E-Commerce Revolution and Its Success Factor

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Yesterday: the Evolution of e-Commerce

- The Early Years,
- 70s. the facilitation of commercial transactions electronically,
  - Electronic Data Interchange (EDI) and
  - Electronic Funds Transfer (EFT)
- 80s
  - The growth and acceptance of credit cards
  - Automated teller machines (ATM)
  - Telephone banking
  - Airline reservation system

Yesterday: the Evolution of e-Commerce

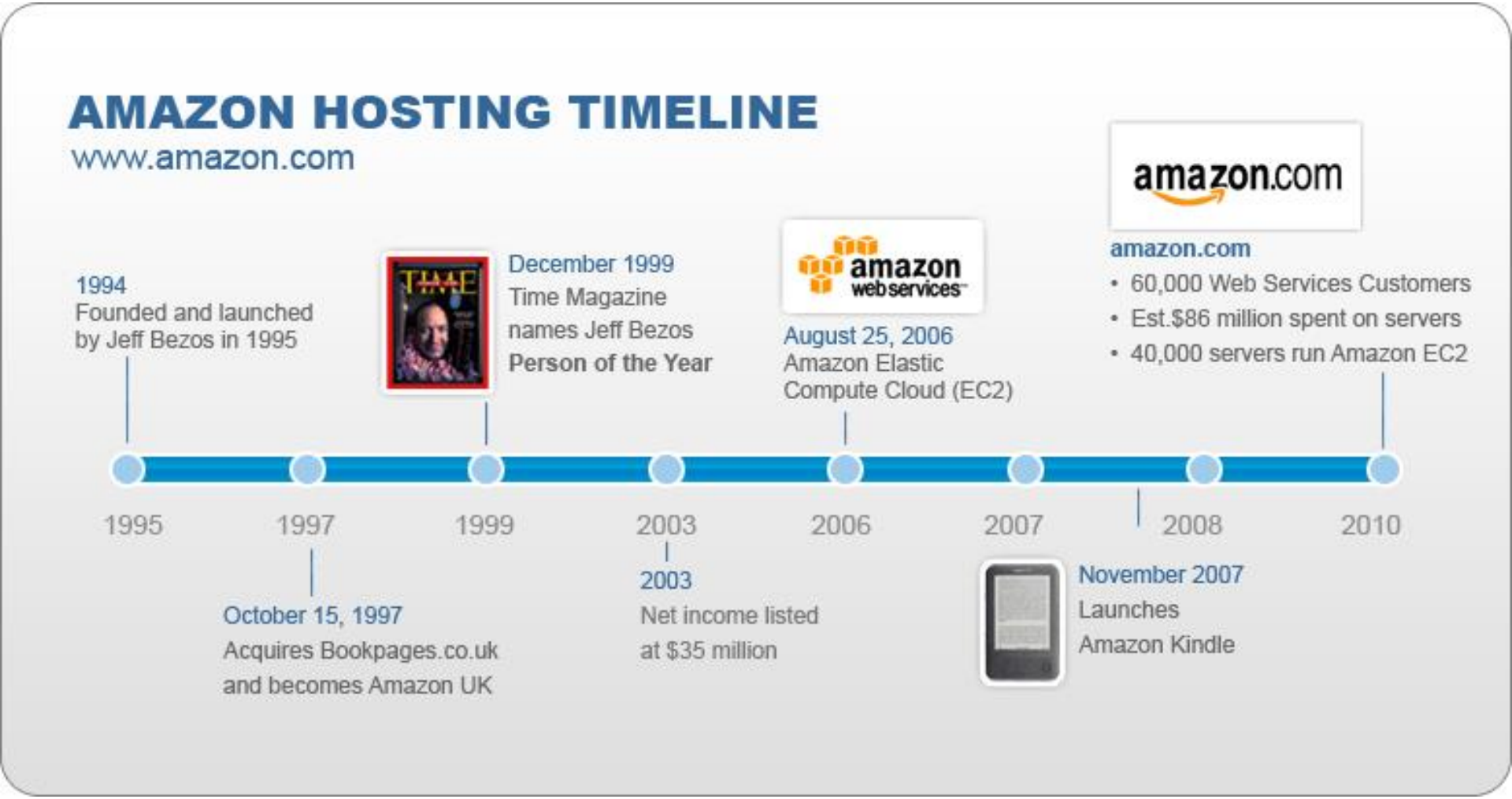
- **Emerging Stage: 90s**
  - The Internet commercialized and users flocked to participate in the form of dot-coms, or Internet start-ups
  - Innovative applications ranging from online direct sales to e-learning experiences
  - 1995: Jeff Bezos launches **Amazon.com**; eBay is founded by computer programmer Pierre Omidyar as AuctionWeb.
  - 1999: Alibaba Group is established in China.
  - 1997—2000: many companies in Western Europe and US started their e-commerce websites

Yesterday: the Evolution of e-Commerce

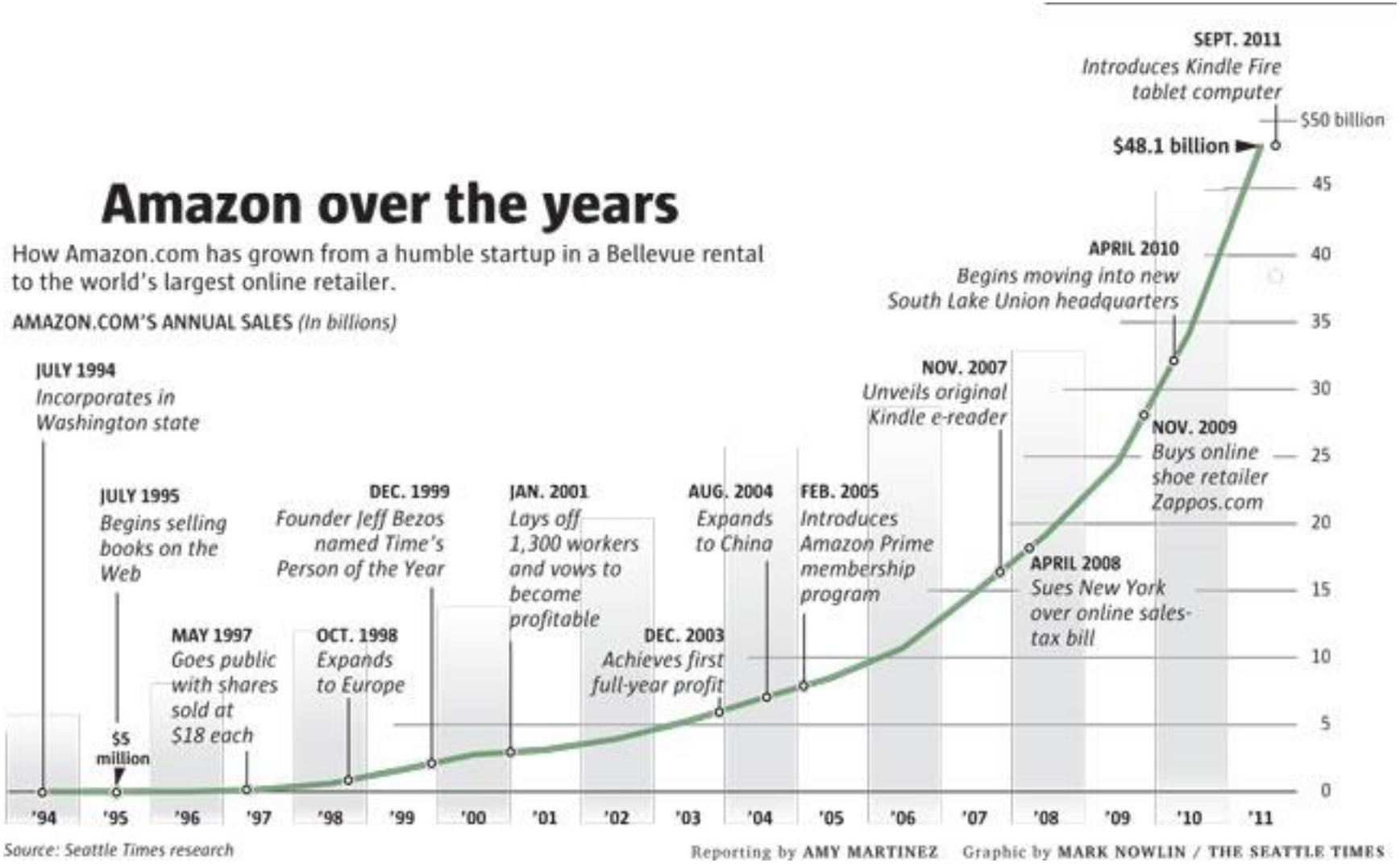
Growth and development:

- 2000: The dot-com bust.
- 2001: Alibaba.com achieved profitability.
- 2002: eBay acquires PayPal for $1.5 billion.
- 2003: Amazon.com posts first yearly profit.
- 2009: Zappos.com acquired by Amazon.com for $928 million.
- 2009: B2B transaction became the largest part of e-commerce, US$700 billion in sales

