

Broadband Access, Indigenous Innovation and Challenges of the Fourth Industrial Revolution

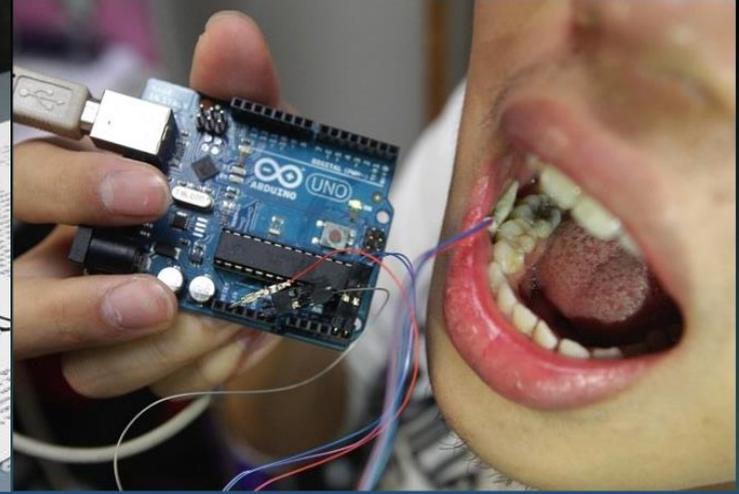
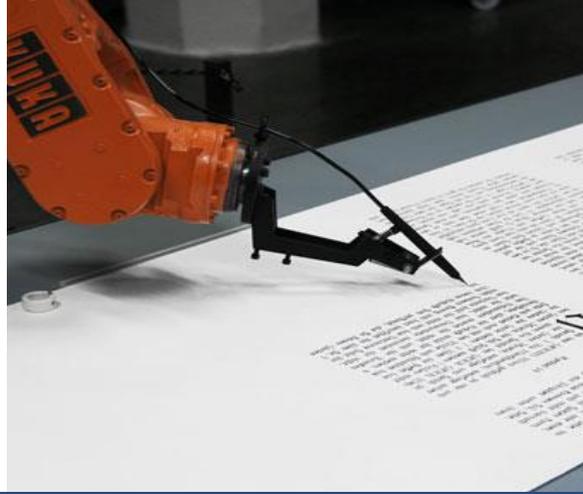
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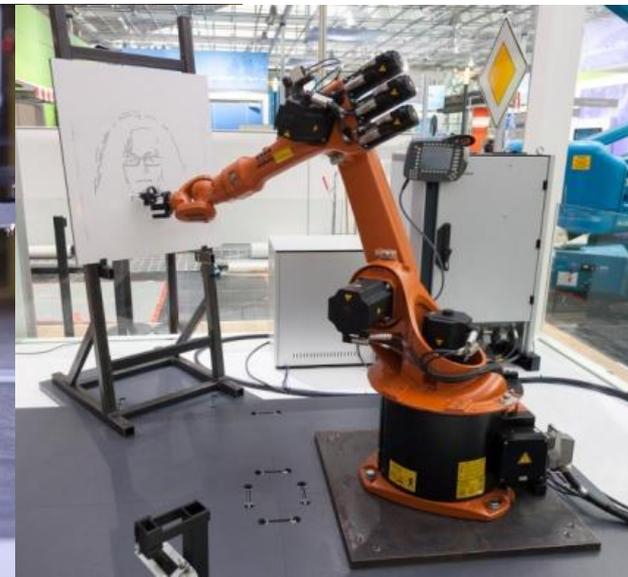
As at March 2017, according to World Stats, there were **3.7 billion users** of the internet representing **49.6%** of the world's population. That's a measure of how things have changed in less than 25 years.





Neural Networks, Artificial Intelligence, Algorithms, Internet of Things (IoT), Drones, Robots have come centre stage in a process of productivity reforms and continuous transformation in the

FOURTH INDUSTRIAL REVOLUTION (4iR).



Technology driven by the 4IR

- 4IR is “*blurring the lines between the physical, digital, and biological spheres*”, says Schwab of the World Economic Forum.
- It is heavily reliant on digital application in the delivery of services...including the use of algorithms and robotics...
- Can have a major disruptive effect on pre-existing norms reminiscent of Schumpeter’s ‘creative destruction’ paradigm (Schumpeter, 1942: 82-83).

Phases of the Industrial Revolution

Shift from a reliance on animals, human effort and biomass as primary sources of energy to the use of fossil fuels and the mechanical power this enabled.

