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Industries without smokestacks: Telecommunication and ICT-Based Services Trade

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Moving towards the new economy

A tectonic change...

- ❑ Major technological revolution being experienced nowadays -> medium and long-term economic and social implications not yet clear.
- ❑ ICTs are a new set of technologies (and platforms) that cannot be confounded with computers and telecom services.
 - Shortened distances;
 - Allowed for instantaneous communications across the globe at a quasi-zero cost;
 - Improved access to information;
 - Led the creation of a myriad of new business ventures.

Using knowledge...

- ❑ Change in the concept of “knowledge-based economy” as we know.
 - Using proficiently the new ICTs will possibly be of greater relevance from both a production and trading perspective than generating them.
- ❑ For developing countries, the new generation of ICTs can at least partially bridge the gap with advanced economies. Focus on facilitating connectivity.

The connectivity imperative

- ❑ It is axiomatic that only by accessing the internet will countries be able to use ICT-related innovations effectively.
- ❑ How to provide high quality, affordable, safe connection to the internet to the vast majority of the population of developing countries?
- ❑ Governments would need to think out of the box: attract investment in infrastructure; remove entry barriers for service providers; lower transaction costs for consumers/producers, facilitating access to devices, and look for public-private partnerships.



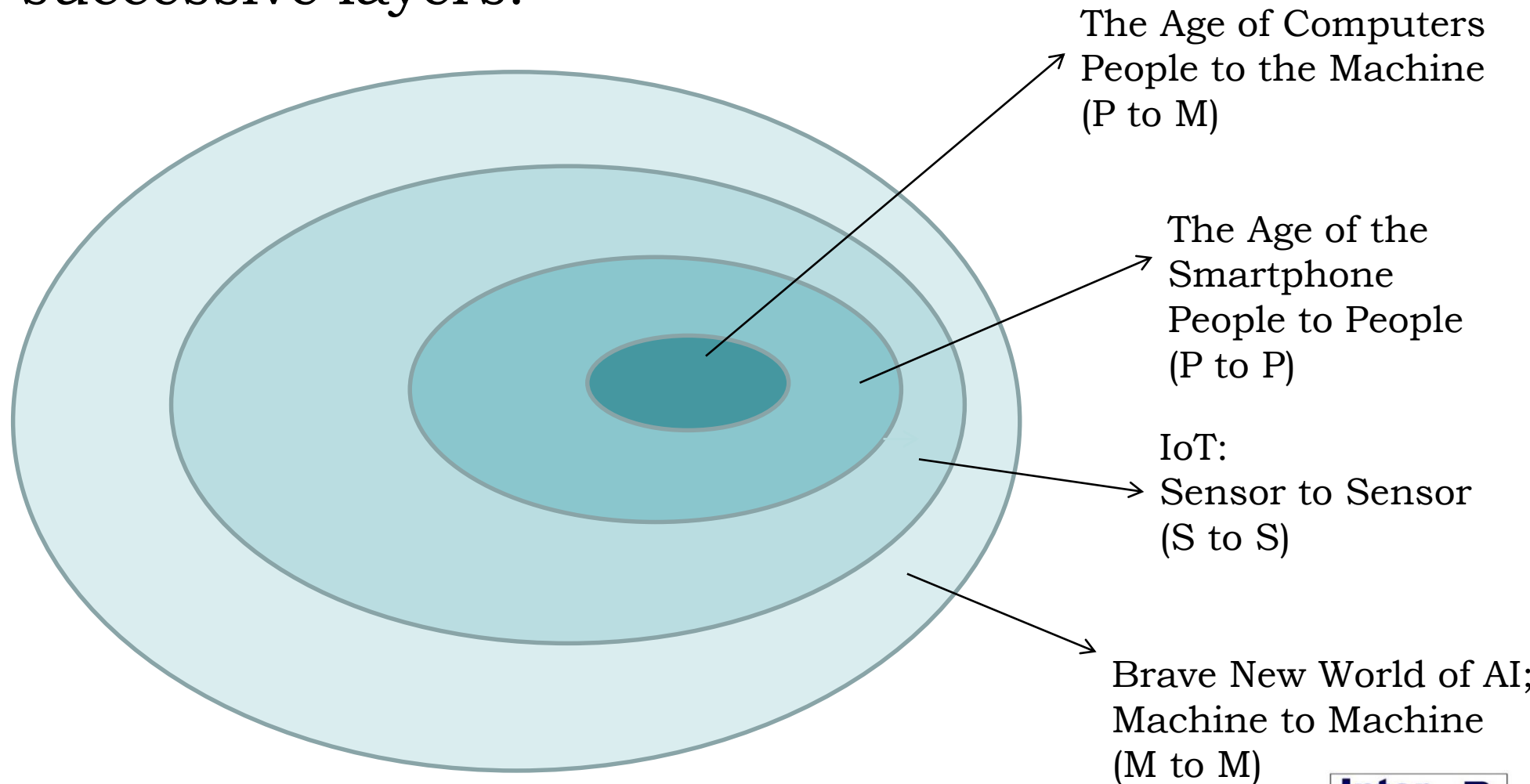
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The ICT Revolution in Brief

