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Basic Internet for All (Basic4All): Towards Digital Inclusion and Sustainable Developments

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Oslo, Norway

UPDATES



- 31Okt2016
 - New slide 34 – overall architecture
 - Updated slide 39 – local infrastructure (TBC)



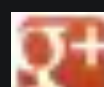
Outline



- Executive summary
- Basic Internet Foundation – History, Mission and Motivation
- Why Basic Internet – Citizen needs and opportunities
 - ➔ Access to knowledge is the basis for education, health, safe shelter, happiness, wealth, and entrepreneurship
 - ➔ Digital Inclusion
 - Basis for Innovation
 - United Nations Sustainability Goals
- Why India?
- The solution: Free Basic Internet access
 - to text and pictures
 - ➔ Supports access on a broad range of access networks
 - ➔ - Built on sustainable business model
- Approach
- Success stories
- Moving forward and Asks!
- Conclusions



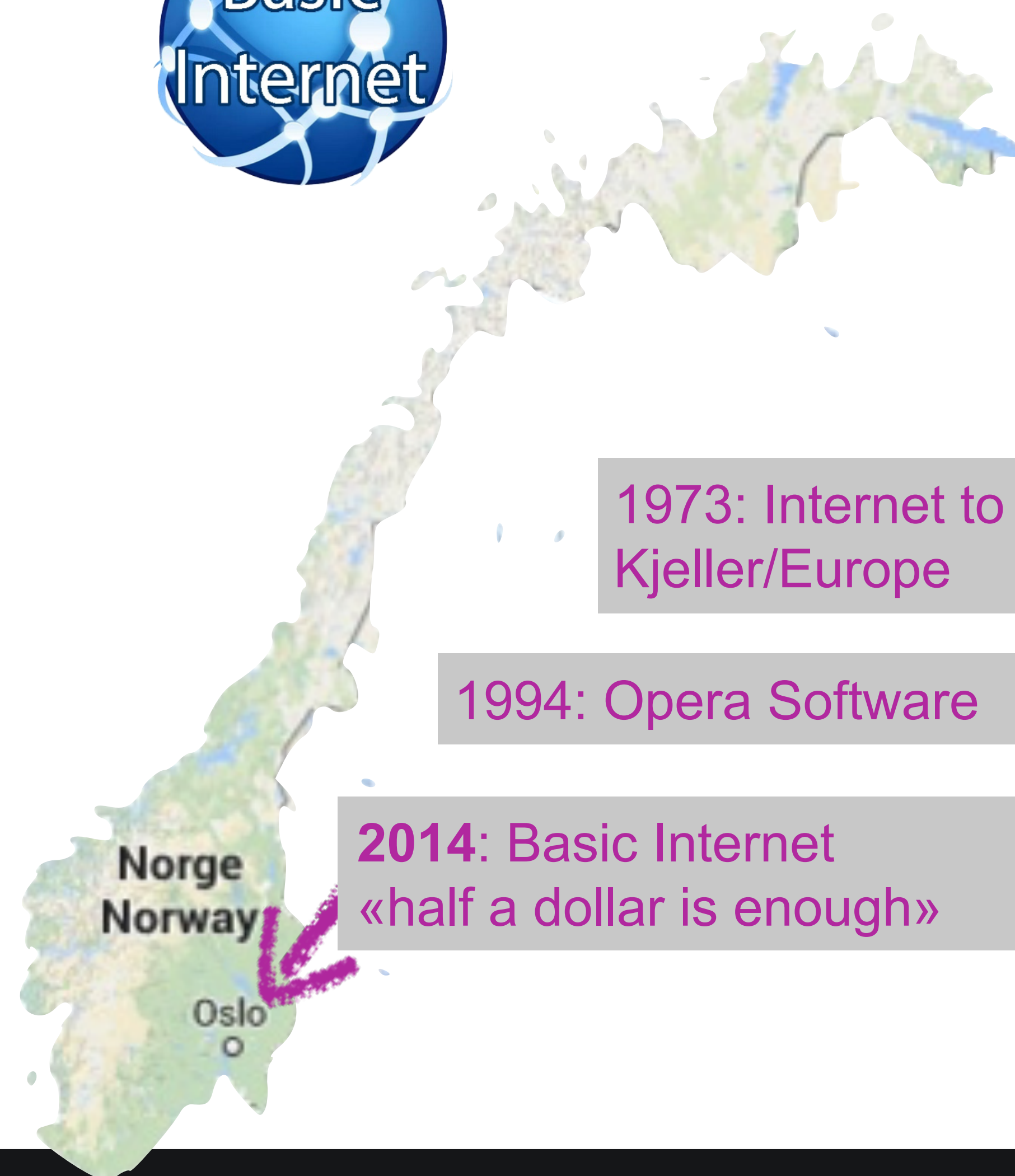
The screenshot shows the Basic Internet website homepage. At the top left is the Basic Internet logo. To its right is the text ': Internet' and a search bar. Below the logo and text is a navigation menu with buttons for Home, Projects, Solutions, Impact Research, Opportunities, and About us. The main content area features a large photograph of three people (two women and a child) in a rural setting. Below the photo is the heading 'The Basic Internet Foundation' followed by a paragraph: 'Envision a world of free access to basic information on health care, education or development. Join our quest to make this vision a reality! The Basic Internet Foundation aims at optimised content delivery on capacity-limited networks:'. This is followed by two bullet points: 'The Foundation will offer free access to low capacity Internet as a carrier of digital content to people in areas with low admission and / or no internet coverage.' and 'The Foundation will assist organisations and companies to adapt and disseminate information for the affected recipients should be able to help themselves.' On the right side of the page, there is a sidebar titled 'About us' with a sub-section 'People' listing names: Josef Noll, Gunnar Nilsson, Tor Blomseth, Vidar Sannerhaugen, Stian Løvold, and Linda Firveld. Below this is a section for 'Founding Partners' listing UNIK and Kjeller Innovation.



Executive Summary



- Opportunity to impact lives of billions of people in the world
- Sustainable development requires digital inclusion, which necessitates Internet for all
- Knowledge is the basis for education, health and entrepreneurship
- Digitalization is the engine of economic growth and wellbeing of people
- Basic Internet is access to text and pictures
- Develops the market, complementary to market actors
- Roll-out through local partners
- Successful pilots in many countries
- Foundation by experienced people
- Private-public partnership in India drives basic internet for all
- Now:
 - ➔ Operations in DRC Congo
 - ➔ Pilot for digital Tanzania
 - ➔ Pilot for "off-grid" satellite GSM with Basic Internet
 - ➔ Others



History, Mission, and Motivation

- Research and Education at Kjeller
- Close relation to FFI, IFE, NILU,...
- Professors from UiO (Oslo) and NTNU (Trondheim)

- The building where the Internet (Arpanet) came to Europe in June 1973



1971 (at which point 23 hosts, at universities and government research centers, were connected to the ARPANET); 29 by August, 1972, and 40 by September, 1973.

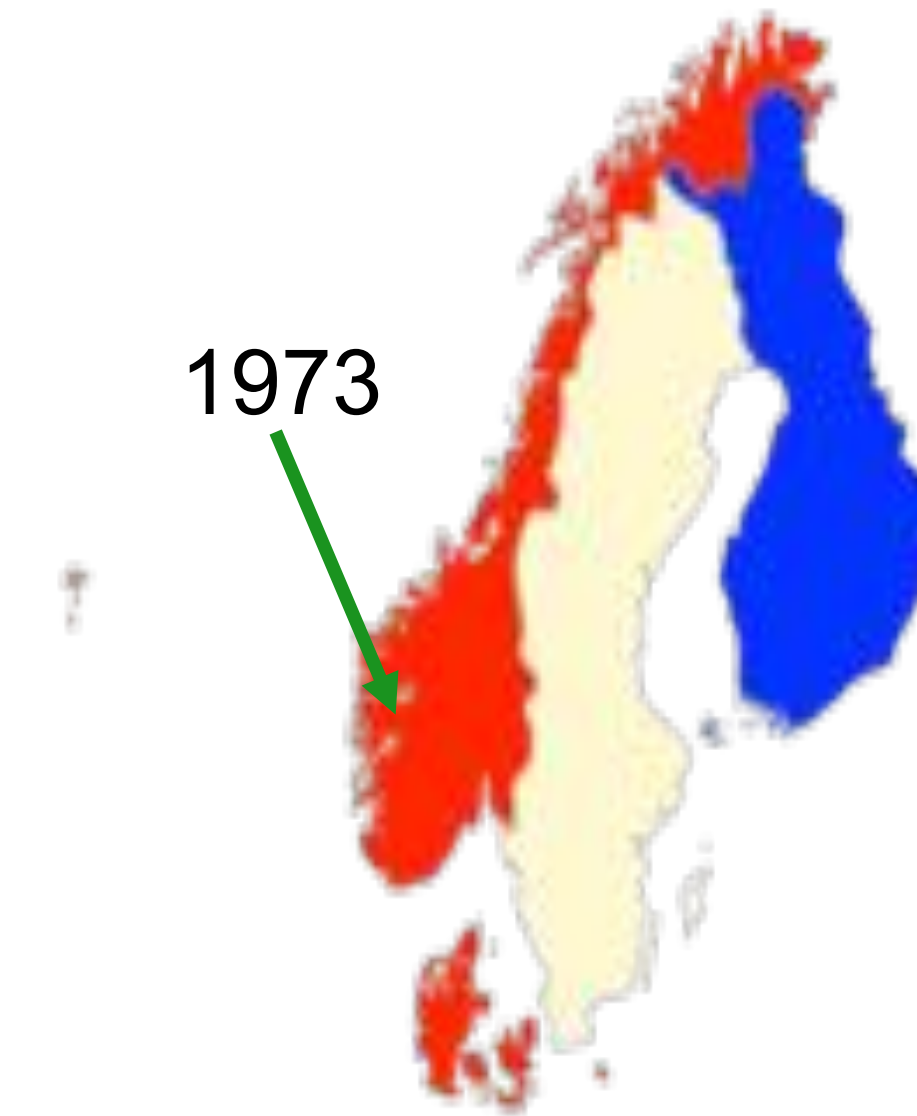
At that point, two satellite links, across the Pacific and Atlantic Oceans to [Hawaii](#) and [Norway \(NORSAR\)](#) had been added to the network. From Norway, a terrestrial circuit added an IMP in London to the growing network.

Source: Wikipedia

Rich Pedigree - The Internet and Scandinavia (incl. Finland)



- The first connection of Arpanet outside of the USA (and Hawaii) was to **Scandinavia** (Kjeller, June 1973)
- List_of_Internet_pioneers [Wikipedia]
 - Yngvar Lundh, Paal Spilling
- Application development
 - .php, OpenSource, Linux, Skype, Spotify
 - OperaSoftware, FAST Search
 - Nokia, Ericsson
 - Telenor, TeliaSonera
- Mobile Internet:
 - GSM
 - Adaptation
- Internet impact:
 - Bridged digital divide
 - Phenomenal impact on health, education, and welfare



Background

- Internet provision to various parts of DRC
 - operations since 2011
- Connection to a.o. University of Lisala
- Experiences from Internet provision
 - Expensive access: 2000 US\$/month for 1 Mbit/s
Note: 80 Mbit/s for 66 US\$ (NO), factor: **2.420** or **0.04%**
 - Requirement for self-sustainable infrastructure
- Developed network infrastructure
 - low-cost establishment of local hot-spots
 - remote core infrastructure (in Norway)
 - based on experiences from Internet history at UiO/UNIK



The Basic Internet Foundation (BIF)

Excellent Team and Collaboration



- Josef Noll, professor and innovator
- Gunnar Nilsson, founder and entrepreneur
- Tor Blomseth, strategist and lawyer
- Linda Firveld, Women Sp3akers and entrepreneur
- Vidar Sannerhaugen, founder and advisor
- Stian Løvold, director at UNIK
- Sudhir Dixit, Fellow at Basic Internet Foundation

Collaboration with a.o.

- Kjeller Innovasjon & UNIK (founders)
- CWI Norway and CTIF (DK) - academic support
- Opera Software - free access to the Internet
- IPXextenso - solar-powered base stations for off-grid,
- Breiband.no - technology and maintenance

1973:
Internet til
Norge

1994:
Opera
Software

2014: Basic
Internet
Foundation



- Driven by the global industry
- Targeting
 - Affordability
 - Efficiency
 - Business Models

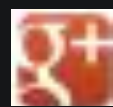
No one should have to choose between access to the Internet and food or medicine.

ERICSSON Ericsson is a world-leading provider of communications technology and services.	MEDIATEK MediaTek Inc. is a leading fabless semiconductor company for wireless communications and digital multimedia solutions.	OPERA Opera products enable more than 350 million Internet consumers to discover and connect with the content and services that matter most to them.	SAMSUNG Samsung is a global leader in technology, opening new possibilities for people everywhere through relentless innovation and discovery.
facebook Facebook's mission is to give people the power to share and make the world more open and connected.	NOKIA Nokia is a global leader in mobile communications whose products have become an integral part of the lives of people around the world.	QUALCOMM Qualcomm is a world leader in 3G, 4G and next-generation wireless technologies.	

Our Mission



- Provide Internet access to everyone
- Free access
 - web pages
 - bandwidth limited
 - basic services
- Ensure sustainable business model



Why Basic Internet for All?

Digital Divide ↔ Digital Inclusion



- Digital inclusion a prerequisite for improving living standards, quality of governance and national wealth
- Basic school in education
 - 3 basics: read, write, mathematics,
 - +2 innovation drivers: express, ICT
- University education
 - basics: analysis, problem solving, evaluation
 - innovation by: English writing, innovation management
- The Global World perspective for beyond 2050
 - Human-Bond-driven systems
 - Knowledge-, sustainability-driven economy
- Affordable Internet access is an excellent alternative to building very expensive physical infrastructure



- Limited Internet access (in the World)
 - Network missing
 - Too expensive
 - Revenue driven



Today, the Internet isn't accessible for two thirds of the world. Imagine a world where it connects us all.