1.0

Major breakthroughs in the form of electricity distribution, both wireless and wired communication, the synthesis of ammonia and new forms of power generation.

2.0

The development of digital systems, communication and rapid advances in computing power, enabling new ways of generating, processing and sharing information.

3.0

Digital application in the delivery of services, including the replacement or enhancement of mechanical and physical tools by software programmes that control algorithms and robotics.

4.0

4IR : Present Impact

Advances in computing power

Crowdsourcing

Young demographics in emerging markets

Rapid urbanization

Ethical and privacy issues

New energy supplies and technologies

Mobile Internet & Cloud Technology

The Internet of Things

Rising geopolitical volatility

Changing work environments

Advanced robotics and autonomous transport

Artificial intelligence and machine learning

4IR Present Impact 2015-2017

Global Digital Divide

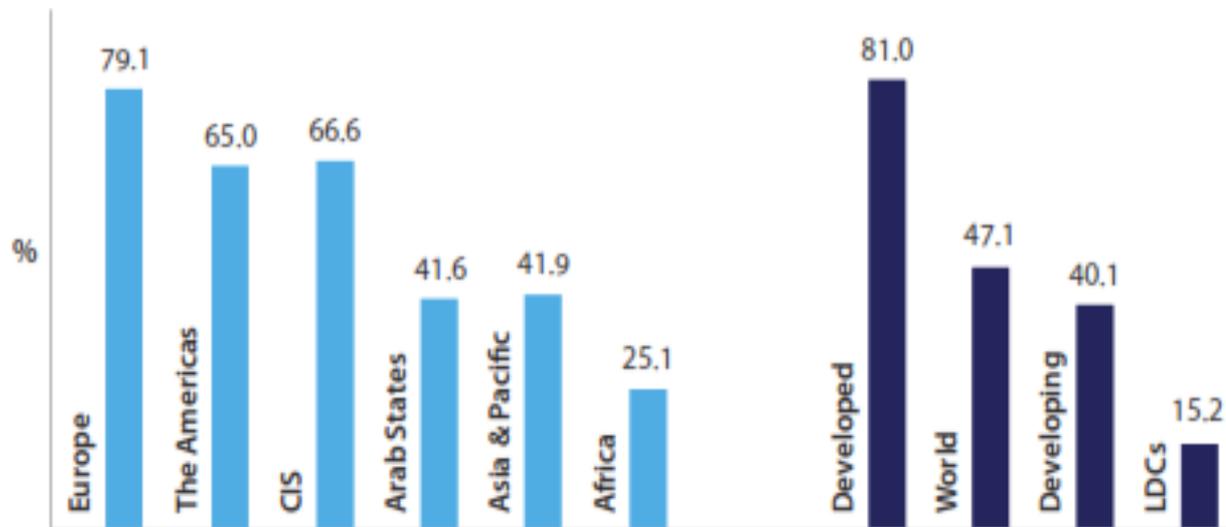


There is a large gap in access to the internet between the developed countries (81%) and the least developed countries (15%)

