Information Systems Management

DIGITAL TECH TRENDS - 1

SAMUELE ASTUTI

Computing power increases

Network bandwidth increases

Cost of computing power declines

Cost of data transmission declines

Computers become interconnected

Computers become easier to use

Digitization and miniaturization increase

Interconnected computing devices become more pervasive and embedded in more aspect of our lives
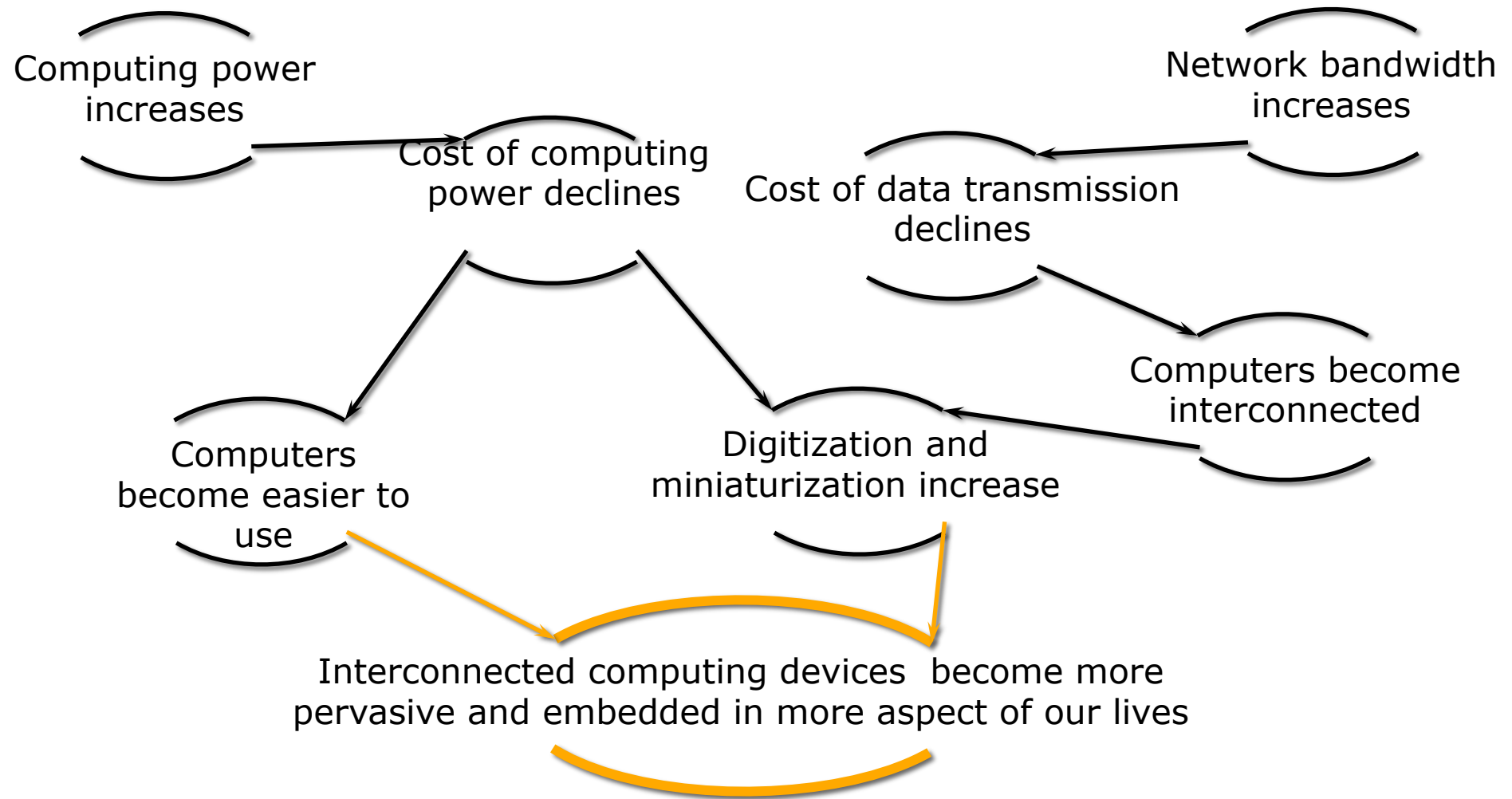
Lessons learned

