

Prinnox

Keynote – IoT turning networks to intelligent

Reijo Paajanen

CEO

Prinnox

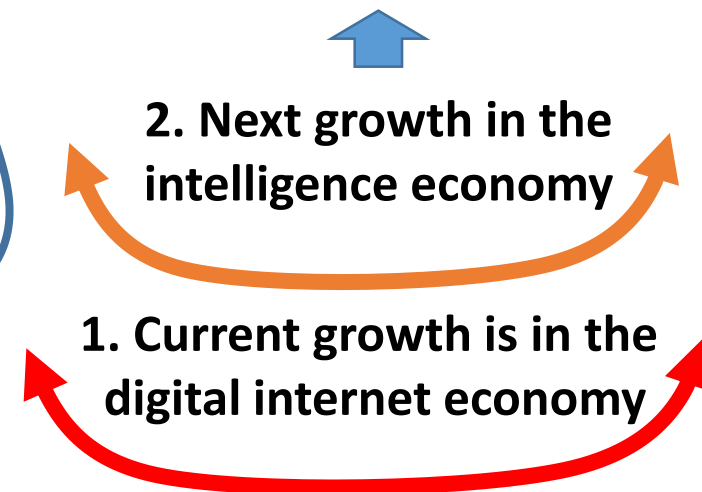
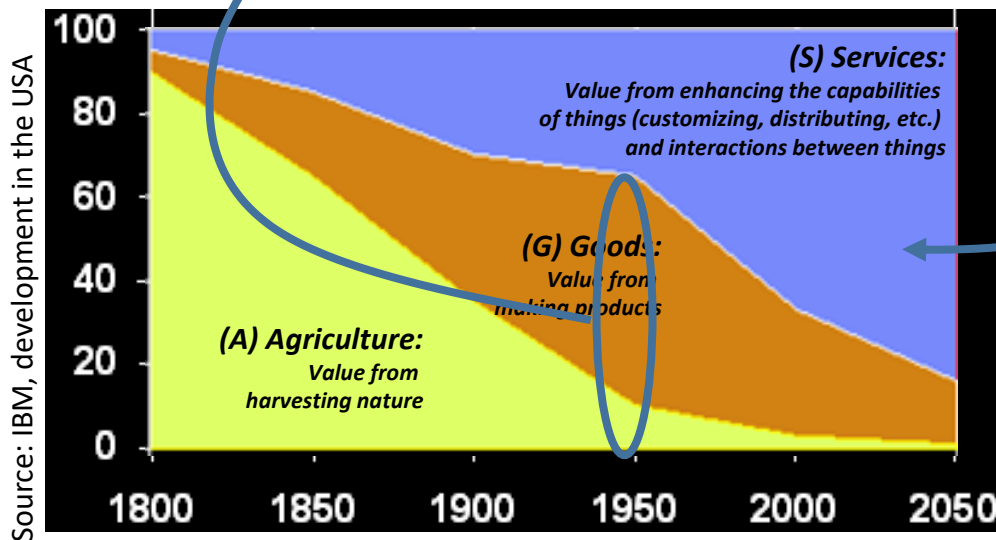
Technology offers
new colors or tools to...



... create new paintings
or business!

The Big Picture

1. Automation has improved productivity
2. Now everything is controlled by computers
3. Work force has moved to service sector
3. IoT and intelligent network



4. Service sector is over 70 % of the GDP in advanced countries
5. Digitalization offers technology for service automation
6. Internet economy will define the new business models
 - Platform economy dominates now

Change of dominant business logic Prinnox

- Good-dominant logic:** the consumer will destroy the industrially created value

- Service dominant logic:** Value is always co-created by multiple actors, including the beneficiary >>> value is also created in the interaction between the service and the beneficiary (consumer) [Stephen Vargo]
- Value is not destroyed but it will accumulate to the digital service platform**
 - Value which is created by service provider and the related ecosystem
 - Value which is created by users

>>> **Fundamentally different business environment**

- Two way value creation

25.1.2016 Prinnox Confidential 17



Consumerism Illustration Prinnox

Internet economy approach

Industrial approach

Innovation

Consumer

Patenting

R&D

Production

Distribution

Consumer

Fast business environment

Slow business environment

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Summary

Internet economy as growth driver

Internet economy

Competence gap is growing

Industrial economy

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Change of Business Logic

Change of dominant business logic **Prinnox**

- **Good-dominant logic:** the consumer will destroy the industrially created value

Value creation Product/Value delivery Value destruction

Raw material Components Producer Consumer

Money

- **Service dominant logic:** Value is always co-created by multiple actors, including the beneficiary >>> value is also created in the interaction between the service and the beneficiary (consumer) [Stephen Vargo]
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>>> **Fundamentally different business environment**

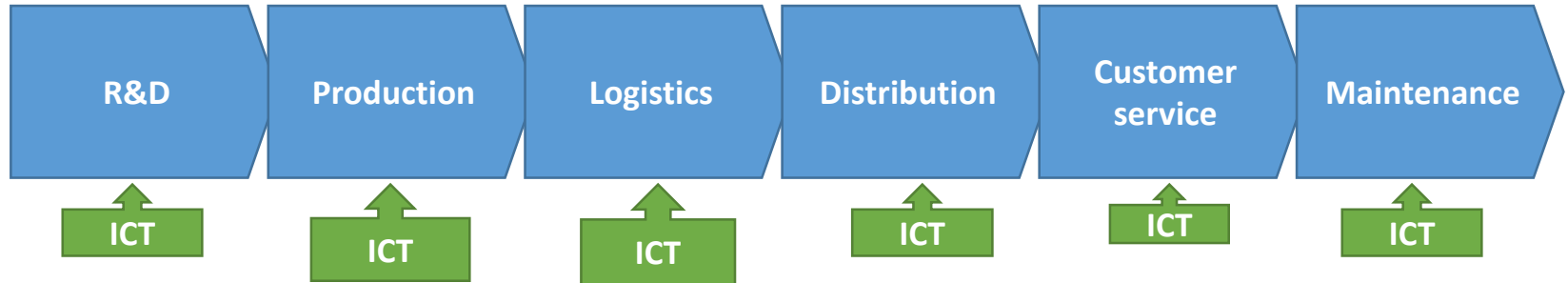
- Two way value creation

25.1.2016 Prinnox Confidential 17

Digital Value Chain Dominance

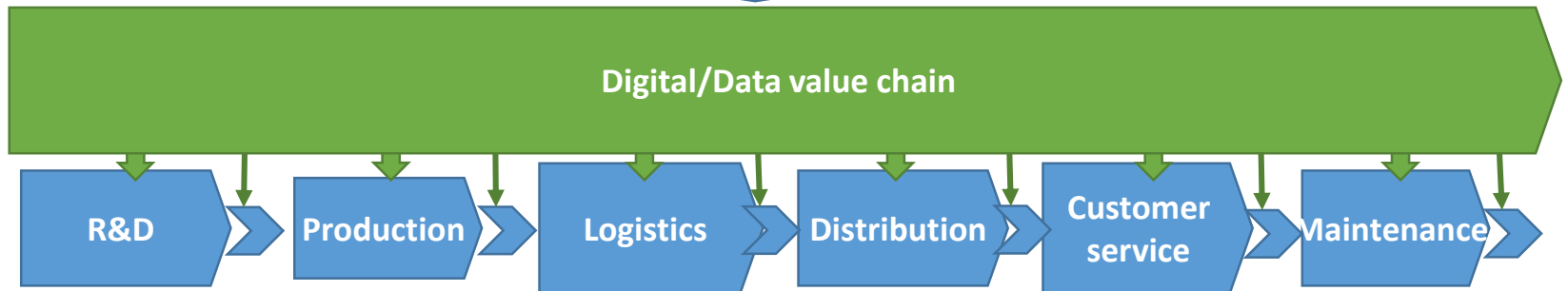


Physical business
Digital business



Computers have been used to help and to increase the productivity in the physical business (Computer Aided XYZ)