Peeling the onion – in reverse

- One way to visualize the changes is to think about successive layers.



Adding the layers

- ❑ **P to M:** process of *codification and digitalization of information*, allowing for information to be processed by digital computers -> “computer age”.
- ❑ **P to P:** build around *connectivity and mobility* propitiated by the growing ubiquity of smartphones.
- ❑ **S to S:** the *internet of things (IoT)*, allowed by the collapsing prices of sensors, data processing and connectivity among sensors -> Big Data at work.
- ❑ **M to M:** driven by *artificial intelligence* -> the ability of machines to learn, reason and correct mistakes by interacting with the environment and other machines.

The Age of Mobility

- Mobility with connectedness centered on the smartphone will possibly bring the most relevant changes for developing economies.

**IP traffic by type and mobile share
2015 (actual), 2016-20 (proj.), PB per month**

Global IT traffic	2015	2016	2017	2018	2019	2020	CAGR 2015-2020 (%)
Fixed Internet	49,494	60,160	73,300	89,012	108,102	130,758	21
Managed IP *	19,342	22,378	25,303	28,155	30,750	33,052	11
Mobile Data	3,685	6,180	9,931	14,934	21,708	30,564	53
Total	75,521	88,719	108,533	132,101	160,561	194,374	22
Mobile Share (% of total)	5	7	9	11	14	16	-
Smartphones Share (% of mobile access)	89	91	93	95	97	98	-

Source: Cisco and own elaboration.

Note: 1 PB (petabyte) = 1,000,000 GB (gigabytes); *Includes corporate IP WAN traffic and IP transport of TV and VoD.

Prices are falling...

- Its dissemination has reached a point that one can envision that most of the population in developing countries will have in their hands smartphones (and their variants, such as phablets)

Global average selling price of smartphones worldwide and number of apps available on major app stores (approximate value) 2010-2016, US\$ and thousands of apps

	2010	2011	2012	2013	2014	2015	2016*	CAGR (%)
Average smartphone prices	440	420	381	333	310	305	283	-7.1
Google Play	38	200	500	850	1,300	1,400	2,200	97
Apple Store	150	425	585	850	1,200	1,500	2,000	53.98

Source: Statista. *Projection.

Beyond devices...Apps

- The most important aspect is how user friendly are most applications
 - Accessing information with the help of **search engines** (e.g.. Google) has transformed radically the way people strive for economic citizenship;
 - Transactions are occurring in virtual platforms such as **market places** (e.g.. Amazon), that host virtual stores at quasi-zero cost;
 - **Fintechs**, providing in the digital realm multiple financial services, an instrument of financial inclusion and business transaction facilitation.

A paradigm change in the Kuhnian sense

- The very nature of economy activity is changing
 - ***Distance manufacturing*** will allow concepts, ideas, designs and prototypes export and materialize them close to consumers;
 - With ***cloud computing***, one does not need in house or even nearby data processing machines and/or facilities – only connection to such facilities irrespective of their location.

- Those technologies are convergent in a fundamental sense: they point to facility of use and lower entry barriers.



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Access to information and the Connectivity Imperative

Barriers to Connectivity

- Many if not most countries still face significant barriers to close-in the connectivity frontier.
 - The HK requirements have been softened; yet *basic skills* remain an important lever to make their effective use;
 - The provision of *physical infrastructure* – fiber, in particular - is critical, although some initiatives are attempting to simplify the requirements for the use of new generation ICTs.
 - *Regulatory barriers* make it more difficult and costly for people to purchase devices (mobile and otherwise), and connect themselves to the internet;

Broadband coverage: improving

- There is still a considerable gap between major regions, but progress in access (specially mobile) seems unmistakable.

