

The Regulatory Conference 2014

Next Generation Fixed broadband Network and Services

Challenges and Opportunities



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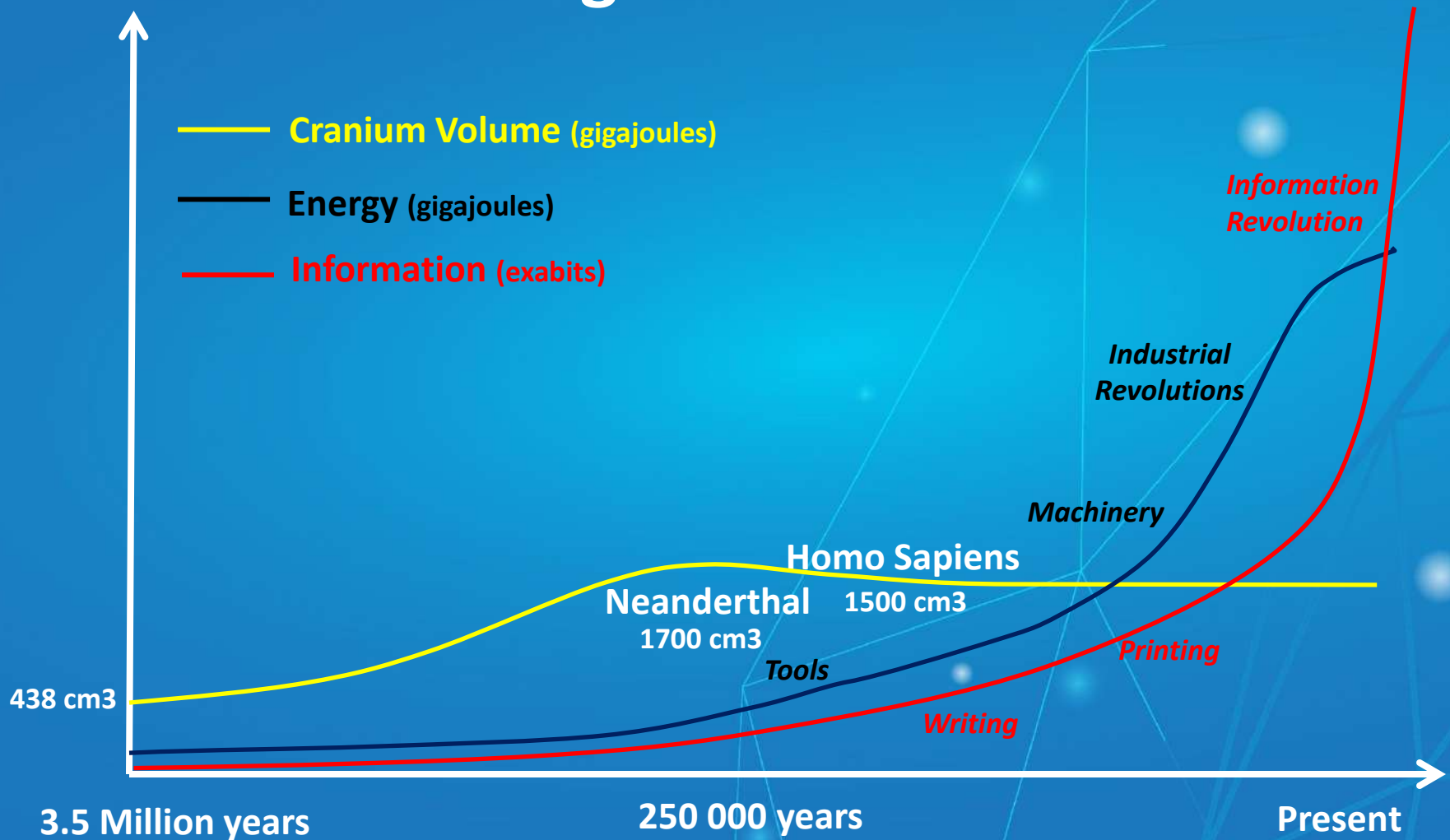
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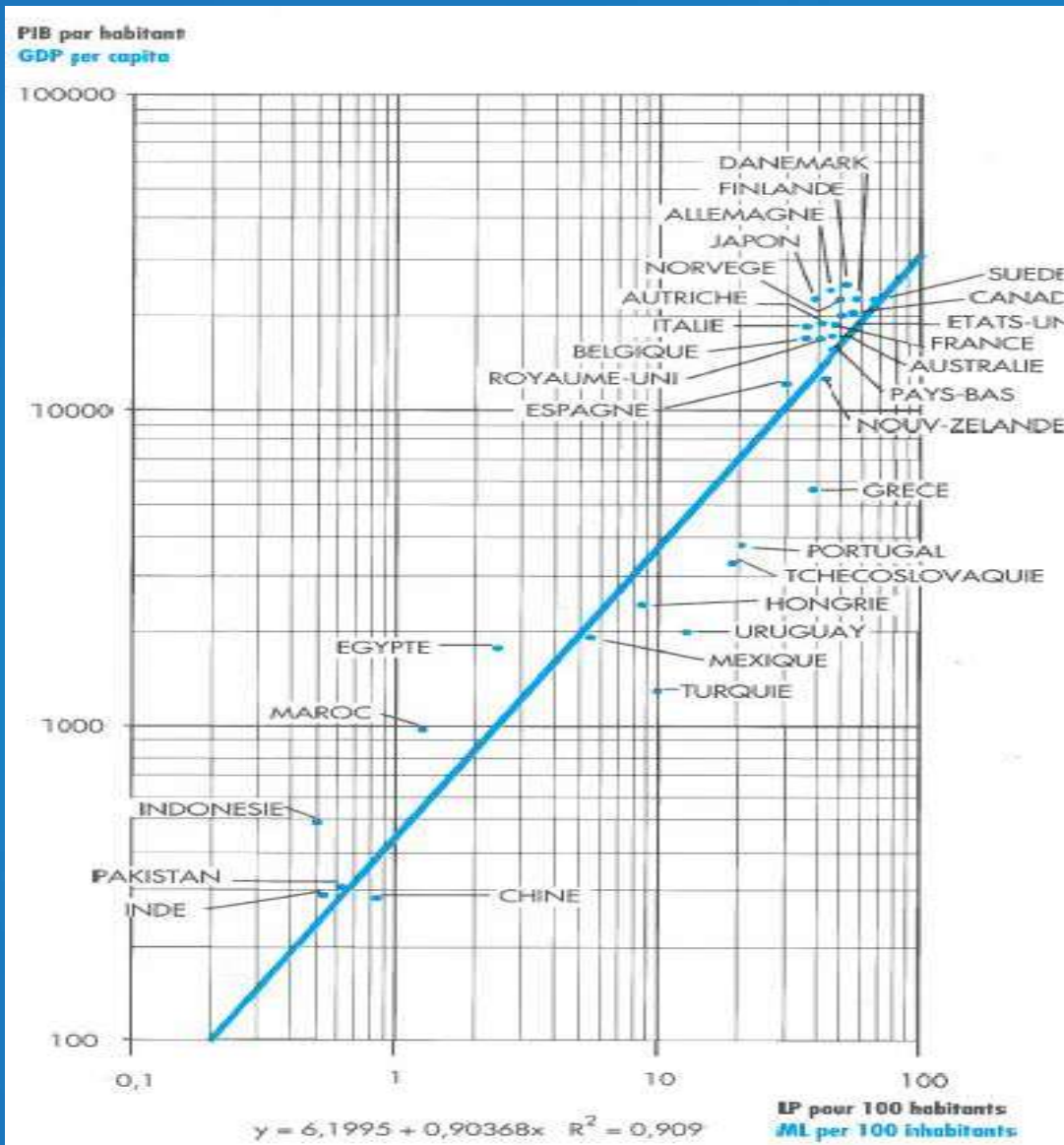