Paradigm shift



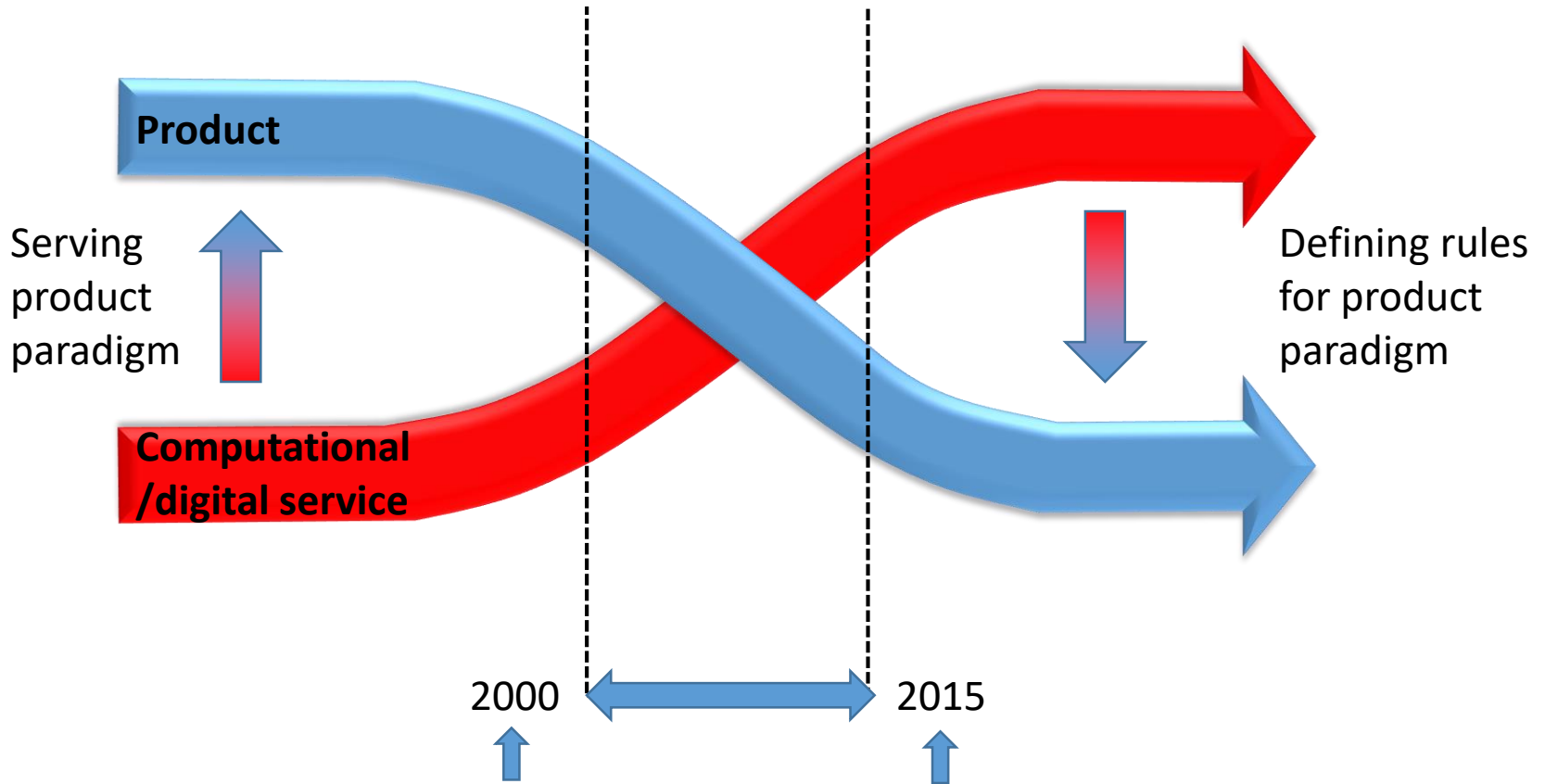
New paradigm:

1. Design first the digital business,
2. Build necessary physical elements

Digital business:

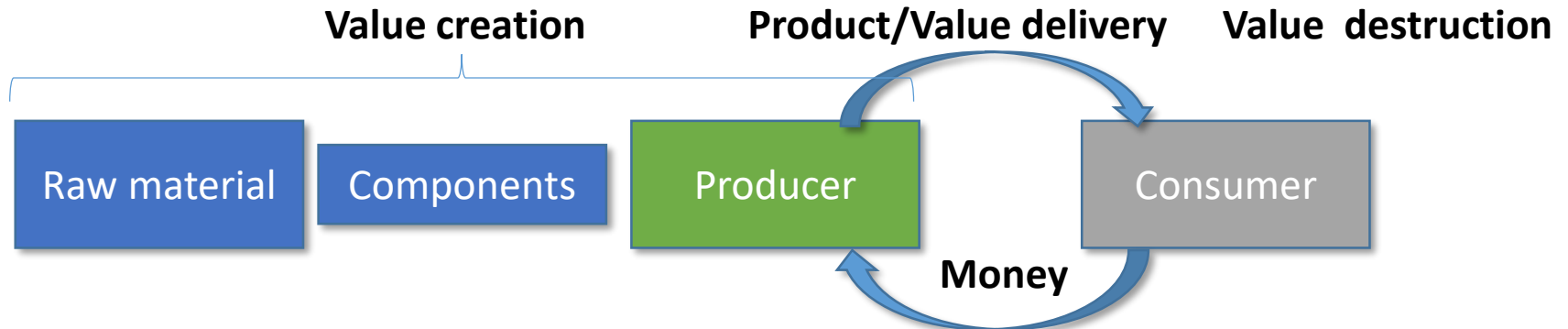
- R&D phase > run the global service in the cloud
- Global coverage for millions over night, expense depends on the real usage
- Scalable funding model instead of huge investment in the beginning

Paradigm shift causing radical changes in market shares, competence needs, business models and valuations!



Transformation window timing depends on industry vertical and its characteristics!

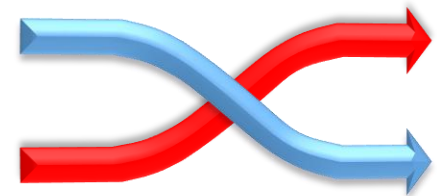
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>>> Fundamentally different business environment

- Two way value creation



This is a big picture change

Traditional Value-Chain Business Models

Platform-Driven Business Models



Value creation is linear and one-way

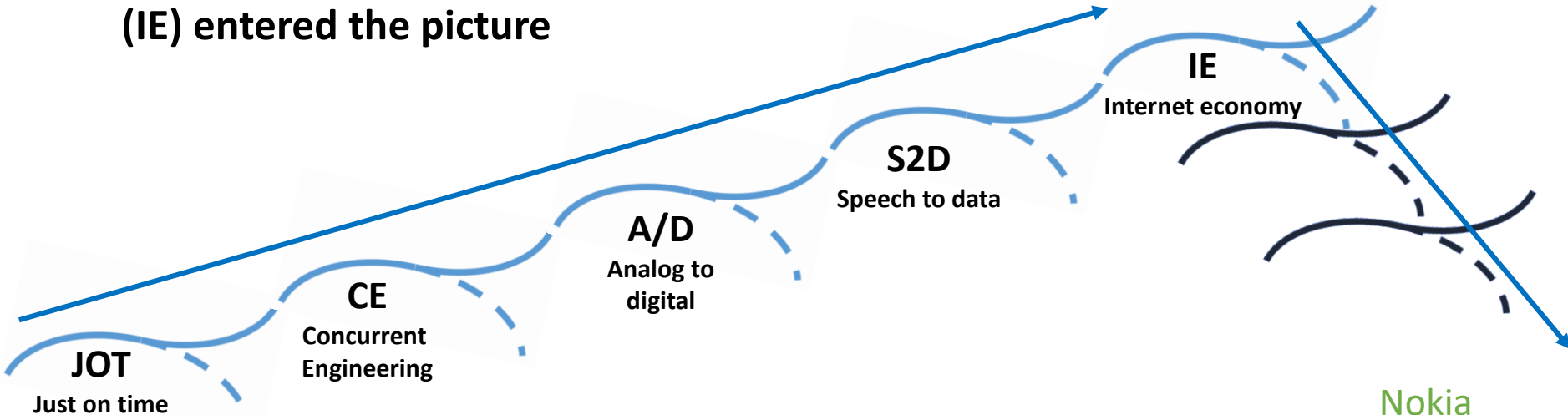
Value creation is two-way and continuous

Nokia's story

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- Very successful utilization of paradigm shifts/ industrial transformations in a row ... **until Internet economy (IE) entered the picture**

Nokia
> 50 B€ @ 2008

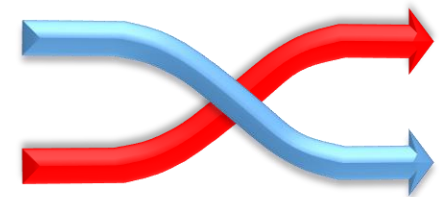


- Learning so far: paradigm shifts and transformations continue to go on >>> new growth business can not be done with old methods >>> do not try to repeat the same step exactly same way but learn and apply in new time and with new tools