**Broadband subscribers (per 100 inhabitants)
Mobile, Fixed and “Total Access Index” (TAI)*
Major regions, 2005, 2010-15**

Region	Type	2005	2010	2011	2012	2013	2014	2015	CAGR 2010-15
Africa	Mobile	N/A	1,8	4,6	8,5	10,3	12,9	17,4	57.4
	Fixed	0,0	0,2	0,2	0,2	0,3	0,4	0,5	20.1
	TAI	0,0	2,0	4,8	8,7	10,6	13,3	17,9	55.0
Arab States	Mobile	N/A	5,1	13,1	16,1	27,3	36,1	40,6	51.4
	Fixed	0,3	1,9	2,2	2,6	3,2	3,4	3,7	14.2
	TAI	0,3	7,0	15,3	18,7	30,6	39,5	44,3	44.6
Asia and Pacific	Mobile	N/A	7,4	11,0	15,3	18,5	29,7	42,3	41.7
	Fixed	2,2	5,5	6,4	7,0	7,8	8,3	8,9	10.1
	TAI	2,2	12,9	17,4	22,3	26,3	38,0	51,2	31.7
Europe	Mobile	N/A	30,5	39,4	49,1	56,1	69,3	78,2	20.7
	Fixed	10,9	23,6	24,8	25,7	27,7	28,6	29,6	4.6
	TAI	10,9	54,1	64,2	74,8	86,0	97,9	107,8	14.8
Americas	Mobile	N/A	24,6	34,1	41,9	55,7	67,3	77,6	25.8
	Fixed	7,5	14,0	15,0	15,8	17,0	17,4	18,0	5.1
	TAI	7,5	38,6	49,1	57,7	72,7	84,7	95,6	19.9

Source: ITU and own elaboration; * Defined here as the sum of Mobile and Fixed Broadband

Narrowing the Gap

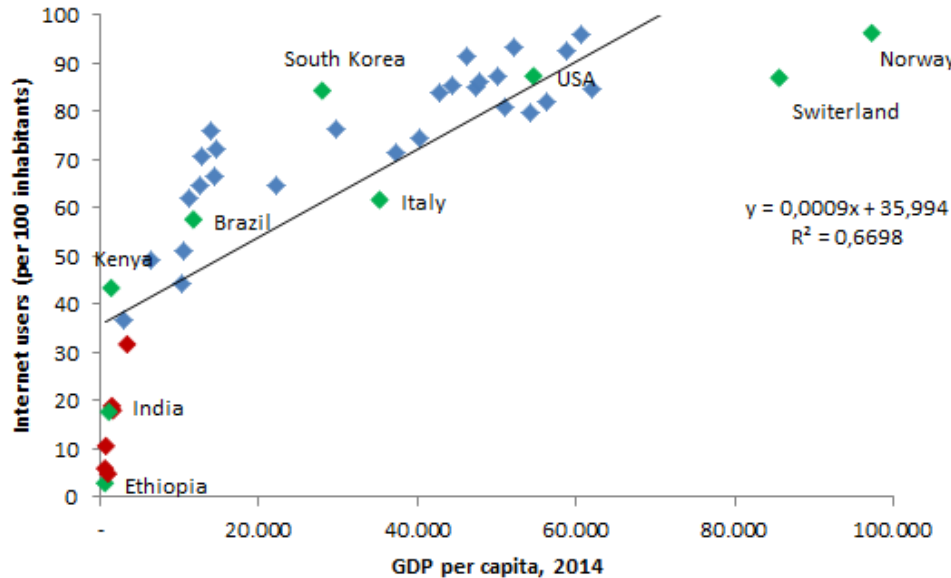
- ❑ In the last 15 years, emerging economies have narrowed the gap with respect to the U.S., South Korea and Hong Kong, with coverage growing at far faster rates.
- ❑ During that period, developing countries have also made major strides, with Kenya, Ghana and Rwanda becoming relevant examples of countries growing out of very small bases.

Where do countries stand?