Percentage of Individuals Using the Internet by Region

THE DIGITAL DIVIDE IN 2016

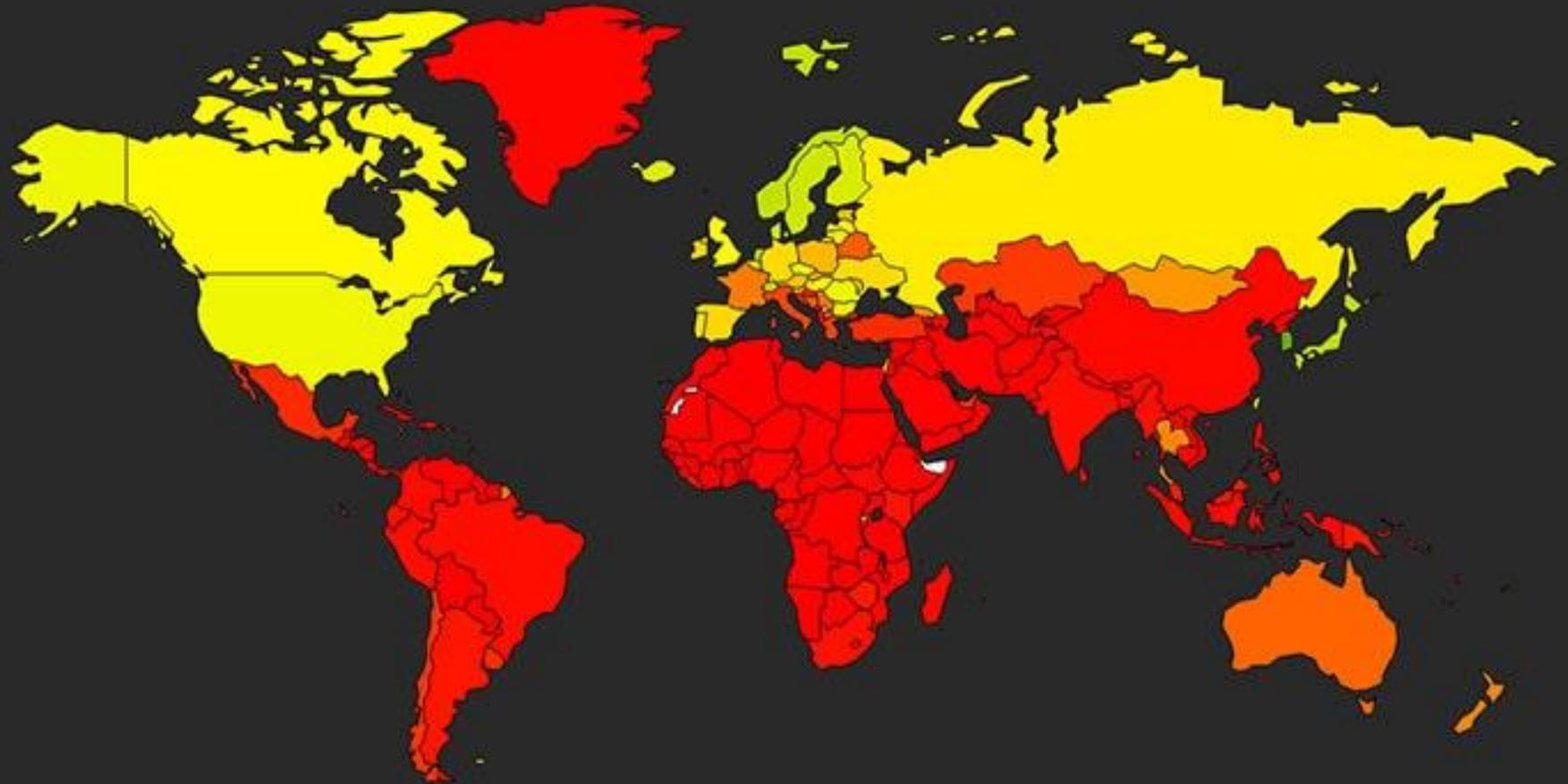
Percentage of individuals using the Internet



Close to one out of two people (47%) in the world are using the Internet but only one out of seven people in the LDCs.

Developed regions are home to one billion Internet users, compared to 2.5 billion users in the developing world.

Global Digital Divide



As ICT users, all over the world embrace the marvels of high internet speeds as a major value in obtaining optimum utility for digital devices.



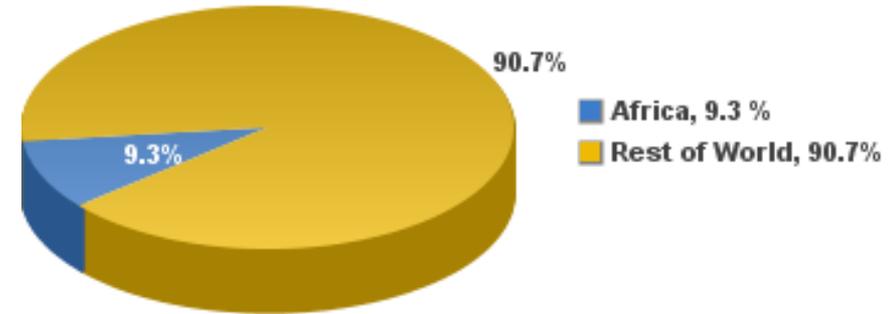
Net Neutrality and the Digital Divide

- Net Neutrality is the basic principle that prohibits internet service providers from speeding up, slowing down or blocking any content, applications or websites on the basis of payment or preference.
- This means an internet in which ISPs provide us with open networks without discrimination against certain content that ride over those networks.