Nokia
> 12 B€ @ 2014

- **Missing of the essential transformation is fatal**

2008 ↔ 2014



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Platform economy



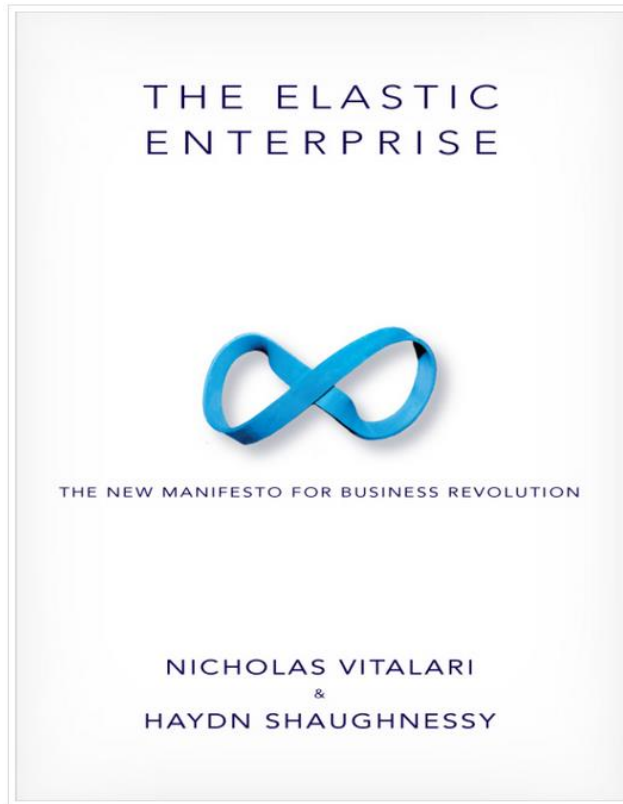


In the internet economy time frame the platform economy is the new phase in business development - towards higher productivity and faster growth!

Platform economy combines the effects of cloud computing, big data and ecosystems to the overwhelming business concept: **collects value from multiple sources and implements the service dominant business logic!**



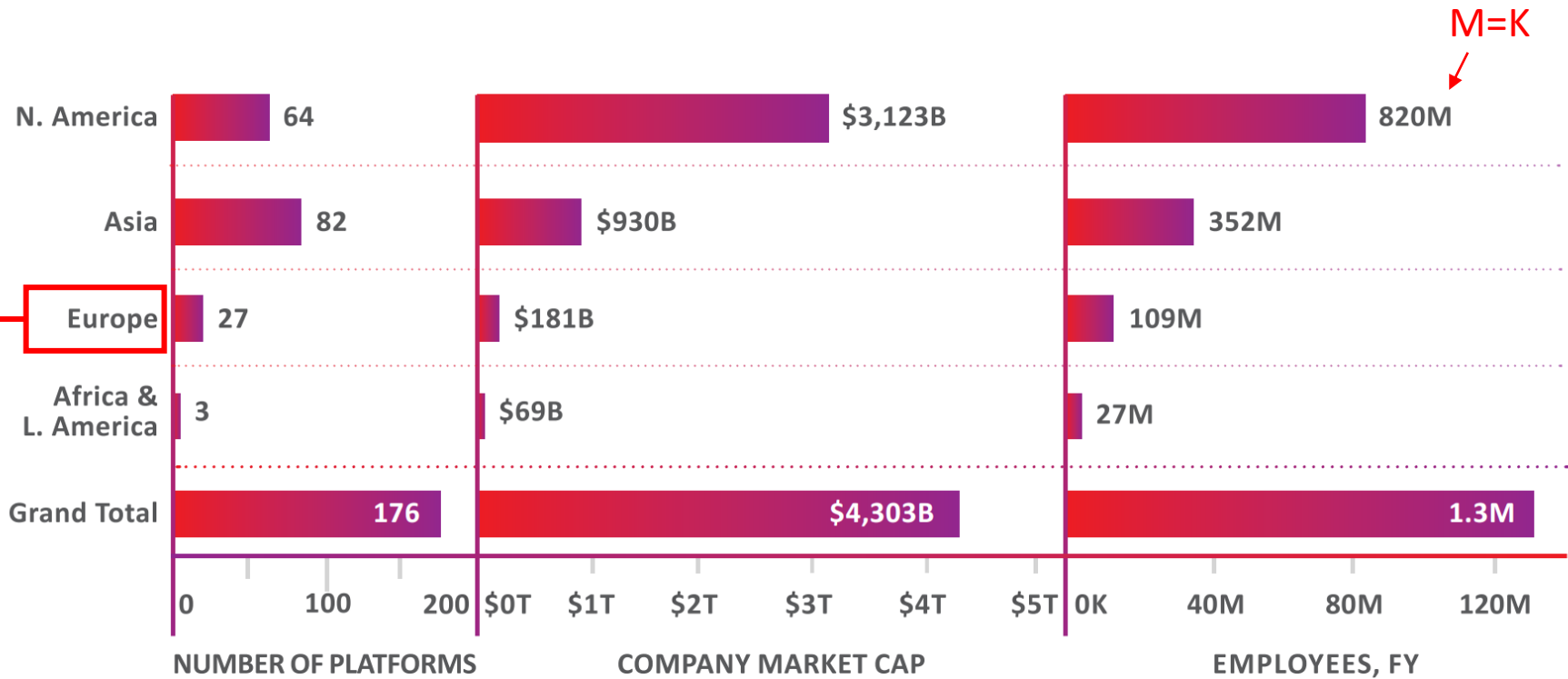
Source: <http://www.slideshare.net/InfoEcon/the-rise-of-platforms-and-what-it-means-for-business>



<http://theelasticenterprise.com/>

- “We see success emerging from five distinct pillars, five new things companies are doing that allow them to scale their businesses, enter new markets with a high assurance of success, and to do both at low relative cost.
- Those pillars are:
 - Business Platforms
 - Business Ecosystems
 - Universal Connectors
 - Cloud Infrastructure
 - Sapient Leadership
- The book is about those five pillars and what we’ve called *radical adjacency strategy*, the way new leaders are aggressively taking on new markets through the five pillars. By adopting radical strategies the best companies are setting out a *Manifesto for Business Revolution*.”
- See examples:
 - <http://theelasticenterprise.com/category/radical-adjacency-2/>