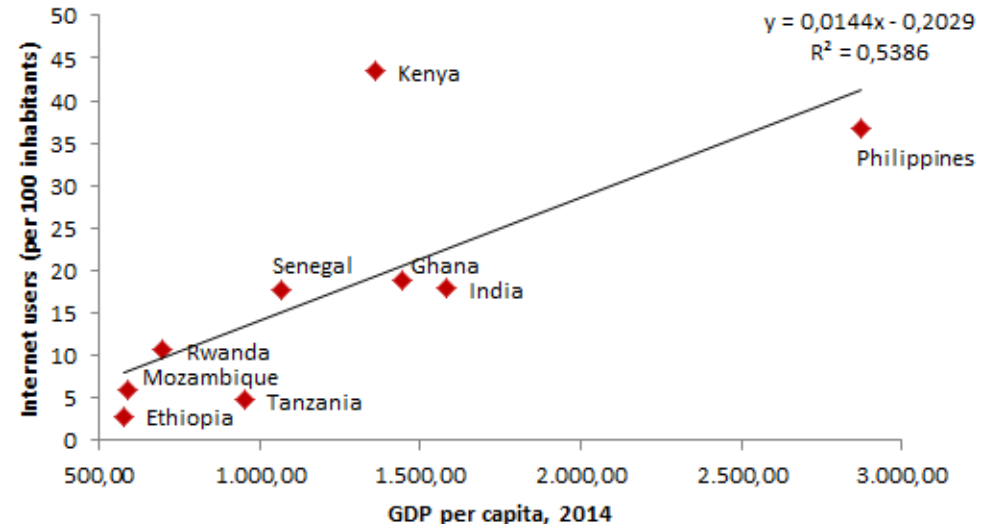
- Among the more developed economies, South Korea stands out; in the developing economies cluster, Kenya is indeed above “the curve”

Internet users per 100 inhabitants and GDP per capita

Selected countries



Developing countries subset



Source: World Bank.

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Quality of access

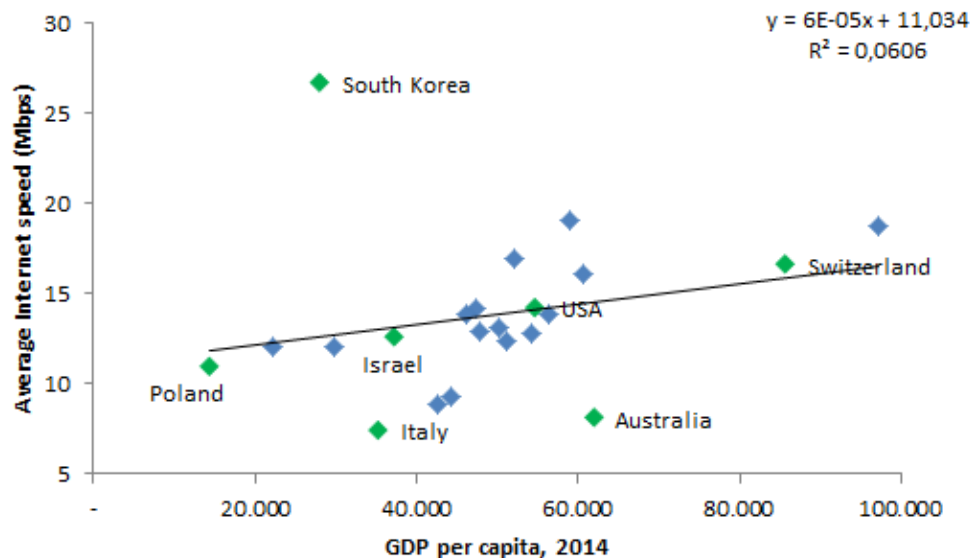
- ❑ The quality of access can be measured by data transmission speeds.
- ❑ While average speeds have increased, the relative gap between the more advanced and other economies seem to have widened in recent years
 - As coverage increased, speed suffered, with most providers announcing maximum speeds, while traffic goes at far lower average speeds
- ❑ Increasing speed generally depends on *infrastructure investments* – fiber connecting cell towers; backbone to backhaul; and household.