Case of Amazon



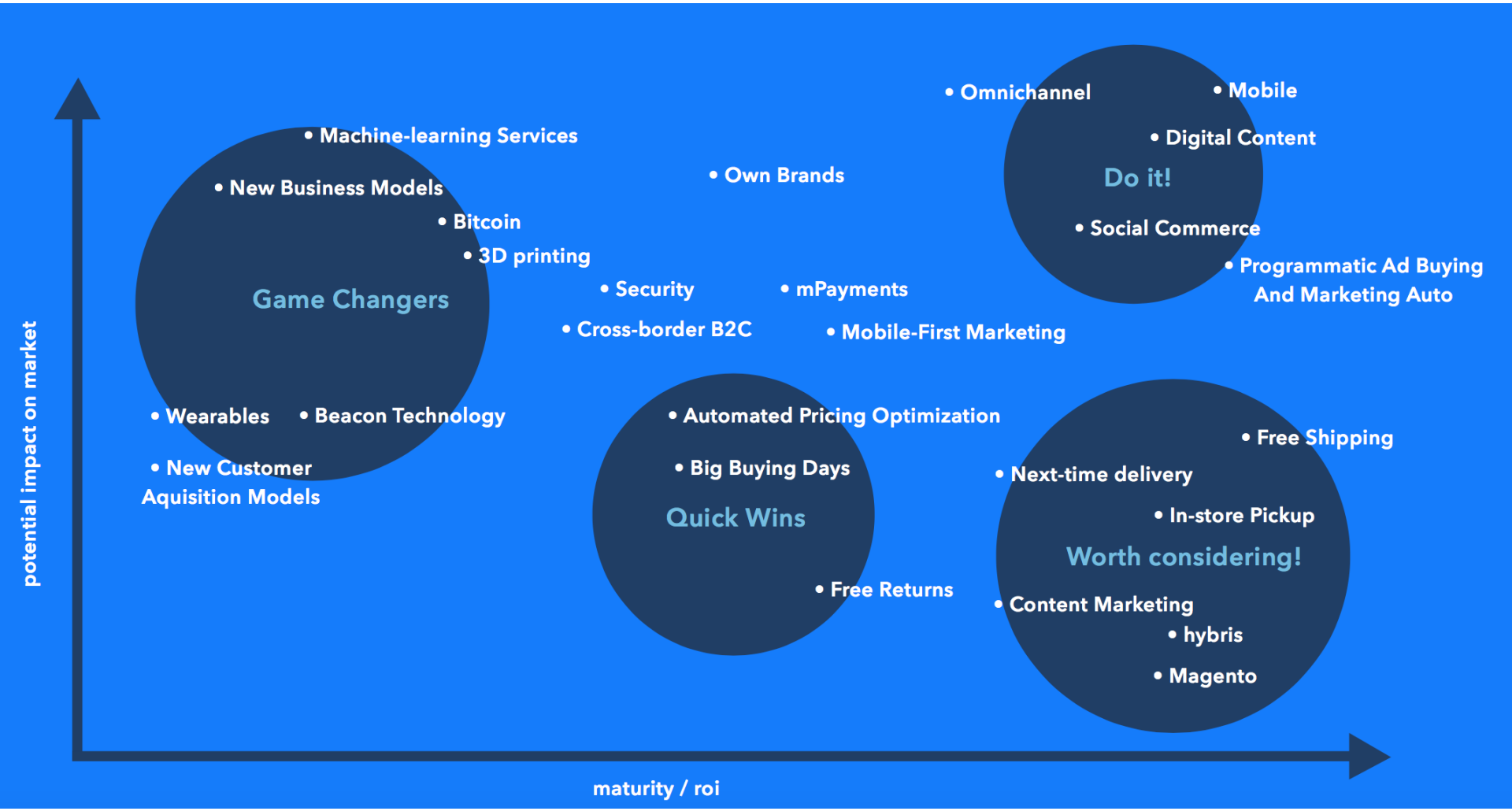
Case of Amazon



Today: New Era of e-Commerce

- Customers are ready: Change of shopping behavior
- Challenges Brick-and-mortar retailers are facing
- Omni Channel: Buy-online-pick-up-in-store (BOPIS) and ship-from-store (SFS)
- Mobile purchase

Overview of Today's e-commerce

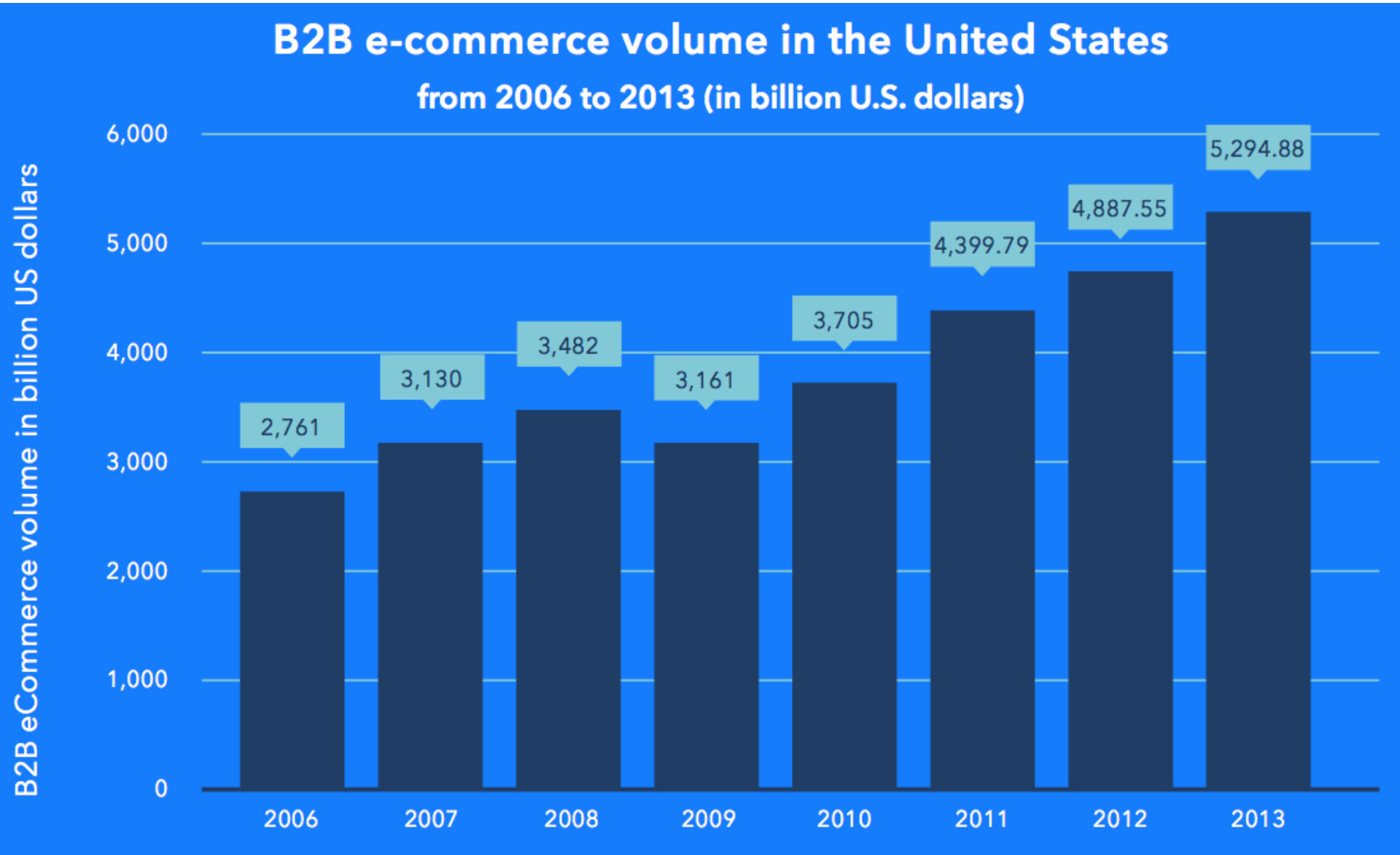


B2C e-Commerce sales

Where to invest – The 2015 Global Retail E-Commerce Index™

Rank	Change in rank	Country	Online market attractiveness score
1	+2	United States	79.3
2	-1	China	77.8
3	+1	United Kingdom	74.4
4	-2	Japan	70.1
5	+1	Germany	66.6
6	+1	France	59.3
7	-2	South Korea	58.9
8	+5	Russia	48.7
9	+15	Belgium	45.6
10	-1	Australia	43.6
11	-1	Canada	43.1
12	+2	Hong Kong	42.2
13	+6	Netherlands	41.8
14	-3	Singapore	41.5
15	+13	Denmark	41.4