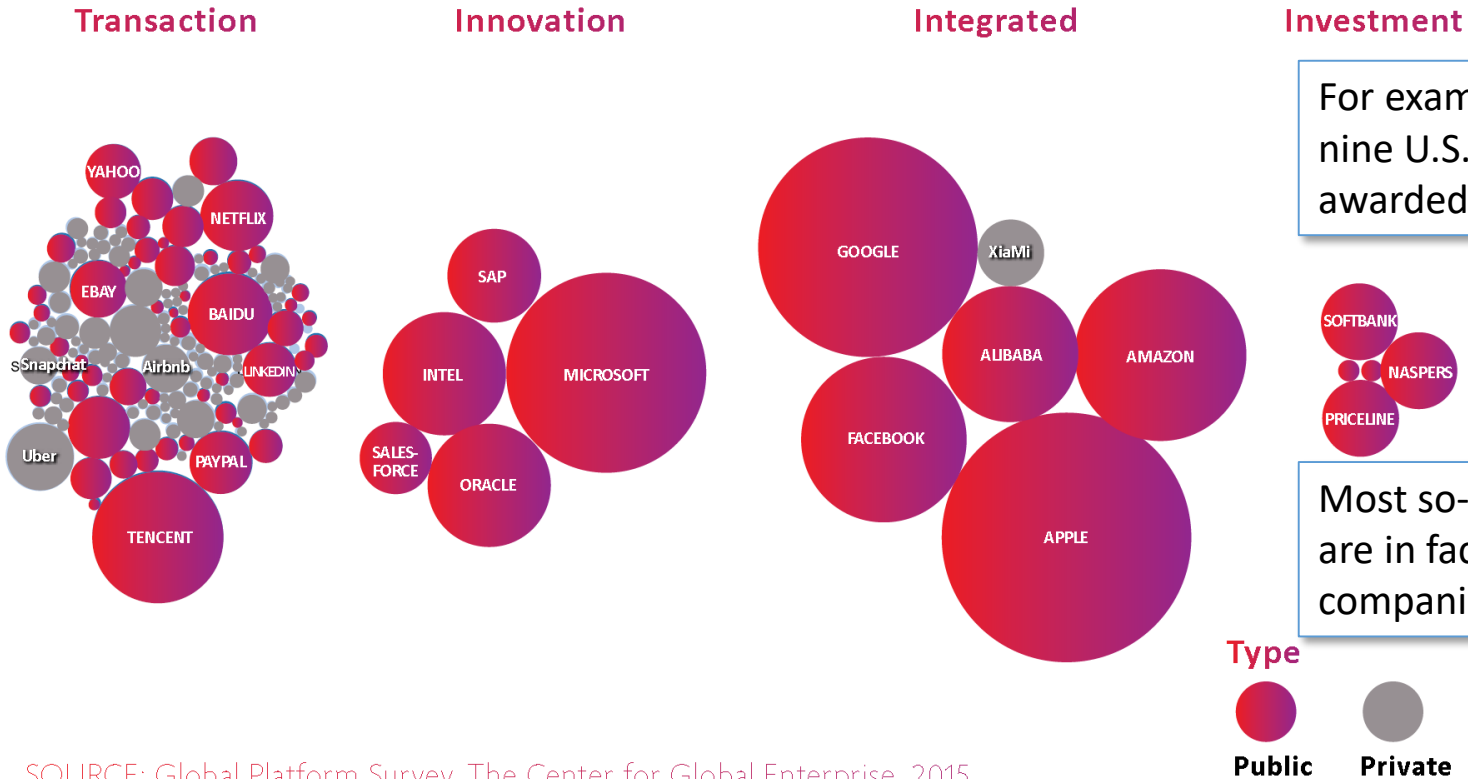
PLATFORM COMPANIES BY REGION



SOURCE: Global Platform Survey, The Center for Global Enterprise, 2015

In the case of Europe, there is a total of 27 platform companies found across 10 countries. The UK has the largest number with nine followed by Germany with five, Russia with three, and France, the Netherlands and Sweden with two each.

PLATFORM COMPANIES BY TYPE



For example, in 2014, nine U.S. platforms were awarded 11,585 patents.

Most so-called "unicorns" are in fact platform companies.

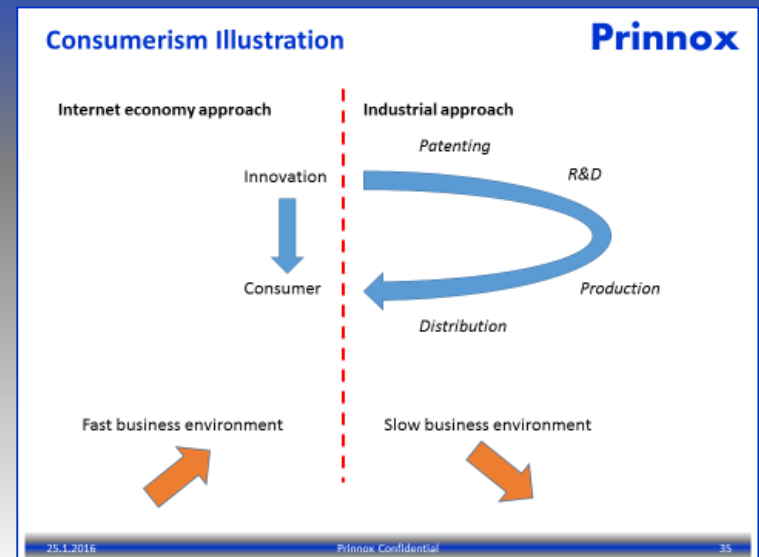
SOURCE: Global Platform Survey, The Center for Global Enterprise, 2015

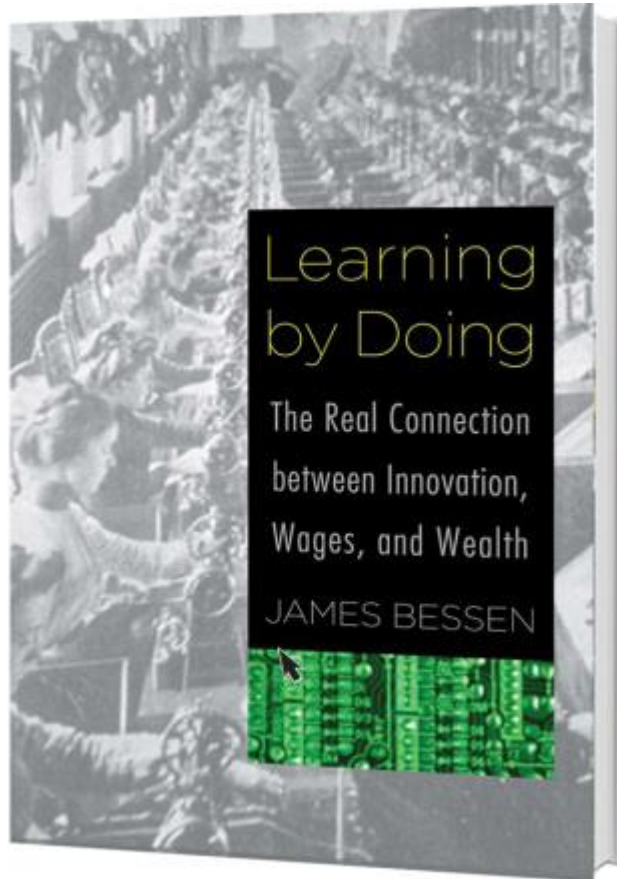
FIGURE 6

Note: Each bubble represents a company sized by market cap as of December 1, 2015

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Consumerism





- **The prosperity of nations depends on the institutions and policies that allow ordinary citizens to acquire technical knowledge, much of it learned on the job.**
- Bessen, James (2015-04-28). Learning by Doing: The Real Connection between Innovation, Wages, and Wealth (p. 6). Yale University Press. Kindle Edition.

- In the internet economy the successful companies and actors are turning technology to the hands of ordinary citizens/consumers
 - So did Nokia for certain period of time: volume production of mobile phones reduced the cost of the phone so that everybody was able to buy a phone
 - Google is offering search for everybody – at the first sight for free
 - Facebook offers social media for masses
 - Twitter offers messaging
 - eCommerce and related platforms
- **What has changed, is that big industrial players are not anymore the best channel to draw benefits from the new technology**
- Consumers and citizens are much more agile to start to use the new opportunities

Internet economy approach

Industrial approach

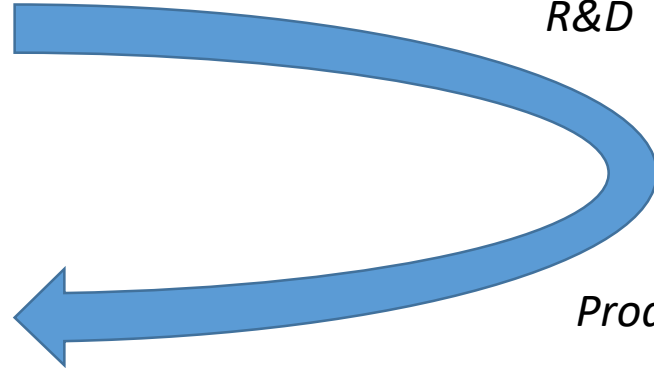
Innovation



Consumer

Patenting

R&D



Production

Distribution

Fast business environment



Slow business environment



1. For growth

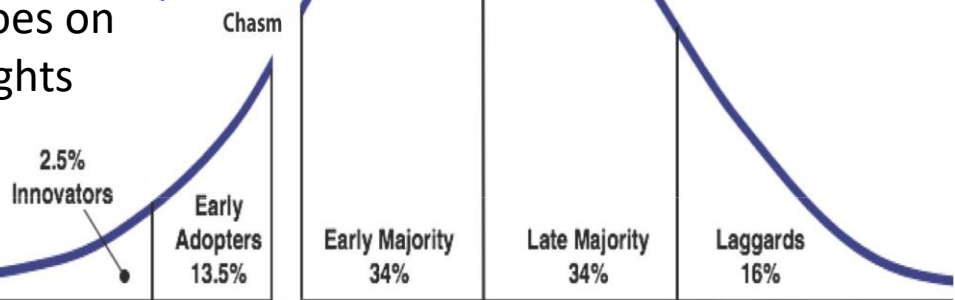
- Platform economy
- Sharing economy and crowds
- Ecosystems
- Radical adjacency etc.

Tools 1. and 2. can be mixed to support the business development! **However, growth is the only sustainable way to stay in business!**

IE causing Paradigm shift

Business goes on to new heights

Business declines



2. For business life extension

- DEV-OPS
- Customer Satisfaction Management
- Productivity etc.

Source: Andrew S. Grove "Only the Paranoid Survive!"

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Competence gap is
growing!