Cross-country dispersion in speed

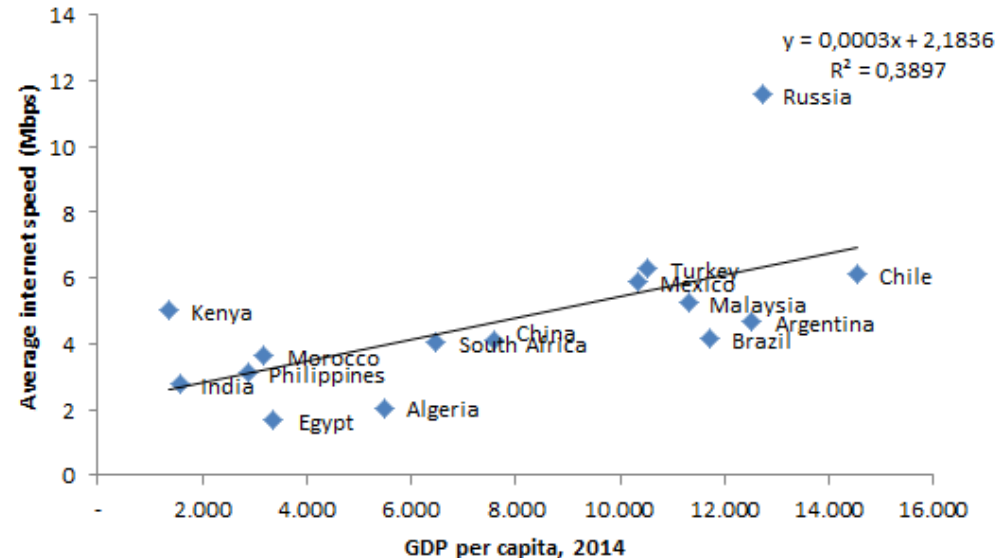
- Again, Kenya stands out when compared to other developing countries; it is also a country with several public-private initiatives to provide better access and services.

Internet Average speed and GDP per capita

Selected developed economies



Selected emerging and developing economies



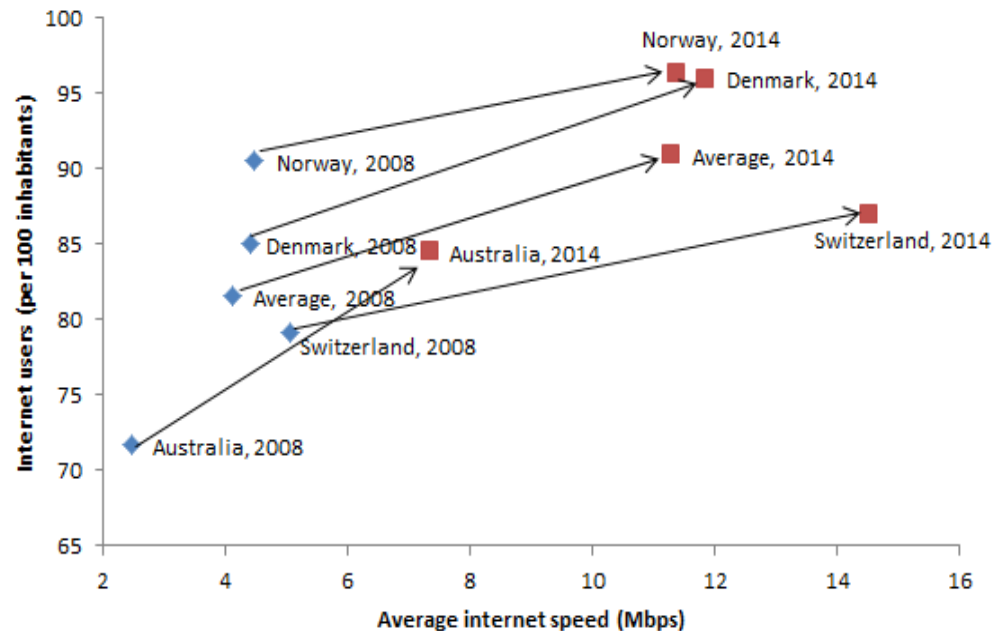
Moving towards the connectivity frontier

- The *connectivity frontier* can be defined as the distribution of countries across the internet access/coverage – average speed space. Approaching it is a pre-condition to the effective use of key technologies and platforms.
- A fast moving frontier with widespread gains.
 - Among developed countries, they are mostly concentrated in speed; for developing economies, the period reveals major strides in coverage.