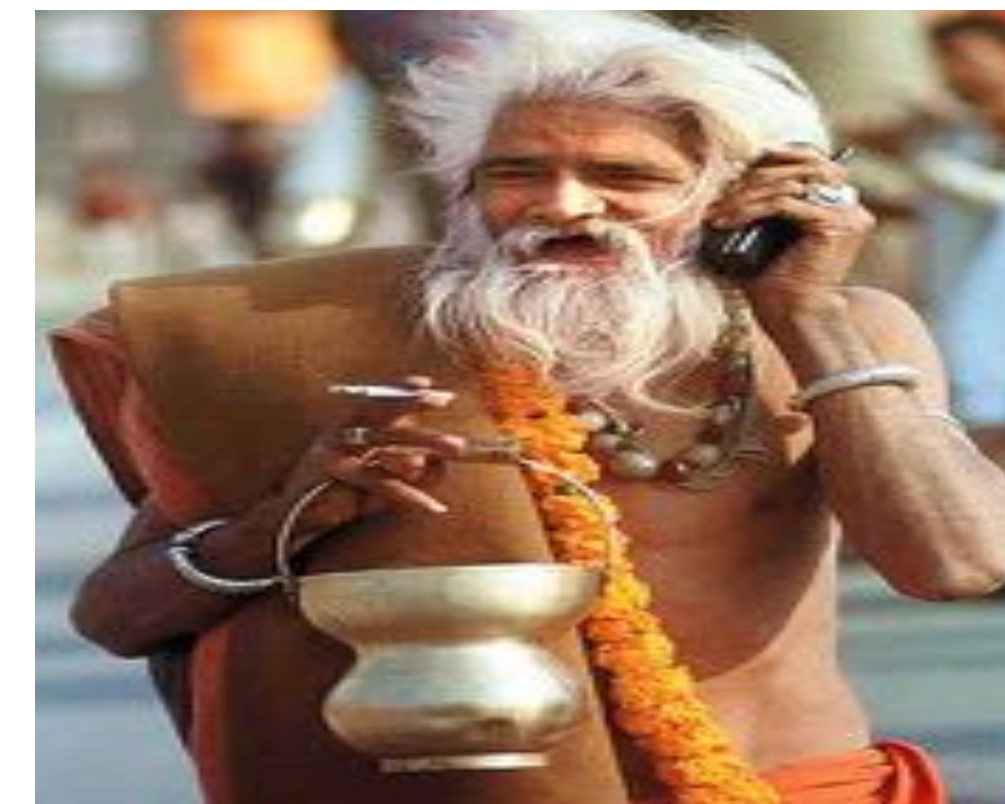
[Source: Internet.org]

2/3 of the World's population have no access to Internet



- Knowledge is the basis for health, education and entrepreneurship
- Providing access to basic information, means
 - ➔ access to education
 - ➔ access to health information
 - ➔ access to global knowledge
 - ➔ creates a
 - level-playing field and
 - helps bridge the gap
 - ➔ opportunity for entrepreneurship

Today, the Internet isn't accessible for two thirds of the world. Imagine a world where it connects us all.
[Internet.org]
Oct 2013



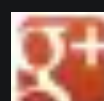
MIT and the global GDP

- 50% of U.S. economic growth after 1945 attributed to technological innovation
- MIT alumni startups (2011 numbers)
 - 25,800 active companies
 - 3.3 million people employed
 - \$2 trillion gross domestic product
 - 10th world rank in GDP
 - 19% higher per capita income than California (27% higher than USA)
- Role of education
- 75% of the world's GDP growth in developing countries

25 largest economies by GDP (PPP) in 2015 in Billions

1	 China	18,976
2	 United States	18,125
3	 India	7,997
4	 Japan	4,843
5	 Germany	3,815
6	 Russia	3,458
7	 Brazil	3,259
8	 Indonesia	2,840
9	 United Kingdom	2,641
10	 France	2,634

United Nations Sustainable Development Goals



The Role of Free Access to the InfoInternet



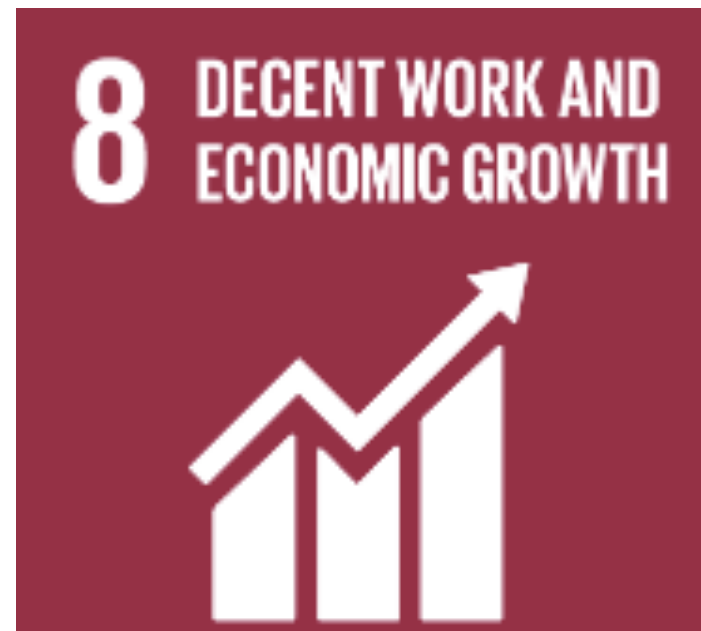
Education & Lifelong



Health & Well-Being



Empower Women & Girls



Growth & Employment



Infrastructure & Innovation



“digital divide”



Peace and Justice



Partnership

The Role of Free Access in key selected areas

- selected
- role of



GOAL 4

ENSURE INCLUSIVE AND EQUITABLE QUALITY EDUCATION AND PROMOTE LIFELONG LEARNING OPPORTUNITIES FOR ALL

Education & Lifelong Learning

More at sustainabledevelopment.un.org/sdgsproposal



GOAL 3

ENSURE HEALTHY LIVES AND PROMOTE WELL-BEING FOR ALL AT ALL AGES

Health & Well-Being

More at sustainabledevelopment.un.org/sdgsproposal



GOAL 5

ACHIEVE GENDER EQUALITY AND EMPOWER ALL WOMEN AND GIRLS

Empower Women & Girls



GOAL 8

PROMOTE SUSTAINED, INCLUSIVE AND SUSTAINABLE ECONOMIC GROWTH, FULL AND PRODUCTIVE EMPLOYMENT AND DECENT WORK FOR ALL

Growth & Employment

More at sustainabledevelopment.un.org/sdgsproposal



GOAL 9

BUILD RESILIENT INFRASTRUCTURE, PROMOTE INCLUSIVE AND SUSTAINABLE INDUSTRIALIZATION AND FOSTER INNOVATION

Infrastructure & Innovation



GOAL 10

REDUCE INEQUALITY WITHIN AND AMONG COUNTRIES

Inequalities

More at sustainabledevelopment.un.org/sdgsproposal



GOAL 16

PROMOTE PEACEFUL AND INCLUSIVE SOCIETIES FOR SUSTAINABLE DEVELOPMENT, PROVIDE ACCESS TO JUSTICE FOR ALL AND BUILD EFFECTIVE, ACCOUNTABLE AND INCLUSIVE INSTITUTIONS AT ALL LEVELS

Sustainable development

More at sustainabledevelopment.un.org/sdgsproposal



GOAL 17

STRENGTHEN THE MEANS OF IMPLEMENTATION AND REVITALIZE THE GLOBAL PARTNERSHIP FOR SUSTAINABLE DEVELOPMENT

Inclusive societies

More at sustainabledevelopment.un.org/sdgsproposal

Internet is a basic human right



- Is Internet access and online freedom of expression a basic human right?
- “All people should be allowed to connect to and use the Internet.”



- The United Nations’ Human Rights Council unanimously backed that notion in a resolution on **5 July 2012**. All 47 members of the Human Rights Council including China and Cuba signed the resolution.

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- **United States Court Backs FCC Rules Treating Internet as Utility, Not Luxury**

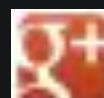
http://www.nytimes.com/2016/06/15/technology/net-neutrality-fcc-appeals-court-ruling.html?_r=0

Top 10 Countries by Internet Usage (2014)



Rank	Country	Internet Users	1 Year Growth %	1 Year User Growth	Total Country Population	1 Yr Population Change (%)	Penetration (% of Pop. with Internet)	Country's share of World Population	Country's share of World Internet Users
1	China	641,601,070	4%	24,021,070	1,393,783,836	0.59%	46.03%	19.24%	21.97%
2	United States	279,834,232	7%	17,754,869	322,583,006	0.79%	86.75%	4.45%	9.58%
3	India	243,198,922	14%	29,859,598	1,267,401,849	1.22%	19.19%	17.50%	8.33%
4	Japan	109,252,912	8%	7,668,535	126,999,808	-0.11%	86.03%	1.75%	3.74%
5	Brazil	107,822,831	7%	6,884,333	202,033,670	0.83%	53.37%	2.79%	3.69%
6	Russia	84,437,793	10%	7,494,536	142,467,651	-0.26%	59.27%	1.97%	2.89%
7	Germany	71,727,551	2%	1,525,829	82,652,256	-0.09%	86.78%	1.14%	2.46%
8	Nigeria	67,101,452	16%	9,365,590	178,516,904	2.82%	37.59%	2.46%	2.30%
9	United Kingdom	57,075,826	3%	1,574,653	63,489,234	0.56%	89.90%	0.88%	1.95%
10	France	55,429,382	3%	1,521,369	64,641,279	0.54%	85.75%	0.89%	1.90%

Source: <http://www.internetlivestats.com/internet-users/>



India Internet Usage and Population Statistics



YEAR	Users	Population	% Pen.	Usage Source
1998	1,400,000	1,094,870,677	0.1 %	ITU
1999	2,800,000	1,094,870,677	0.3 %	ITU
2000	5,500,000	1,094,870,677	0.5 %	ITU
2001	7,000,000	1,094,870,677	0.7 %	ITU
2002	16,500,000	1,094,870,677	1.6 %	ITU
2003	22,500,000	1,094,870,677	2.1 %	ITU
2004	39,200,000	1,094,870,677	3.6 %	C.I. Almanac
2005	50,600,000	1,112,225,812	4.5 %	C.I. Almanac
2006	40,000,000	1,112,225,812	3.6 %	IAMAI
2007	42,000,000	1,129,667,528	3.7 %	IWS
2009	81,000,000	1,156,897,766	7.0 %	ITU
2010	100,000,000	1,173,108,018	8.5 %	IWS
2012	137,000,000	1,205,073,612	11.4 %	IAMAI

India Gross National Income (GNI):
USD 1350 (2015) according to IMF

India Broadband Subscribers:
119M (June 2015) according to TRAI



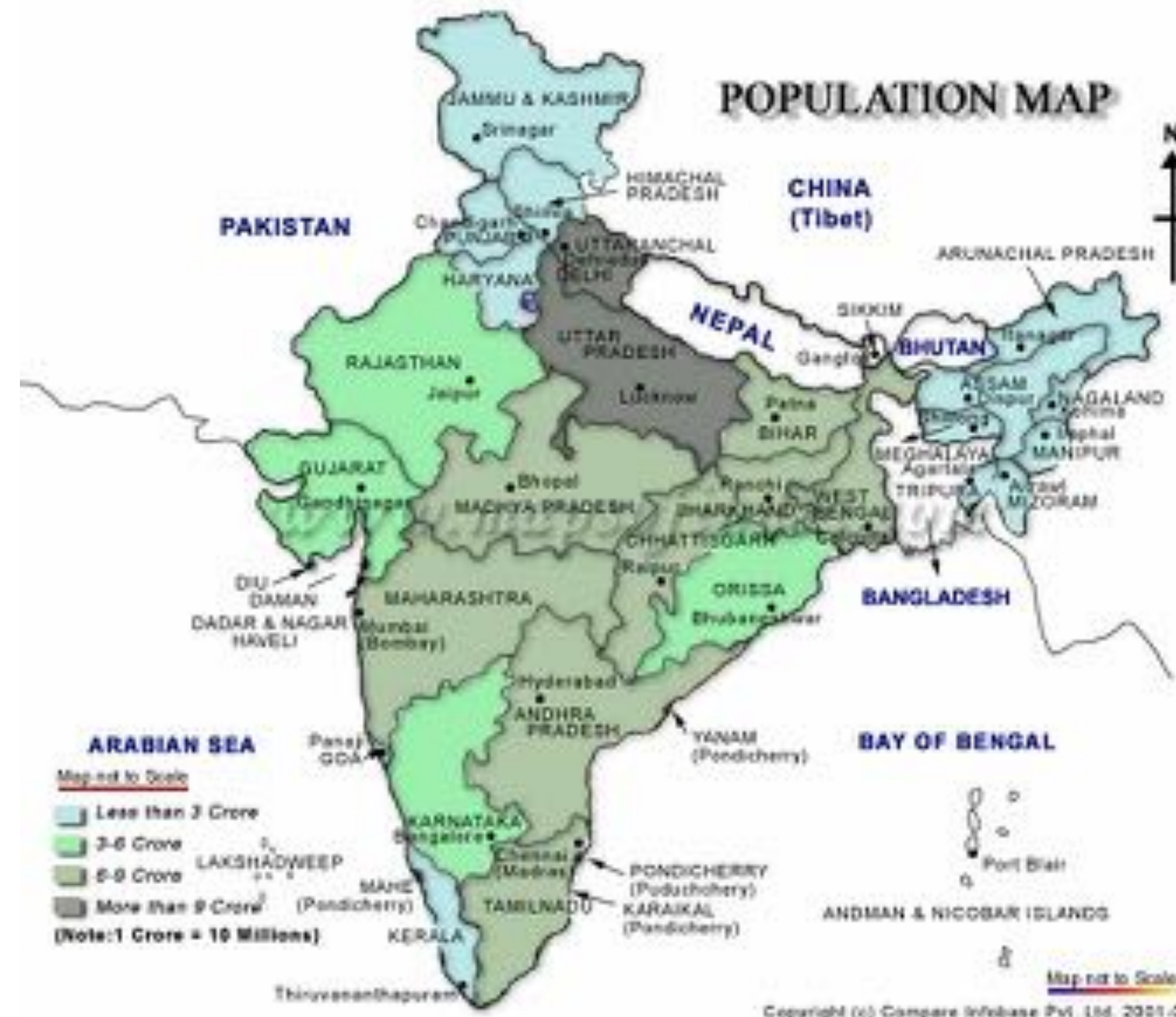
Why India?

- India leads the emerging markets in ICT and public policy & regulations
- An excellent market as a test case to prove viability of Basic Internet – Internet penetration, scale, services, affordability, and literacy rates
- A launching pad for the rest of the developing and developed countries
- India an important country to develop Basic Internet requirements, Digital Inclusion Alliance, and attract major actors



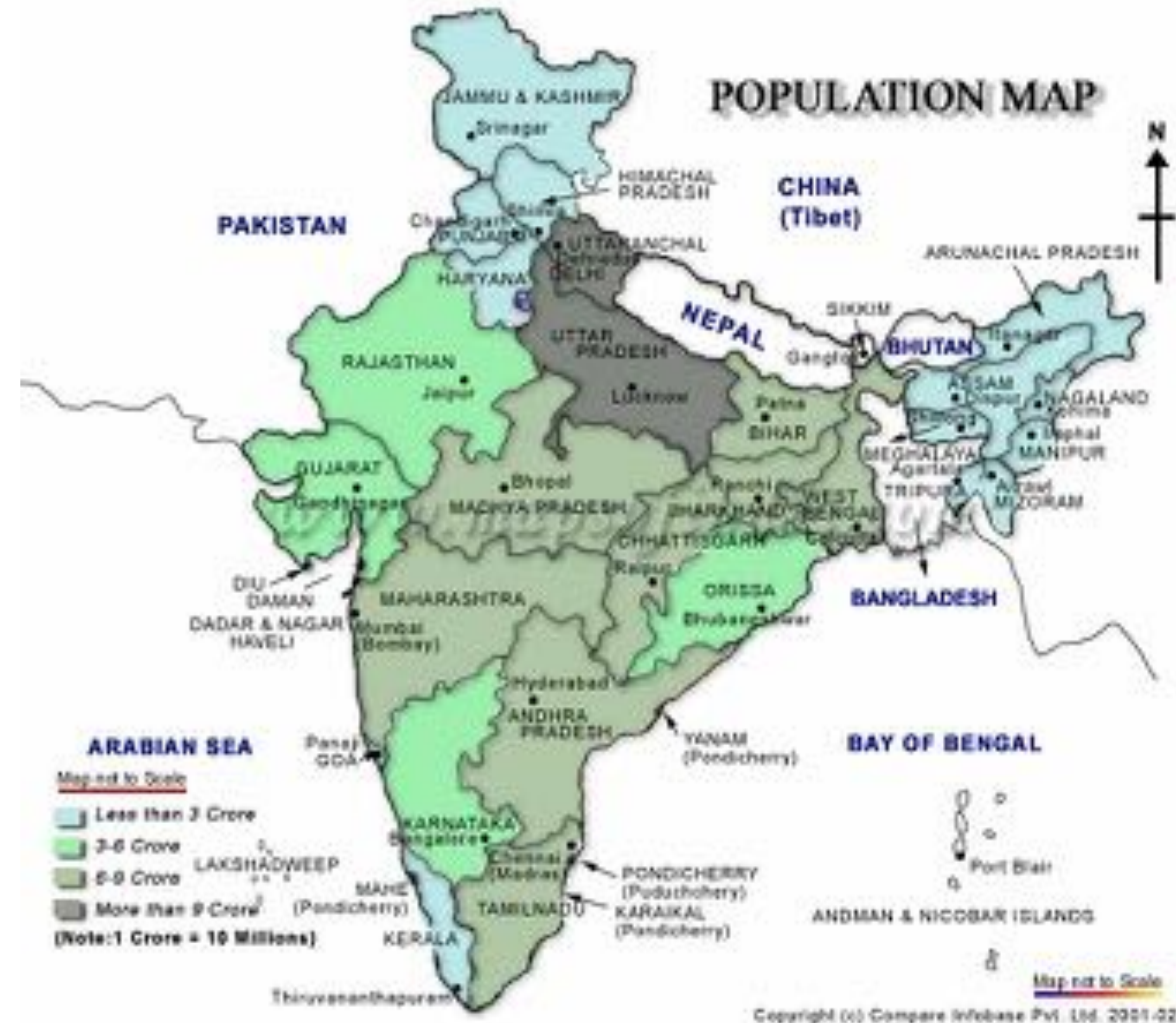
Wireless Rural connectivity: India, China, Africa

- Typical village demographics:
- 250 households in a dense Cluster of 5 sq. km.
- Villages about 2-5 km apart.
- Market towns 30-40 km apart
- Each town served (surrounded) by 250-300 villages



Map of India

- Total Population
 - ➔ 1.28 billion (2015), 50% under the age of 25 years
- Area
 - ➔ 3.3m km²
- Income (2014-15)
 - ➔ \$1808 per capita based on GDP (IMF)
 - ➔ \$6266 per capita based on PPP (IMF)
- Rural Population
 - ➔ 72% (921M) in 638,000 villages
- Income
 - ➔ \$700
- Village size:
 - ➔ Average 250 households in a dense cluster within 5 sq km,
 - ➔ villages spaced 2-5 km apart,
 - ➔ spread out in all directions from the market towns (30-40 km apart).
 - ➔ Each town serves about 250-300 villages.