HEX25 vs. USA25-Internet economy

M€	2012	2013	2014	2015	12>>>15
Amer Sports	2064.00	2136.50	2228.70	2534.40	22.8%
Cargotec	3327.30	3181.00	3357.80	3729.30	12.1%
Elisa	1553.40	1547.40	1535.20	1569.50	1.0%
Fortum	6159.00	5309.00	4751.00	3459.00	-43.8%
Huhtamäki	2321.20	2161.10	2235.70	2726.40	17.5%
Kemira	2240.90	2229.10	2136.70	2373.10	5.9%
Kesko B	9686.00	9315.00	9070.60	8678.90	-10.4%
Kone	6276.80	6932.60	7334.50	8647.30	37.8%
Konecranes	2171.49	2099.58	2011.40	2126.20	-2.1%
Metso	4282.00	3858.00	3658.00	2977.00	-30.5%
Neste	17853.00	17238.00	15011.00	11131.00	-37.7%
Nokia	15400.00	12709.00	11763.00	12499.00	-18.8%
Nokian Renkaat	1612.40	1521.00	1389.10	1360.10	-15.6%
Finnair*	2449.40	2400.30	2284.50	2324.00	-5.1%
Orion B	980.40	1006.90	1015.30	1015.60	3.6%
Outokumpu	4538.00	6745.00	6844.00	6384.00	40.7%
Outotec	2087.40	1911.50	1402.60	1201.20	-42.5%
Sanoma*	2376.30	2083.50	1901.60	1716.60	-27.8%
Stora Enso R	10814.80	10563.00	10213.00	10040.00	-7.2%
Telia Company	12051.73	11755.50	8917.11	9255.09	-23.2%
Tieto	1825.30	1606.80	1522.50	1460.10	-20.0%
UPM-Kymmene	10492.00	10054.00	9868.00	10138.00	-3.4%
Valmet	3014.00	2613.00	2473.00	2928.00	-2.9%
Wärtsilä	4725.00	4607.00	4779.00	5029.00	6.4%
YIT	1988.90	1743.00	1778.60	1732.10	-12.9%
Together	132290.72	127326.78	119481.91	117034.89	-11.5%
Annual growth		-3.8%	-6.2%	-2.0%	
* Finnair replacing Nordea as its comparable revenue is not available					
* Sanoma replacing Sampo A as its comparable revenue is not available					

M\$	2012	2013	2014	2015	12>>>15
Amazon	61093.00	72252.00	88988.00	107006.00	75.2%
AMD	5422.00	5299.00	5506.00	3991.00	-26.4%
Aphabet (Google)	46039.00	55519.00	66001.00	74989.00	62.9%
Apple	156508.00	170910.00	182795.00	233715.00	49.3%
Cisco	46061.00	48607.00	47142.00	49161.00	6.7%
DELL	52902.00	61494.00	62071.00	56,940.00	7.6%
Ebay	14072.00	8257.00	8790.00	8,592.00	-38.9%
Expedia	4030.35	4771.26	5763.48	6,672.32	65.6%
Facebook	5089.00	7872.00	12466.00	17,928.00	252.3%
Groupon	2334.47	2573.66	3042.12	3,119.52	33.6%
IBM	102874.00	98367.00	92793.00	81,741.00	-20.5%
Intel	53341.00	52708.00	55870.00	55,355.00	3.8%
Intuit	3808.00	3946.00	4243.00	4,192.00	10.1%
LinkedIn	972.31	1528.55	2218.77	2,990.91	207.6%
Microsoft	77849.00	86833.00	93580.00	85,320.00	9.6%
Netflix	3609.28	4374.56	5504.66	6,779.51	87.8%
Oracle	37180.00	38275.00	38226.00	37,047.00	-0.4%
Priceline group	5260.96	6793.31	8441.97	9,223.99	75.3%
Qualcom	19121.00	24866.00	26487.00	25,281.00	32.2%
Salesforce.com	3050.20	4071.00	5373.59	6,667.22	118.6%
Symantec	6906.00	6676.00	3956.00	3,600.00	-47.9%
TripAdvisor	763.00	945.00	1246.00	1,492.00	95.5%
Twitter	316.93	664.89	1403.00	2,218.03	599.8%
VMWare	4605.00	5207.00	6035.00	6,647.00	44.3%
Yahoo	4986.57	4680.38	4618.13	4,968.30	-0.4%
Together	718194.07	777490.61	832560.72	895636.80	24.7%
Annual growth		8.3%	7.1%	7.6%	
Together	380987.5	427365.2	485613.6	566713.5	48.7%
Annual growth		12.2%	13.6%	16.7%	

Change 2012 >>> 2015:

-11.5 %

Platform companies

+ 24.7 % / + 48.7 %

Value is in service dominant business

The Largest Companies by Market Cap Over 15 Years



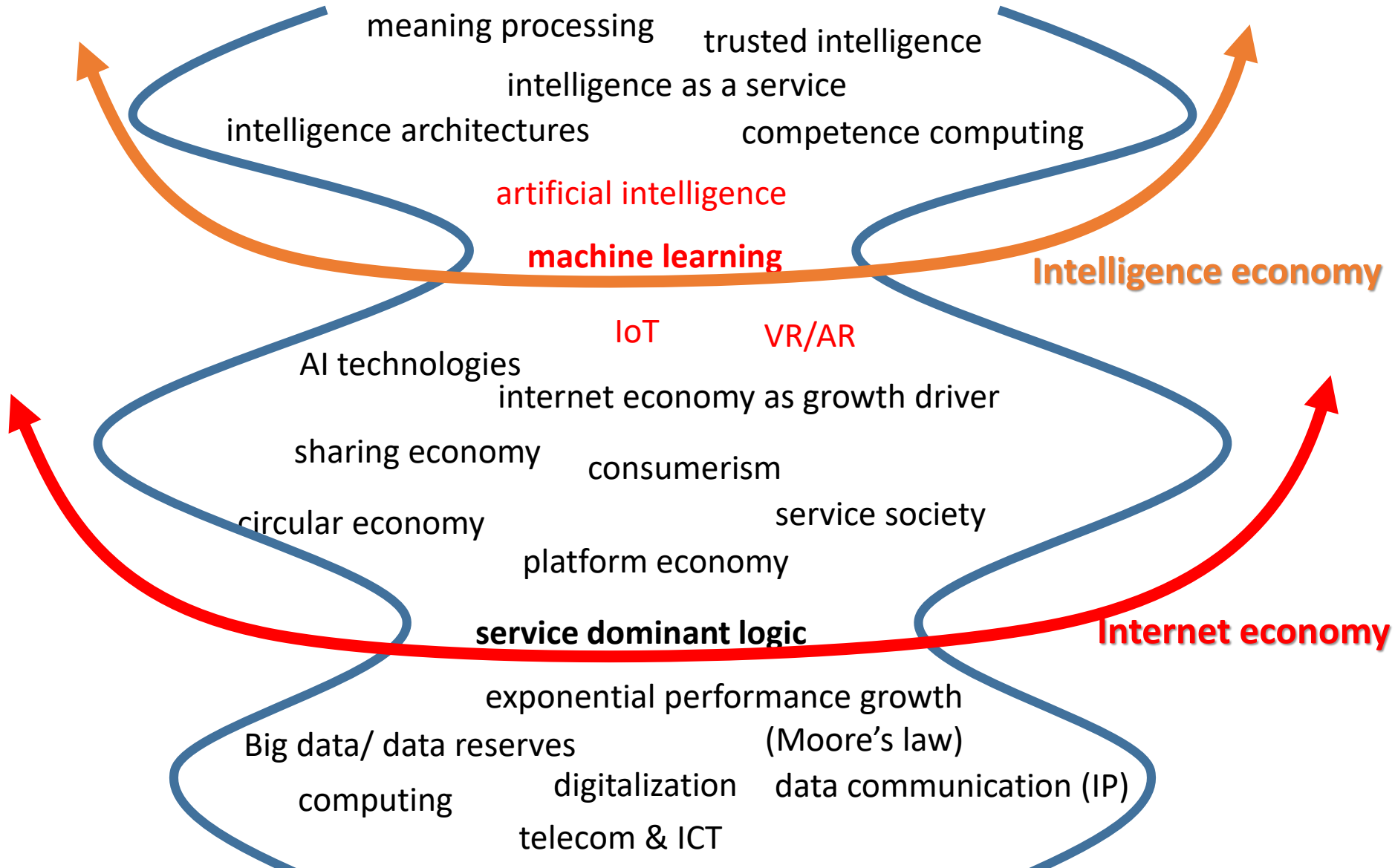
Source: <http://www.visualcapitalist.com/chart-largest-companies-market-cap-15-years/>