- Managers have to make educated decisions about *the use* of IT

- Organizations use new IT to serve growing/changing business needs

- Savvy managers partner with IT pros to ensure information systems success

- Managers may or may not be end-users of the new systems they help introduce

IS ≠ IT

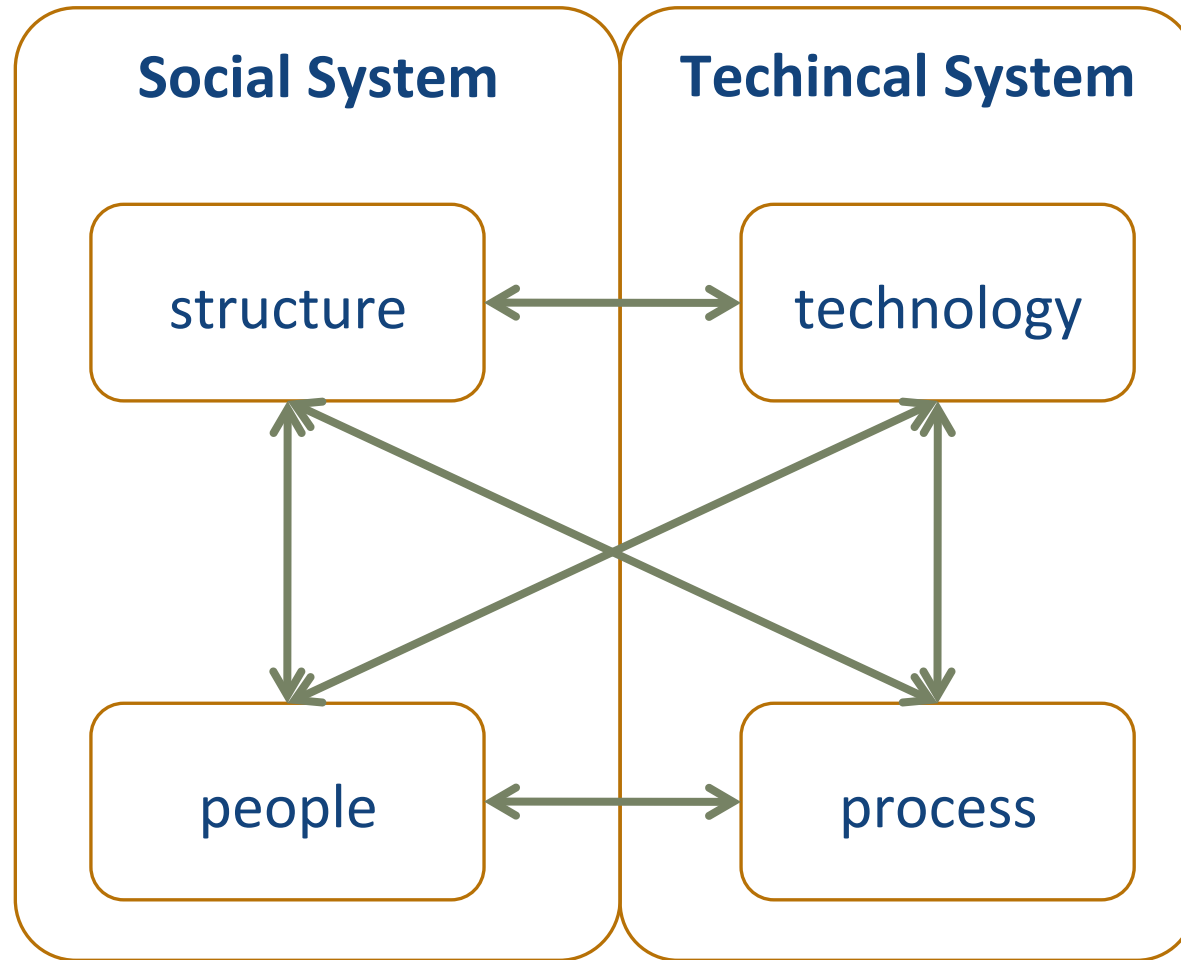Information Systems and Information Technology have in common the term **Information**

The real issue is **Information** and NOT Information Technology

- Although **nowadays** the two terms may appear synonymous, just because of the spread of IT devices in the everyday personal and professional life

- Under certain conditions, it is debatable whether IT pervasivity is strictly necessary even in complex organizations

- It's not a given that - as a manager - you should ask your organization to make investments in IT
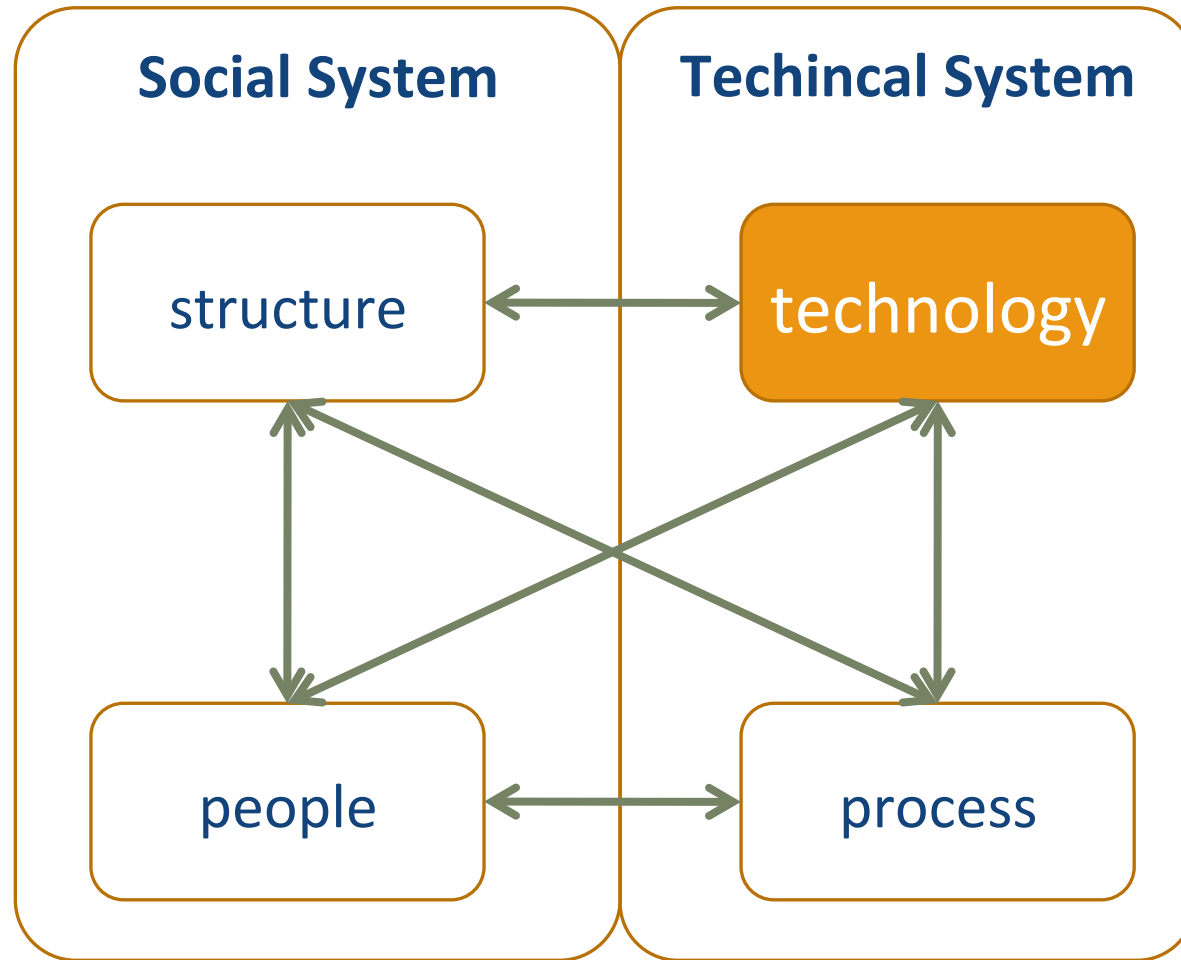
Information System: a definition