A typical village scene in India

- mud 1 storey houses,
- nonlinear roads,
- flat agricultural land with line of sight, thick vegetation and trees surround houses,
- 250–300 households,
- every village has power with intermittent supply,
- clear and sunny weather for about 90% of the time)



Services in Rural Areas

(Determined by repeated visits to villages)

Kentaro Toyama :: Karishma Kiri
(adopted from Microsoft studies)



- E-agriculture
- E-government
- E-banking
- E-ticketing/E-transportation
- E-Commerce
- E-security and remote monitoring
- Computer training
- **Telemedicine**
- **VoIP, chat, e-mail**
- Etc.



Goal of Basic Internet Foundation:

Empower citizens to access freely available content and services on web while meeting net neutrality requirements

Thirst for Broadband Connection...



VSAT for kiosk in Kodia, Madhya Pradesh



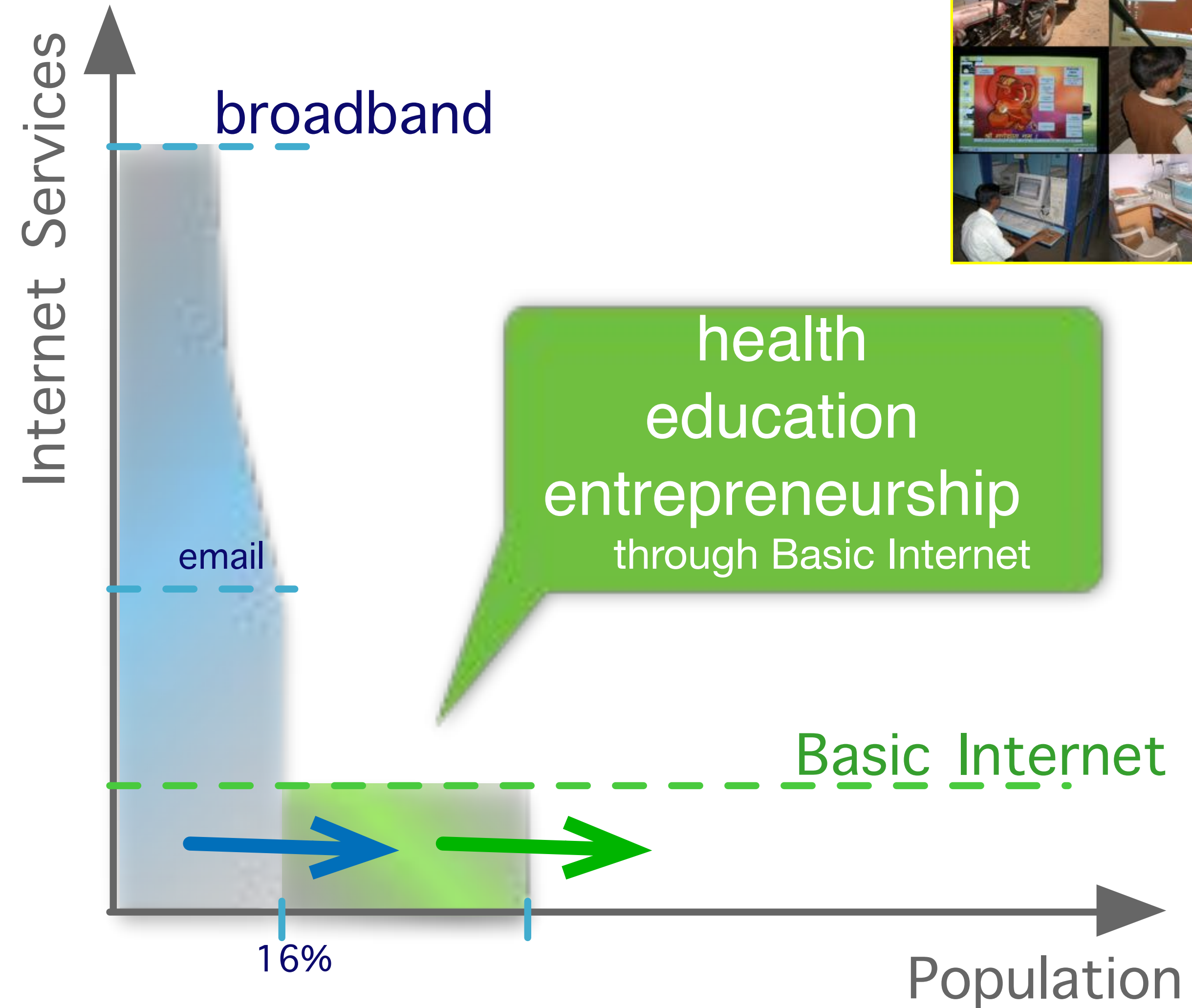
n-Logue corDECT wireless tower

#Basic4All

Access to basic information to everyone



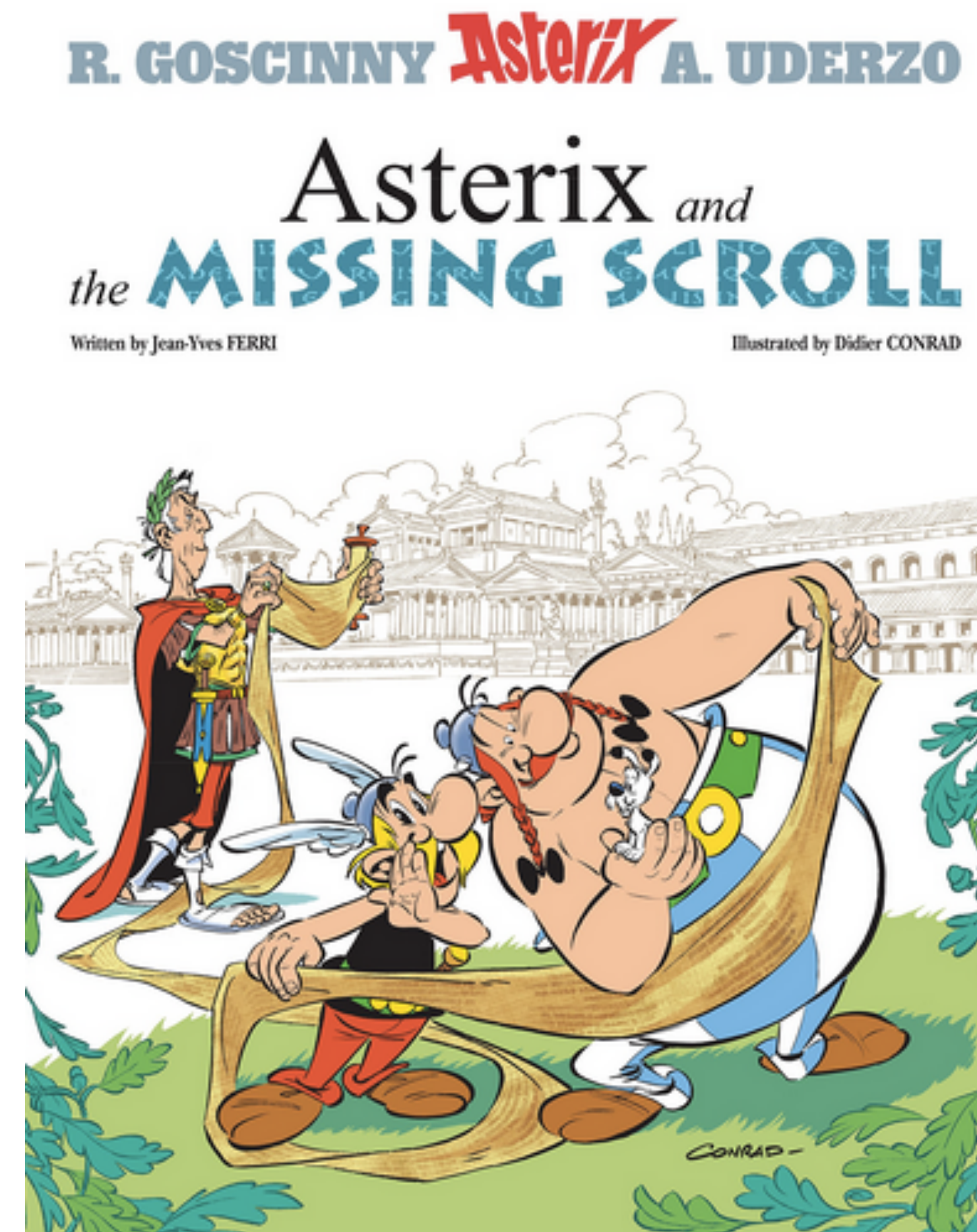
- A typical situation in India
- Need for
 - those who don't have Internet coverage
 - those who don't have income for access
 - those who don't have rich parents
 - those who are not tech savvy
- We develop the market
 - Basic Internet is complementary to traditional industry
- The World
 - Internet access spammed by video and gaming
 - Roaming (3G/4G) - affordability
 - Authentication (WLAN) - availability



The role of information

- Preserving Net Neutrality is vital
- Basis for economic development
- «Children are good in using IT»
 - video, gaming, snapchat, Facebook, WhatsApp...
- «Children are bad in retrieving information»

Information
- knowledge that you get
about someone or something
- facts or details about a
subject
[source: merriam-webster.com/dictionary]