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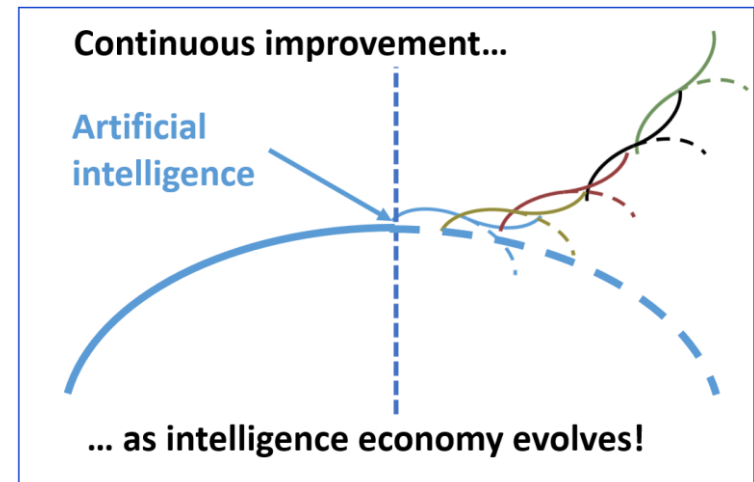
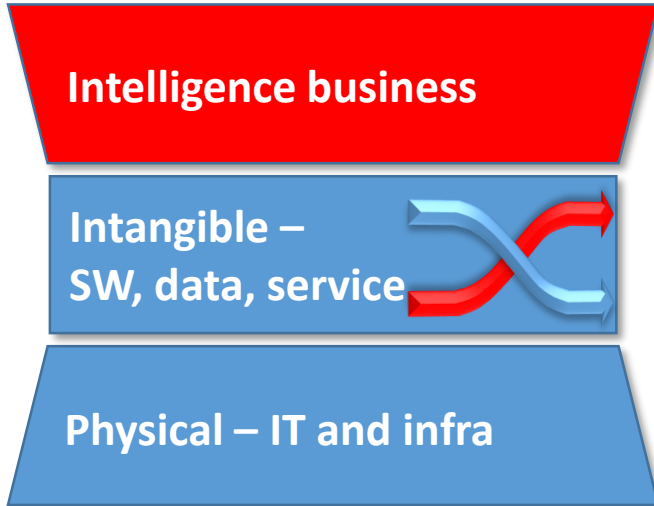
**Next growth in the
intelligence economy**

Towards Intelligence Economy

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Key elements of internet economy will be amplified in the intelligence economy!



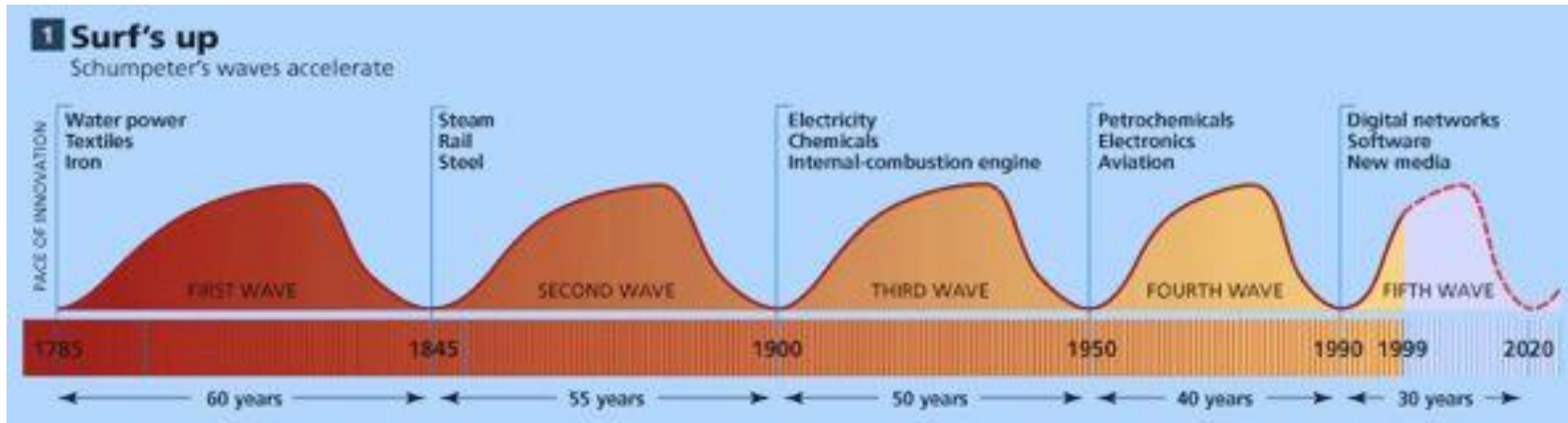
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Why The Fast Growth?



Waves of Innovation - accelerating

“Konratiev Waves” Help Explain What Carries Our Economy Forward over Generations



<https://scienceprogress.org/2011/05/waves-of-innovation-2/>

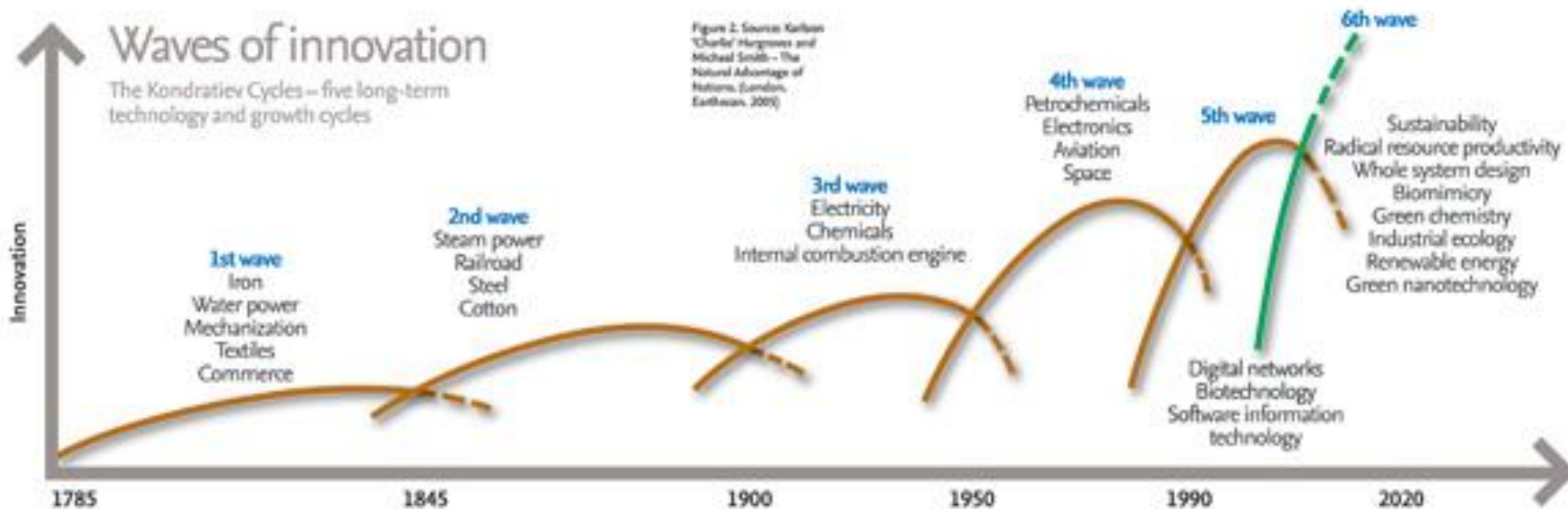
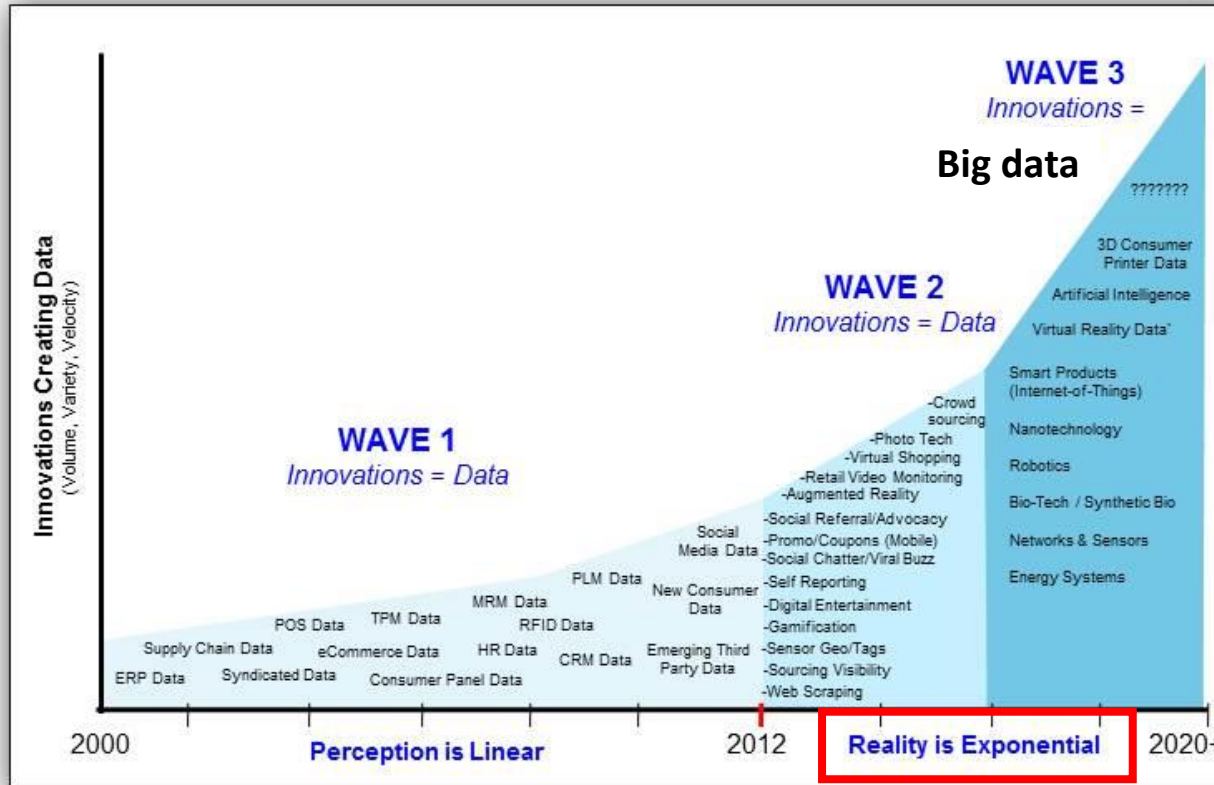