Université Paris II

An eco-anthropological view of humanity's long term development: The increasing use of information



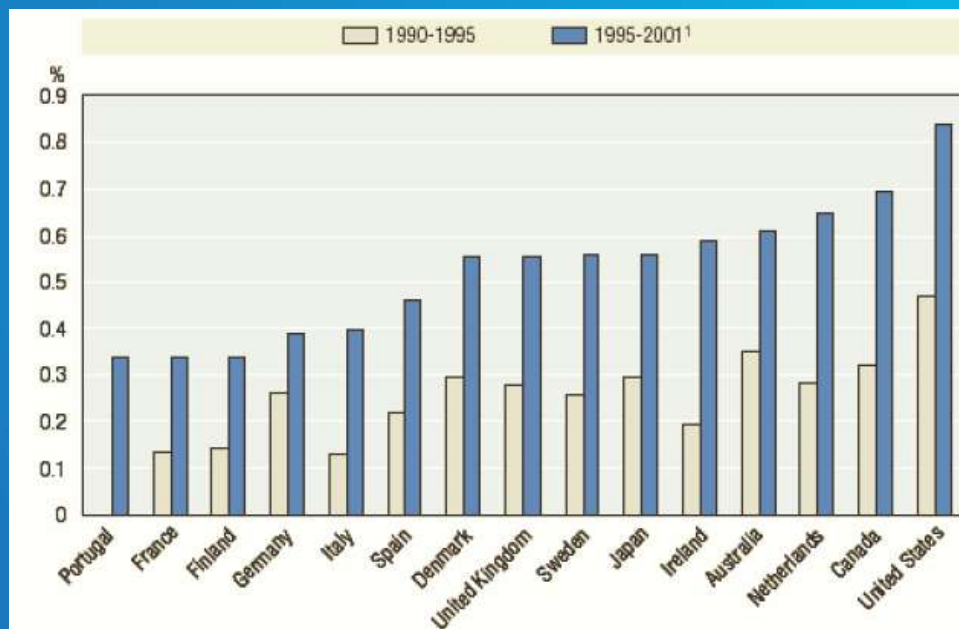
The “Jipp Curve” in 1982



- The higher the Gross Domestic Product per capita, the higher the telephone penetration.
- The correlation is statistically very significant ($R^2 > 0.9$)
- But Correlation is not causality : is the equipment in telecoms infrastructures the source of wealth of nations? Or does the wealth of nations drive their deployment of telecoms infrastructure ?

Policy Makers decided to develop information technologies (infrastructure and services): a challenge based on a conviction rather than on a rational economic study

Contribution of Information Technologies to Gross Domestic Product in main OECD countries



Source : OECD

Therefore, the contribution of Information technologies to GDP doubled in average in OECD countries during the nineties (1990s)

And they used competition as a leverage.

- OECD countries engaged liberalization policies in the nineties and broke up the incumbent telecommunications monopolies.
- Market and competition were considered as the best framework to push investment, innovation and price reduction in telecommunications and services.

The analysis was right !

The incredible and fast development of Internet and Mobile are economically considered as the result of these liberal competition policies.