Formal, socio-technical,
organizational system designed to
collect, process, store, and distribute information

Four Components of an Information System

Social System

Techincal System

structure ←→ technology

people ←→ process

Four Components of an Information System

Social System

structure

people

Techincal System

technology

process

Digital Innovation

What makes computers (IT) so unique compared to other technologies?

We need to dig deeper:
- ◦ CPU
- ◦ RAM
- ◦ SD Cards
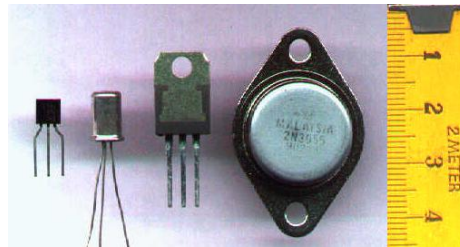- ◦ Flash Memory drives

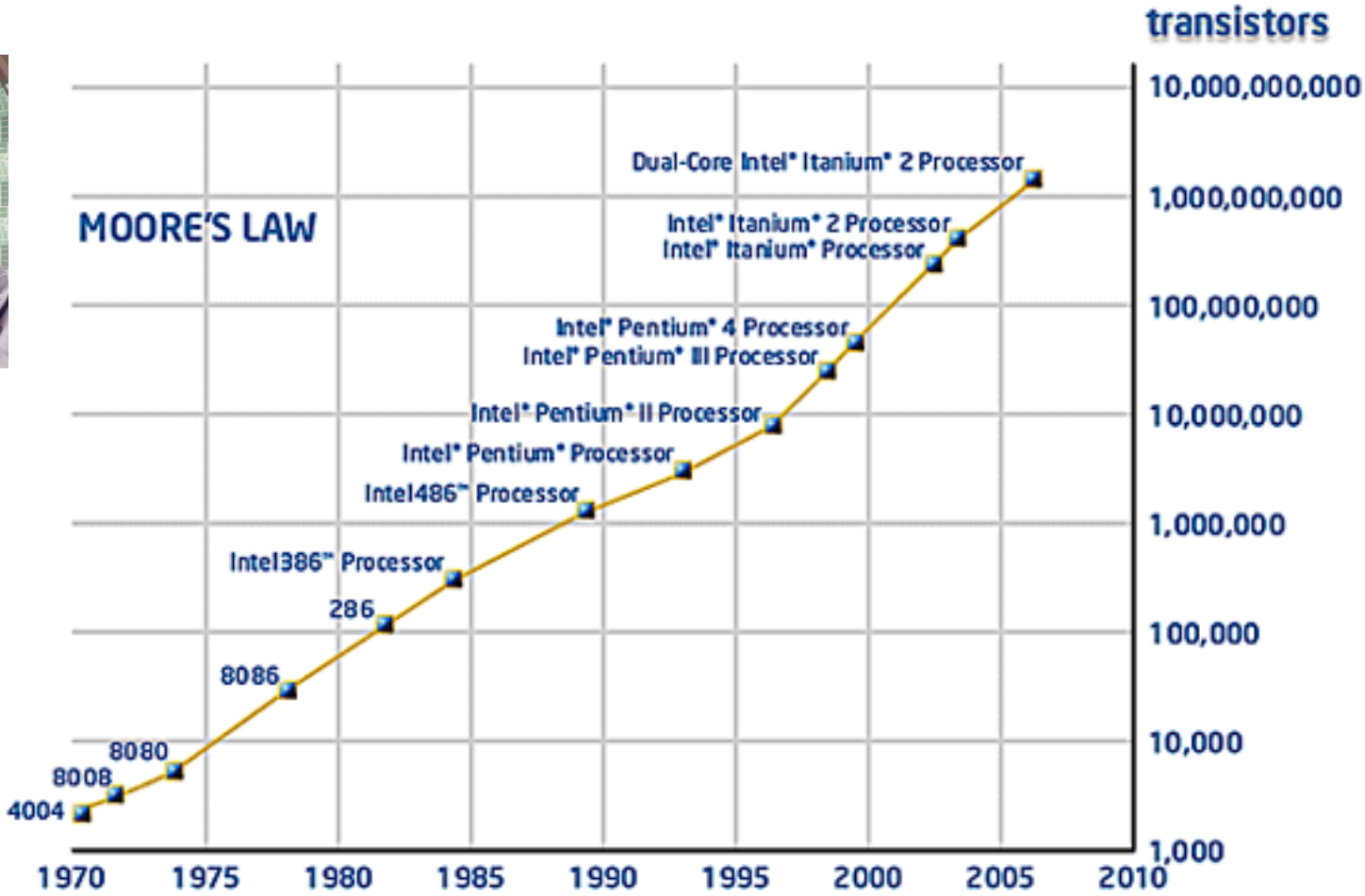they are all made by "microchips" (aka "chips")