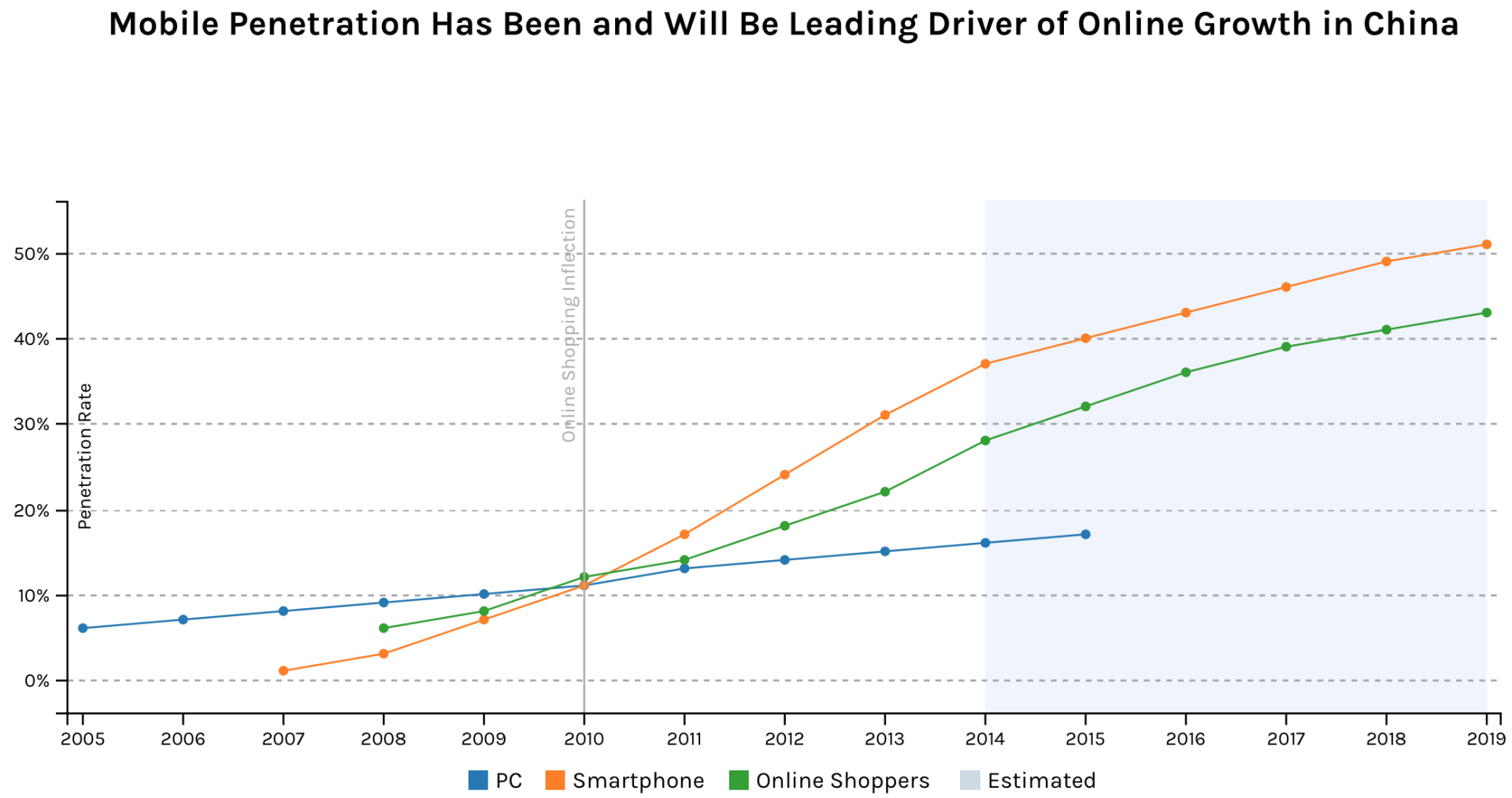
B2B


B2B e-commerce volume in the United States
from 2006 to 2013 (in billion U.S. dollars)
B2B eCommerce volume in billion US dollars
6,000
5,000
4,000
3,000
2,000
1,000
0
2,761
3,130
3,482
3,161
3,705
4,399.79
4,887.55
5,294.88
2006
2007
2008
2009
2010
2011
2012
2013

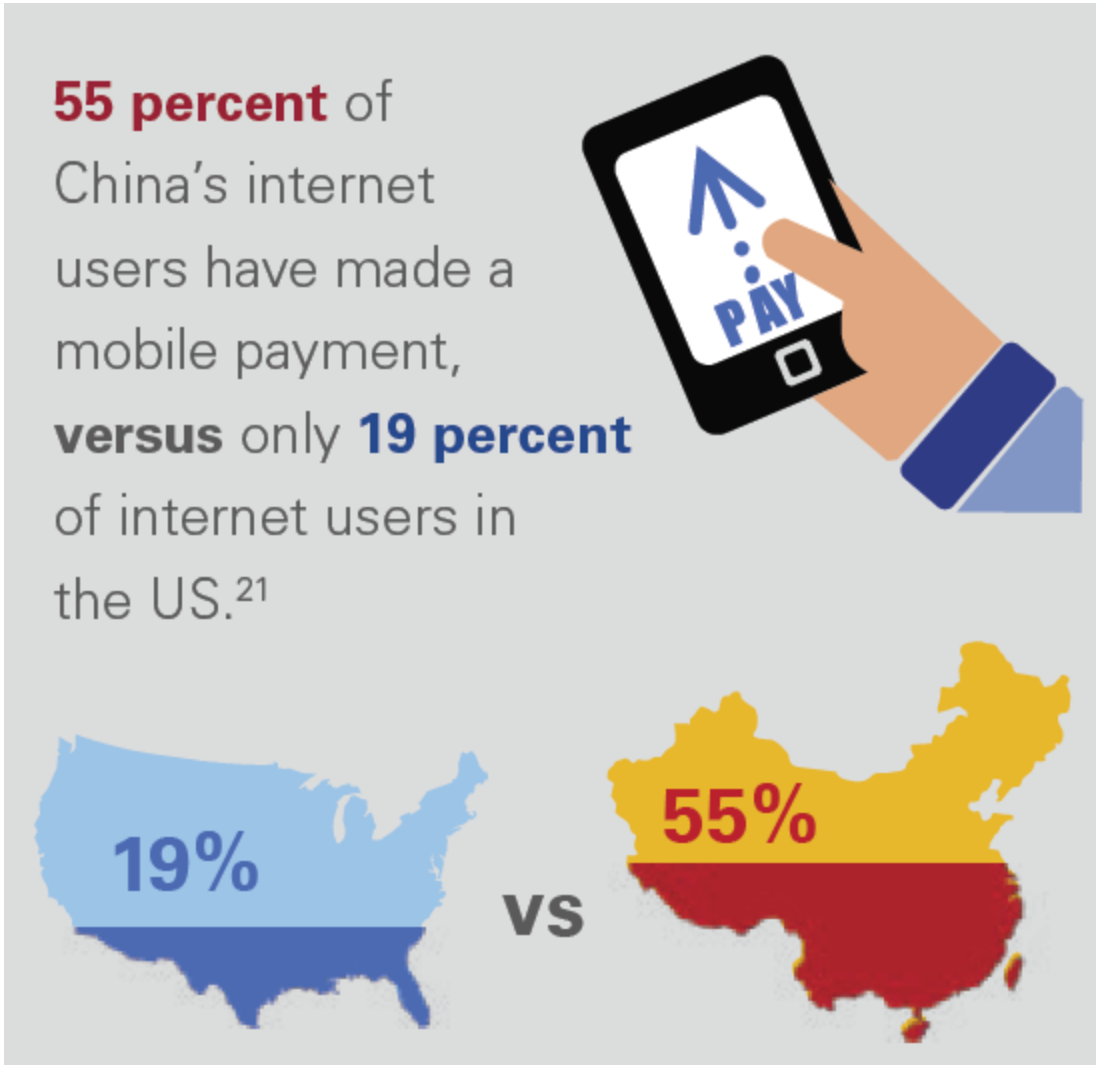
Amazon and Alibaba, will own 39% of the global online retail market in 2020

1. Taobao – 601 m UU/mo
2. Amazon – 524 m UU/mo
3. eBay – 268 m UU/mo
4. Alibaba – 107 m UU/mo
5. Alipay – 104 m UU/mo
6. Rakuten – 65 m UU/mo
7. Flipkart – 65 m UU/mo
8. Fiverr – 53 m UU/mo
9. Etsy – 44 m UU/mo
10. Snapdeal – 30 m UU/mo

Rise of Mobile Commerce



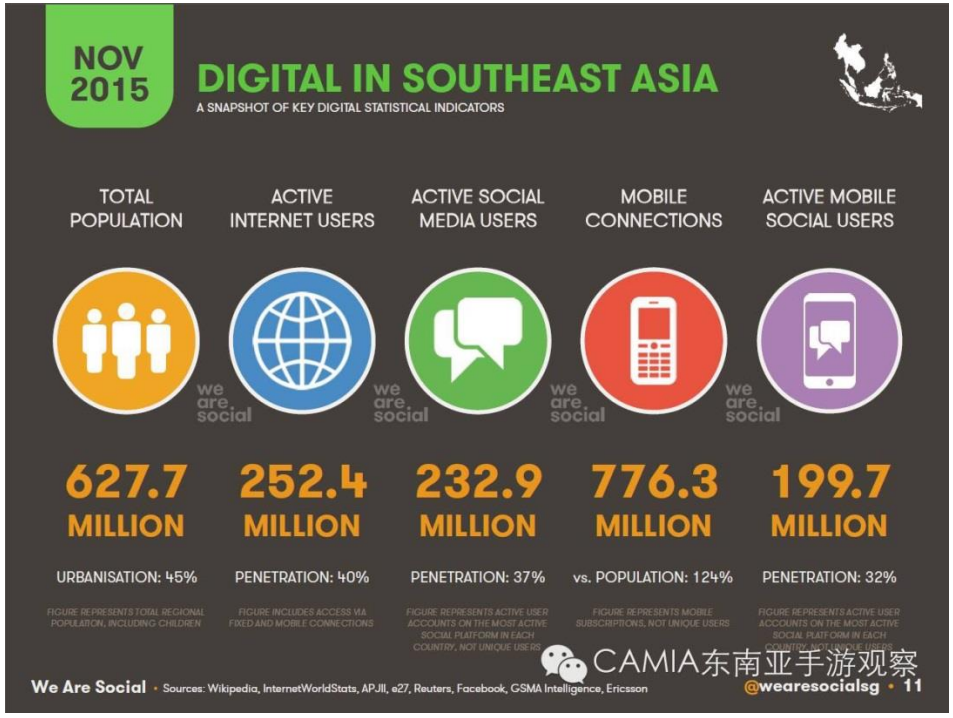
Mobile Purchase: the new page

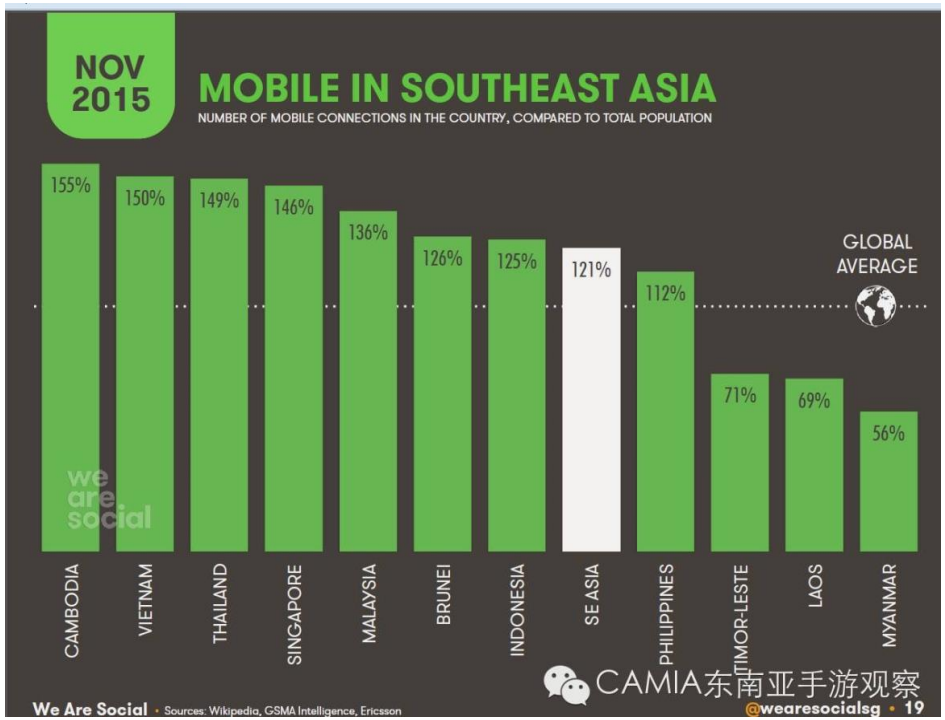


- Mobile purchasing aligns with the Chinese consumer's desire for speed, and the convenience of 'any time' shopping. According to data presented by Taobao, the busiest time of the day for mobile shopping is 10pm, and purchases made by mobile devices are 67 seconds faster than purchases made on personal computers.