Figure 2. Source: Karlson, Charles, Ingrid, and Michael Smith - The Natural Advantage of Nations, (London, Earthscan, 2009)

Our preconceived notion of “Change” is about to be Disrupted....



AI will proceed in the cloud environment

- Process & Operational Improvements
- Better Visibility to Opportunities/Issues
- Optimize Sales, ROI, Margins
- Efficiency and Effectiveness Gains
- Improve Employee Reward & Incentives
- Consumer Understanding
- Trade, Supplier, and Partner Relationships
- Product Improvements

- Consumer Engagement
- Direct 1-1 Consumer Relationships
- Armies of Brand Ambassadors
- Capitalizing on Influencers
- New Sources of Revenue
- New Forms of Products
- New Partnerships

- DISRUPTIVE New models of value creation

Why Microsoft Corporation Open-Sourced Its Artificial-Intelligence "Brain"

- The tech titan is leveling the playing field for all AI developers.
- **Microsoft** ([NASDAQ:MSFT](#)) recently open-sourced CNTK (Computation Network Toolkit), its artificial-intelligence framework that powers Cortana and Skype's speech-recognition engines. This means that anyone can now view, modify, or use Microsoft's code in their own software. CNTK is a framework for "deep learning", which helps machines understand human speech and recognize images by imitating the functions of a human brain.
- Tech giants like Microsoft, **Alphabet** ([NASDAQ:GOOG](#)) ([NASDAQ:GOOGL](#)), **Amazon.com** ([NASDAQ:AMZN](#)), and **Facebook** have [all invested heavily](#) in this market over the past few years. But more recently, these tech giants have all started open-sourcing their platforms to expand their applications beyond their first-party services.
- Last year, Google open-sourced its AI framework, TensorFlow, which powers the voice-recognition capabilities of Android and its core search engine. Amazon open-sourced the machine learning engine that powers its shopping recommendations, and Facebook open-sourced [custom hardware designs](#) to run its latest AI algorithms. Let's discuss how **these growing AI ecosystems can help these tech titans expand their influence over machines in the near future.**

<http://www.fool.com/investing/general/2016/02/05/why-microsoft-corporation-open-sourced-its-artific.aspx>

TENSORFLOW

- TensorFlow originally developed by Google Brain Team
- Allows using GPUs for deep learning algorithms
- Single processor version released in 2015
- Multiple processor version released in March 2016



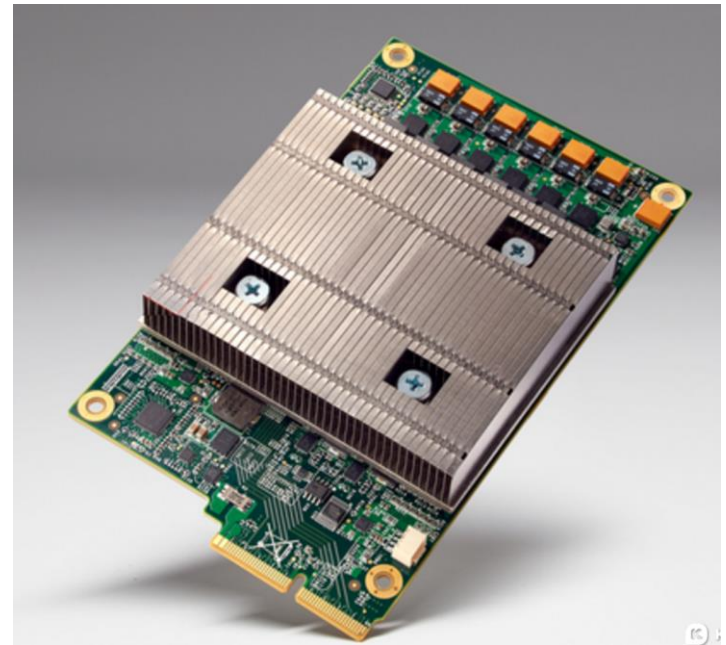
Machine/deep learning processors can be produced in huge volumes!

Source: http://www.slideshare.net/AsimJalis/neural-networks-and-deep-learning-62286693?next_slideshow=1

- Google's Tensor Processing Unit could advance Moore's Law 7 years into the future
- **Google unveils a custom chip, which it says advances computing performance by three generations.**

Forget the CPU, GPU, and FPGA, Google says its Tensor Processing Unit, or TPU, advances machine learning capability by a factor of three generations.

“TPUs deliver an order of magnitude higher performance per watt than all commercially available GPUs and FPGA,” said Google CEO Sundar Pichai during the company’s I/O developer conference on Wednesday.



Google CEO Says AI Is the Next Big Evolution for Technology

Pichai's letter covered the search giant's numerous priorities, from improving search in mobile to the heightening focus on cloud computing to compete with Microsoft Corporation and Amazon Inc. The predominant subject however, was the power of artificial intelligence. He said that the company will shift from a *mobile first* to an *artificial intelligence first* world.

Google CEO said that computers will soon be replaced by artificial intelligence. He envisions that over time, the computer itself will be an intelligent assistant helping people through their day. CNET notes that as the search giant lays out its plan for the future, it is ensuring that business is given a healthy dose of AI.

Google CEO proclaims the end of computer era and predicts that artificial intelligence will run people's lives. Sundar Pichai said that people should be able to move seamlessly across Mountain View's services in a natural way, and get assistance that understands their situation, context and requirements. He said that for the company, technology is not about products or devices, but about democratizing force, empowering people through information.

>>>

Computer paradigm change via services!

<http://cdanews.com/2016/05/google-ceo-says-ai-is-the-next-big-evolution-for-technology/>

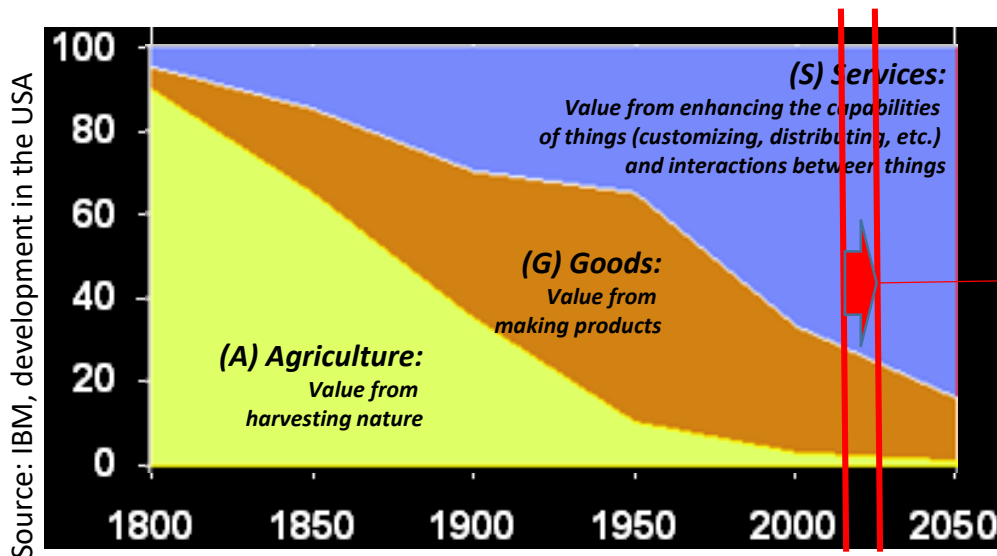
Microsoft CEO Satya Nadella Has Much To Say About Artificial Intelligence

- *Fortune* 26.9.2016
- Microsoft's overarching goal is to "democratize A.I.," which Nadella explained has something to do with analyzing the mountains of data produced by consumers and businesses and then presenting the findings to people who have far less free time than they used to have.
- Microsoft's "A.I. approach" consists of four "core pillars" that Nadella said are **agents, applications, services, and infrastructure**. Not coincidentally, a Microsoft service underpins each one of those pillars
- Microsoft's agent is digital assistant Cortana, which Nadella described as a "new organizing layer" that sits "**across all the applications you will use in your life.**" He mentioned Microsoft's Office work productivity and Dynamics software for salespeople as being two examples of applications Microsoft has imbued with better data crunching technology.
- As for services, Nadella said that A.I. has opened up some of the technology that powers Cortana to outside developers to use to build their own apps on. It's a similar strategy to companies like Google and Facebook, which have released A.I. software development tools for free to popularize their technologies and attract talent.