From microchips to transistors

Chips are made by transistors

Microchips makers have been improving transitors through a continuous miniaturization that follows
the **Moore's Law**:
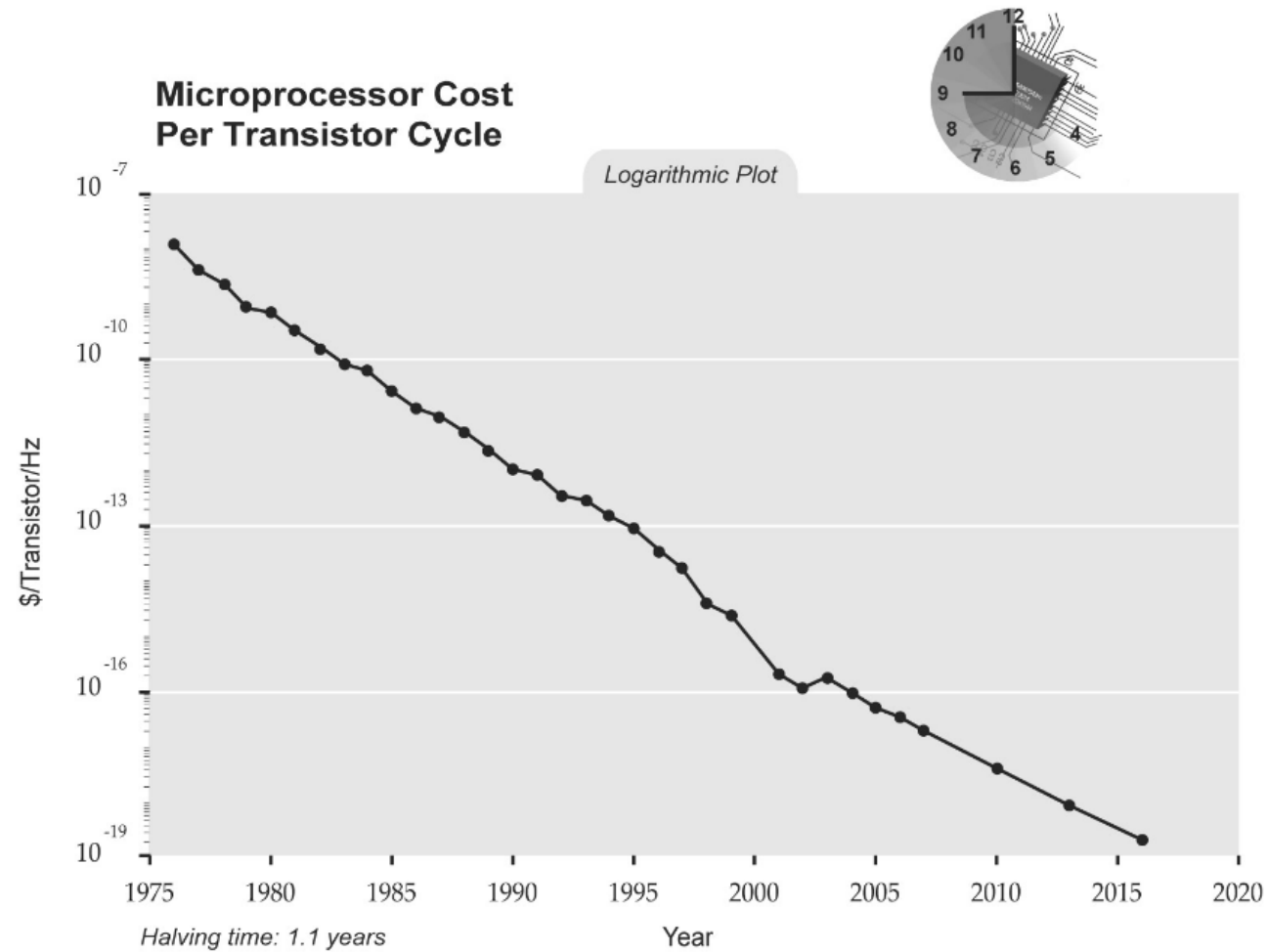
<p style="text-align:center; color:red;">every about 18 months
the number of transistor per cm^2 doubles</p>