Social Commerce

e-Commerce in Southeast Asia

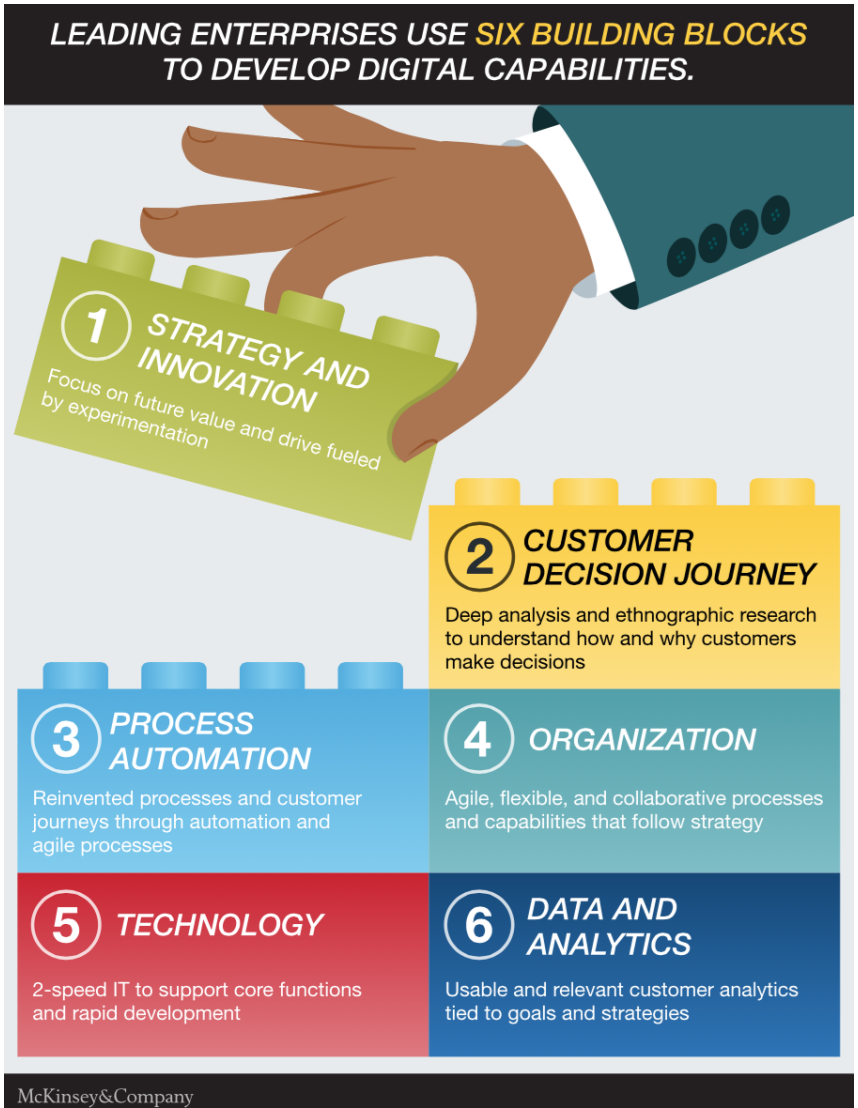




E-Commerce in Singapore

- Well developed ICT infrastructure in terms of internet, mobile phone penetration, payment systems, logistic chain and social media.
- Singapore's online shopping market is expected to reach US$2.7 billion in 2014 and to grow significantly to US$3.45 billion by 2015, which accounts for 15% of total retails volume.
- Mobile commerce is on rise, with 55% online shoppers choosing mobile purchase.
- 60% of the online sales come from cross border e-commerce
- Omni-channel strategy is the key success factor.

Six Building Blocks for better e-commerce enterprise



- Strategy and Innovation
- Customer decision journey
- Process automation
- Organization
- Technology
- Data and Analytics

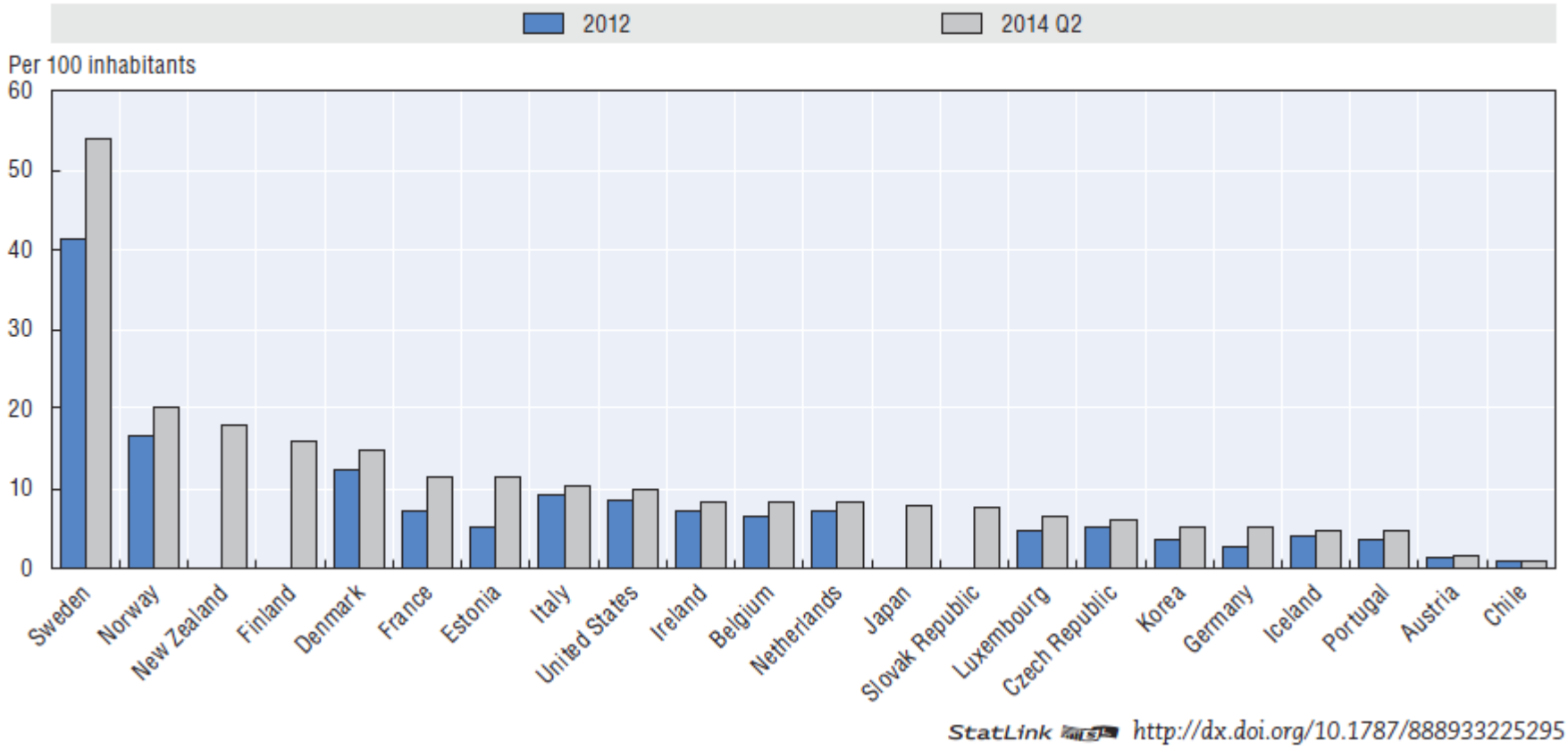
Tomorrow: Internet of Everything

- Internet of Things
- Industry 4.0

Internet of Things (IoT)