And finally a very positive bottom line

In OECD countries : 96% of firms with 10 or more persons employed use the Internet

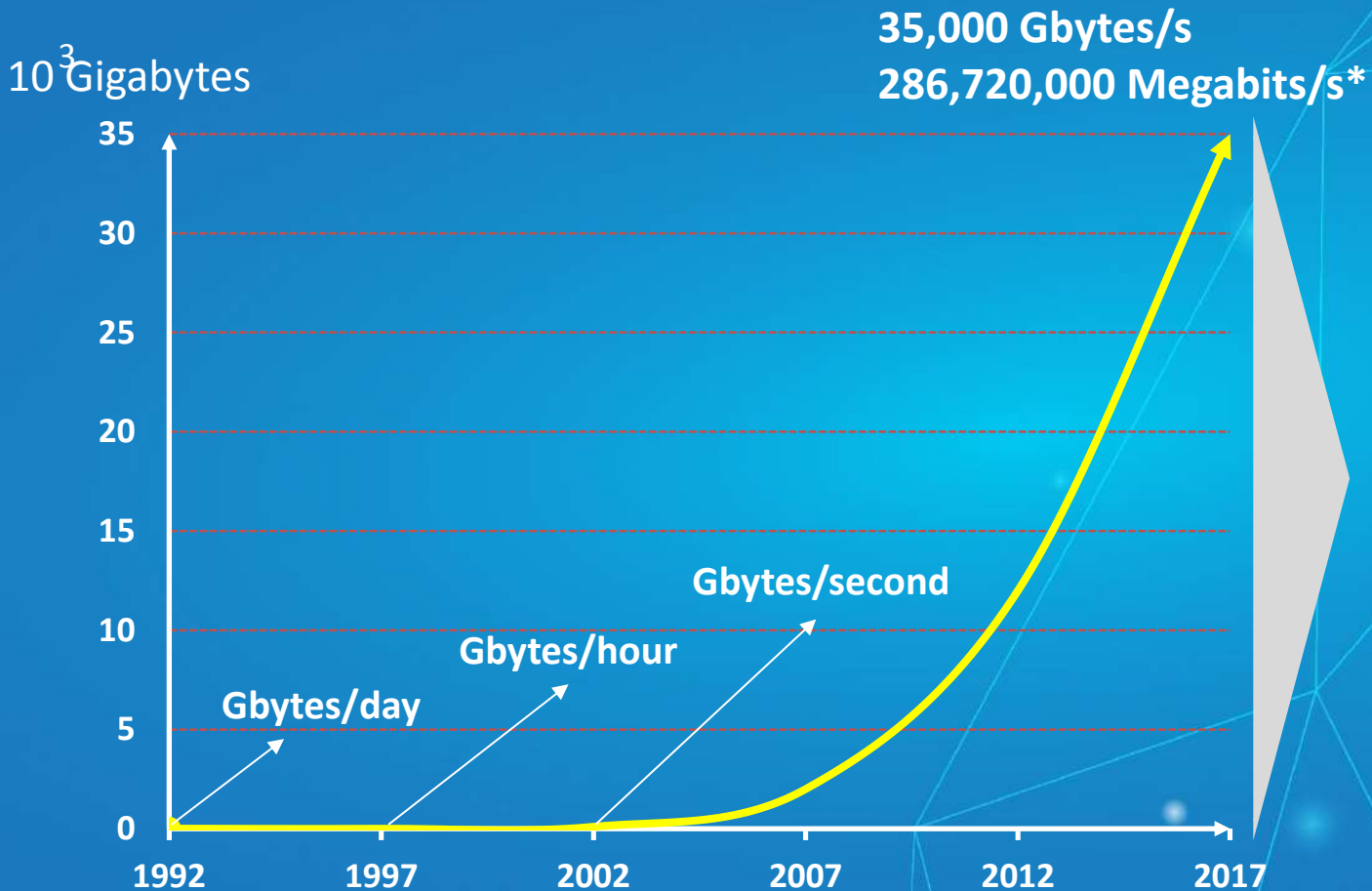
In the European Union (25 countries): more than 80% employees work on connected machines (computers, robots, transportation, etc.)

OECD estimates that Internet facilities and the use of the Internet increase the probability of innovation in manufacturing and services (more than 50% : based on a panel comprising Italy, Norway, Spain, UK, Switzerland, Canada)

In France, Internet activities account for 3.9% of GDP in 2011, more than energy, transportation or agriculture sectors

But, more important, **75%** of the value added generated by the Internet is created outside the Telecoms sector and pure Internet players (source: McKinsey).

As predicted: global traffic of information exploded and the trend will continue



**And a new challenge arises:
how will this information be delivered to businesses, governments, households?**

Source : Cisco, *The Zetabyte Era*, White Paper, May 2013.