Moore's Law

CPU's dropping prices

Microprocessor Cost Per Transistor Cycle — Logarithmic Plot. $/Transistor/Hz vs Year (1975–2020). Halving time: 1.1 years
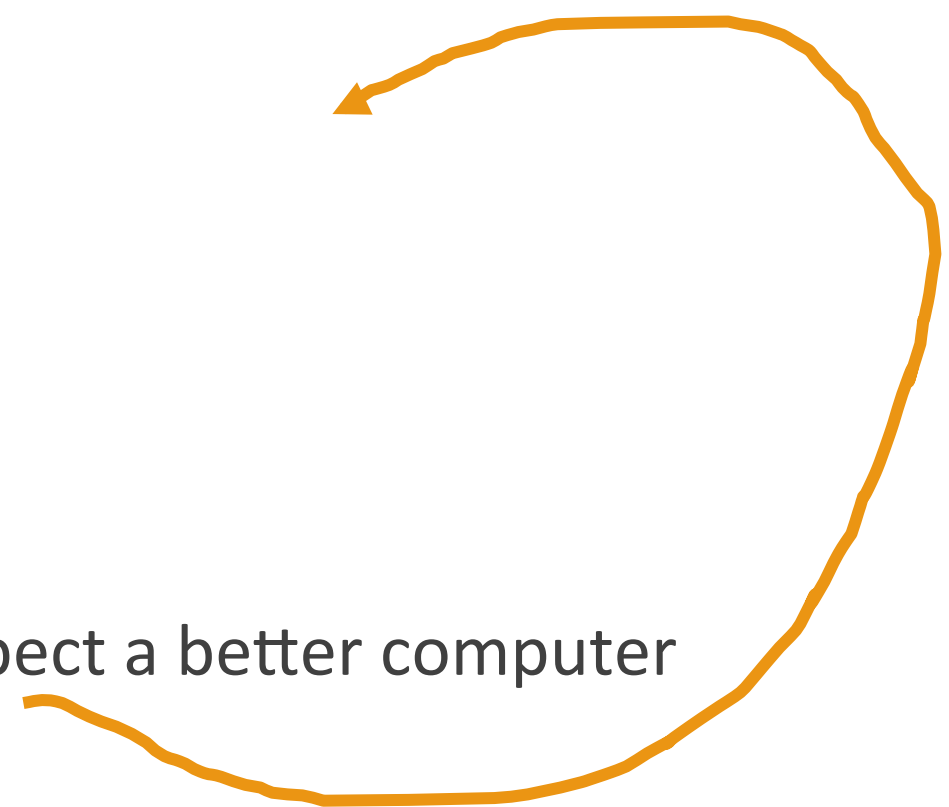
Moore's law effects in technological terms

Why the Moore's law (still) works ?

every 1.5 year a better HW is available
(Moore's Law)

→ better OS

→ better SW applications

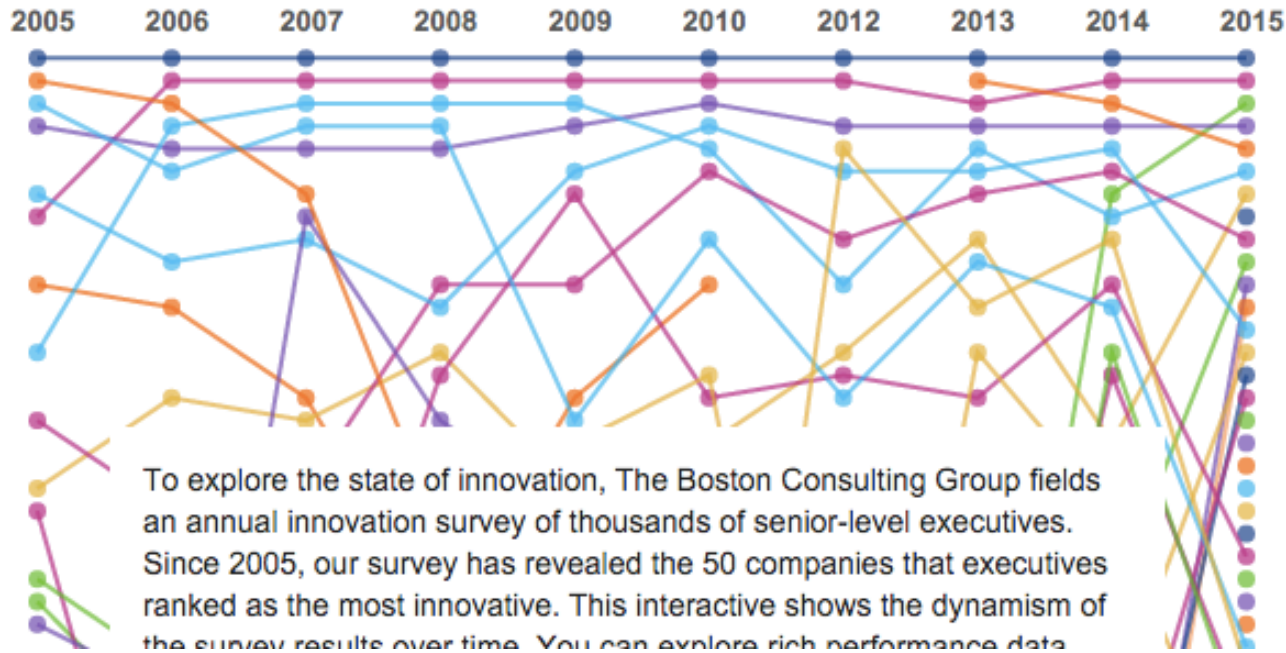→ higher users expectations: users expect a better computer

Moore's Law effects in business terms: innovative companies

THE **MOST INNOVATIVE** COMPANIES
AN INTERACTIVE GUIDE

2015 BCG Global Innovators Survey

To explore the state of innovation, The Boston Consulting Group fields an annual innovation survey of thousands of senior-level executives. Since 2005, our survey has revealed the 50 companies that executives ranked as the most innovative. This interactive shows the dynamism of the survey results over time. You can explore rich performance data

2015 rank	Company	Revenue	EBIT	TSR	R&D spending
1	Apple	7.0	7.2	40.4	35.0
2	Google	10.3	19.8	−6.1	24.3
3	Tesla Motors	58.8	NA	47.9	100.4
4	Microsoft	11.0	0.0	27.5	5.8
5	Samsung	−9.8	−32.0	−1.8	4.3
6	Toyota	16.4	73.5	21.1	0.4
7	BMW	5.7	11.6	8.3	−0.2
8	Gilead	122.2	235.0	104.5	18.1