Net Neutrality and the Digital Divide

- This principle on which the internet has been built, there will be no two track system based on high-speed privileges for content providers such as Netflix.
- Assuming equivalency of computer capacity and service specifications, download of a Nollywood film should not be slowed in comparison with one from Netflix or Hulu.
- No two-speed or two-track system

Internet Users in Africa March 2017

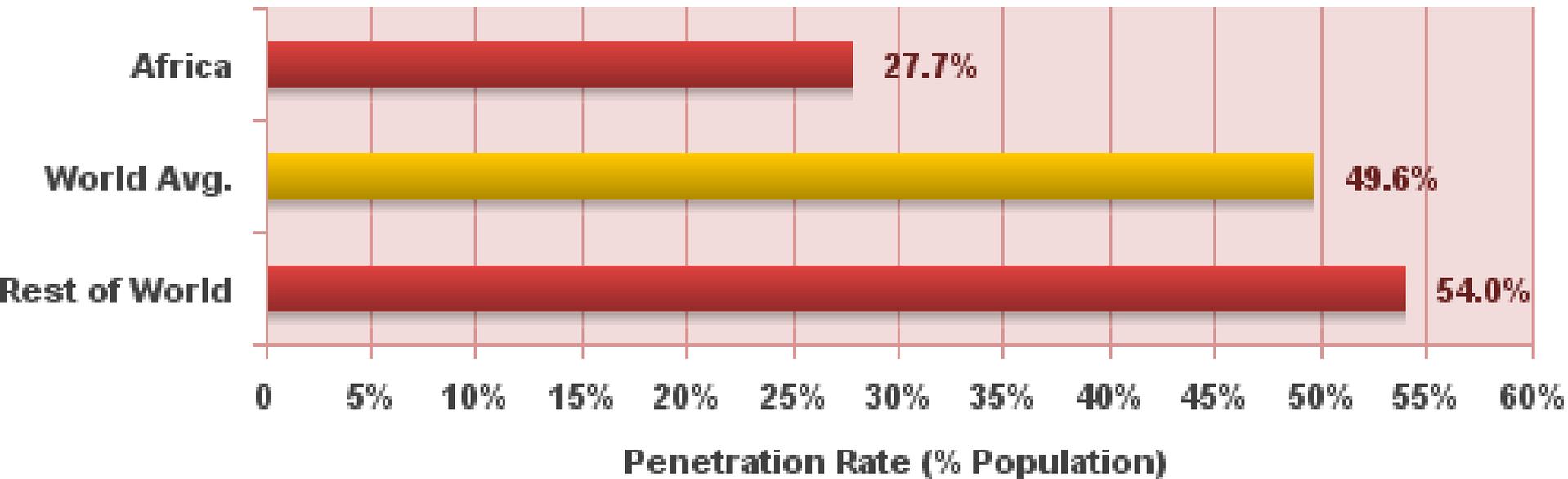


Source: Internet World Stats - www.internetworldstats.com
345,676,501 estimated Internet users in Africa in March 31,

Africa accounts for 9.3 % of internet users in the world.

Internet Penetration in Africa

March 31, 2017



Source: Internet World Stats - www.internetworldstats.com/stats1.htm

345,676,501 estimated Internet users in Africa in March 31, 2017 and

3,731,973,423 Internet users in the World in March 31, 2017

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Africa – Broadband Access

- Twenty per cent of the continent already has access to a mobile broadband connection, a figure predicted to triple in the next five years.
- The mobile industry will account for 8% of Africa's GDP by 2020 – double what it will be in the rest of the world.
- Internet penetration is rising faster in Africa than anywhere else as costs of data and devices fall.

Africa – Broadband Access

- Internet penetration in Africa jumped from 16% of individuals in 2013 to over 20% in 2015.
- The proportion of individuals online in Africa is 17.4%, still far behind the global average of 49.6%.

Nigeria – Broadband Access

- ITU/UNESCO report credits Nigeria with 20.95% broadband penetration
- Internet subscribers stand at 93.5 million as at August 2016
- Nigeria targets 30% broadband penetration 2018

Source: International Journal of Research Studies in Computer Science and Engineering (IJRSCSE) Volume 2, Issue 1, January 2015, PP 1-7 ISSN 2349-4840 (Print) & ISSN 2349-4859 (Online) www.arcjournals.org

Nigeria – broadband penetration challenges

- Electrical Power Supply Infrastructure
 - Cost and reliability of powering telecommunication equipment (Base stations, radios etc.) increase the overhead cost for expanded broadband penetration
- Right of Way
 - The huge amount paid by telecommunication operators to have right of way is high, thereby affecting the building of infrastructures which also contribute to lower penetration

Nigeria – Factors limiting broadband penetration

- Distance
 - The distance from the base station to the internet users has made it almost impossible for those in the rural areas to access internet
- Equipment Cost

The cost of acquiring computer systems is out of the reach of some sections of the middle and lower classes, creating an internal digital divide along social and geographical lines.