#Basic4All Development Focus



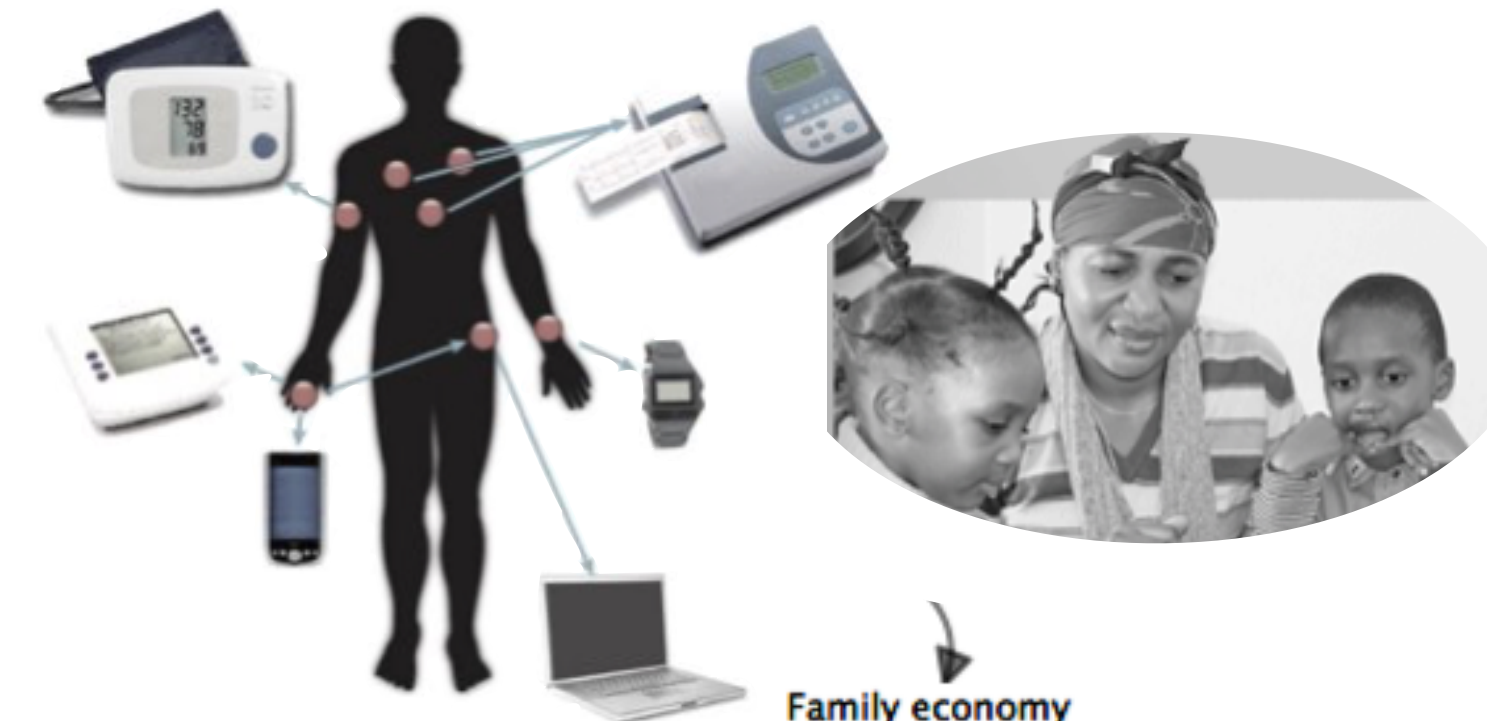
- Education

- ➔ Digital Inclusion
- ➔ Free access to Basic Information



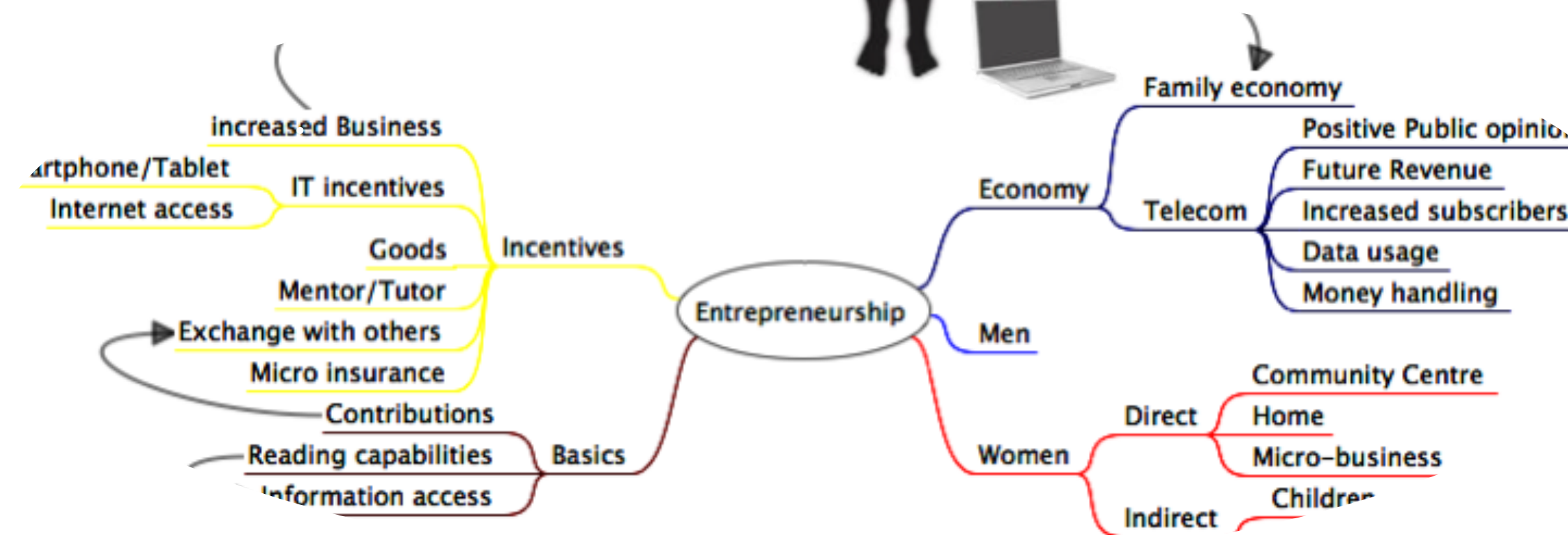
- Health

- ➔ sensor/app supported health information
- ➔ new role of health professionals



- Innovation

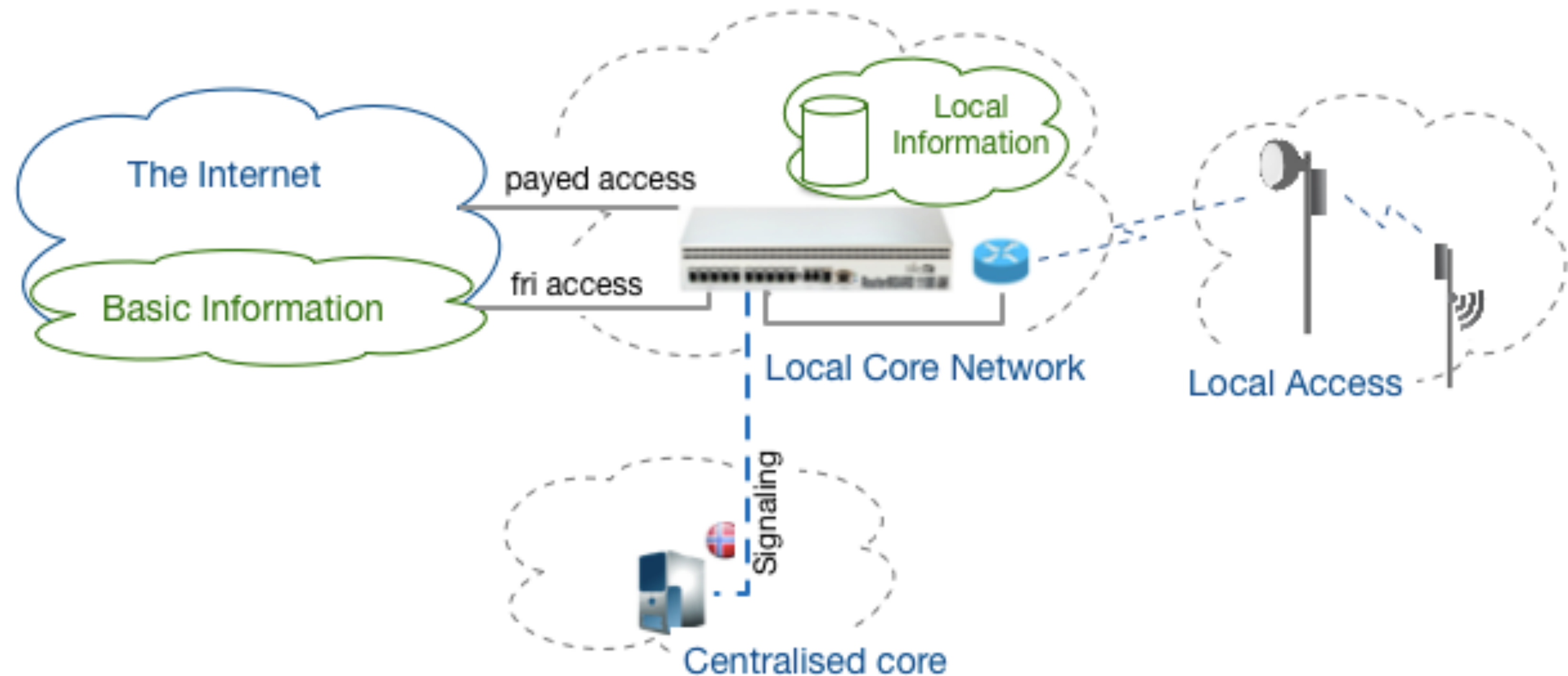
- ➔ Women entrepreneurship
- ➔ Knowledge-based



The Solution from Basic Internet Foundation

Basic Internet – high level solution

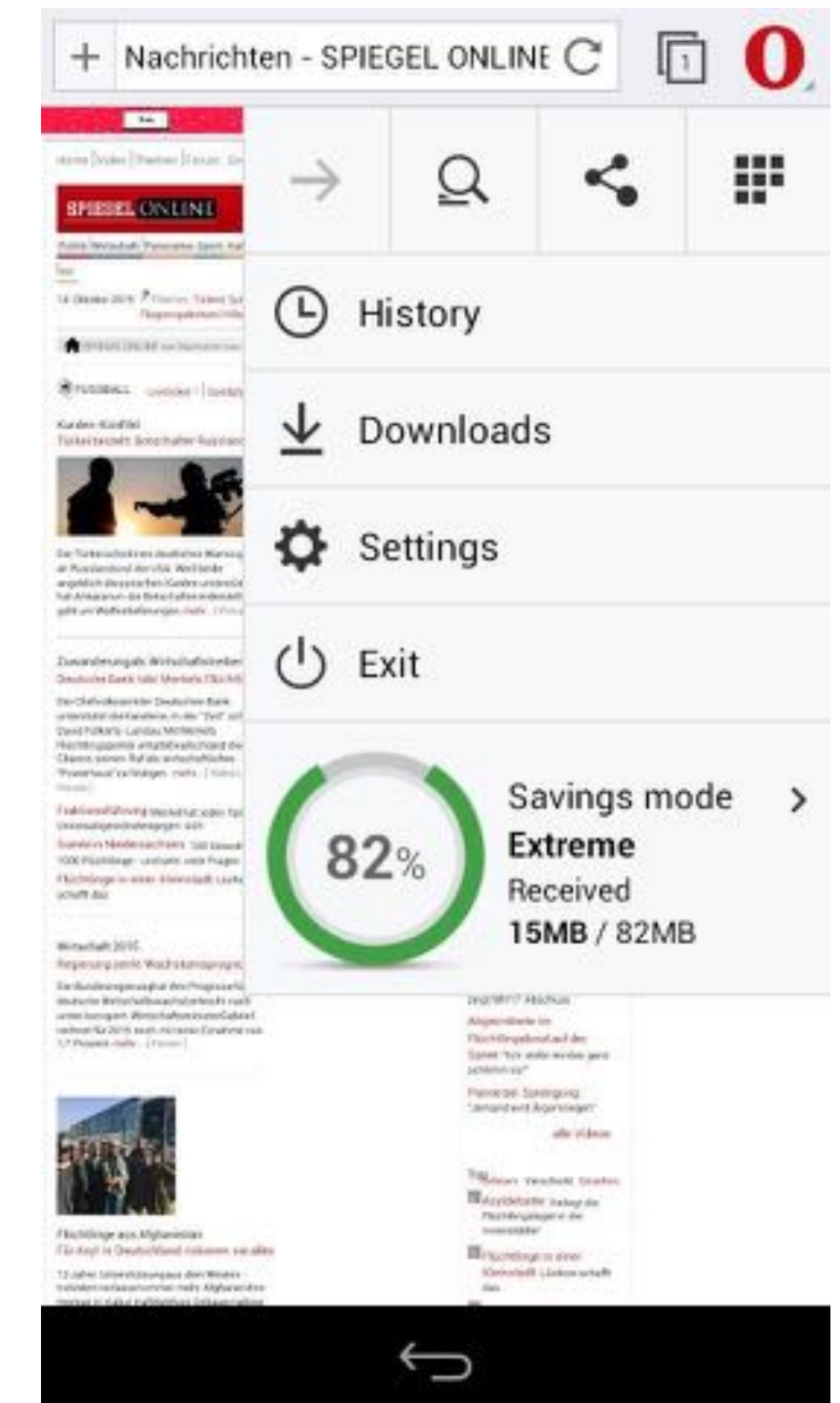
- Distributed architecture
 - ➔ Centralised core
 - ➔ Local core network
 - ➔ Local information
 - ➔ Local access
- Fri access to
 - ➔ Basic Information (**InfoInternet**)
 - ➔ Local Information
- Paid access (voucher)
 - ➔ For full Internet, including
 - ➔ Video, Streaming, Games
- Connectivity to
 - ➔ Mobile Operator Network
 - ➔ Radio Link Network
 - ➔ Satellite back-bone



Technological challenges

- Goal: free information to everyone
 - ➔ compressed text
 - ➔ low/medium-size pictures
- Information type filtering
 - ➔ filter dynamic elements
 - ➔ Web browser
 - Opera Mini
 - http2 standard
 - ➔ Basic Internet App Store
 - traffic amount, capacity
- Network protocol
 - ➔ signalling versus data amount

- ➔ mobile network load
- Centralised management
 - ➔ open protocols, e.g. TR-069
 - ➔ Customer premise equipment (CPE) and Auto-configuration server (ACS)
 - auto-configuration
 - software management, modules
 - status and performance
 - diagnostics
- IoT extension
 - ➔ set-up, configuration of communication
 - ➔ secure (encrypted) communication
 - ➔ update/revoke security certificates



Free Information access: Removing the digital divide



● Societal aspects

- everyone has access to information
- on all WLAN (&mobile) networks



● Technical requirements

- browser with just text & picture
- compressed content to be transmitted over radio
- proxy-based splitting of information

● Example: Opera Mini

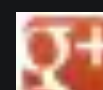


- encrypted request from Opera Mini browser
- Opera access Web page, removes animations, and compresses the page
- Compressed page is sent to device
- typical 80% reduction

● Usage results

- 4 MByte average user
- 20 MByte max user/month

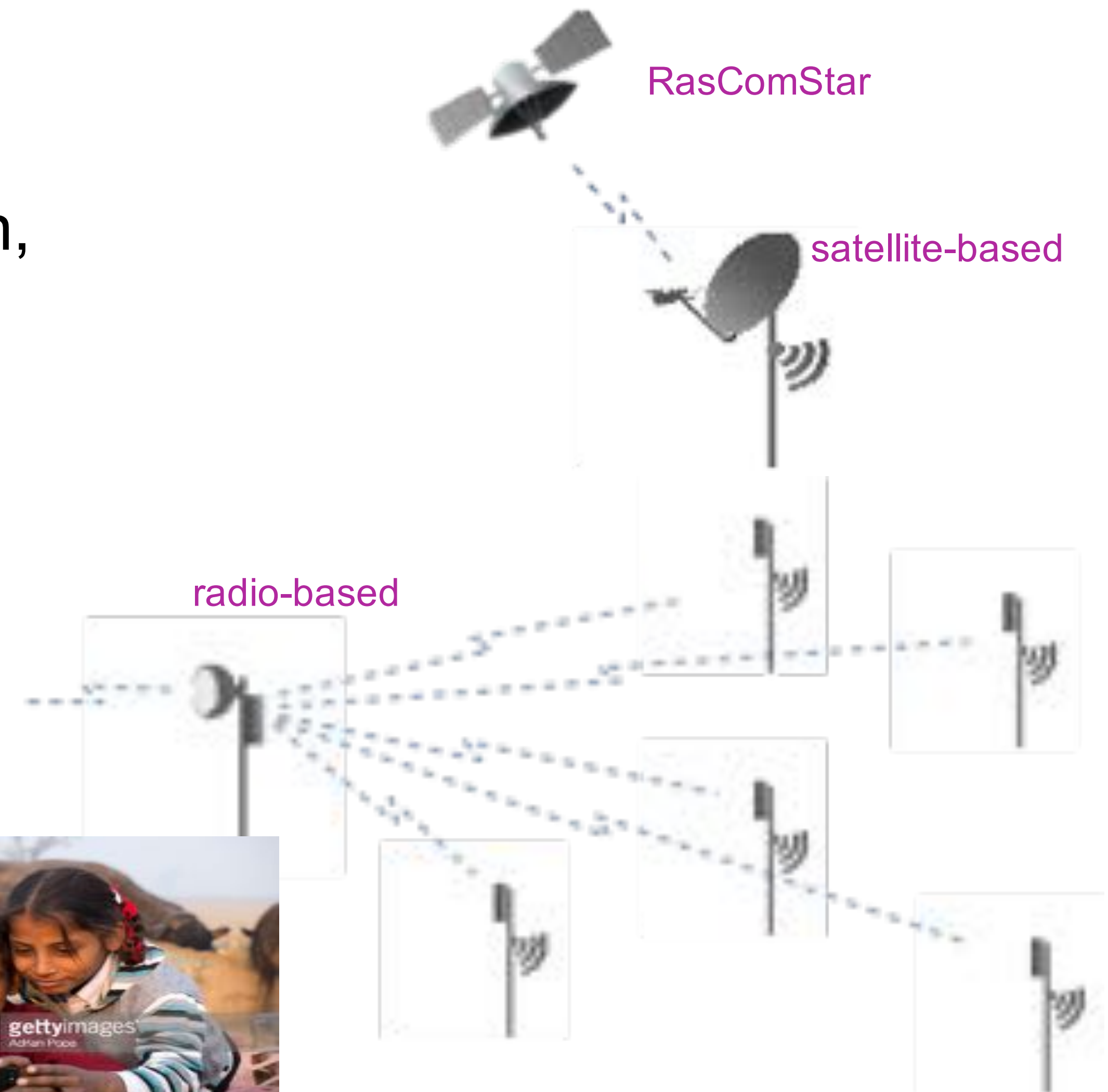
[Opera Software, Nigeria, 2011]



Basic Internet provision through Partners

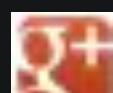
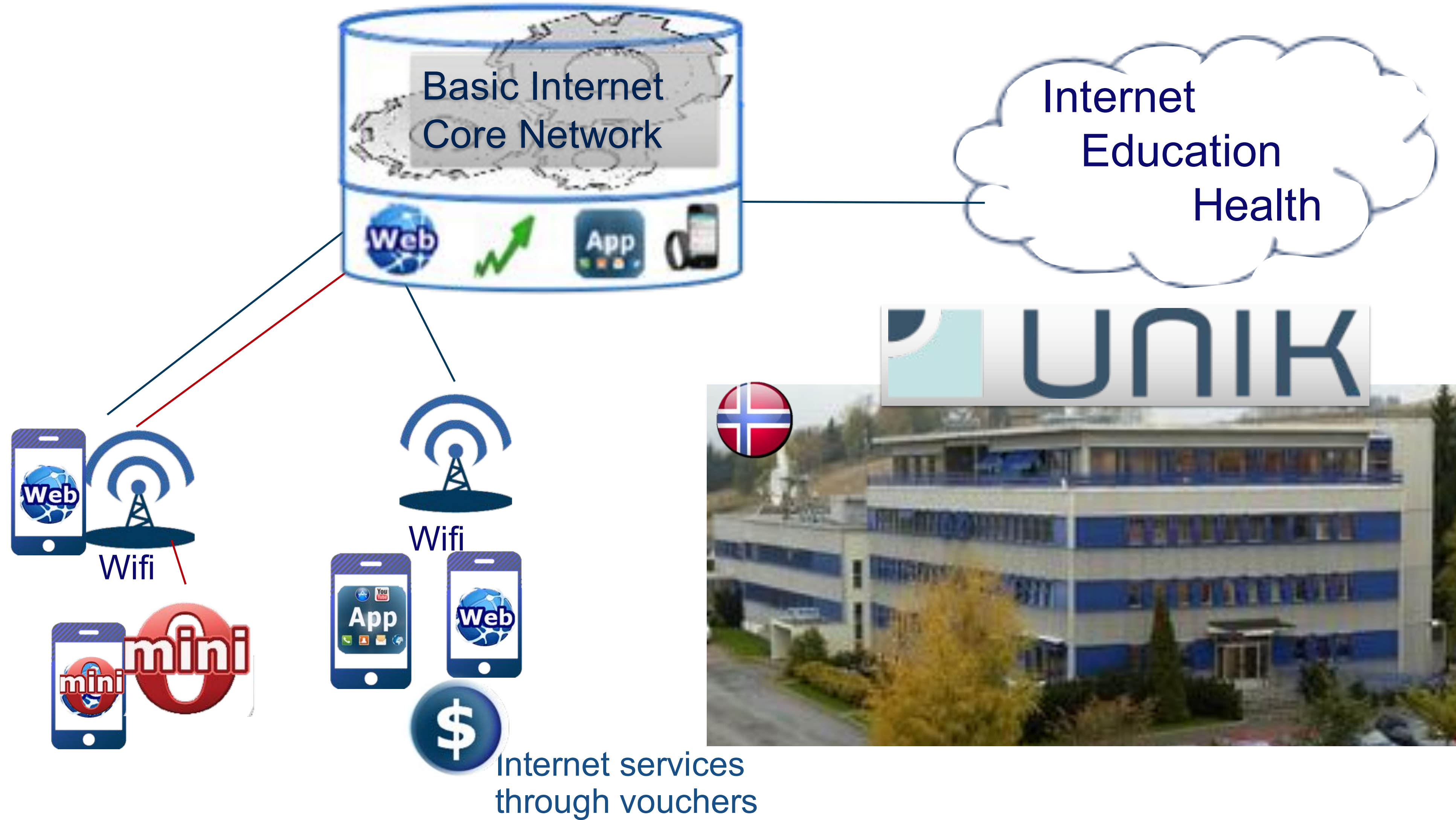