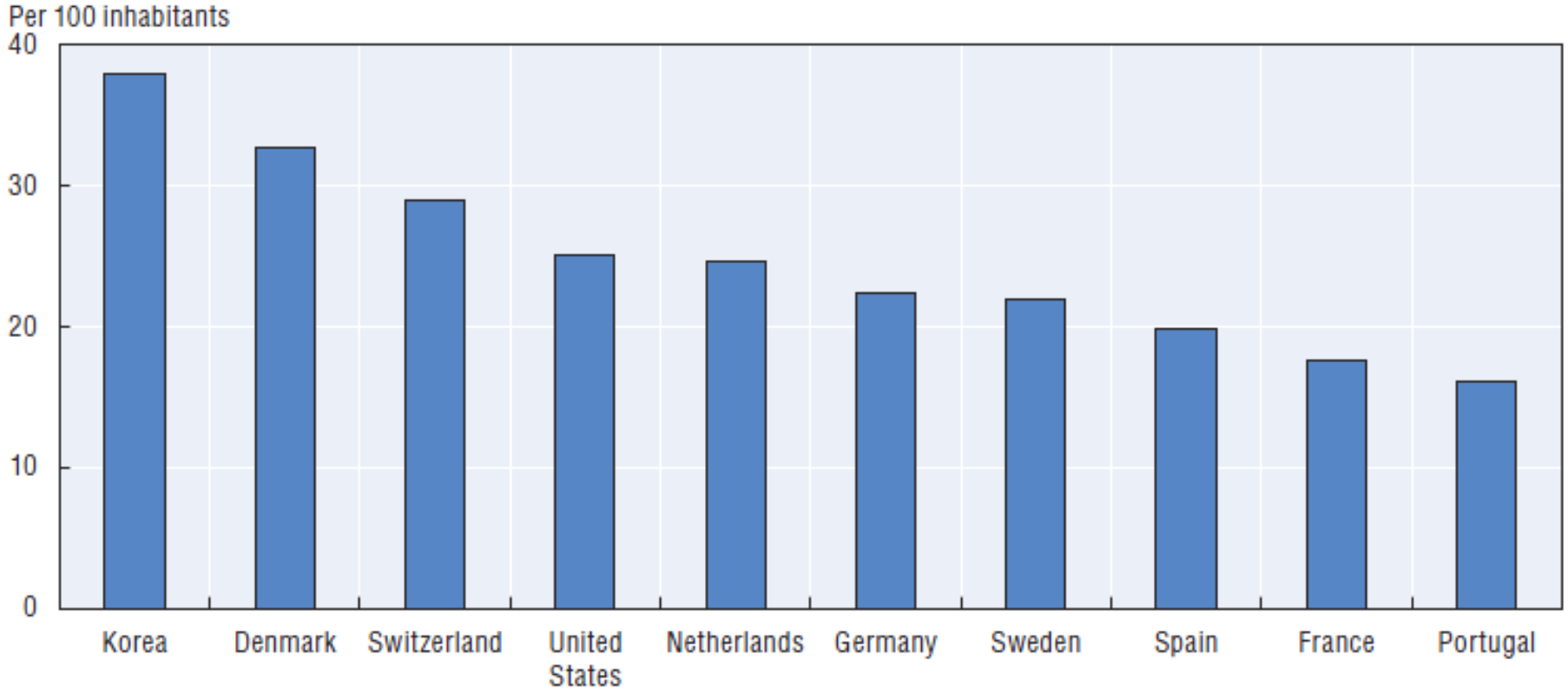
- In 2015 OECD's digital economy outlook, Internet of Things are listed as the major emerging issues.
- The IoT in broad terms is defined to include all devices and objects whose state can be altered via the Internet, with or without the active involvement of individuals.
  - Heart and brains (Laptops, routers, servers, tablets)
  - Things (furniture, air conditioner, …)

Number of M2M/embedded mobile cellular subscriptions, per 100 inhabitants



StatLink http://dx.doi.org/10.1787/888933225295

Devices online per 100 inhabitants, top OECD countries

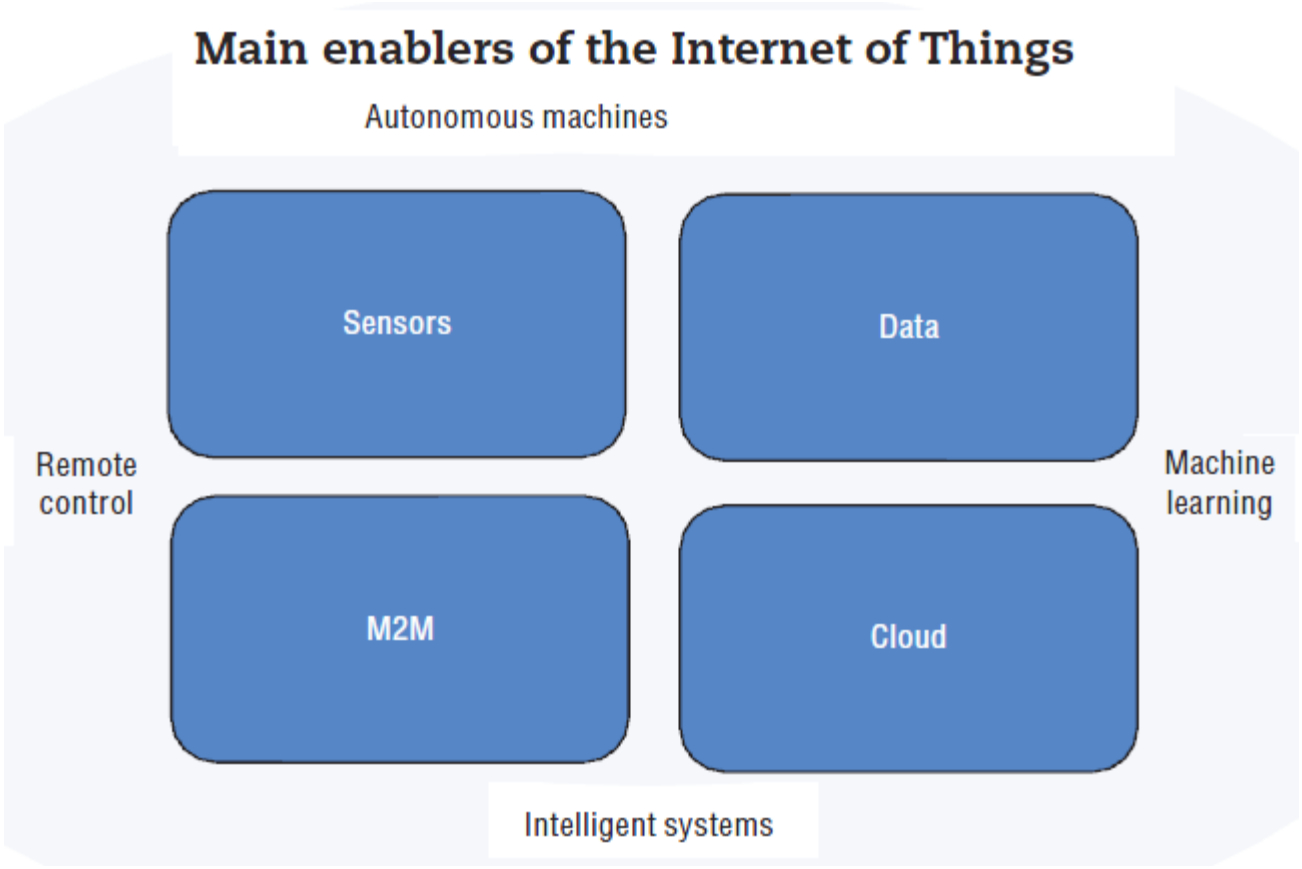


Sources: Based on Shodan, *www.shodanhq.com*.

A selection of IoT-related projects from Kickstarter

Name	Description	More information	Funding pledged (USD)
EasyTouch: Turn your world into a touch sensor	EasyTouch is the world's easiest to use capacitive touch sensor. Turn bananas, pencil drawings, water or fabric into a touch button.	*www.kickstarter.com/projects/54060271/easytouch-turn-your-world-into-a-touch-sensor?ref=category*	13 023
Ambi Climate: The smart add-on for your air Conditioner	Ambi Climate learns about your habits and home environment. Auto adjusts AC for ideal temperature and energy savings. Remote access via Android/iPhone.	*www.kickstarter.com/projects/ambi-labs/ambi-climate-the-smart-add-on-for-your-air-conditi*	94 865
Digitsole: The first interactive insole to heat your feet	Digitsole is the first connected insole on the market controlled via your smartphone – warm your feet, track your distance and calories.	*www.kickstarter.com/projects/1308642275/digitsole-the-first-interactive-insole-to-heat-you?play=video_pitch&ref=home_featured*	90 074
Prizm: Turn your speakers into a learning music player	Prizm is a learning device that instantly plays the perfect music on your speakers, based on people in the room and the context.	*www.kickstarter.com/projects/prizm/prizm-turn-your-speakers-into-a-learning-music-pla?ref=category*	105 594
Notti: A more beautiful smart light	This beautifully designed app-controlled light provides highly customised visual notifications and other useful info from your phone.	*www.kickstarter.com/projects/26398080/notti-a-more-beautiful-smart-light?ref=category*	44 727
PLAYBULB color: Smart Color Light and Wireless Speaker 2-in-1	PLAYBULB color is a smart colour LED speaker light bulb with the PLAYBULB X free App. Let colour and music fill up your living space.	*www.kickstarter.com/projects/mipowusa/playbulb-color-smart-color-light-and-wireless-spea?ref=category*	37 446

Source: Kickstarter, 3 November 2014. *www.kickstarter.com*


Main enablers of the Internet of Things
Autonomous machines
Sensors
Data
Remote control
Machine learning
M2M
Cloud
Intelligent systems