Moore's Law effects in business terms: innovative companies

EXHIBIT 2 | 2015 Most Innovative Companies

1. Apple	18. The Walt Disney Company	35. Volkswagen
2. Google	19. Marriott International	36. Visa
3. Tesla Motors	20. Johnson & Johnson	37. DuPont
4. Microsoft Corp.	21. Netflix	38. Hitachi
5. Samsung Group	22. AXA	39. Roche
6. Toyota	23. Hewlett-Packard	40. 3M
7. BMW	24. Amgen	41. NEC
8. Gilead Sciences	25. Allianz	42. Medtronic
9. Amazon	26. Tata Motors	43. JPMorgan Chase
10. Daimler	27. General Electric	44. Pfizer
11. Bayer	28. Facebook	45. Huawei
12. Tencent	29. BASF	46. Nike
13. IBM	30. Siemens	47. BT Group
14. SoftBank	31. Cisco Systems	48. MasterCard
15. Fast Retailing	32. Dow Chemical Company	49. Salesforce.com
16. Yahoo!	33. Renault	50. Lenovo
17. Biogen	34. Fidelity Investments	

Source: BCG Global Innovation Survey, 2015.

Moore's law effects in economic terms

Rise of the IT industry

Concentration of IT industry

Convergence of several industries (e.g. automotive, public transportation and IT)

Servitization of manufacturing

How long will it last?

Readings on Moore's Law

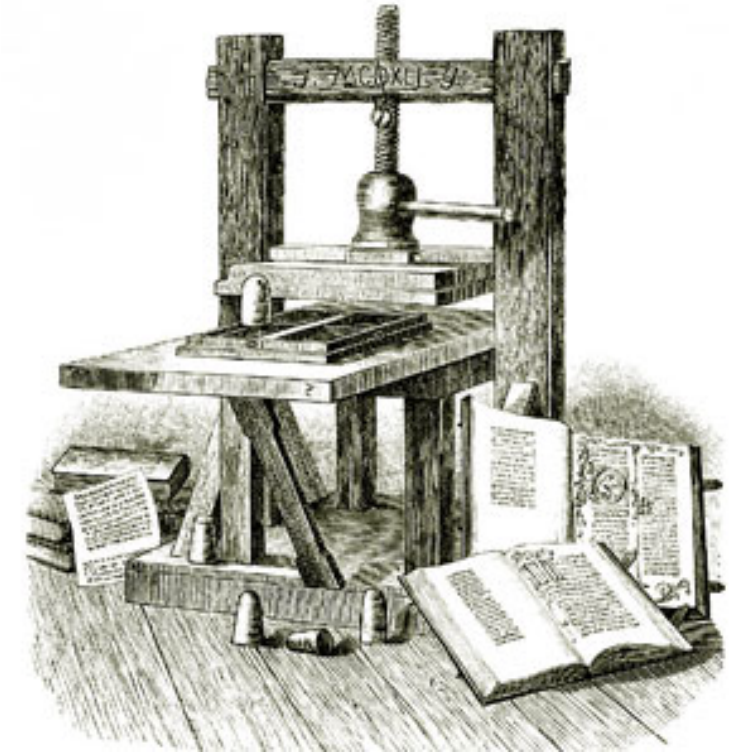Read the following articles and answer "tweet style" these questions:
1. what are the main effects of the Moore's law inside and outside the IT industry
2. what are the conditions under which the Moore's law may come to an end

2015 09 27 NYT: Smaller, Faster, Cheaper, Over The Future of Computer Chips
http://nyti.ms/1iSQ35l

2015 04 25 The Economist: Moore's law turns 50
http://www.economist.com/node/21648683/print

2016 03 12 The Economist: After Moore's law

http://www.economist.com/technology-quarterly/2016-03-12/after-moores-law

2016 02 Nature - More than Moore
http://www.nature.com/news/the-chips-are-down-for-moore-s-law-1.19338

Information Systems Management

DIGITAL TECH TRENDS - 2

SAMUELE ASTUTI

WHAT exactly IS Internet?

WHAT IS WEB 2.0,
AS I SEE IT FROM MY COMPUTER?

From Web to Web 2.0: what changes

Web
- ◦ The user can **search** information

Web 2.0
- ◦ The user can **create** and **share** information

Structure of a PC "using Internet" (2013)

Web Services

| Wikipedia | Google Search |

Web Services "2.0"

| Twitter | Facebook |

Browser(es. MS Internet Explorer, Firefox, Chrome)

Data (Database / File)

Operating System (Windows)