- Fixed broadband, satellite, radio or mobile link
 - 📖 local roll-out
 - 📖 with partners
 - 📖 with the government (e.g., **Universal Service Obligation, Deity**)
- Mobile Operators: extend the reach, prepare the market
- C-DoT & TCE: increase innovation
- Own deployment: hot-spot owner
- AID organisations: education, health information
- Sponsored access
- Higher education: educate teachers



Basic Internet Core Network

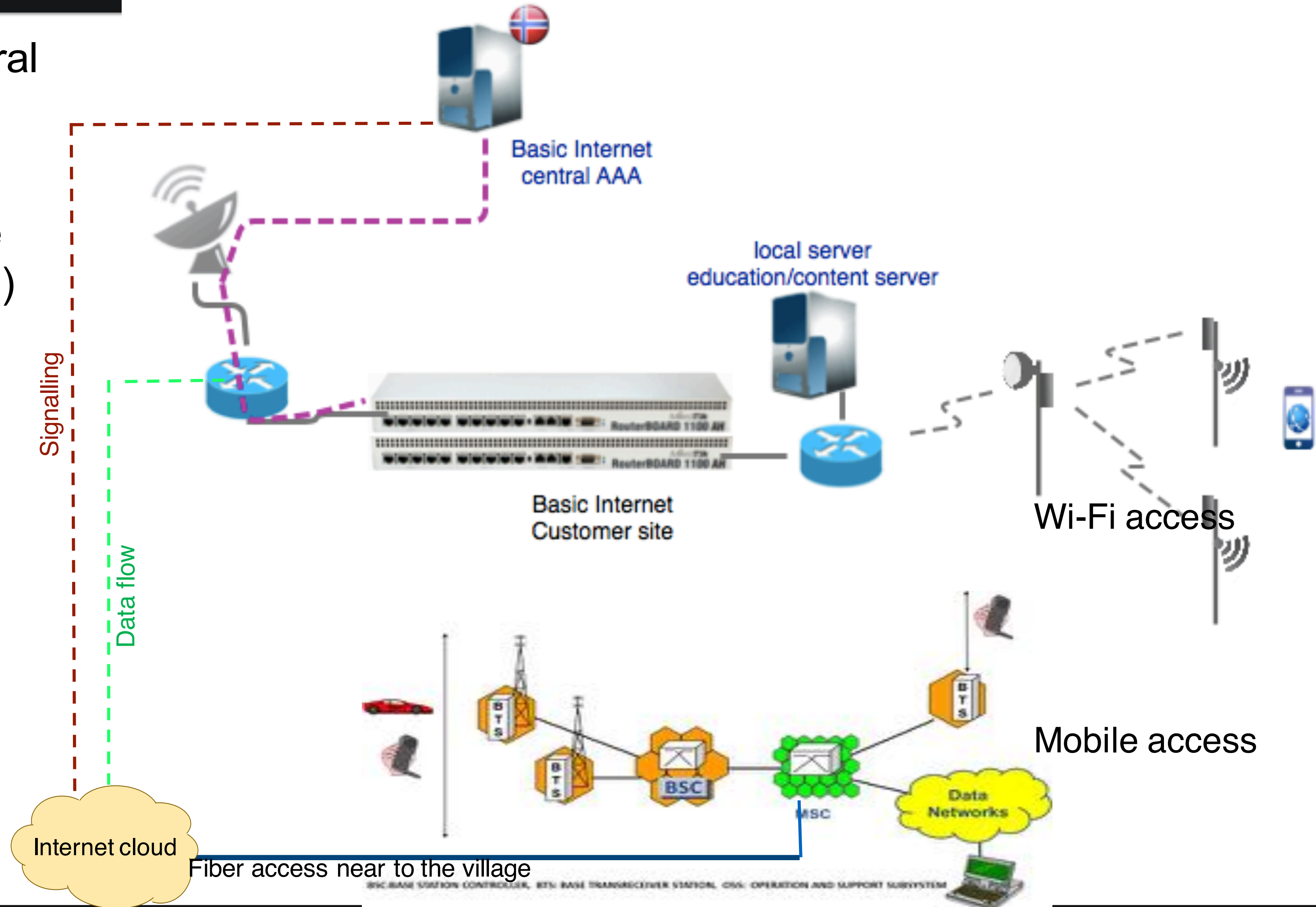
at Kjeller



Basic Internet architecture with village access infrastructure



- Only signalling to central AAA
- Local data flow
- Integration with mobile infrastructure (planned)



Our extended partner network: Business Ecosystem



Edu	Health	
News		App

Access	Access	Access
---------------	---------------	---------------

Back-bone	Proxy	Billing
Satellite	3G/4G	



The Competitive Landscape for Free Basic Internet (in India)

Competitive Landscape



- Free Basics from Facebook

- ➔ Through Internet.org and partnership with companies
- ➔ Access through mobile infrastructure and Express WiFi (ISPs)
- ➔ Free access to zero-rated content by mobile operators
- ➔ Open platform for providers of apps, websites or services through a qualification process to be classified as zero-rated
- ➔ Launched in 39 countries with experience that those subscribing to Free Basics will pay for the broader Internet within 30 days
- ➔ In India, Free Basics was disallowed due to violation of “net neutrality” requirements and collection of network analytics by FB

- Airtel Zero

- ➔ Free access to some apps and services as long as those developers pay a fee to Airtel for data access
- ➔ Violates net neutrality regulations as the content provisioning is conditional tie-up with Airtel and collection of user analytics



Competitive Landscape (Contd)

- Mozilla's Free Access

- ➔ Developed low cost handset with own Firefox OS
- ➔ Partnered with local operators, such as Orange and Grameenphone, to deliver up to 20MB of free data
- ➔ Users required to visit mobile market place, which helps pay for through advertisements
- ➔ Stifling competition through collusion between operators and Mozilla has led to charges of violation of net neutrality rules
- ➔ Not allowed in India and some other countries

Connectivity & Affordability



- Mobile driven development,
 - ➔ Revenue-driven
- **Affordability** (costs of data)
- industrial perspective
 - ➔ Industry4.0, Internet of Things
- **Novel Approach** required



The Unconnected Market Landscape

Unique Mobile Internet Users

Population 15+ (bn)	Total
Developed World	0.9
Developing World	4.3
Total	5.2

BMI	NMI	Unconnected	Total
0.6	0.1	0.3	
1.0	0.8	2.5	3.3
1.6	0.9	2.8	

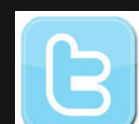
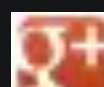
Penetration 15+ (%)	Total
Developed World	100%
Developing World	100%
Total	100%

BMI	NMI	Unconnected	Total
64%	31%	27%	
23%	18%	59%	77%
30%	17%	53%	

Source: GSMA Intelligence; figures reflect position at end of 2014
 BMI = Broadband Mobile Internet (3G/4G); NMI = Narrowband Mobile Internet (<3G)

77% don't have decent access

[Source: GSMA, Nov2015]



InfoInternet - the infrastructure for Digital Access



Road Infrastructure

- Basic infrastructure
 - free usage for pedestrians
 - authentication for cars
- Highways & toll roads
 - speed & comfort
 - often privately managed
- Successful complementarity



InfoInternet Infrastructure

- Basic Access
 - free access of information
 - walk to Internet
- Broadband and Mobile services
 - Voice, video & games
 - speed & comfort
 - privately managed
- Complementarity



multimedia++

Basic Internet Sustainable Business Models

The need for an Information-Internet (InfoInternet)

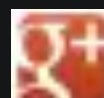


Telecom focus InfoInternet



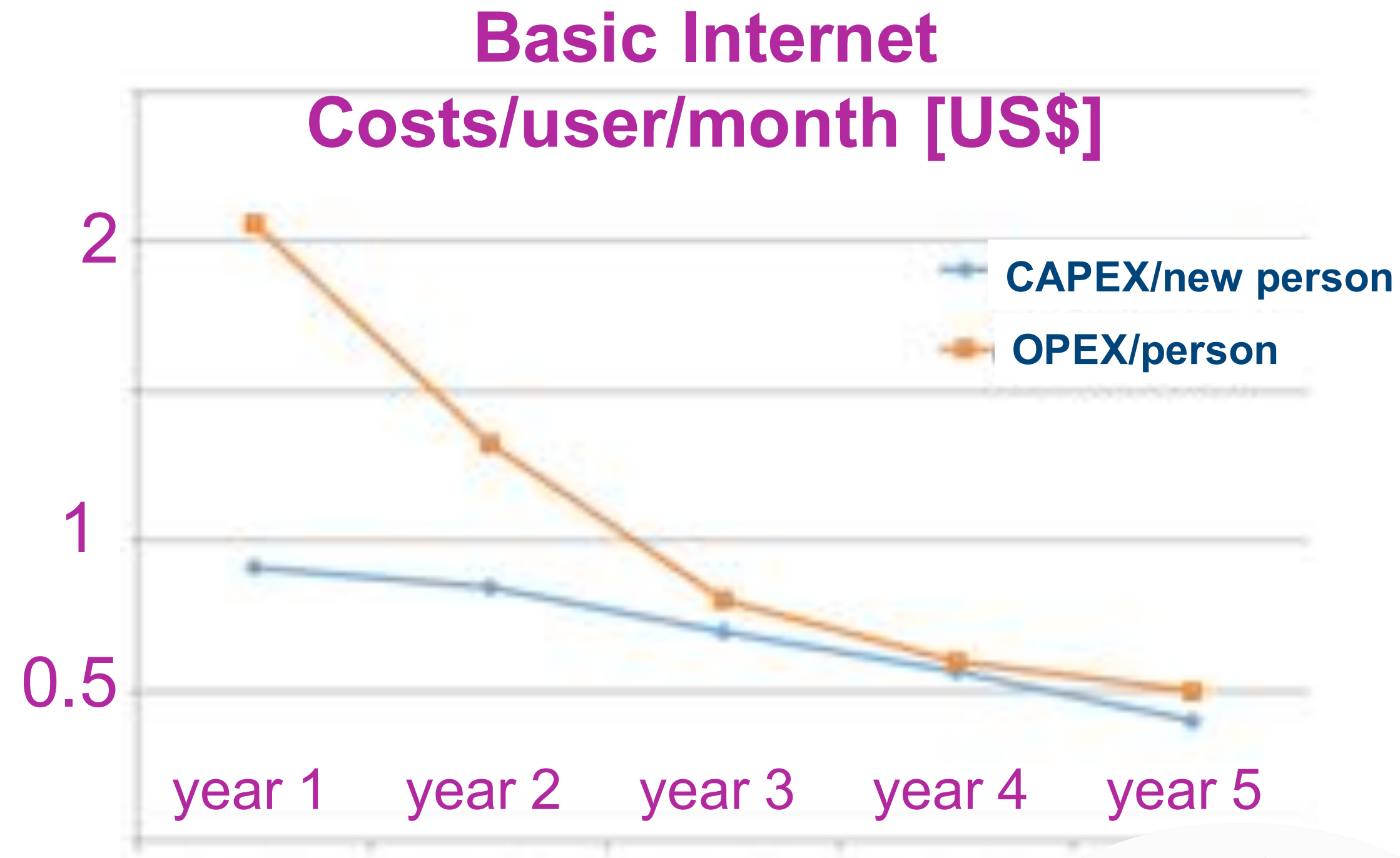
Partnership for digital inclusion	
Telecom	InfoInternet
revenue-driven	non-profit
targeting leveraged creation	targeting no- and limited use
voice & mobile broadband	compressed text & pictures
subscription based (SIM)	free access & voucher
mobile network: coverage & capacity	Wifi-spots: health- /community centres, schools
operator cost model	target: 0.5 US\$/month
operator roll-out	NGO & community roll-out

[Source: GSMA, Nov2015]



Society costs

Cost of ICT development



- local Wifi spots
- based on Satellite connectivity

half a dollar is enough*



Questioning traditional business assumptions

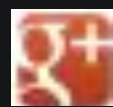


- Mobile Operators
 - start from city centre
 - revenue driven

 - Quality of service
 - voice & data

- “User-owned network”
 - User runs access
 - Demand driven
 - Start from rural areas
 - Mobile operators and content providers as partners

 - Web information only
 - user driven
 - someone to run backbone and distribution
 - (use mobile backbone)



India Specific BI Opportunities

- **Three potential sales channels**

- **(1) Direct channel** - sell directly to users by becoming an ISP with the infrastructure of WiFi hotspots owned and operated by the Foundation or its commercialization service arm
- **(2) Indirect channel** - selling the service to end users through MVNOs, or through bi-lateral agreements with the WiFi hotspot owners
- **(3) Indirect channel** - Selling the solution to mobile operators or hotspot owners with revenue sharing agreements (with upfront one-time payment + license fee based on the number of users signing in).