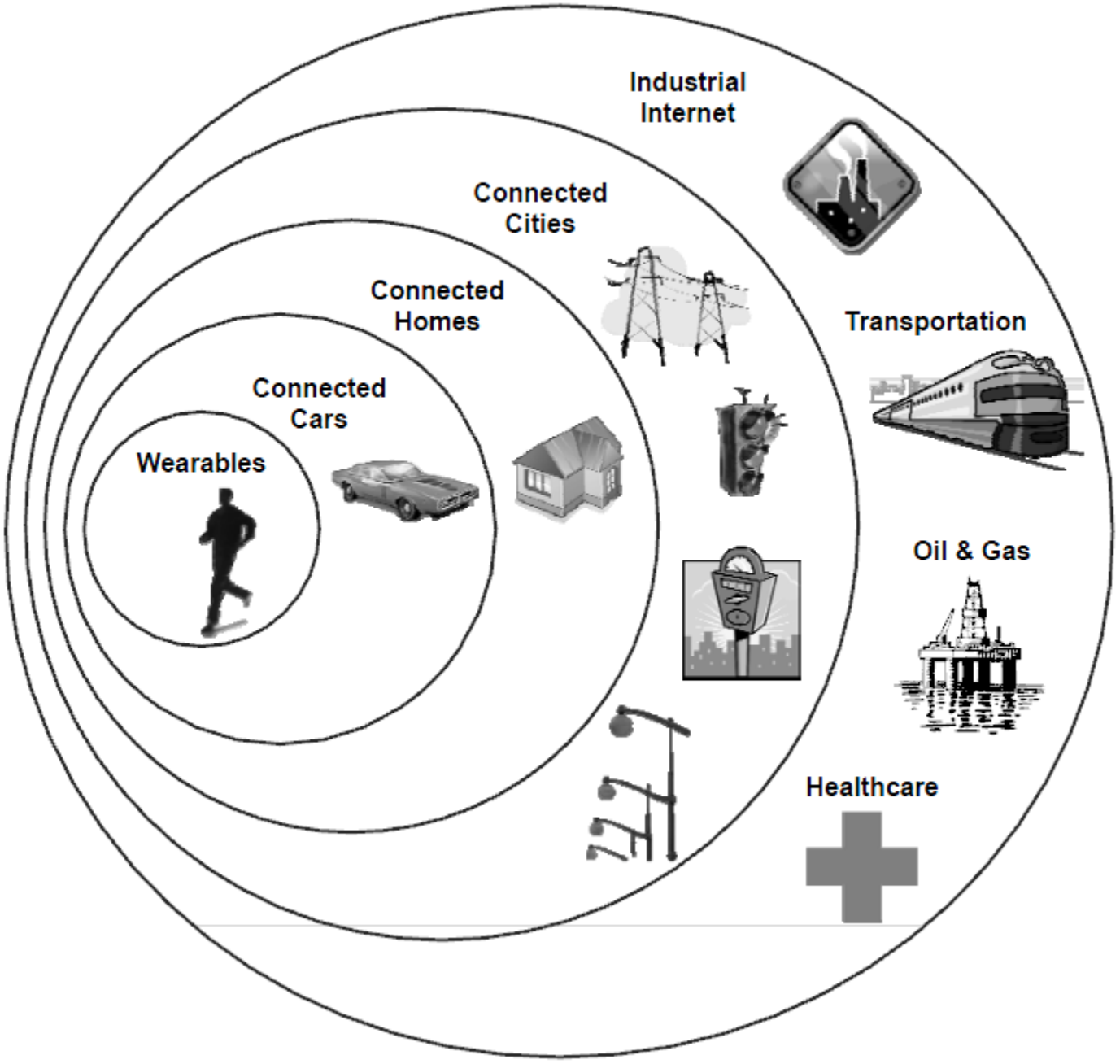
Mobile Phone: the hub of the IoT

- Smartphones play a prominent role in consumer use of the IoT. Internet-connected smart watches, fitness bracelets, running shoes and heart rate monitors are just some of the products consumers can buy and link to the Internet via their smartphone, enabling them to interact with other users or monitor their own fitness levels. Nearly all IoT-connected products come with an interactive smartphone app.

Number of devices per household

2012	2017	2022
2 smartphones	4 smartphones	4 smartphones
2 laptops/computers	2 laptops	2 laptops
1 tablet	2 tablets	2 tablets
1 DSL/Cable/Fibre/Wi-Fi modem	1 connected television	3 connected televisions
1 printer/scanner	2 connected set-top boxes	3 connected set-top boxes
1 game console	1 network-attached storage	2 e-Readers
	2 eReaders	1 printer/scanner
	1 printer/scanner	1 smart meter
	1 game console	3 connected stereo systems
	1 smart meter	1 digital camera
	2 connected stereo systems	1 energy consumption display
	1 energy consumption display	2 connected cars
	1 Internet-connected car	7 smart light bulbs
	1 pair of connected sport shoes	3 connected sport devices
	1 pay-as-you-drive device	5 Internet-connected power sockets
		1 weight scale
		1 eHealth device
		2 pay-as-you-drive devices
		1 intelligent thermostat
		1 network-attached storage
		4 home automation sensors
Devices that are likely, but not in general use		
e-Readers	weight scale	alarm system
sportsgear	smart light bulb	In-house cameras
Network-attached storage	ehealth monitor	connected locks
connected navigation device	digital camera	
Set-top box		
smart meter		

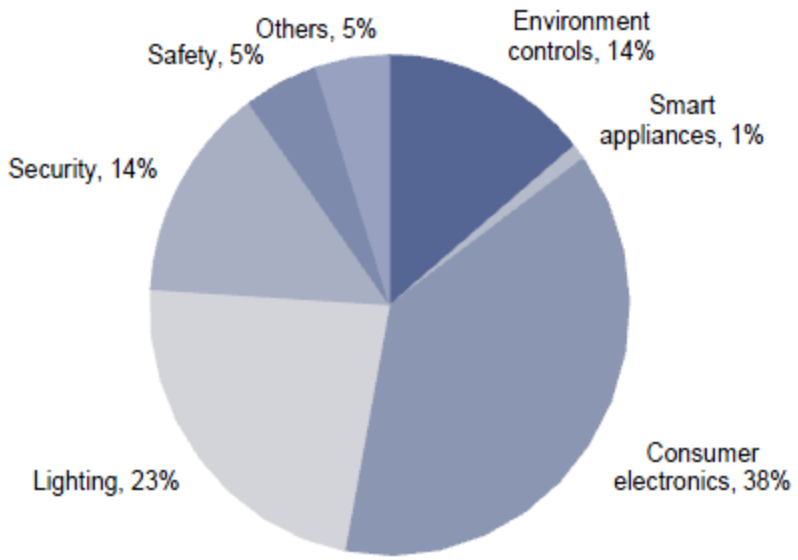
The IoT landscape



Pipes, Apps, and Things

- **The pipes: building the infrastructure to connect the world's devices**
- **The apps: developing the software platforms that will unlock the torrent of data**
- **The things: identifying where connectivity legitimately adds value and is not merely intrusive**

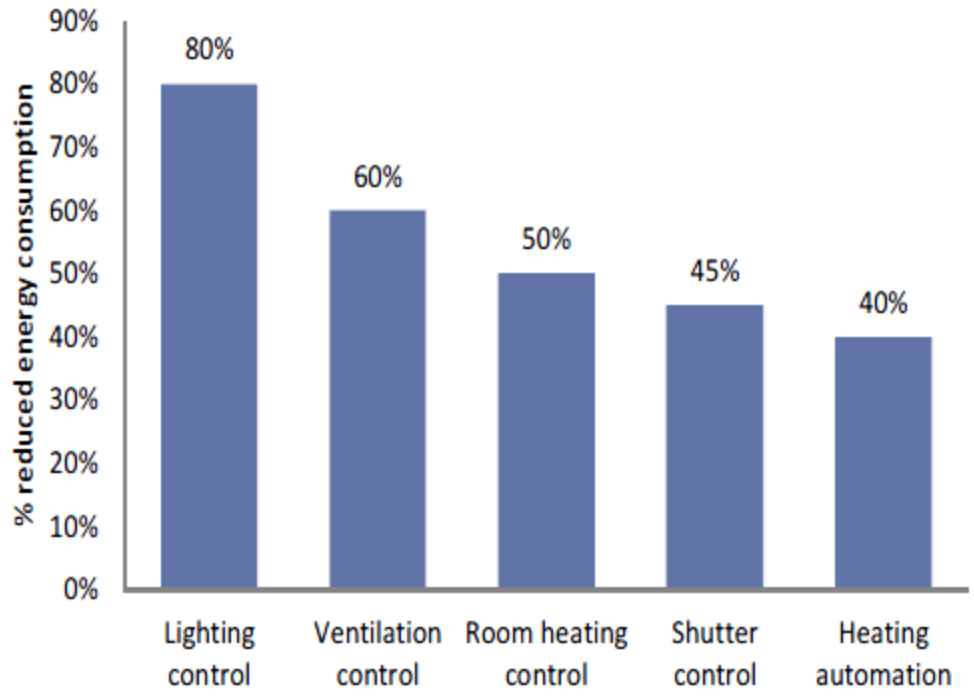
Energy efficiency, home comfort and security will be key areas of Industrial focus



Home automation market - North America

Source: ABB, Goldman Sachs Global Investment Research

: IoT can help reduce home energy consumption by over 40% in various applications