* = 121 000 exabytes/month

Exa = 1 billion of billion, 1 Trillion, 10^{18}

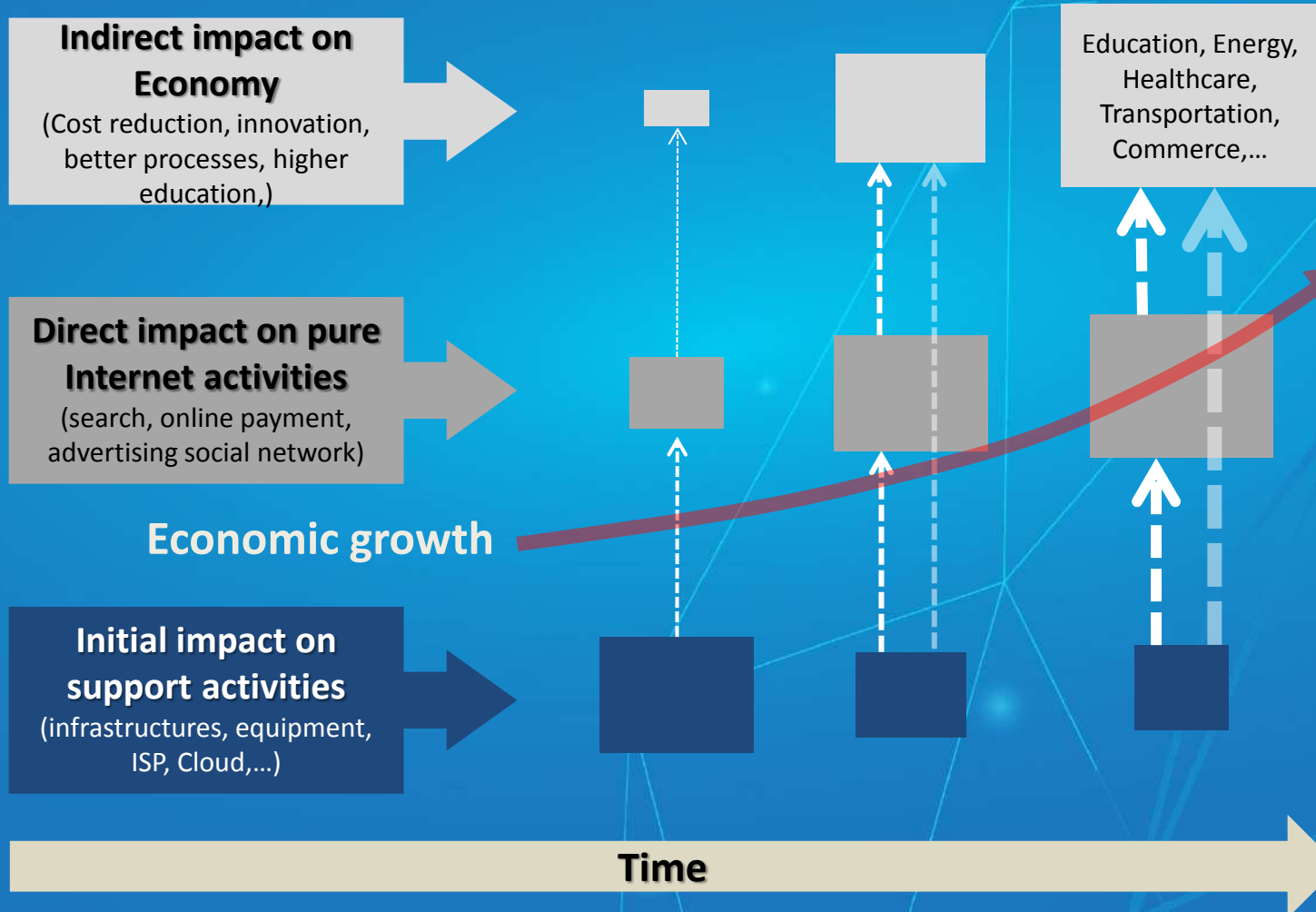
Re-investment in information infrastructure with a new frontier: New Generation Access Networks

Examples of Digital Strategies per Country

Country	Strategy name	Date
Australia	Australian National Digital Economy Strategy	May 2011
Austria	Strategy for Research, Technology and Innovation (RTI strategy)	March 2011
Canada	Canada's digital economy strategy built upon the Government's economic plan, Advantage Canada	In the implementation process
Czech Republic	Smart Administration Strategy for the period 2007-15	September 2006
Estonia	The Estonian Information Society Strategy 2007-13	January 2007
European Community	Digital Agenda for Europe (DAE)	May 2010
France	Plan Numérique 2012	November 2011
Germany	Digital Germany 2015	November 2010
Hungary	The Digital Renewal Action Plan	December 2010
Japan	New Strategy in Information and Communications Technology	May 2010
The Netherlands	Digital Agenda.nl	May 2011
New Zealand	Directions and Priorities for Government ICT	October 2010
Norway	Digital Agenda for Norway	Under development
Portugal	Digital Agenda 2015	September 2010
Spain	Plan Avanza 2	July 2010
Sweden	Digital Agenda for Sweden	September 2011
Switzerland	Strategy for an Information Society in Switzerland	Updated March 2012
Turkey	The e-Transformation Turkey Project since 2003	New strategy to be formulated by end-2012
United Kingdom	Digital Economy Act	June 2010
United States	Many ICT initiatives form part of the Strategy for American Innovation	December 2010

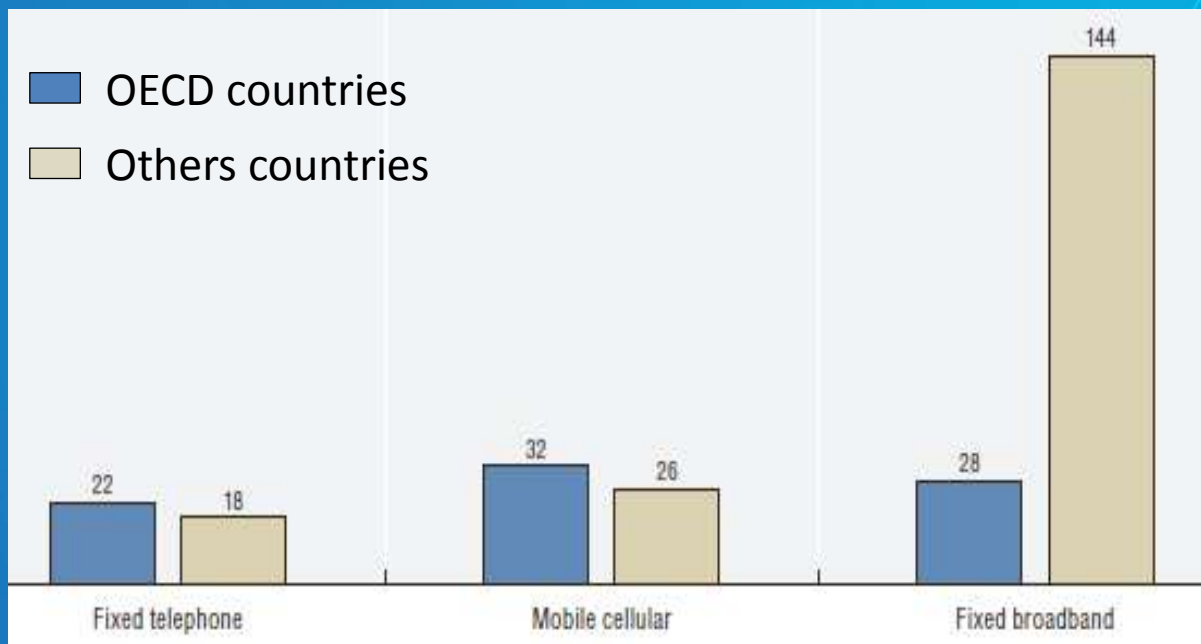
All developing countries adopted national plans to deploy universal New Generation Access Networks over the next decade, and invest in information infrastructures (storage farms, cloud computing, SRAS) and services (Big data, open data)