Wifi

- Free InfoInternet +
- Voucher Full Internet

Mobile Networks

- Zero rated content

Charging model:

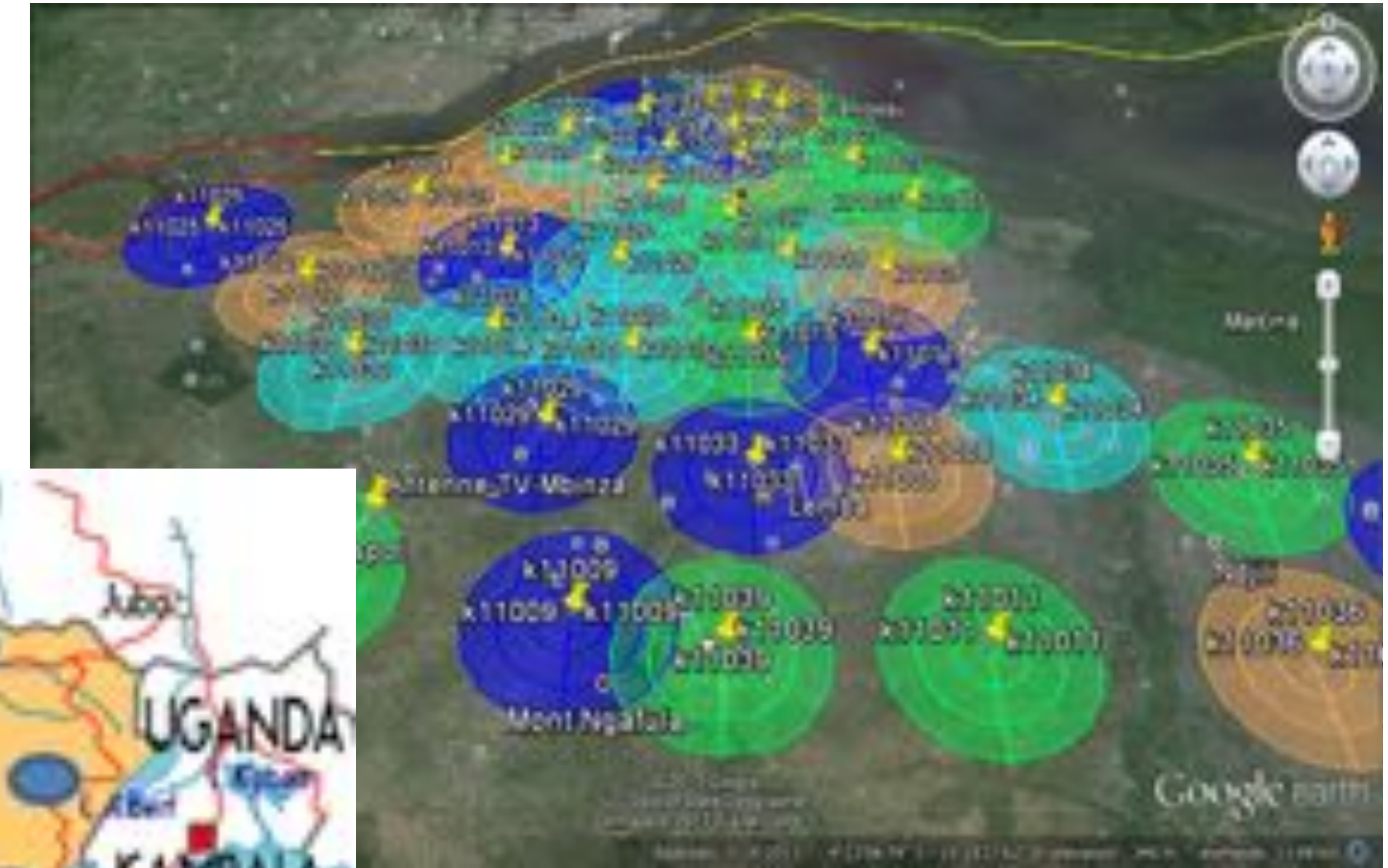
- Access to **basic information** (i.e., InfoInternet content) for free + **pay** for non-basic (i.e., **premium or high capacity content**) based on actual consumption, “Pay for what I need”
- BI Service Providers and Operators enabled to **generate revenue** while providing path to **migration toward full Internet** access plans thus increasing subscriber base

In dollars and cents..

- Rural segment consists of 69% population, 45% of those in age group over 30 not tech savvy not touched by Internet => 400M TAM
- With 50% BI adoption, directly impacted population 200M users
- With \$5 per month per user for premium content, potential revenue
 - opportunity of \$1B per month (\$12B per year) => globally translating into
 - \$2.25B per month (\$27B per year)
- Additional significant revenues from users migrating to full internet service plans not included!!

Success stories (Congo as a pilot/test country)

- Remote sites with 500.000 inhabitants
- Revenue target: 4 €/month/user
- City coverage Kinshasa
- mixed: fixed, mobile, hot-spot concept



Activities - DRC (Congo) Implementation



- Internet access
 - ➔ University of Lisala
 - ➔ Deployment at 4 other universities in Kinshasa (DRC)
 - ➔ 10 additional implementations
- IPXextenso, Orange
 - ➔ 2 successful pilots
 - ➔ 570 planned installations
 - ➔ expected: 2000 villages
- upcoming pilots in Mali++



Pilot: Democratic Republic of Congo



11 sites (Lisala,
Kinshasa,...)
4 hot-spots
(Kinshasa)

might be replaced
by fibre, radio link,
3G, 4G....

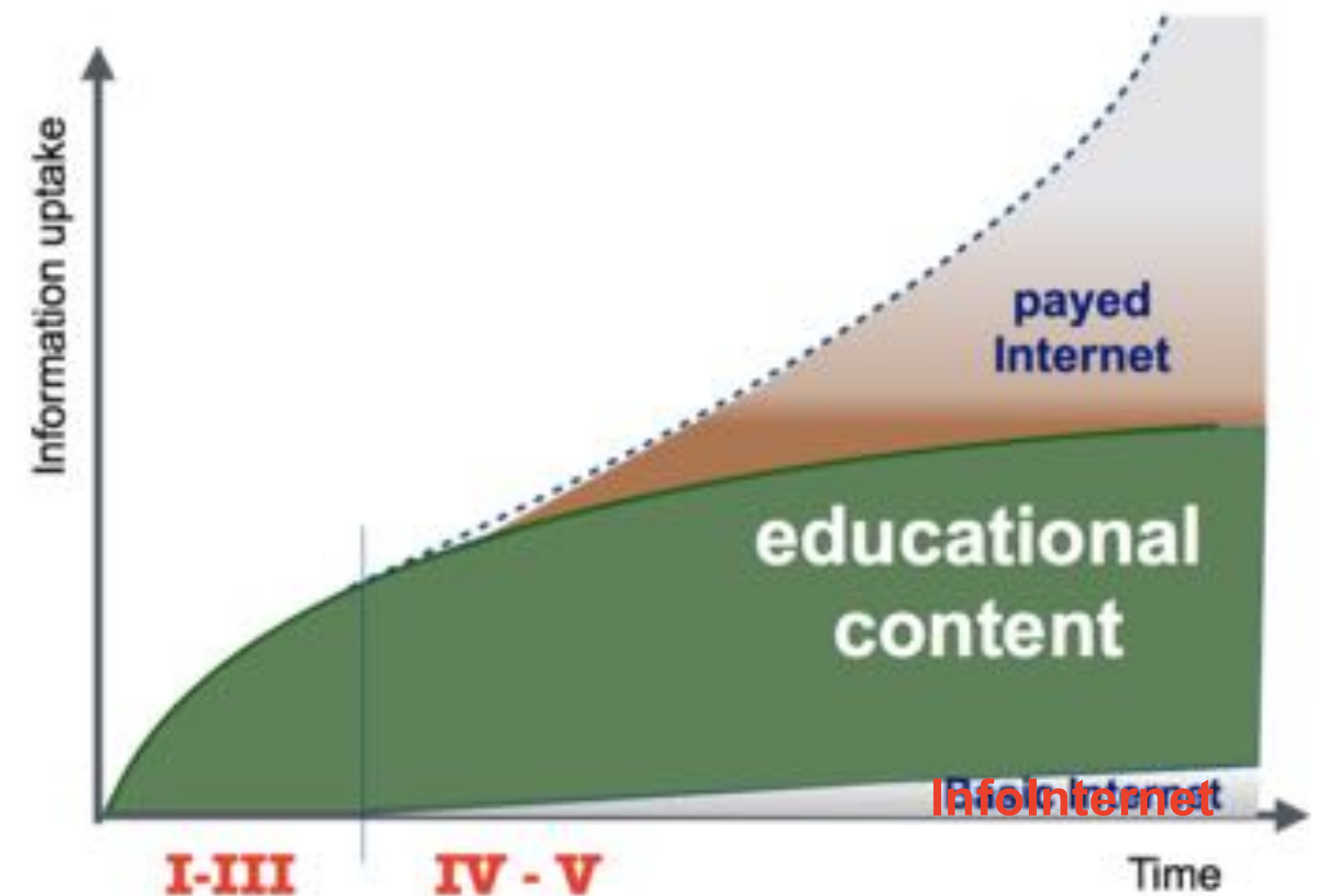
voucher admin,
access control,
billing

Nextelco Foundation

The need for an Information-Internet (InfoInternet)



- Pilot - Kinshasa (DRC)
 - ➔ Information focus (text & pictures)
 - ➔ low-ba
 - ➔ Focus on compressed text and pictures
- **Affordability** (costs of data)
- industrial perspective (Ind4.0)



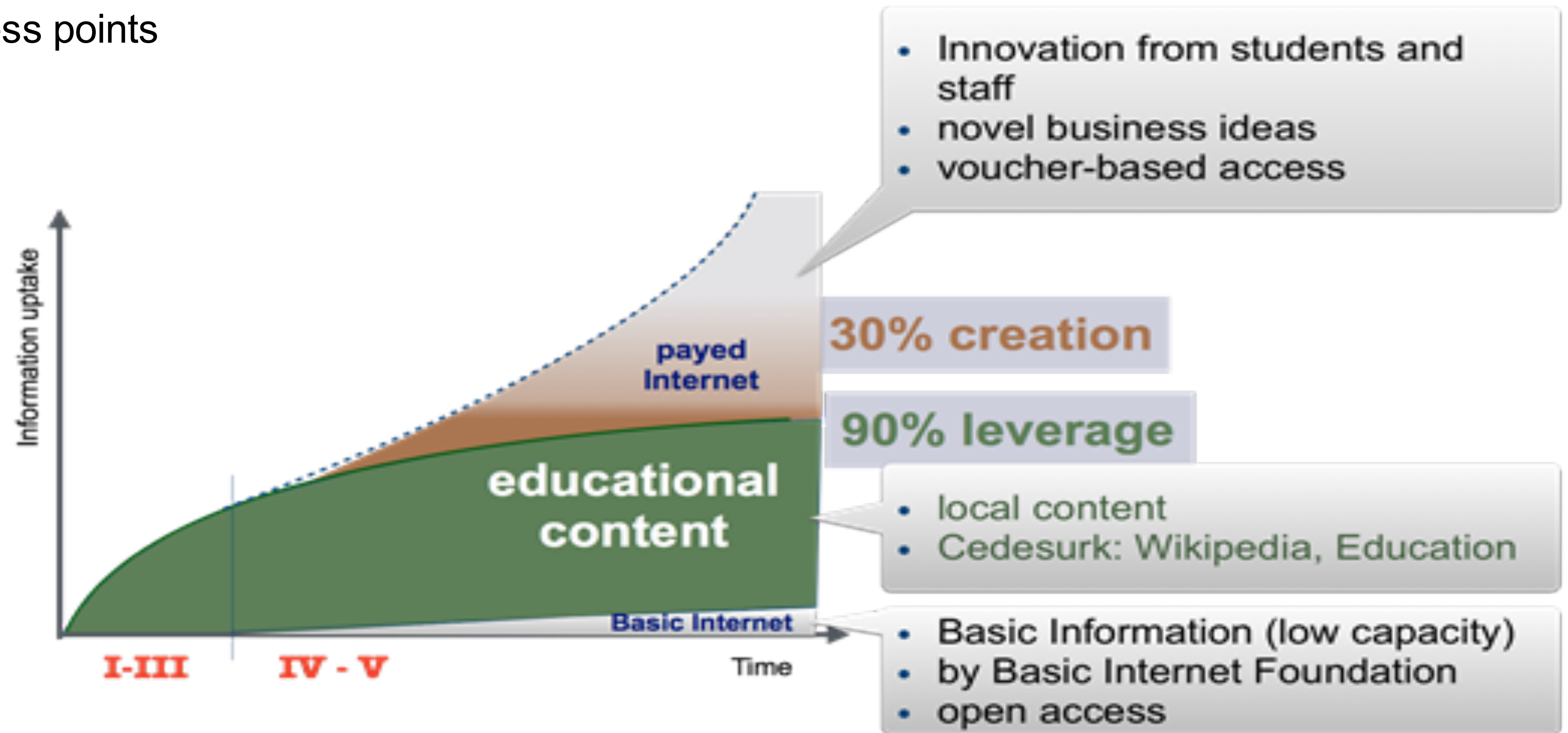
[Source: GSMA, Nov2015]

Experiences: Pilot in DRC (Contd)



- Three different variants of the product piloted:

- ➔ satellite link,
- ➔ public WiFi access points, and
- ➔ satellite based public WiFi access points



Phases to internet adoption by students.



- Affordability
 - Free information:
Web, Facebook, News
 - Proxy operation
 - no subscriptions
 - no hassle with username/password
- Authentication/Voucher
 - Video, TV, Music, Download
 - “I pay for what I need”:
 - ▶ 1 hour, 1 week
 - ▶ 20 MB, 100 MB

Other International Activities

- Latvia - «free Wifi European capital»
- Germany - Government vs Freifunk
- Romania - E-NET
- Wireless Cities
 - Bologna, Bristol, Dublin, ,...
 - Municipal_wireless_network [wikipedia.org]
- IT-industry
 - Google, Microsoft, Yahoo - Wifi
 - Internet.org
 - zero rated content



[tagesschau.de, 2015]

Regierung will WLAN-Netz in Deutschland ausbauen
tagesthemen 22:15 Uhr, 12.03.2015, Kirsten Rulf, WDR

- Access
 - Google Loom
 - Facebook Solar Aircrafts
 - Facebook AMOS-6
 - Thales/Alenia Zepelin
 - Satellite
 - Fibre/Virtual Fibre

Market trends and partnerships

Trends

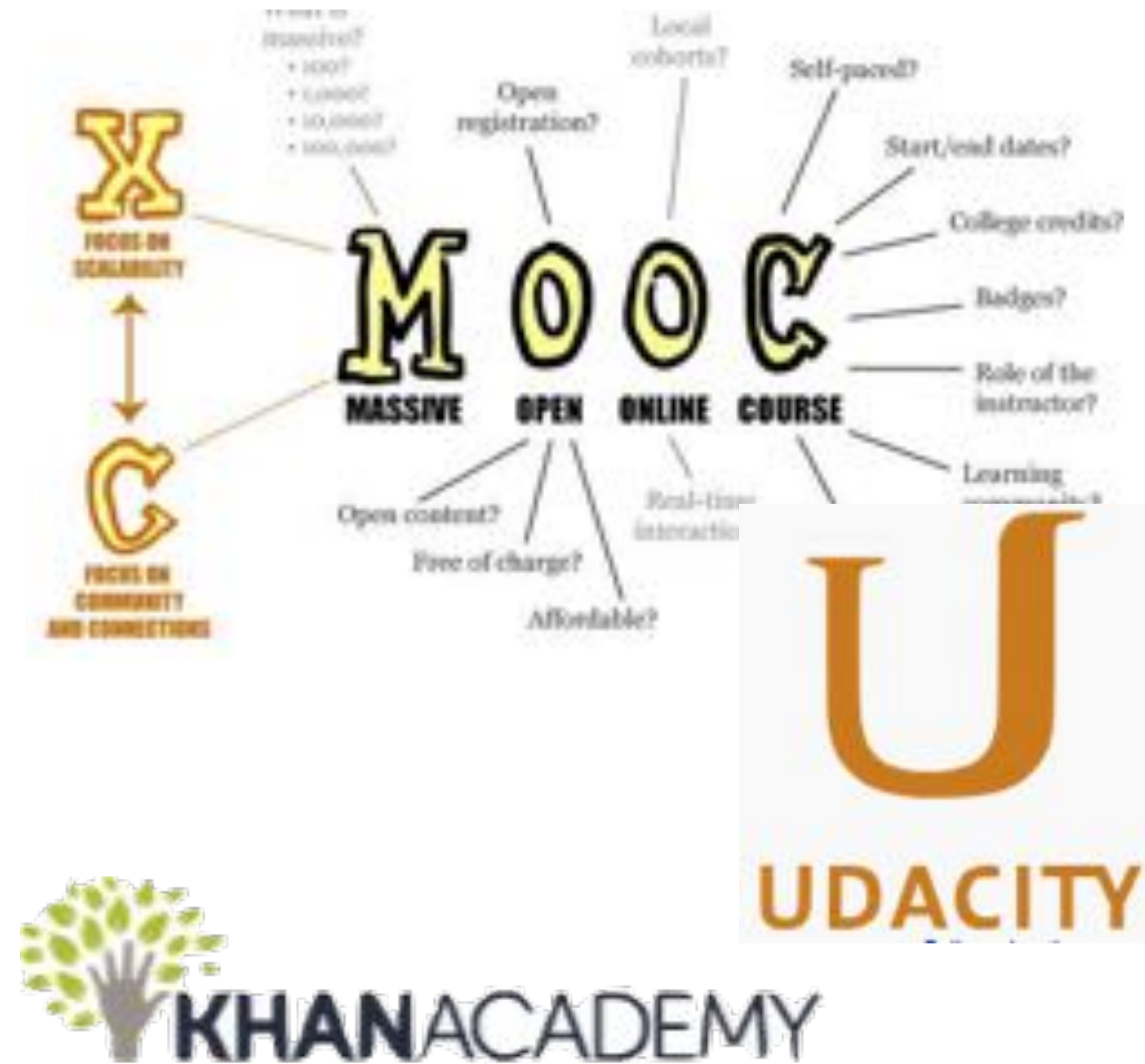
- Cheap phones & tablets

&

- Free education

- Khan academy
- Self-learning Apps
- iTunesU
- Cisco academy

- Massive Open Online Courses (MOOC)



- E-services and e-governance gaining momentum

Status - Partnership (funding)



- **Founding**
- Bill & Melinda Gates Foundation
- Google

- **Collaborations**
- PSI - International help organisation (health)
- AUF - L'Agence universitaire de la Francophonie (education)
- CWI Norway/CTIF Denmark

- **Envisaged partnerships**
- Utdanningshjelpen
- Redd barna
- Røde kors
- Plan Norge
- Care
- Caritas

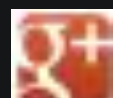


Moving Forward and Asks...