Nigeria – Broadband Affordability

According to the IJRSCSE journal, the high cost of internet access remains one of the fundamental ICT growth challenges in the Nigeria

- Relatively high internet access in cities like Lagos, Port Harcourt, Abuja among others but lower in other urban centres and in rural areas.
- a high number of internet users visit cyber cafes for internet access while others rely on mobile devices or their offices.

GLOBAL ACCESS AND AFFORDABILITY OF INTERNET USE

- Everyone should have access to the services provided by ICT, e.g. computer programs, e-mail and the World Wide Web.



Affordability: A Global South Problem



- **The UN Broadband Commission currently defines broadband as affordable if an entry-level (500MB) data plan is available at less than 5% of average monthly income (i.e., GNI per capita).**
- **Affordability does not adequately take into account poverty and income inequality — two major challenges facing the world today**

Affordability Issues

- The current 5% GNI affordability target is insufficient in a world where income inequality is increasing.
- Some countries have achieved the 5% target for entry-level broadband (500MB) – but it is still too expensive for at least the bottom 20% of income earners.
 - Allows a user to watch just two minutes of high-quality video.
- Not enough to enable regular use of health, education, and other valuable online tools and information sources

Broadband Costs as % of GNI per capita

- An ITU 2013 global study found that subscribers in developing countries paid a much higher proportion of Gross National Income (GNI) per capita than did subscribers in developed countries
- Subscribers in some developing countries were paying 30.1% of GNI per capita for fixed broadband while those in counterpart developed countries paid 1.7% of GNI per capita (ITU 2013, 4)

Fixing the Problem...

- The national average measure must move below the current 5% threshold” to allow lower income users to gain access.
- A 2% threshold will allow a broadband connection to become truly affordable for all income groups, enabling billions more to come online.
- A larger data allowance is needed for users to realise the development benefits of the Internet.
- Moving from 500MB to 1GB would be a good start
- Developing policy and regulatory reforms to reduce network roaming charges.

High Roaming Charges

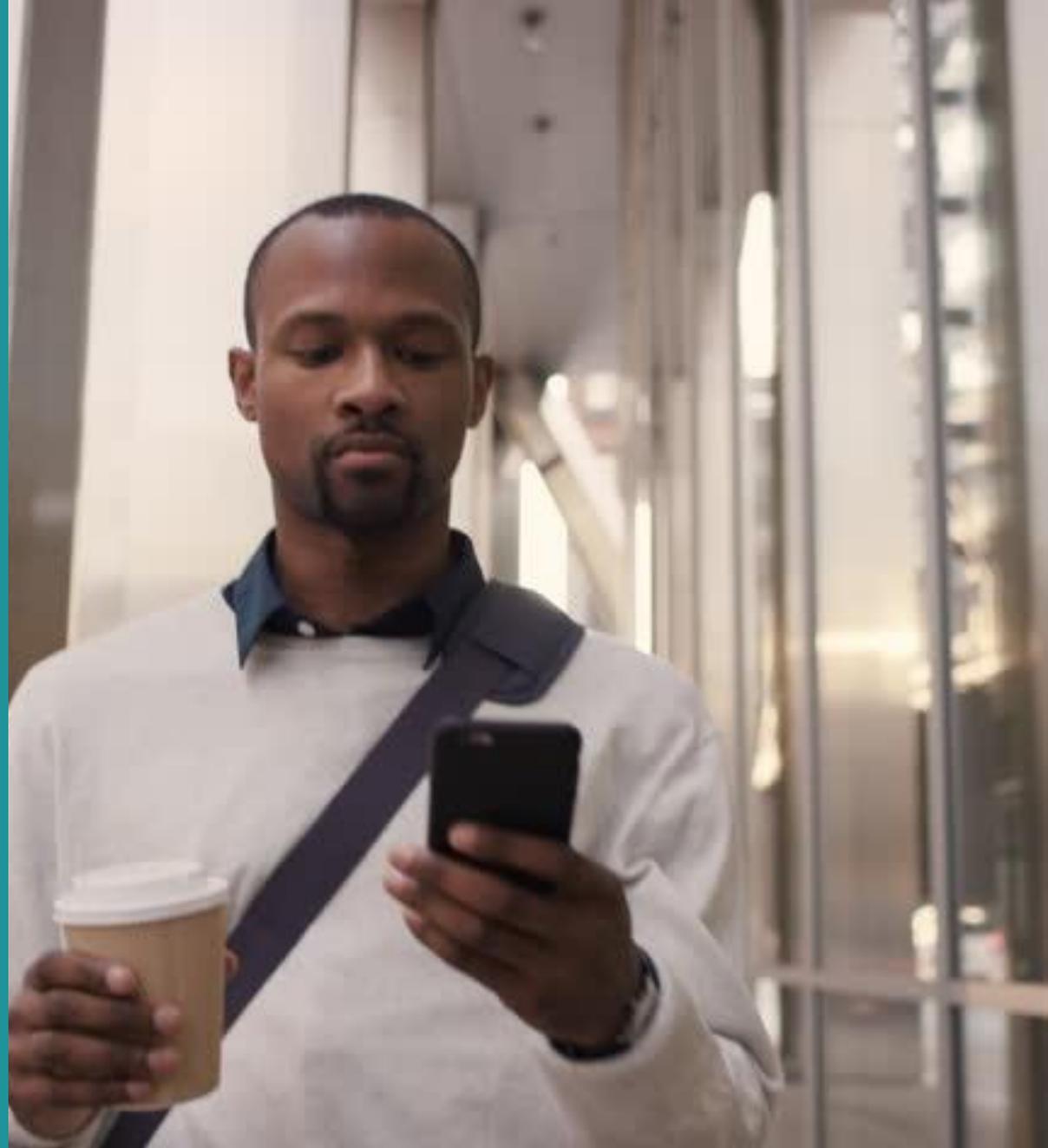
Persistently high mobile roaming charges are a continuing challenge for business operators, including start-ups