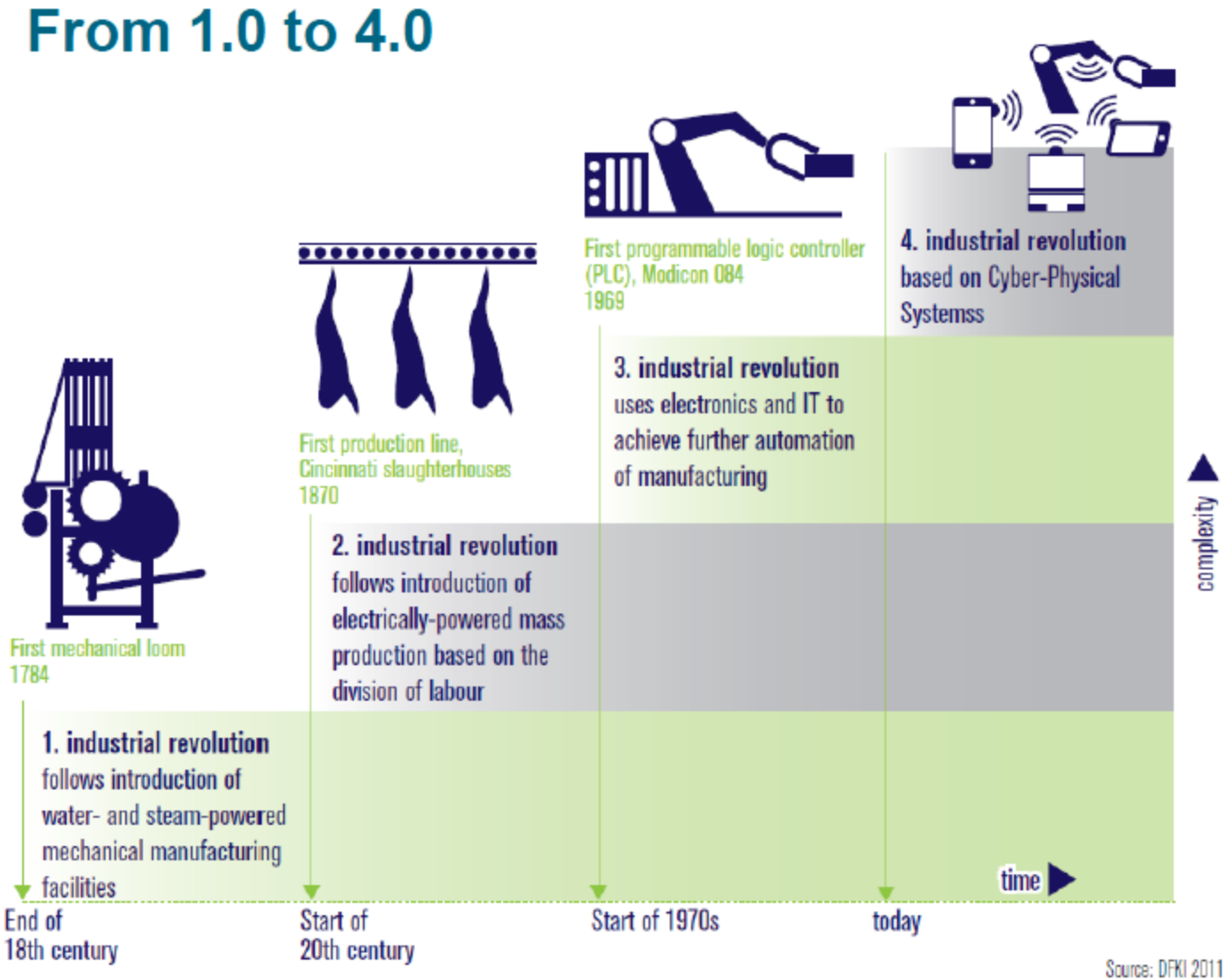


Source: Goldman Sachs Global Investment Research.

IoT advances in Korea

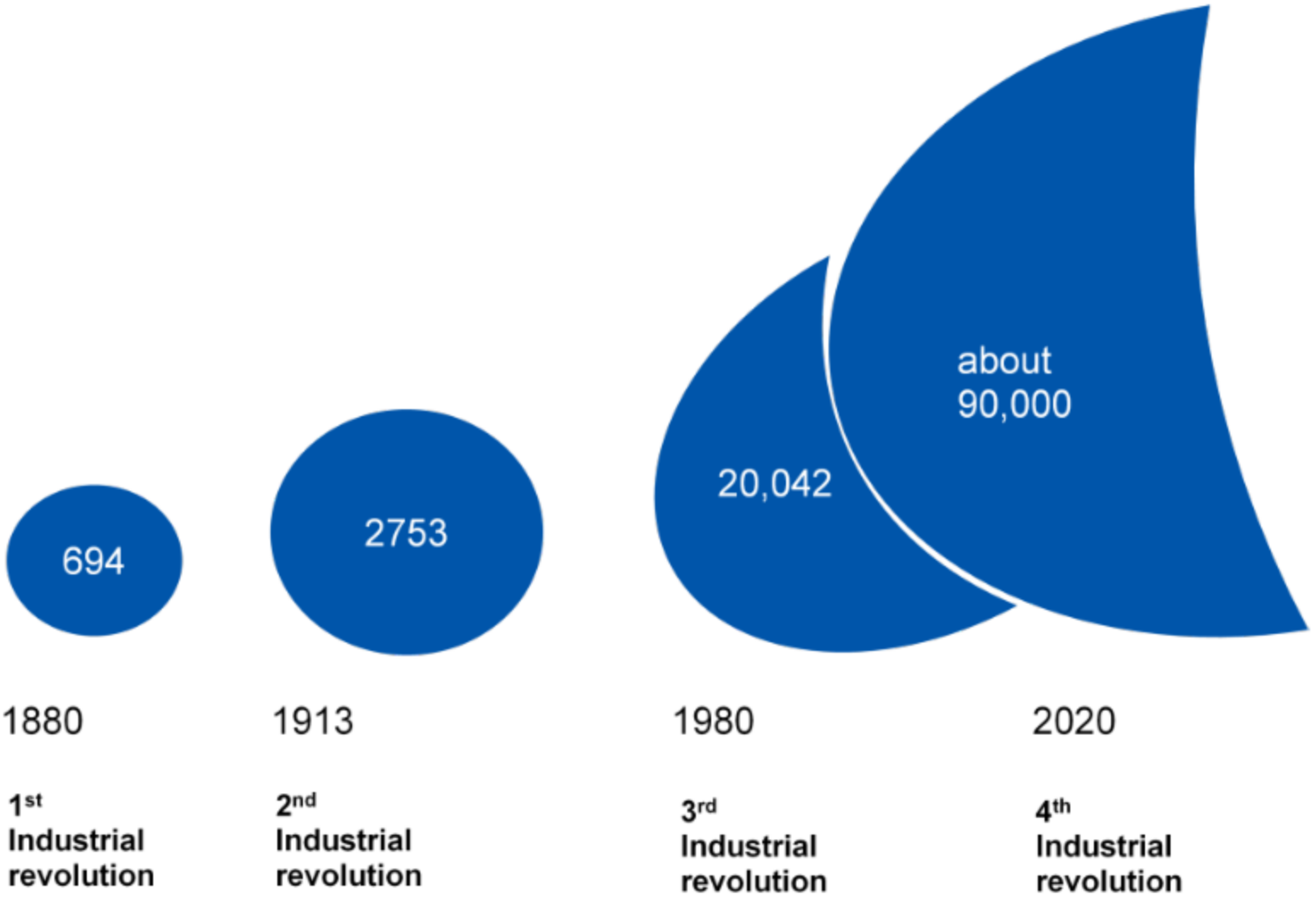
- Smart farm projects
- Songdo Smart City

Industry 4.0


From 1.0 to 4.0
First mechanical loom
1784
1. industrial revolution
follows introduction of
water- and steam-powered
mechanical manufacturing
facilities
End of
18th century
First production line,
Cincinnati slaughterhouses
1870
2. industrial revolution
follows introduction of
electrically-powered mass
production based on the
division of labour
Start of
20th century
First programmable logic controller
(PLC), Modicon 084
1969
3. industrial revolution
uses electronics and IT to
achieve further automation
of manufacturing
Start of 1970s
4. industrial revolution
based on Cyber-Physical
Systemss
today
time
complexity
Source: DFKI 2011

Development of economic output since first industrial revolution

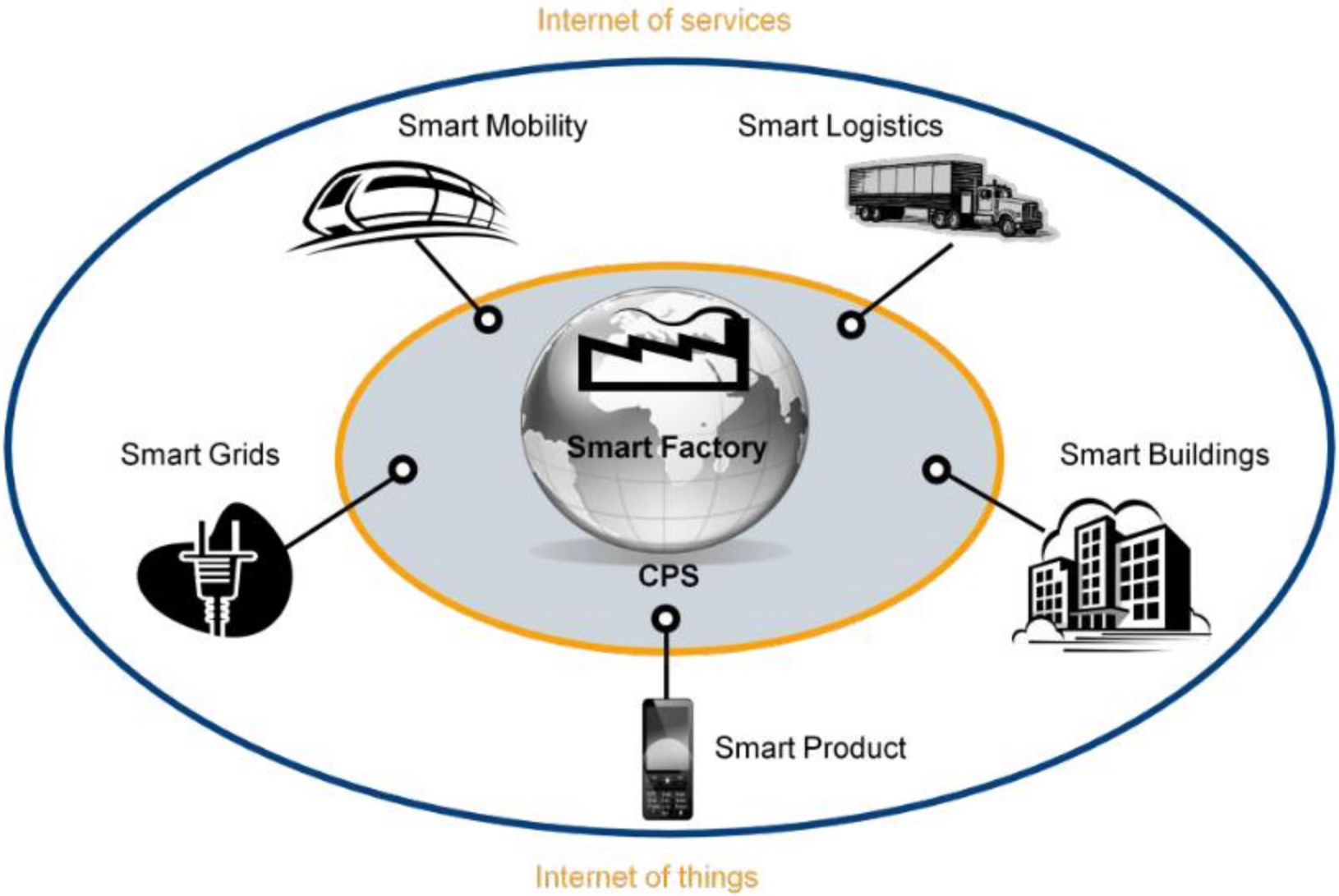
Gross domestic product worldwide, bn USD (purchasing power adjusted)