Hardware (physical devices)
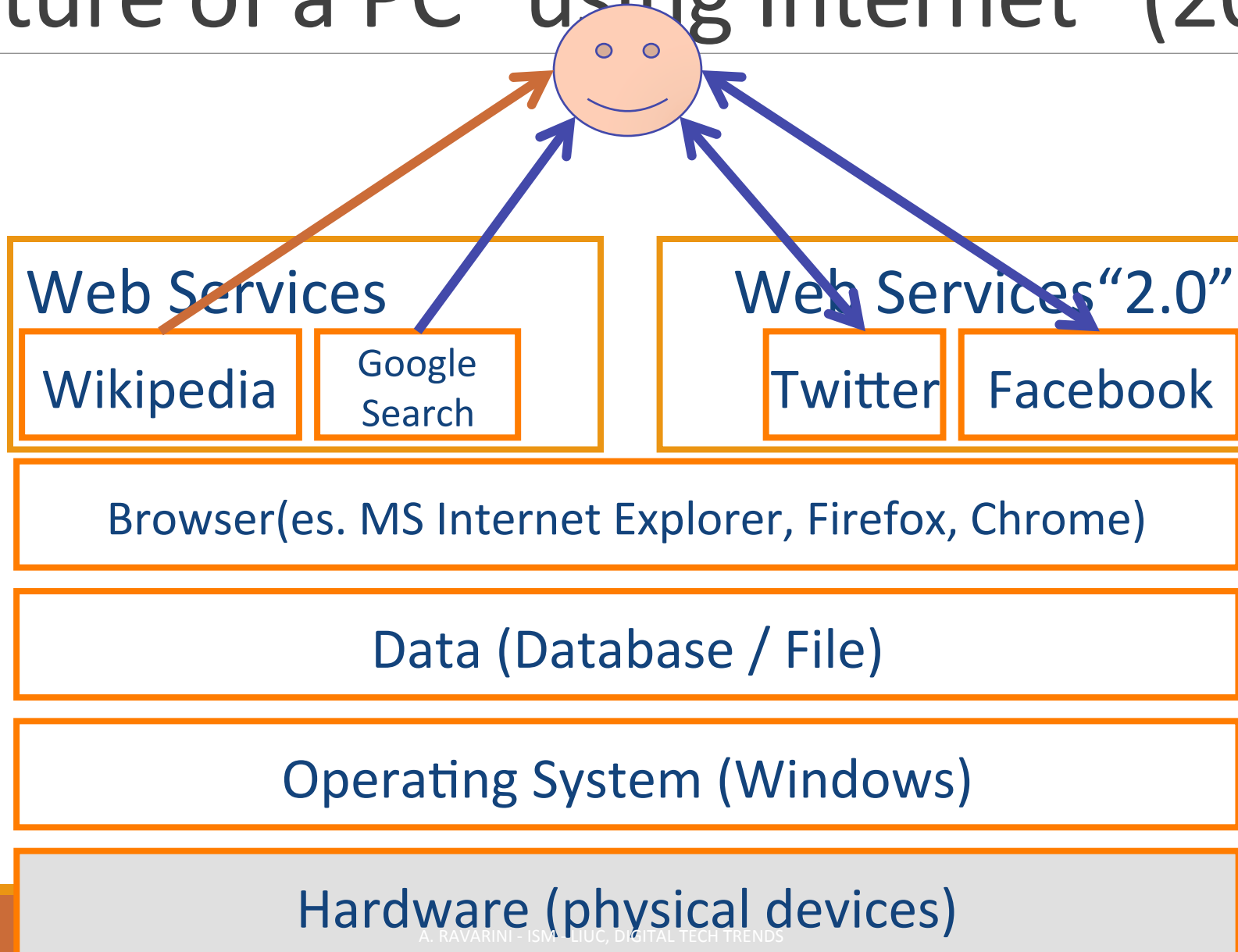
WHAT exactly IS Internet?

WHAT IS INTERNET (SIMPLIFIED)

Defining Internet

This is just *a* possible, simplified representation of Internet, or, more precisely, of the architecture of a computer connected to the Internet

What is the Internet, then?
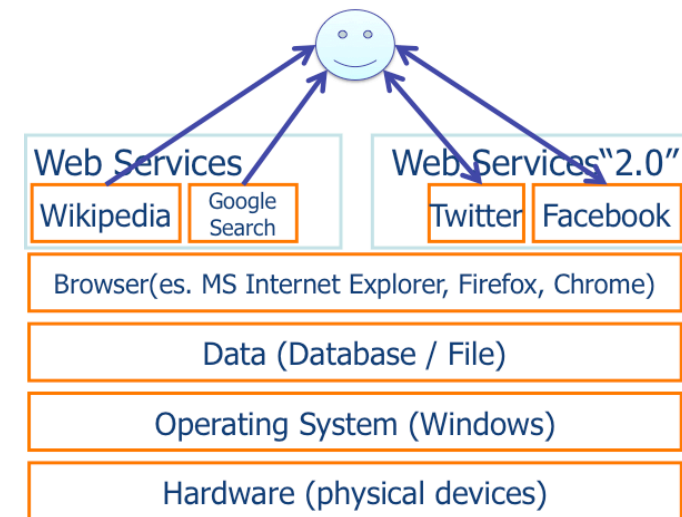
Internet = ?

From an ethimological point of view

- "Inter" = *between*
- "Net" = A piece of open-meshed material made of twine, cord, or something similar, used typically for catching fish or other animals (Oxford Dictionary)

    → a set of **nodes** **interconnected**

Internet = metaphor to describe a set of sets of nodes interconnected

In this metaphor, what corresponds to the nodes?