Implications of High Roaming Charges

- Even where certain providers offer so-called 'Roam like You're Home' packages, users still have to make substantial down-payments at base before travel or activation.
- The imposition of high roaming charges continues despite the now low-to-negligible cost of making these international telephone connections.
- Increased access by users at all levels to 'over-the-top' internet based services has signalled the need for policy and regulatory reforms to reduce or eliminate network roaming charges globally, as Europe has started to do.

Small business operators continue to express concern about high internet access and roaming charges. The implications for their business communication when travelling abroad are significant.



In the Caribbean, several regional bodies agree that MSMEs are important drivers of economic growth and development.



According to the Caribbean Export Development Agency, “**the MSME Sector is a critical pillar of economic development within the Caribbean Community as they contribute more than seventy percent (70%) of GDP in some CARICOM Member States and they often employ more people than large businesses across the region**” (CEDA 2013).

Digital Empowerment of MSMEs

- Despite the enormous contribution of the SME sector to sustainable economic development, MSMEs face serious challenges with digital access in Africa, the Caribbean and globally
- The focus on digital empowerment of SMEs is therefore important.
- Given the rapid pace of change in the digital economy, remaining competitive through adoption of ICT skills and applications is imperative for survival and success.

MSME: Challenges in the Caribbean

Leading concerns related to Caribbean MSME productivity:

- High broadband cost and unaffordability,
- Unreliable network services and infrastructure,
- Limited access to bank loans especially for ICT and Creative Industries start-ups,
- Outdated laws, policies and regulations,
- Poorly targeted training programmes and the
- Need for improved media literacy programmes across a wide section of the public, to help drive more business and individual adoption of new or indigenous technology products and services

Existing and Required Actions Towards Improved ICT Usage by MSMEs

MISSION	EXISTING APPROACH	PROPOSED NEW APPROACH
Widen MSME Access, Improve Technical Support with New Applications	Current Focus: Govt Tech Training in Schools and Provision of Community Broadband Access Points (CAPs)	Needed: Diverse Tech Support, Access and ICT Training for pre-qualified MSMEs and Start-ups
Lower Internet Cost and Improve ICT Affordability	Current Focus: Promote Competition among service providers to lower costs, Universal Service Funds for low-cost access to CAPs. Tech price reductions.	Needed: A proportion of USF funds targeted to MSMEs and pre-qualified Start-ups to reduce ICT access costs at early or vulnerable stage of business operation
Improve Infrastructure and regional network connectivity for MSME trade	Current Focus: Country Regulation and regional Commercial services	Needed: Stronger regional MSME Alliance and a dedicated network. Cut Roaming costs and build global peer-to-peer trade links
Update Policies, Laws and Regulations	Current Status: Many outdated laws and inadequate regulations	Needed: International agencies and university support to update and harmonize ICT laws and broadband access policies
Provide Tax Reliefs, Bank Loans and More Targeted Business Support for MSMEs	Current Status: Little or No special provisions for MSMEs and start-ups. Low rate of Bank loan approvals for ICT projects	Needed: Develop a regime of special reliefs and benefits for start-ups and prequalified MSMEs. Ramp up Business and Tech Support.
Training and Online Marketing Opportunities	Current Focus: Local courses delivered face to face, with little or no new media marketing exposure	Needed: Expand MSME Business training into high schools and offer more Social Media Marketing, Crowd-funding and 'Sharing Economy' modules