Source: ZVEI, 2013

Smart factory in focus

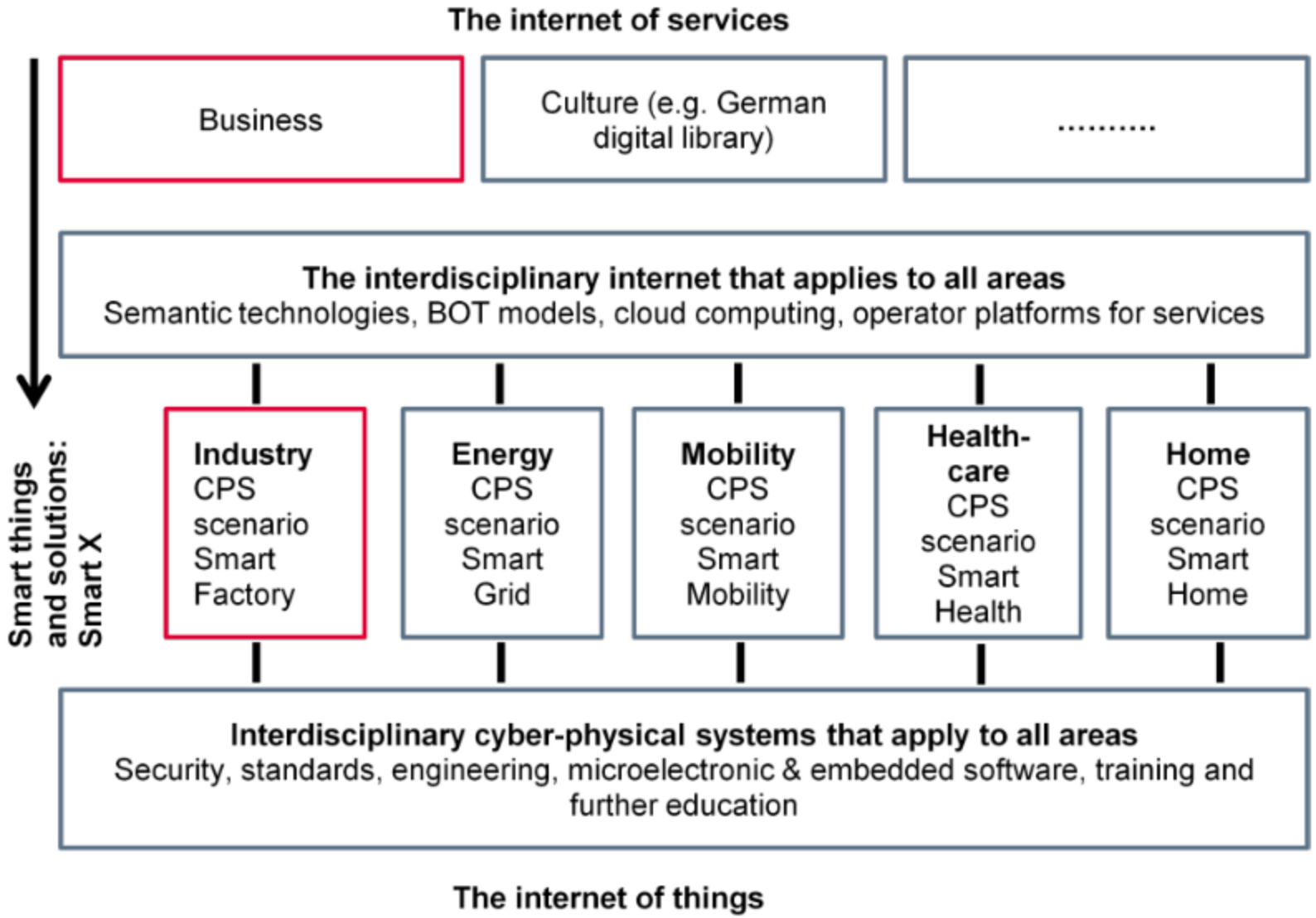
Smart X components



Source: acatech, 2013

Physical and virtual world converging

Application areas for cyber-physical systems



Source: See Forschungsunion Wirtschaft – Wissenschaft, 2013

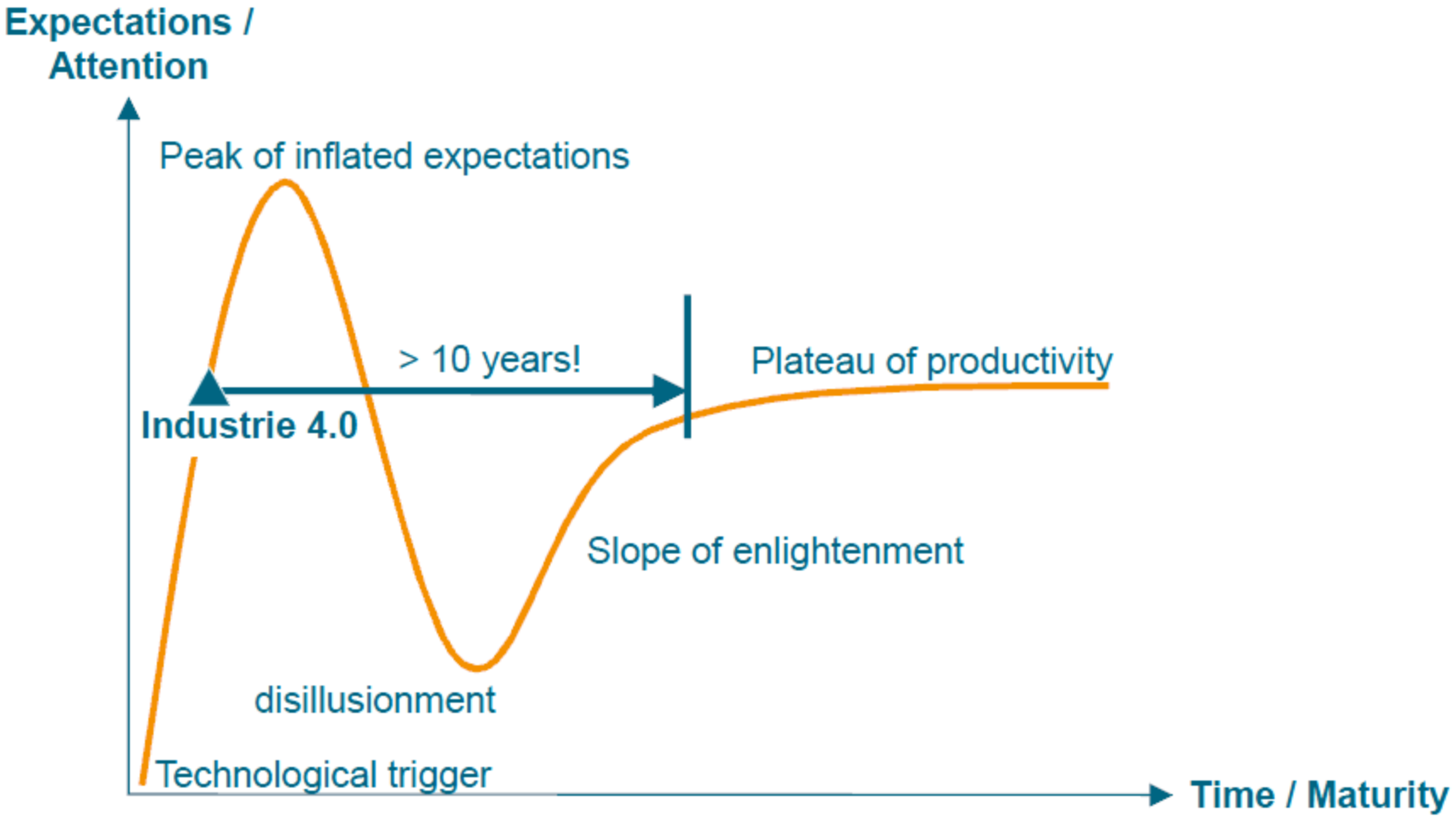
Why Industry 4.0

- global markets are demanding more flexibility and productivity
- resource consumption has to be minimised.
- progress in in communication,sensor and production technologies opens new sustainable and competitive ways of innovation, production and consumption.
- **More and faster information will optimise resource use, shorten lead times, increase productivity and allow the automised production of small series and customised products.**

Why Industry 4.0

- Cost-cutting
  - Capital costs:
  - Energy costs:
  - Personnel costs:
- More than cost cutting
  - More flexibility
  - Reduce lead times
  - Adapting to customer requirements with small batch sizes

Industrie 4.0 in a hype cycle




Industry 4.0 levers
Value drivers
Service/ aftersales
Resource/ process
Time to market
Asset utilization
Supply/ demand match
Quality
Inventories
Labor
Virtually guided self-service
Remote maintenance
Predictive maintenance
Rapid experimentation and simulation
Concurrent engineering
Customer cocreation/open innovation
Data-driven design to value
Data-driven demand prediction
Digital quality management
Advanced process control
Statistical process control
Batch size
Real-time supply-chain optimization
In situ 3-D printing
Automation of knowledge work
Digital performance management
Remote monitoring and control
Human-robot collaboration
Augmented reality for MRO[1]
Predictive maintenance
Remote monitoring and control
Machine flexibility
Routing flexibility
Real-time yield optimization
Intelligent lots
Smart energy consumption