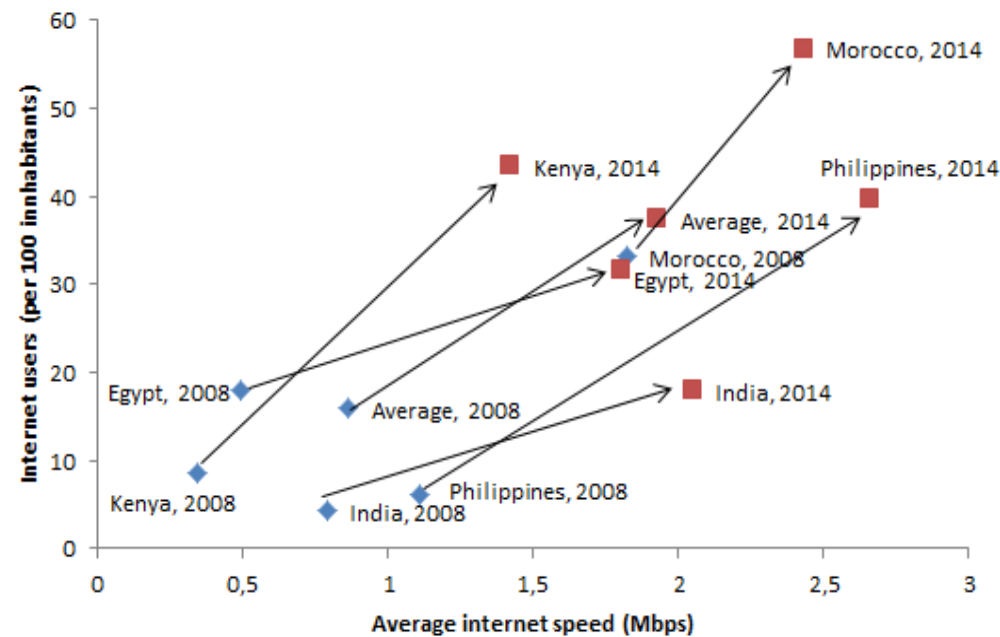
Cross-country shift in 2008-14

The moving connectivity frontier , 2008-2014

Selected developed economies



Selected developing economies



Source: Akamai Faster Forward, "The State of the Internet" and World Bank.



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ICTs and Services Trade: a half opened door to developing countries

A short preamble

- ❑ Services trade are already responsible for an estimated 25% share of global trade (and 55% in value added) and growing at rates significantly above trade in goods
- ❑ It appears that ICTs will play a critical role as an enabling condition to capture a share of this market.
- ❑ However, it is important to differentiate between first and second-generation ICT-based services trade.

First and Second-Generation ICTs

- ❑ The first-generation ICTs includes computers and high-speed satellite and cable links.
 - India and the Philippines are examples of a successful trade strategy focusing on the cross-border supply of business and other advanced services.
- ❑ The ongoing ICT revolution of this decade is beginning to propitiate the second-generation of services exports; it empowers people, entrepreneurs, small and medium-sized firms to break into markets until now closed to them.

Breaking Barriers

- ❑ ICTs are changing the competitive landscape by lowering entry barriers for countries not as well-endowed as India -> *this is what is new*.
- ❑ As an emerging trend, it is still little understood and documented -> scattered, anecdotal evidence regarding the growth in service exports from developing countries that can be traced back to new generation ICT investments.
 - it is hard to anticipate the scope of activities in this true next-generation “industry without smokestacks”.

The new access paradigm

- ❑ Connectivity does not mean access to land lines anymore; it means high quality (in terms of speed and stability), universal, affordable, open and safe mobile (and desktop), access to the internet.
- ❑ Infrastructure is still needed, and it depends on the country's ability to attract providers of cable and others links (e.g. Kenya).
 - What will propitiate people to acquire the skills to become ICT literate and respond to market opportunities, is a commitment by governments to the *access paradigm*, from putting in place a set of solid and forward looking policies.

An Agenda for Developing Countries

- ❑ How can developing countries adopt the new access paradigm in the face of scarce resources?
- ❑ The starting point is an assessment of the country-specific barriers that discourage infrastructure investment and reduce competition for the supply of devices (desktop and computers)
 - Policy and regulatory reform that attract investment is the first step to create an enabling environment for ICTs to play its potential.
- ❑ Consumers should have at their disposal the best cost-performance combination available with a minimum tariff/tax wedge.

Governments can do more...

- ❑ Governments can and should go further by actively engaging key services providers (e.g. Alphabet and Facebook) which have plans to connect people in developing countries and more isolated regions at quasi-zero costs.
 - In the face of limited resources, access can be traded by advertising time for developing countries to move up the digital gradient
- ❑ Policy makers need to think creatively to leverage its markets and, in addition to removing obstacles in general, governments need to experiment with new models of public-private cooperation to bring the country the new access paradigm.

Complementary actions

- The potential of technology depends on other initiatives to improve the environment for trade:
 - Progressive reduction of tariff and non-tariff barriers, combined with preference schemes for the least developed;
 - Systematic efforts at trade facilitation, including improvements in procedures for border management;
 - Provision of trade finance;
 - Upgrading of transportation and related physical and “soft” infrastructure.

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