To benefit from economic effects induced by NGA Networks



And to maintain a competitive advantage in the information age

Global Price differentials for communications services
(Average prices for a monthly subscription in USD PPP, 2010)



Today, the average price of fixed broadband is five times cheaper in OECD countries than in others

Sources : OECD, ISOC, UNESCO

More bandwidth, yes! But what for?

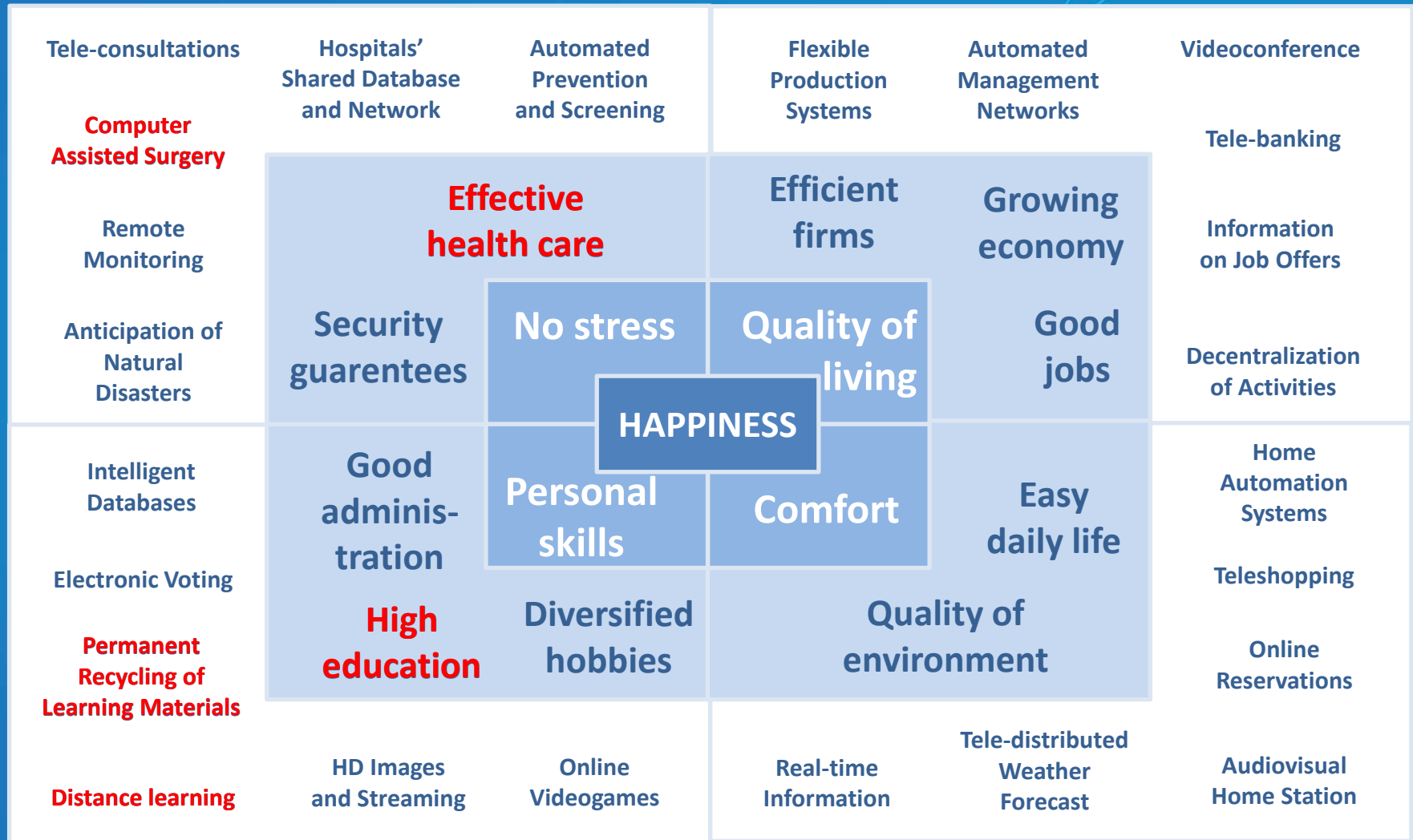
Ask the final users what they want? (Demand pull)
or create the needs by innovations ? (Technology push)

In 1922, Henry Ford wrote in his memoirs: « *If I asked my clients what they wanted, they would answer « A faster horse! », but not a car... »*

In 2010, Steve Jobs said « *People don't know what they want until they see it* »

A technology push is certainly the good approach for innovators but policy makers must satisfy social needs

Reconciliate Demand Pull and Technology Push approaches



Telesurgical

- The first remote surgical operation successfully took place in 2001 between New York, USA, and Strasbourg, France.
- The Lindbergh Operation in numbers:
 - Distance of 15,000km between patient and surgeon
 - Transmission delay of 150ms
 - 2 years of preparation for this world premiere



**How to transform a pioneer telesurgery
into an operational activity?**

How surgical robots are still used today?

