a need for active engagement by promoting the public oversight of the explosive technology to create opportunities and not dangers to Africa**
- **To realize opportunities and forestall or avoid dangers to build innovative smart, green and integrated innovative Africa to make Africa leapfrog to the knowledge economy global value chain**
- **Break the failure and loss and bring success and gain with the explosive, disruptive digital technology now!**

Finally

**Amsegalehu, Asante Sana, and Thank
You**

Mammo Muchie

www.sarchi.org

www.africaninnovationweek.com

<https://iono.fm/e/791900>