Moving Forward..



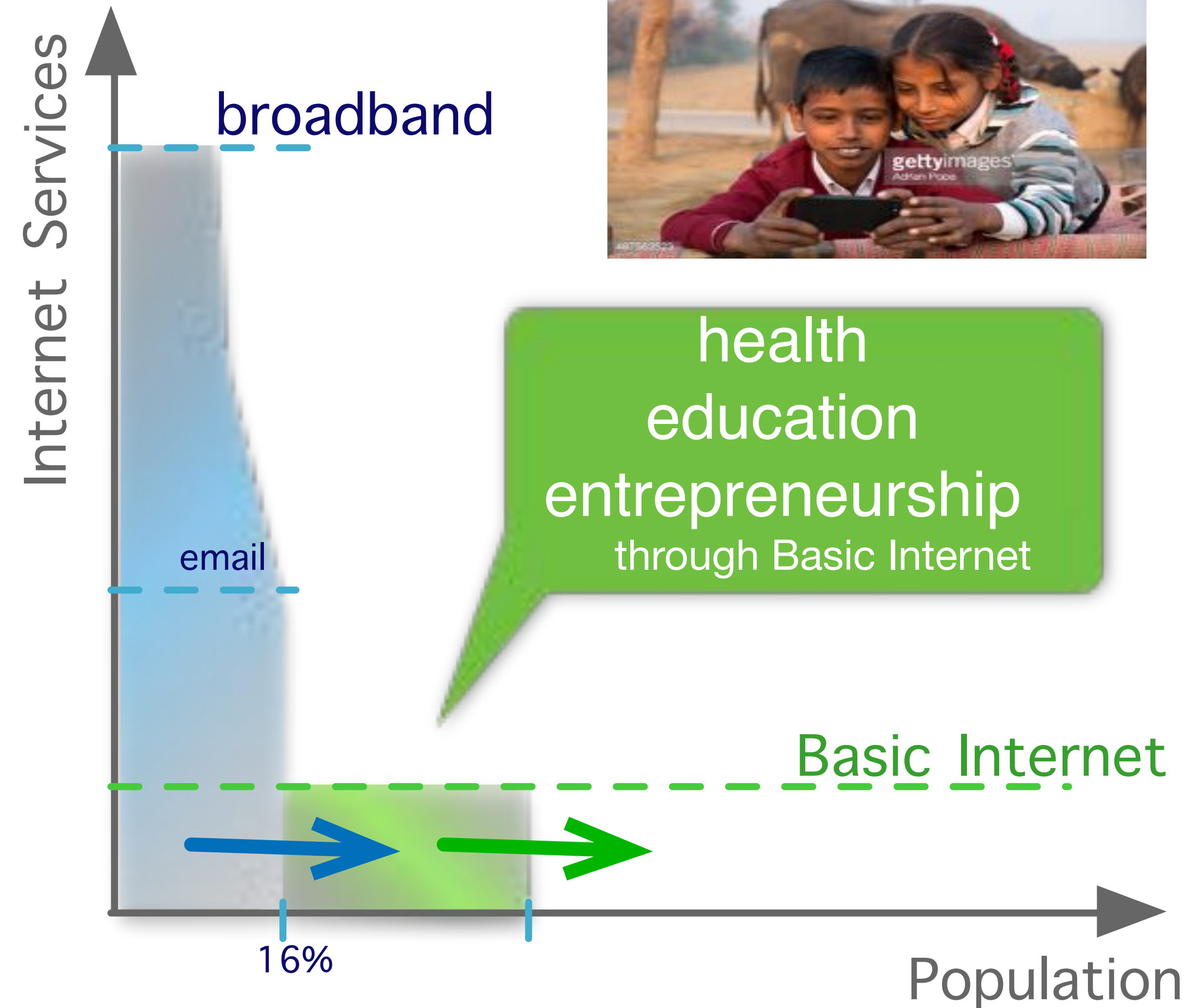
- (1) Launch global awareness campaign: workshops, meetings, collaborations with industry, governments, regulators, mobile operators, United Nations
- (2) Focus on India
- (3) Launch “Global Alliance for Digital Inclusion” to develop consensus on affordable Low Capacity Internet (LCI) and its specifications
- (4) Develop NG Basic Internet solution for multiple local access network types that meet the requirements of “net neutrality”
- (5) Algorithms for certifying LC and HC content
- (6) Develop an independent body for certification of LC content
- (7) Focus on India
- (8) Develop and foster local collaborations (with operators, TRAI, DeitY, operators) and launch BI pilots



#Basic4All Conclusions



- Digital Inclusion is the key for sustainable development
 - Complementary to traditional industry
 - Relevant for the developing world (and the World)
- Net neutrality
 - access to information, compressed text and pictures through the **InfoInternet**
- Technology challenges
 - Information type filtering
 - Network load (DHCP, data vs signalling)
 - Remote maintenance (TR-069)
 - Browser development (http2)
 - IoT extension (App store)
- Proxy Development
 - Like "Responsive Design" (for mobile phones)
 - Convert "dynamic Web" into **InfoInternet**
- A collaborative foundation from Kjeller (Norway)



Conclusions: Free access to Information



for a world:
"Where everyone
can open his browser
and get free access
to Internet"

No one should have to choose between
access to the Internet and food or medicine.

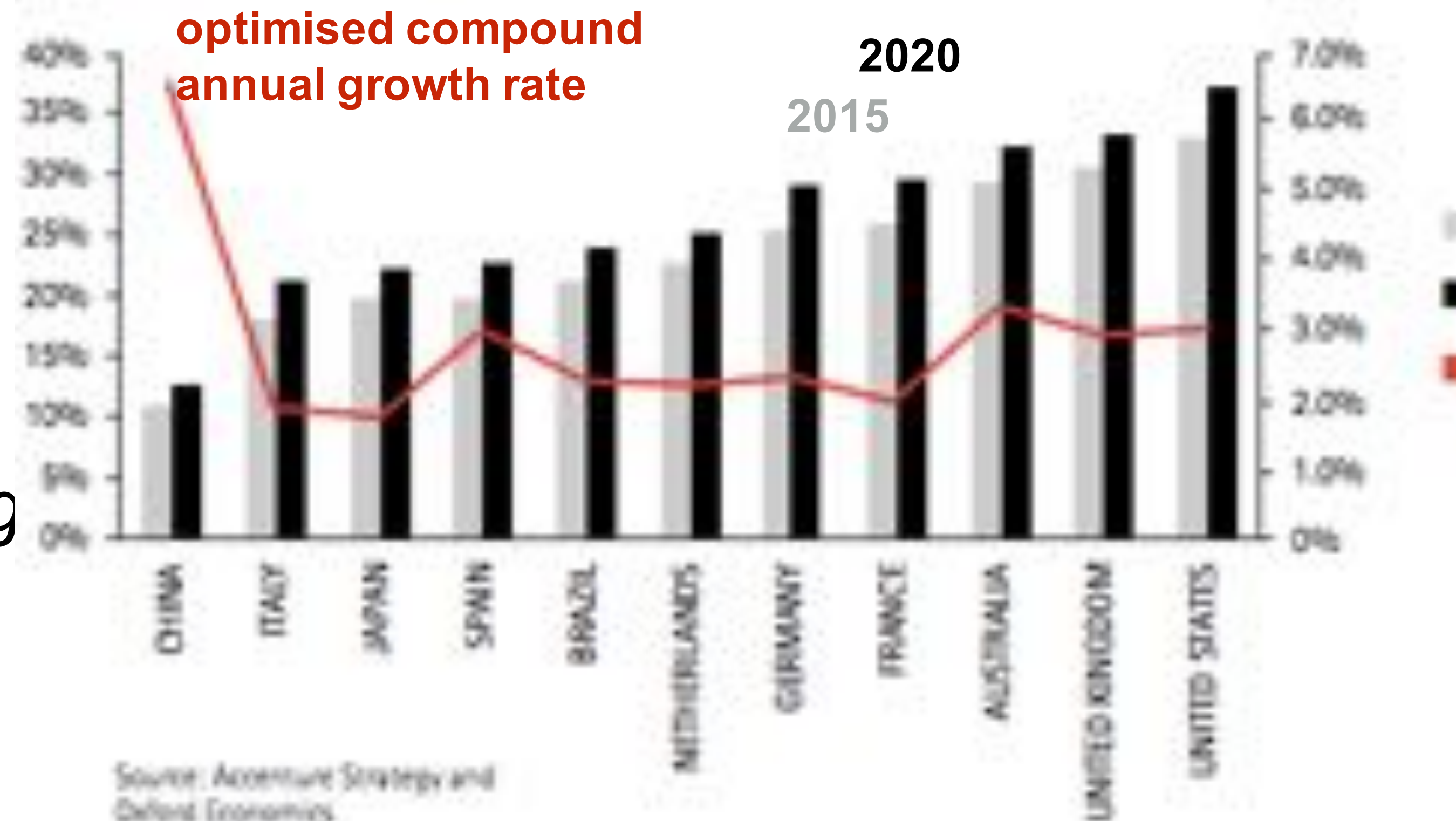


Background information

Digital share of GDP (2015 - 2020)

- Accenture Strategy & Oxford Economics, 2016
- Today: USA, 33% of GDP due to digital
- Financial Services 57% digital
Business Services 54%
Communications 47%
- 22% of global retail from digital,
28% in health,
20% in consumer goods
- digital achievements: *technology skills, accelerators*

Figure 1. Country-by-country digital share of gross domestic product (2015 and 2020) showing Compound Annual Growth Rate under optimized scenario* (right hand axis)



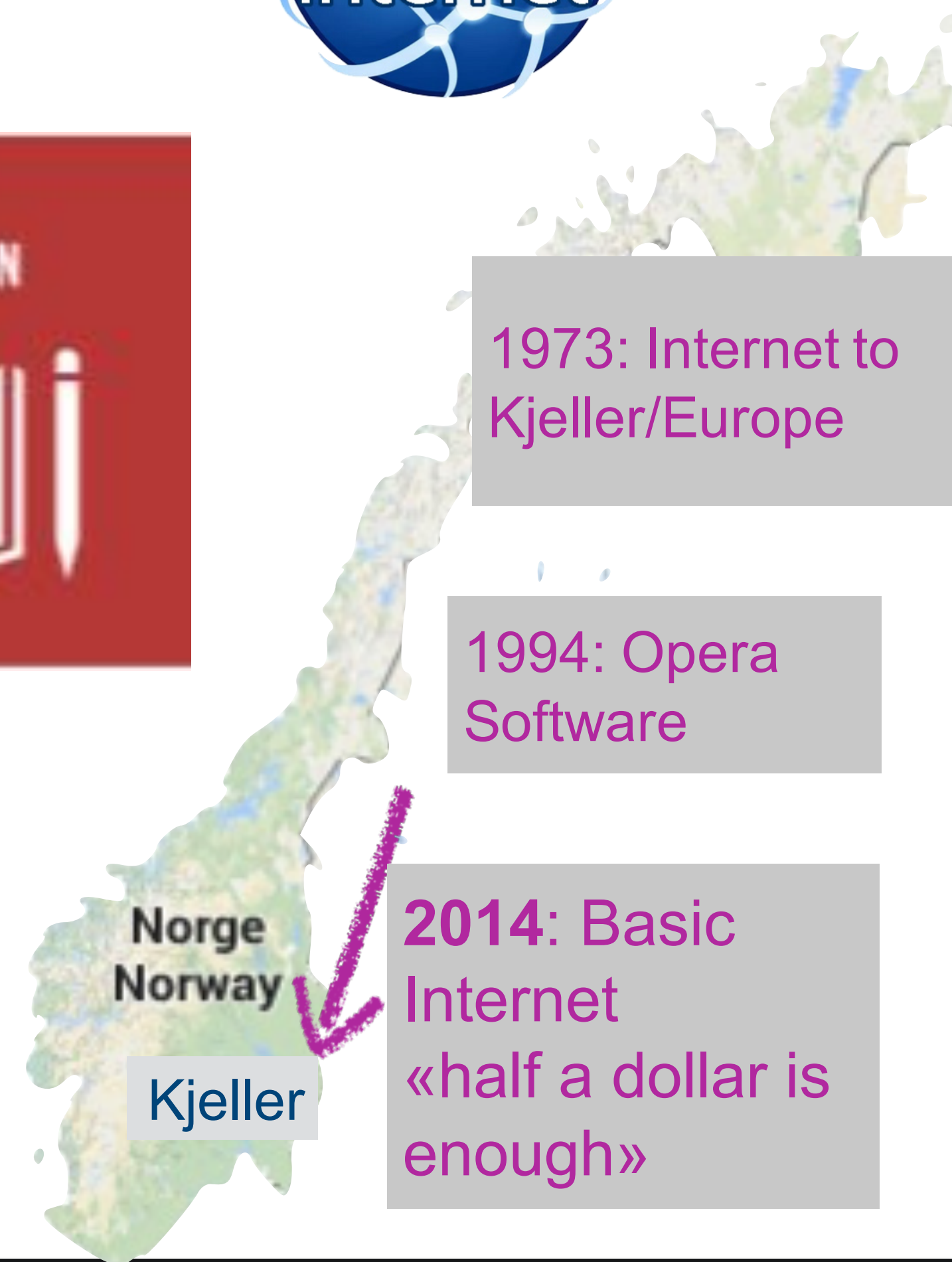
Source: Accenture Strategy and Oxford Economics

[Source: Accenture, "Digital Disruption Growth" 2016]

Motivation: “Need to close the digital gap”



- The Global Goals:
Norway is the secretariat for Quality Education
- Internet history
 - ➔ 1973 Europe through Kjeller
 - ➔ 1994 Opera Software
 - ➔ 2014 Basic Internet Foundation



1973: Internet to Kjeller/Europe

1994: Opera Software

2014: Basic Internet «half a dollar is enough»

leverage

Desire to use authoring tools + Ability to use existing platforms + Inspiration & Confidence