- The robot most used for surgery is the 'Da Vinci' : over 2,000 units sold worldwide by January 2013
- Advantages: increased by 10 precision in surgical procedure, less invasive procedure, less post-operative trauma,...



Source: Intuitive Surgical

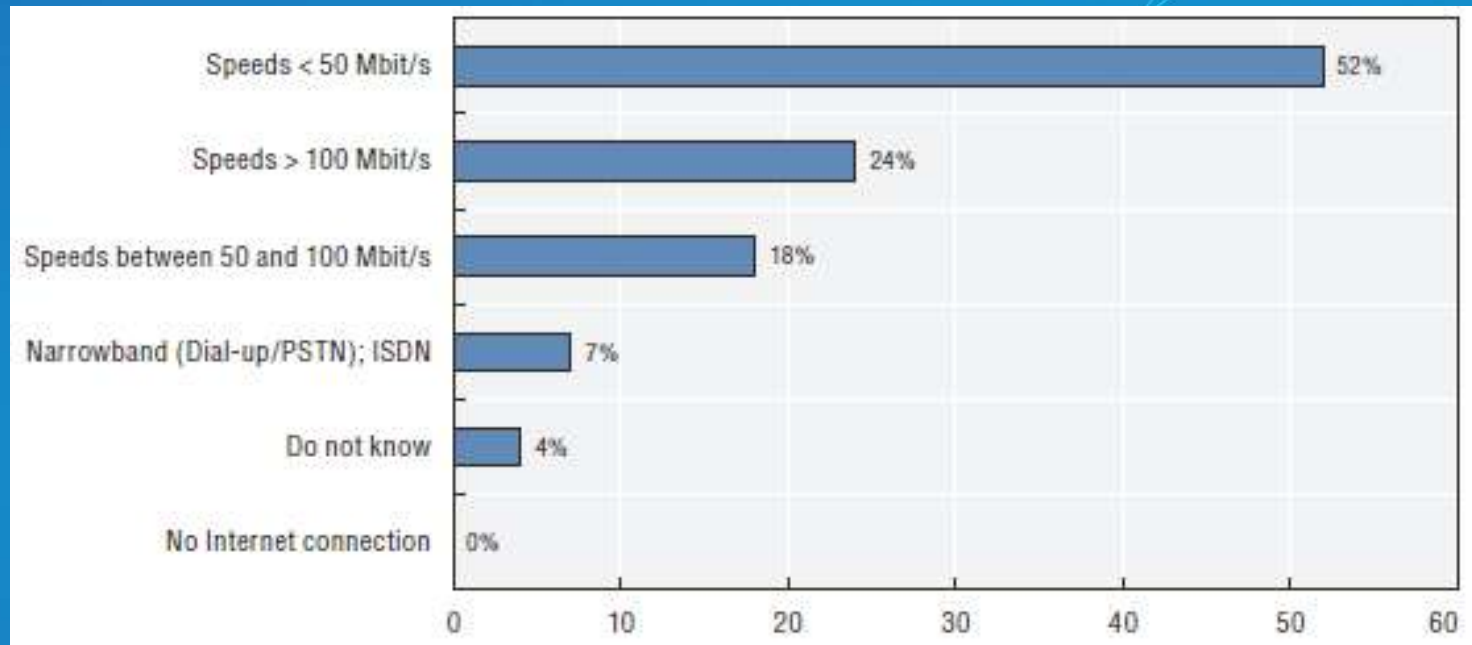


2 meters

- The cost is above \$2 million USD plus several hundred thousand dollars of yearly maintenance

The networks' bottleneck

Type of Internet connection in European hospitals (2011)



Source : European Commission,, e-Health Benchmarking III, Deloitte & Ipsos, 2011

Because of insufficient broadband connection, less than 0.1% of European hospitals could today host an operational TELESurgical platform

Create a Global Surgical Platform

- Implement a platform with many robots in a dedicated hospital
- Implement control boards of robots in any part around the world where the best professionals in all surgery specialties are based
- Connect the platform with control boards through top-of-the-line Next Generation Access Network both in quantity (bandwidth) and quality (availability, ping).
- With this organization, the platform becomes a state-of-the-art medical and surgical complex:
 - Virtually concentrating the best surgeons around the world
 - Concentrating the patients on the platform (economies of scale)
 - Offering patients and their families integrated medical and hotel infrastructures.

The Global Surgical Hospital

Control Board
with a surgeon


Qatar



E-learning

- Massive Online Open Courses (MOOCs) are a revolution in terms of education: they give access to high quality learning materials to any student around the world.
- But today the concept is flawed:
 - 90% drop-out rate
 - 0.8% graduation rate for MOOCs that deliver a diploma

Why?

- The self-learning requires discipline (alone in front of the computer screen)
- Necessity to feel physical presence of other students, professors, assistants...



Toward more efficient On-Line Courses

- A second generation MOOC could be created as a World On Line University (WOLU) :
 - The WOLU is built with amphitheaters equipped with ultra high definition studios (source of signal) connected to Next Generation Access Network through a platform.
 - The world's best Professors in their fields come to the university to teach in these amphi-studios as visiting professors and their courses are filmed and broadcast.
 - WOLU installs, in international partnering universities, classrooms with very large high definition screens connected with the platform to deliver online courses with a local supervision of students by assistants of partnering universities
 - The system allows Online participation and students interaction with the Professors and his assistants
 - Tests are organized by partnering universities with the WOLU and a double diploma could be delivered by the WOLU and partnering universities.

