

Week 3. Effects of digital technology on economic activity

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Evolution of computing power

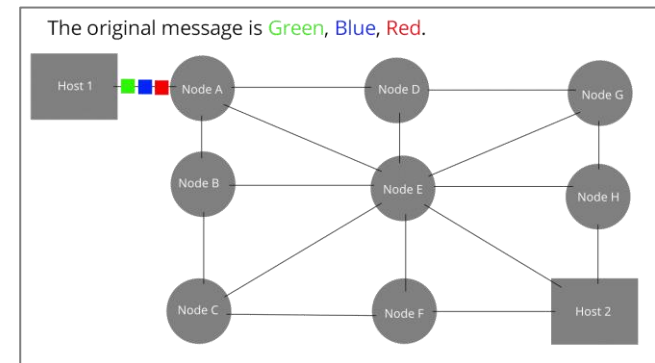
- 1st computers – little capacity for memory & information retrieval => *arithmetical benefit*
- Development of magnetic core memories => *non-arithmetical benefit*: **lower marginal cost of reproducing information**
- Moore's Law of Productive Technology
 - G. Moore - former chairman of Intel, one of the founding fathers of the chip industry
 - available computing power quadruples every 30 months
- Semiconductor technology vs. microprocessor (*a computer on a chip*)

Computing power growth

- Computing power as measured in MIPS (*million instructions per second*)
- Expression of computing power growth: 2 to the power of n where n is the current year minus 1986
 - 1987: $2^1 = 2$ MIPS
 - 1990: $2^4 = 16$ MIPS
 - 1997: $2^{11} = \text{over } 2 \text{ BIPs}$
- Next steps - quantum computing

Computers' effect on economy

- Limited communication between computers = limited effect on the economy
- Key inventions of 1960-70s
 - packet switching to break & re-assemble messages
 - TCP/IP - defines internet communication
- Browsers and search engines layered on top of TCP/IP
 - increased collection and use of data

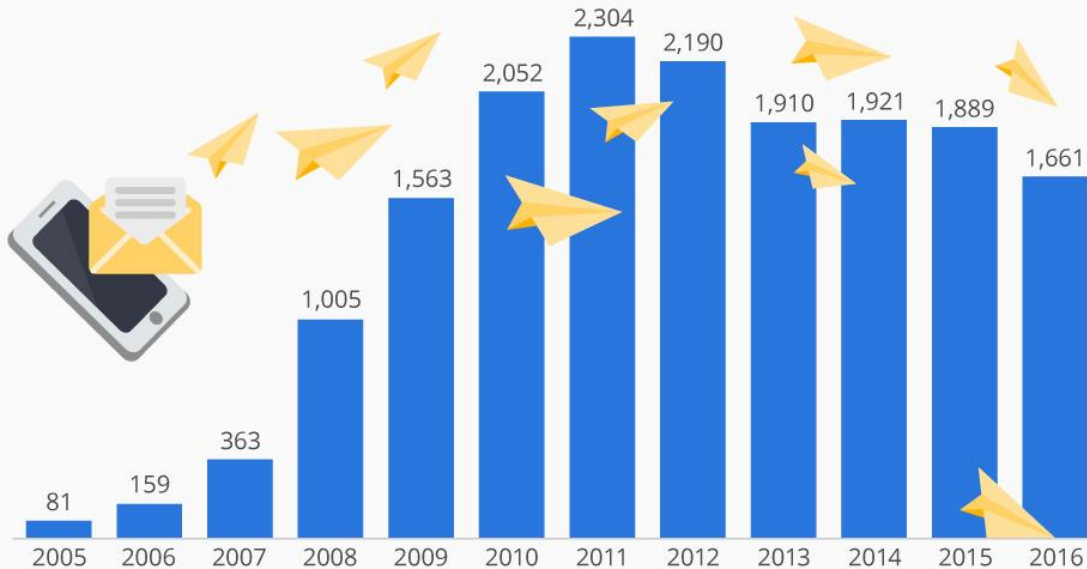


iStockphoto

Evolution of communication

Texting Turns 25 But Is Clearly Past Its Prime

Annual number of SMS messages sent in the United States (in billions)



@StatistaCharts Source: CTIA

statista



Orbitel-901

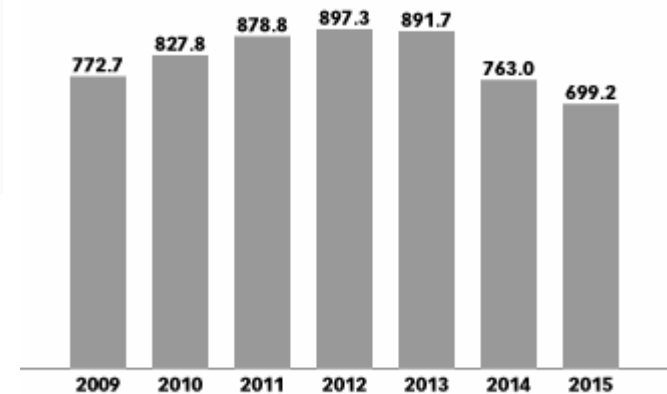
Released: 1992

Display: LCD

Weight: 2,1kg

Text Messages Sent in China, 2009-2015

billions



Source: Ministry of Industry and Information Technology (MIIT) - People's Republic of China, Jan 21, 2016

160792

www.eMarketer.com



Motorola-Micro 1989

Price tag: \$3000

New communication as enabler

- The mobile web
 - 2014 mobile data traffic increased by 81%
 - PC activities are moving to mobile devices
- Geospaciality
 - Web surfing is now augmented
- Internet of Things
 - Possibility for exponential change in business model innovation

New communication as enabler – cont.

- The Cloud
 - Internet as global computer on which human activity *creates value*
 - For companies - decreases costs and increases integration
 - Software as a Service (SaaS): users log into a service or program without having to install (examples: Amazon, Google, Oracle Cloud)
- OVERALL: **decentralization of internet activity**

Net neutrality

- Internet service provider should treat all data in the same way
 - regardless of *provider*
 - regardless of *content*
 - (*internet service provider vs internet content provider*)
- Companies cannot pay an internet service provider to have faster speeds
 - Netflix pays the same to send a gigabyte of data to one of their customers as a small startup would pay to send data to the same customer.

Effects of digital technology on economic activity

- Search costs reduction
 - low search costs make it easier consumers to compare prices, => puts downward pressure on prices for similar products
- Reduction of replication costs
 - replication cost of digital goods is 0
- Lower transportation costs
 - the cost of distribution for digital goods approaches 0
- Lower tracking and verification costs
 - information stored automatically
 - enables personalization and the creation of one-to-one markets