Globalisation and Access to Technology

- Globalisation is a two edged sword
- It has created new opportunities and ideas, opened new markets and fostered greater access to technology, which are all accessible to every business and economy,
- But it facilitates and privileges large external conglomerates, sometimes at the expense of local start-ups.

Cultural Synchronization

- Coined by Hamelink (1983)
- Refers to the imitative lifestyle effects of economic globalization from the US on dependent societies elsewhere.
- Anticipated and mapped the rapid growth of cross-border information flows leading to cultural homogenization, especially in the Global South.



Resisting Synchronization

- Resilience - preserving cultural identities and innovations that are not easily displaced.
- Hybridity - a tendency to change whatever we encounter, while resisting wholesale adoption
- Counter-Flow - a counter-cultural process of uploading from below, using available technologies.

Globalization from Within

A new analytical tool that

- empowers individuals, enterprises and agencies, especially in emerging economies, to innovate locally and grow globally.
- Its utility is not only economic but also in the cultural and social spheres

Globalization from Within (GFW)

Transforming into action the individual, community or societal impetus to generate new ideas locally or to re-purpose existing innovations internally.

The associated processes by which these innovations, capacities or ideas are enabled to expand globally, using appropriate strategies, policies or technologies.

Globalization from Within (GFW)



“Globalization From Within” in Jamaica and Developing Countries

- **Caribbean Pan Africanism** - Marcus Garvey (1920s and 30s) used his several newspapers, especially ‘The Negro World’, to internationalize his movement.
- **The Rastafarian Movement** has achieved an immense global reach since its early beginnings in colonial Jamaica in the 1930s.”
- **Caribbean Popular Music and Sport**