Organization of the Worldwide On-Line University



Resources required for efficient global services in the information age

Local NGA Networks



Big data centers
to host a maximum of
information & services

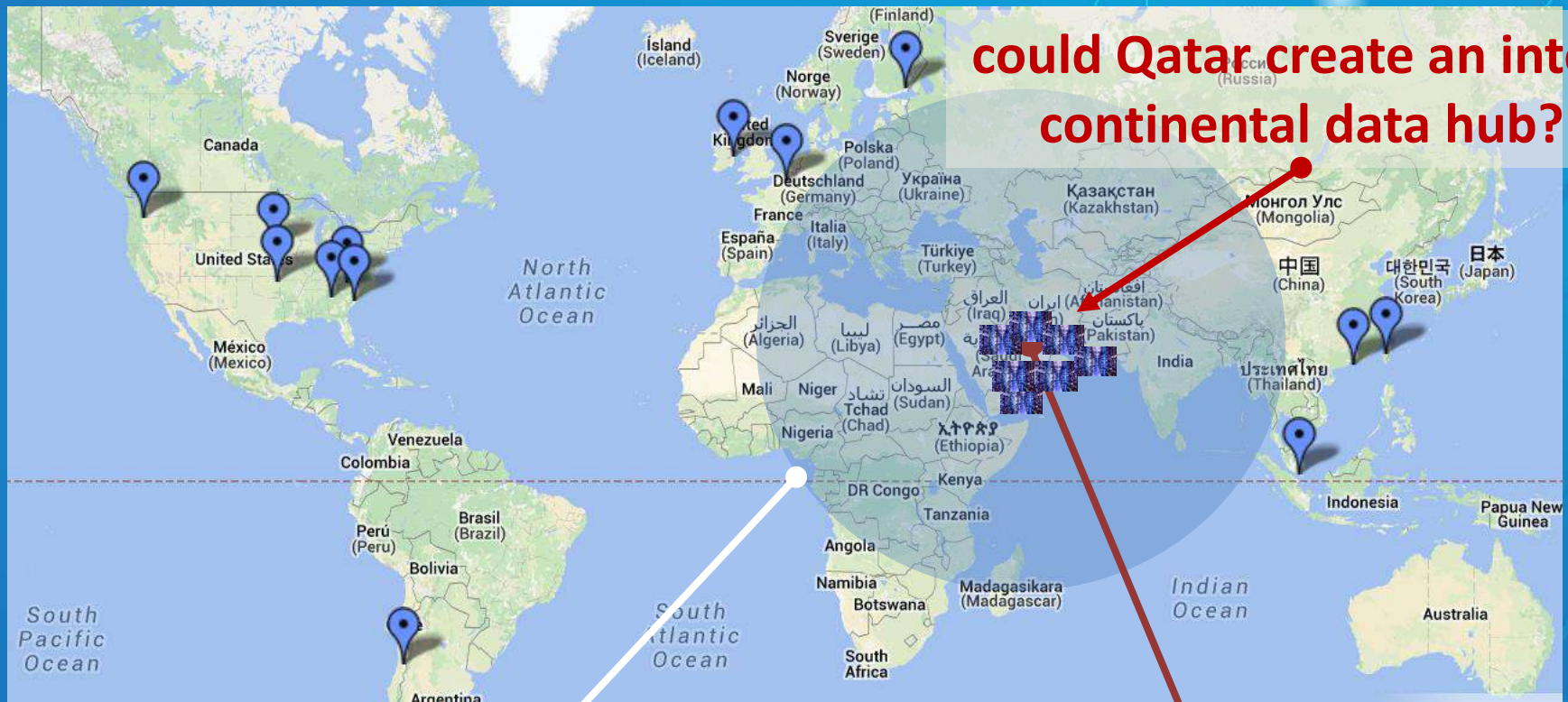


Large intercontinental
interconnections with very
high bandwidth availability



Where Google localizes its data centers

It is estimated that Google operates 1.8 million servers around the world. Google gives the geographical implantation of its datacenters.