The Internet /1 = devices + cables + wireless systems

http://www.submarinecablemap.com/
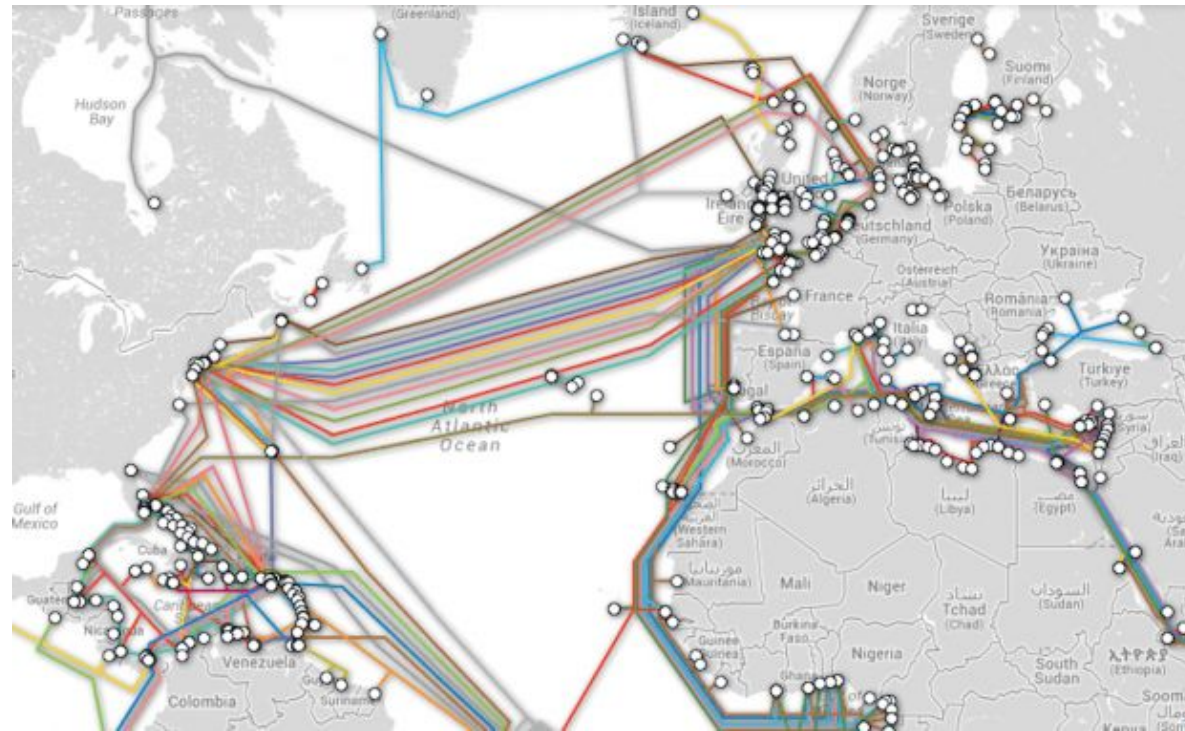
The Internet /2 =
Information exchanged exploiting the physical infrastructure (Internet /1)

The Internet /3 = Internet users

The Internet /3 = Internet users

The Internet = Internet users?

THE NEXT BILLION
INTERNET USERS:
What Will They Look Like?

The Internet =
Information exchanged on the Internet?
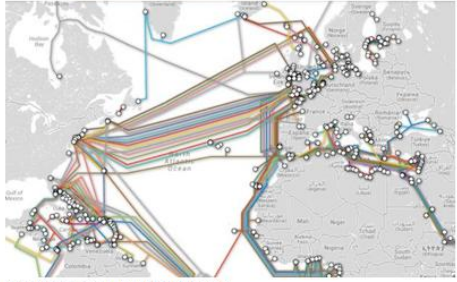
http://www.tweetping.net/
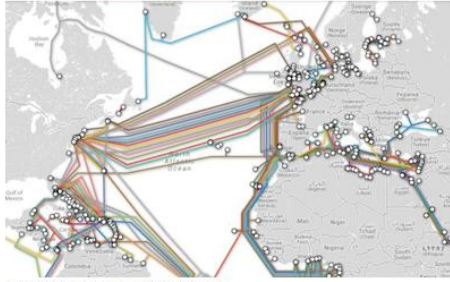
The Internet = devices and cables and
wireless systems?

http://www.submarinecablemap.com/

Architecture of the Internet

People	
Applications	
Physical infrastructure	

Internet

- **the Internet:** An infrastructure upon which many services (App layer) are delivered to individuals *(People layer)*
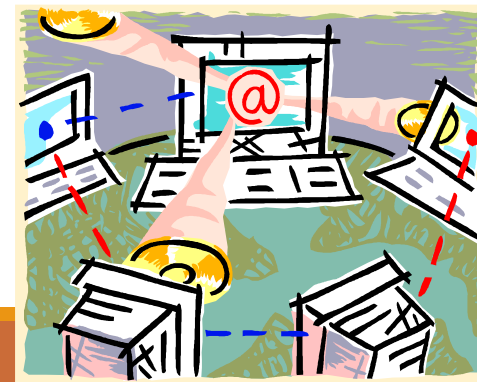
Physical infrastructure layer:

◦ The worldwide, publicly accessible system of interconnected computer networks that transmit data by packet switching using the standard Internet Protocol

Application/messages layer

◦ When using the app called Browser
→ the Web (Internet ≠ the Web!)

People interaction layer

Characteristics of Internet -1

Distributed ownership: Different portions of the Internet are owned by different entities

Multiplicity of devices: The Internet consists of millions of smaller digital networks, a collection of digital devices (nodes)

Characteristics of the Internet -2

Open standards: The agreed upon set of rules or conventions governing communication among Internet nodes are freely available to everyone

The Internet is rapidly evolving.
◦ Network and grid computing
◦ Wired and wireless connections of a range of intelligent devices

Keep on working on Assignment2

Imagine the following situation: you have been recently hired in the Operation Department of a multinational corporate. The COO has just deliver to you a few reports (listed below) that present the most important "Digital Tech Trends" for 2015-16.
You are asked to make a synthesis (an executive summary) of no more than 5 slides, in which you
- identify the main "streams" (or "mega-trends") of Tech Trends that emerge my merging all the reports
- describe one of the "streams" (or "mega-trends") of the Tech Trends you identified.