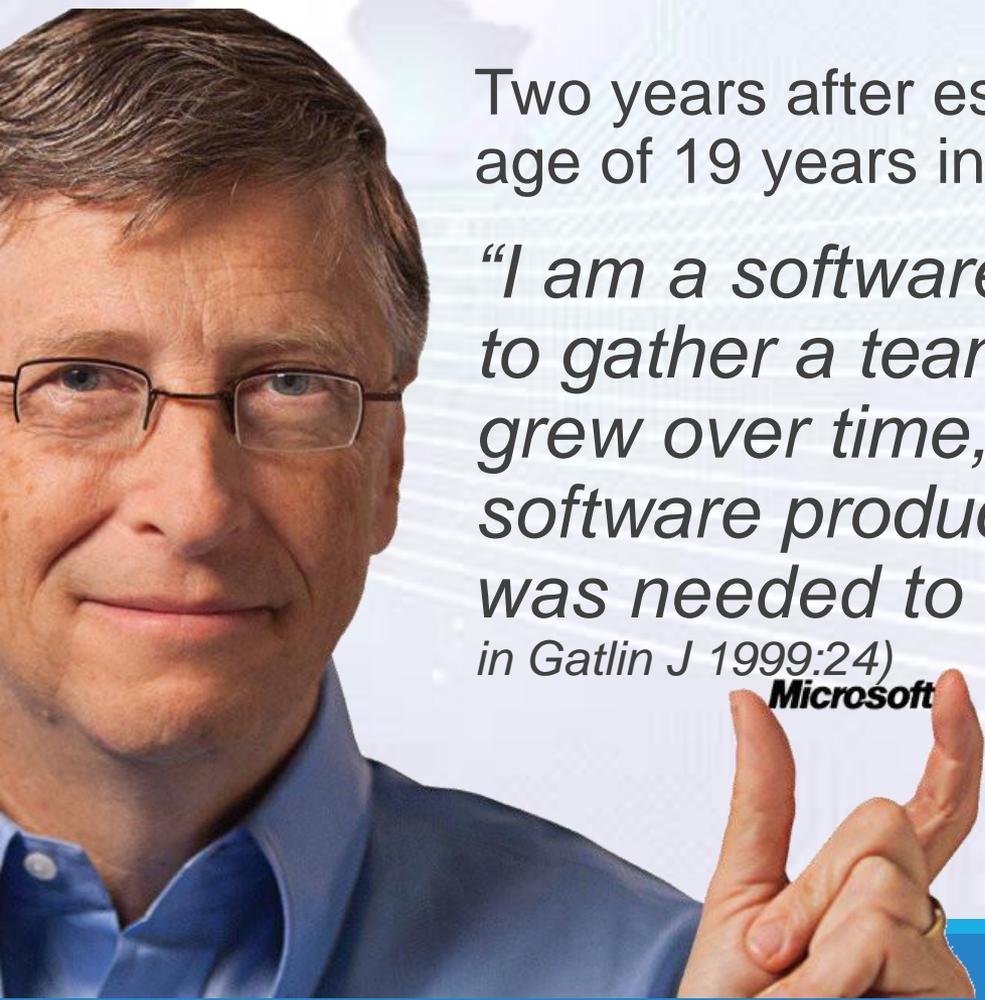


The Case of Microsoft and Bill Gates

Two years after establishing Microsoft at the age of 19 years in 1995, Bill Gates remarked:

“I am a software engineer and I decided to gather a team together. The team grew over time, built more and more software products and did whatever was needed to drive that forward” (Gates in Gatlin J 1999:24)

Microsoft

A photograph of Bill Gates, wearing glasses and a blue shirt, making a peace sign with his right hand. The background is a light blue gradient with a faint globe and circuit patterns.

Paradigmatic Innovation



Think different.

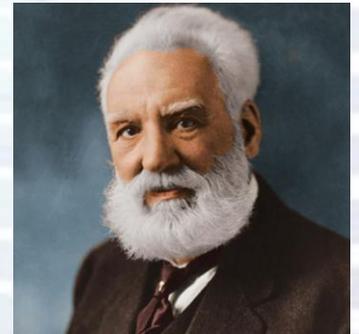
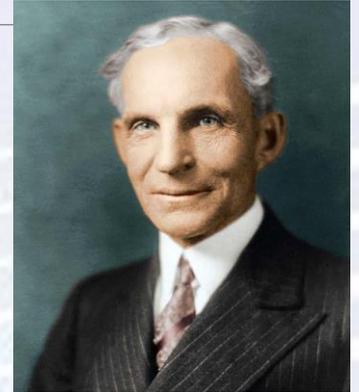
Steve Jobs

Changes in an organization's mindset,
values and business models

Other Early Start-ups in a process of “Globalization from Within”

- **Henry Ford**
- **Alexander Graham Bell**
- **Guglielmo Marconi** and others

Key inventors and innovators, who operated **within** a start-up confined initially to a local space, but later emerged as the captains and conveyors of global outreach and world dominance.



Reaping benefits of 4iR

- Create technology and media literacy curricular in schools, colleges and universities
- Maintain campaigns of public education on trends in technology, their implications for work, culture and education
- Create training programmes and courses to prepare the current generation to think about our robotic and technology driven futures.
- More Actively Support and Promote MSMEs and Women's roles in them

Governance & Policy Measures:

- Build Better ICT infrastructure for Improved Access to Rural and Remote Areas
- Finance and encourage expansion in Digital and Cultural Content Production
- Undertake Regulatory reform to Converge Existing Fragmented Regulatory Structures
- Re-fashion Fiscal Regime to Reduce Taxation on the ICT Sector
- Establish a monitoring task force or office to co-ordinate growth of the knowledge economy in the context 4iR

Cautionary Note on 4iR

- Let us adopt the caution offered by Stephen Hawking, Neil Postman and others that we must not allow advanced technology, such as artificial intelligence, robotics and neural networks, to dominate human lives and agency.
- 18th century philosopher Thoreau put the same message differently in observing that we must not become the 'tool of our tools'.

Conclusions

Globalization emanating and adopted primarily from outside is really **IMITATION..**

Indigenous development should be about valuing every individual idea and in generating **INNOVATION.**

Within the context of
Globalization from Within and the
Fourth Industrial Revolution, how
can we strengthen indigenous
innovation by becoming societies
more concerned with

UPLOADING

than mainly

DOWNLOADING ?