A very large empty zone

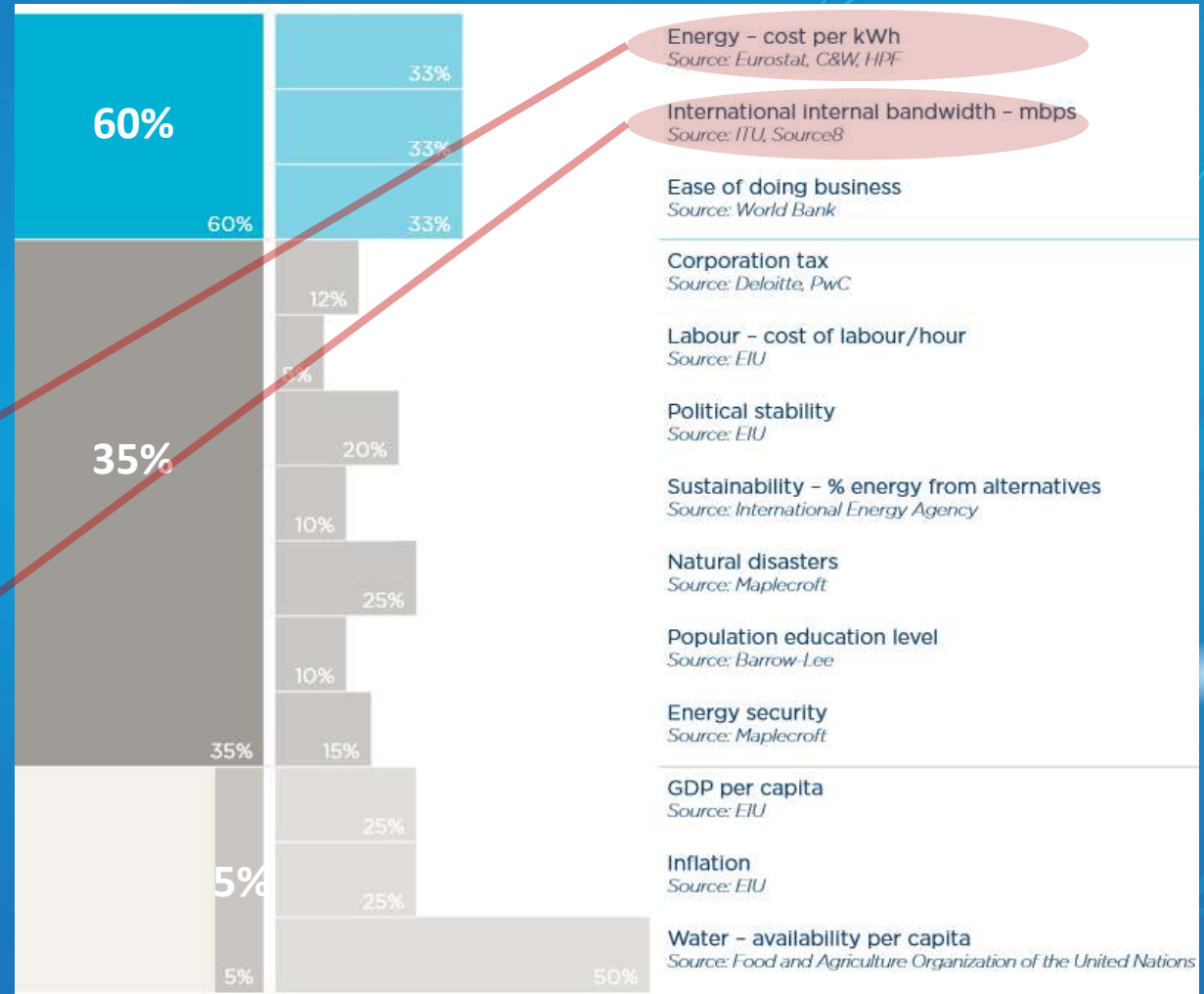
Qatar is in the center of this zone

A multicriteria analysis for the implantation of datacenters

13 criteria and 30 countries are examined. The two most important criteria are:

Energy cost

International internal bandwidth



Strengths and weaknesses for Qatar ?

2013 RANK	INDEX SCORE 1ST = 100	COUNTRY
1	100.00	US
2	89.53	UK
3	82.29	SWEDEN
4	81.29	GERMANY
5	81.16	CANADA
6	79.63	HONG KONG
7	79.47	ICELAND
8	79.45	NORWAY
9	78.74	FINLAND
10	78.37	QATAR
11	77.11	SWITZERLAND
12	76.26	NETHERLANDS
13	74.59	KOREA, REP.
14	73.98	FRANCE
15	72.49	SINGAPORE
16	68.96	MALAYSIA
17	67.43	POLAND
18	67.09	IRELAND

Qatar is well ranked (10th), ahead of Switzerland, Korea, France, but lost 4 positions between 2012 and 2013.

Best criteria for Qatar are:

- Energy cost: 1st position
- GDP/capita: 1st position
- Corporation tax: 2nd position

Worst criteria for Qatar are:

- International-internal bandwidth: 30th position
- Sustainability: 30th position
- Water availability: 30th position

Information requires energy...

- The virtual world of information needs real infrastructures: servers, routers, commutators, bridges, calculators, processors,...
- Information technologies account for more than 10% of the world electrical consumption
- Energy used by data centers is shared between 50% for activating the machines and 50% for cooling the machines with a lot of water.
- 'Green' energy (CO2 and nuclear free) is a key criterium to localize data centers.

Origin of energy for three major internet pure players



- Facebook chose to implant its most recent data center in Sweden using these criteria: hydro-electricity and abundant fresh water.

Information and Energy: what mix?

- The most abundant source of energy available on earth is the solar energy, especially in Qatar...
Qatar could easily improve its attractiveness ranking for local implementation of a data center hub:
 - by producing power with thermodynamic solar plants (not via photovoltaic cells)
 - by cooling installations not with water but with gas (LNG?).

Qatari LNG Plant



Cooling



Data centers

Electricity



Thermodynamic power plant

Wrap-up (1/2)

Two challenges to ensure the competitive advantage of Qatar in the information age

- 1. First: Accelerate and achieve the deployment of NGA Networks and improve interconnections with the main routes of the global Internet network**
- 2. Second: Guarantee an easy, equal and competitive access to these networks to insure the development of services**

Wrap-up (2/2)

Therefore, seize opportunities

- Innovators could imagine the future creating new products and services
- Policy Makers could:
 - Promote the development of new business sectors to support economic growth and development
 - Improve the satisfaction of social needs to increase the general welfare

To conclude:

- I found a short silent movie dating 1922 on the Internet :This film shows two women in a street. One woman uses a fire hydrant as a ground wire and activates a portable device. The second opens her umbrella which is an antenna. She calls an operator to ask for something.
- The operator plays a song over the gramophone and put the phone near the sound source of the gramophone.
- The woman can hear the song in the street.
- Today, this system is called: streaming music on a smartphone.
- This movie is more than 90 years old. I fomulate the wish that we will not wait a so long time to know the services that I describe to you in my presentation.

Thank you for your attention

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