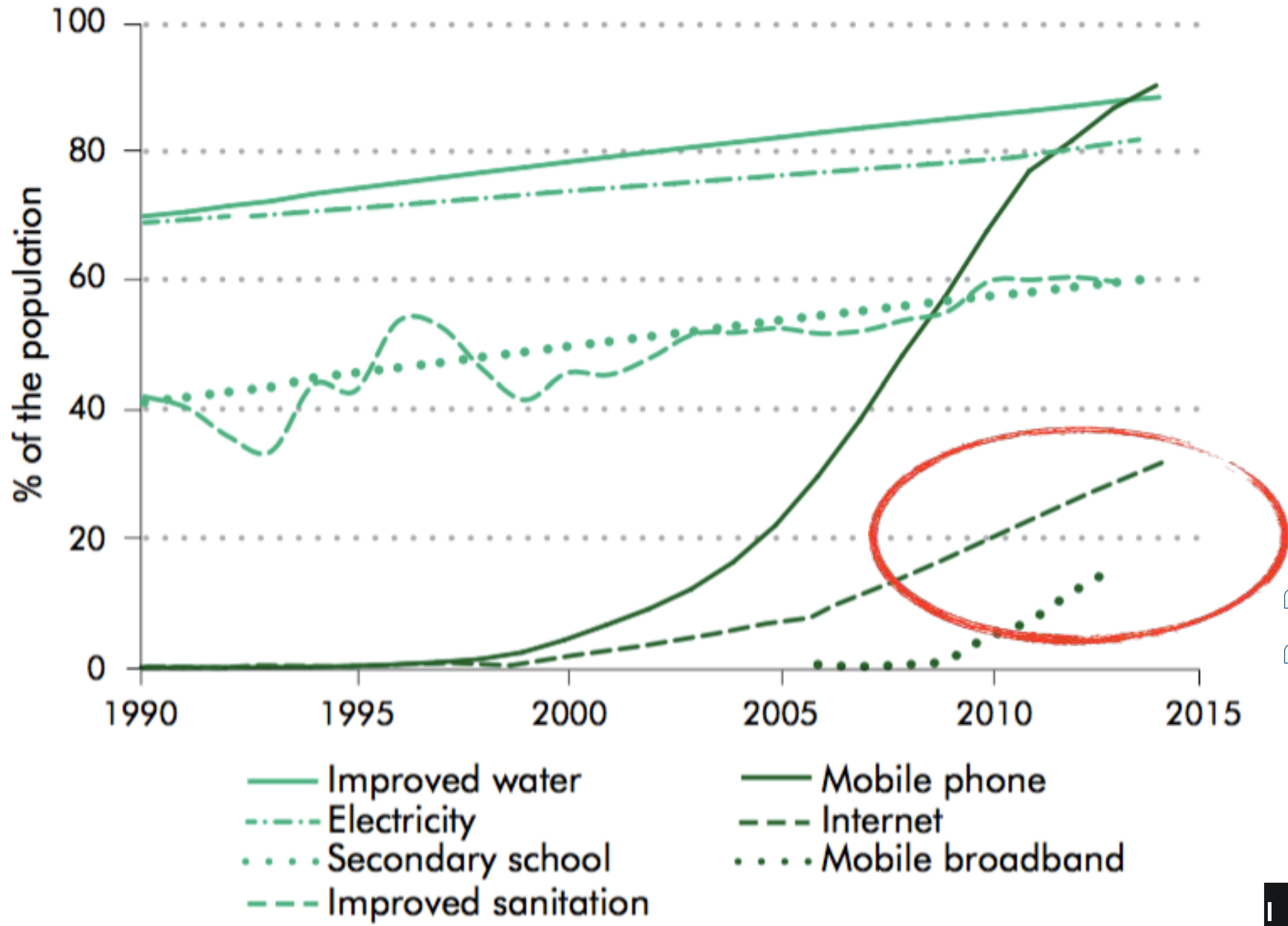
creation

“Internet is my teacher”

“I’m currently learning Python and HTML, so I can make a website for my parents’ business”



a. Digital technologies are spreading rapidly in developing countries



[Source: World Development Report 2016]

- 📁 Digital Economies/Societies
- 📁 Internet of Things (IoT)

Digitalisation of the Society



Digital Agenda Scoreboard 2015: Strengthenin...



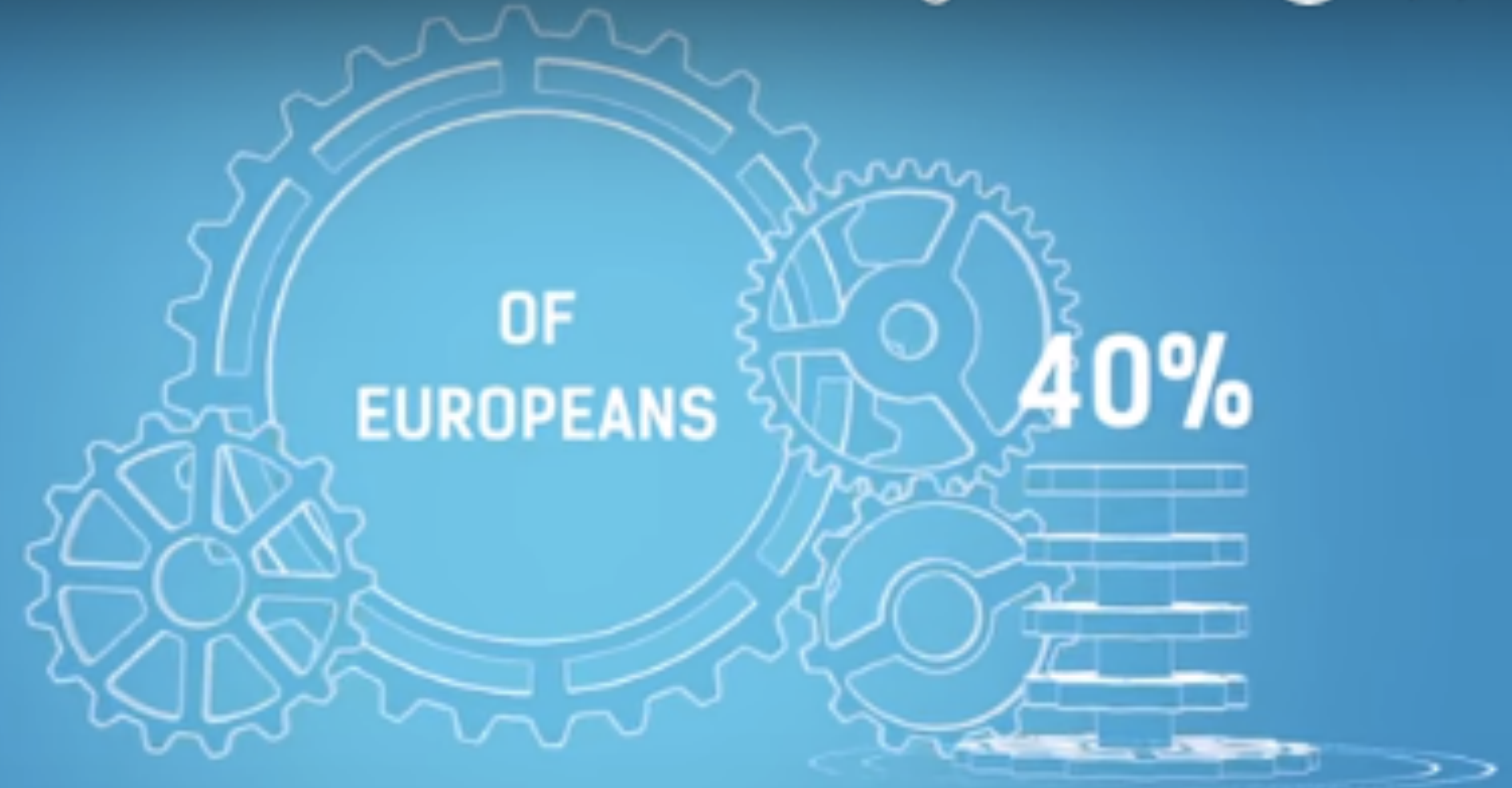
A DIGITAL SOCIETY IS MADE OF
DIGITALLY-SKILLED CITIZENS

m

D students

Board

Digital Agenda Scoreboard 2015: Strengthenin...



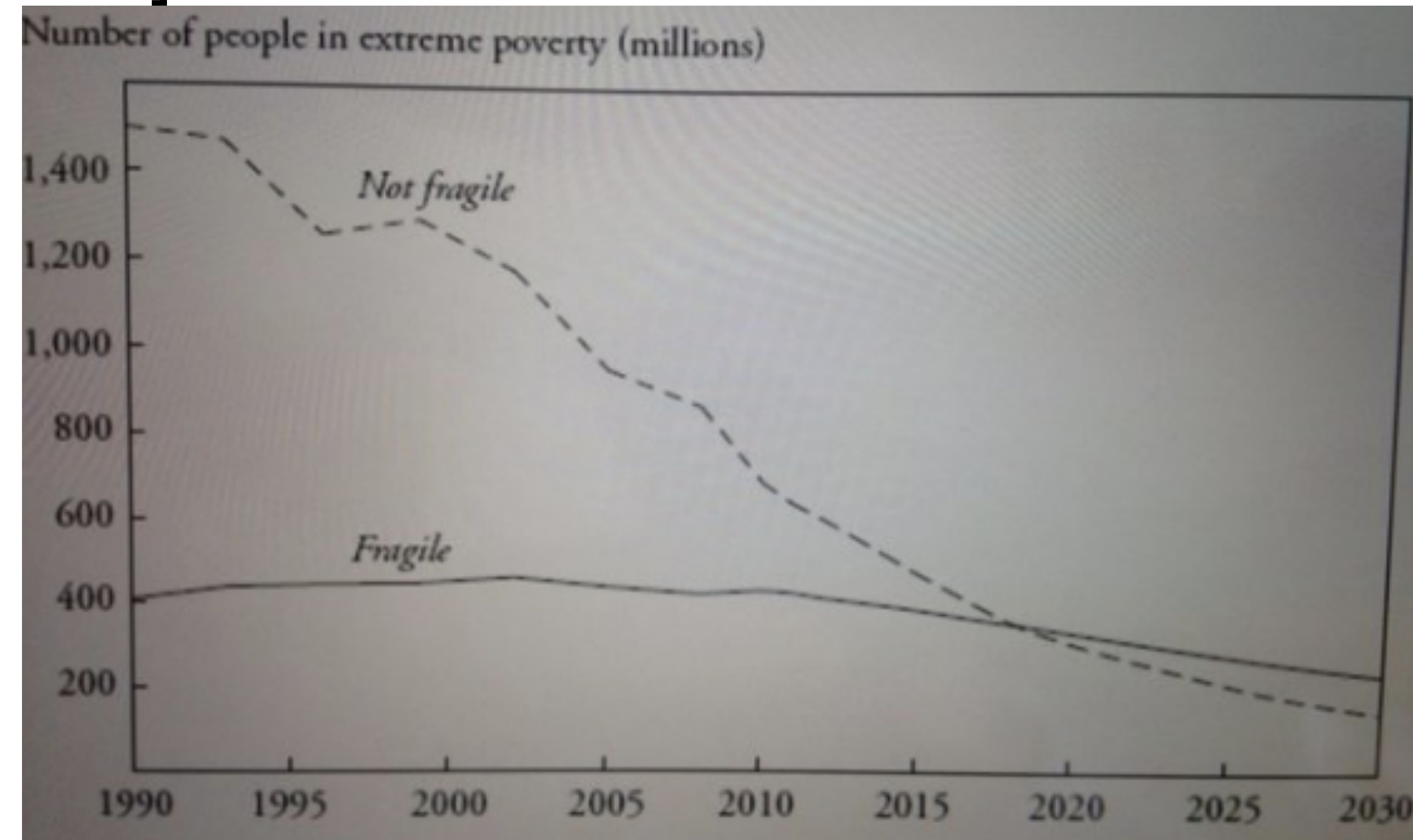
DON'T EVEN HAVE BASIC DIGITAL SKILLS

Source: EU commission,
<https://www.youtube.com/watch?v=BK-UuUnQaIM&feature=youtu.be>



Poverty and stability

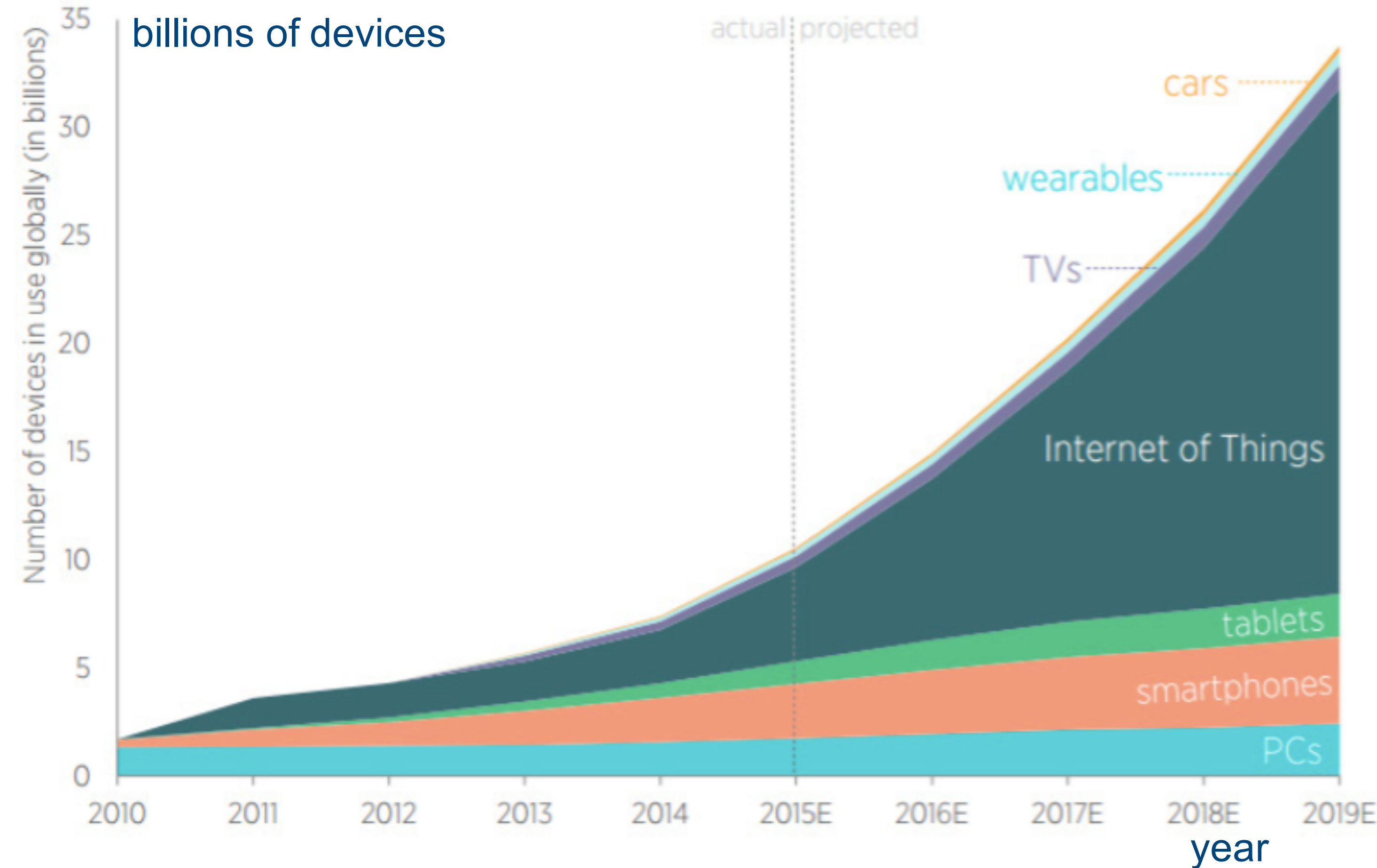
- 80% GSM coverage, but only 20% mobile broadband (0.4% cable broadband)
- “Everything is connected”: social, politics, climate and economy
[source: Nikolai Hegertun, Civita_10_2016 report]
- “money is not the decisive faktor” [@Civita]
 - ➔ “security/rights, peace and development”
- >2 billion people with less than 3 US\$/month, ~1 billion people with less than 1.5 US\$/month [World Bank, 2016]



IoT expected impact

[Source: A. Thinner and A. Castillo, 2015]

- Smart home appliances, “wearables”, smart metering, autonomous vehicles,...
- 10 billion (2013) -> 19 - 40 billion (2019)
- total global impact: US\$ 2.7 - 14.4 trillion by 2025
- ~3/4 of devices from IoT++
~1/4 from tablet, mobile,...



Source: John Greenough, "The Internet of Everything 2015," *Business Insider Intelligence*. Produced by Adam Thierer and Andrea Castillo, Mercatus Center at George Mason University, 2015.

Topics of discussion for digital health



- Inventory list of commodities
- Epidemiological data
- Transitional care after hospital visit
- Online prescription, ("digital money")
- Medical data handling
- Digital support of people with rare diseases
 - ➔ Social network
- Emergency/refugee
 - ➔ "information first"