<http://fortune.com/2016/09/26/microsoft-satya-nadella-artificial-intelligence/>

10 years from now

- Every service is intelligent
 - Every business is intelligent
 - Every device is connected to some sort of intelligence
 - We are using various intelligence architectures to support human intelligence
 - Augmented intelligence
 - Organizations are full of AI >>> augmented intelligence and organizations
- >>> Service productivity development is still booming



Trends in agriculture and goods industry remain
&
Exponential productivity gains in the service environment in a very short time!
>>>
Growth in the intelligence economy accelerates!

AI network collects the competence

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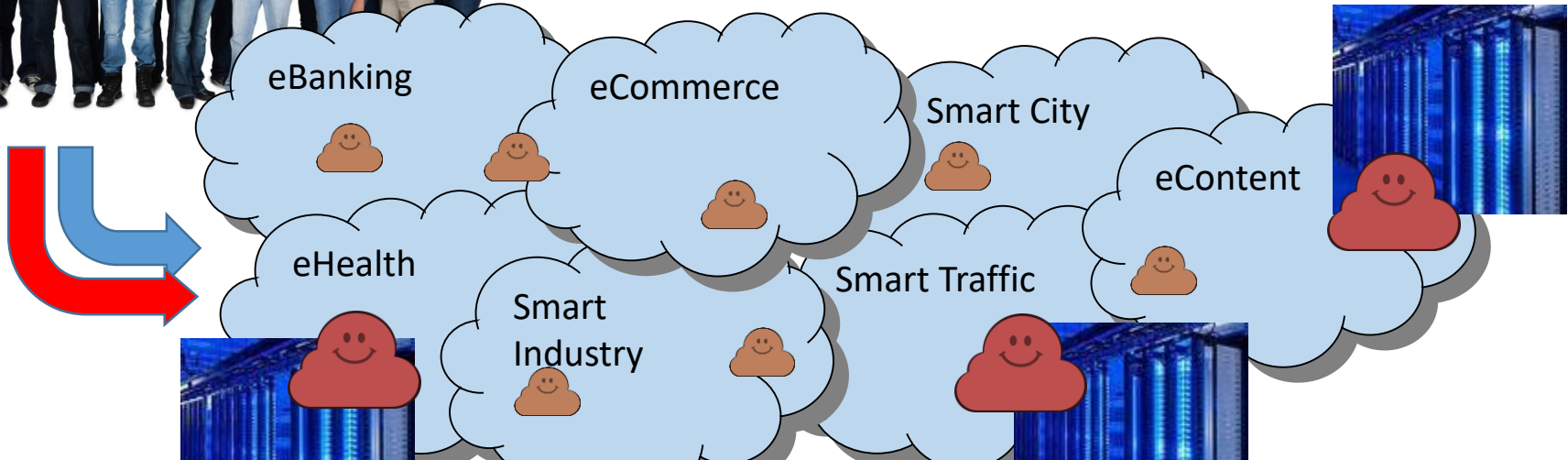
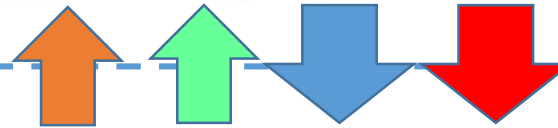
Human work value is collected to computing environments

Computational intelligence will accelerate this value capture

Users



Developers



From big data to big AI with distributed skills!

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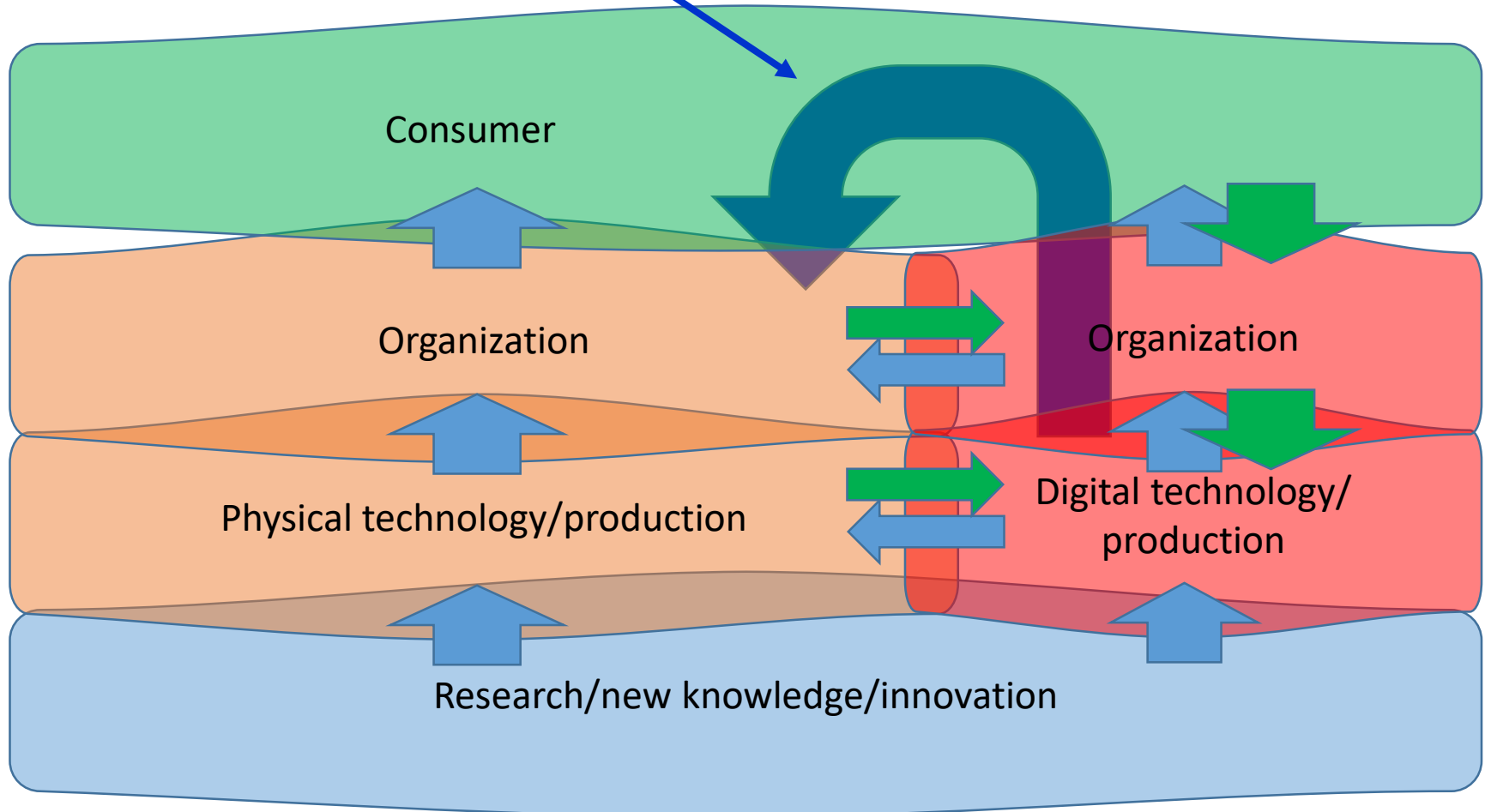
**Change of value flows –
boosted by AI**

Industrial economy

- Offers low cost solutions to industrial sector

Internet economy

- Started with industrial structure
- Turned to service dominant logic
- Is consumer driven via platforms



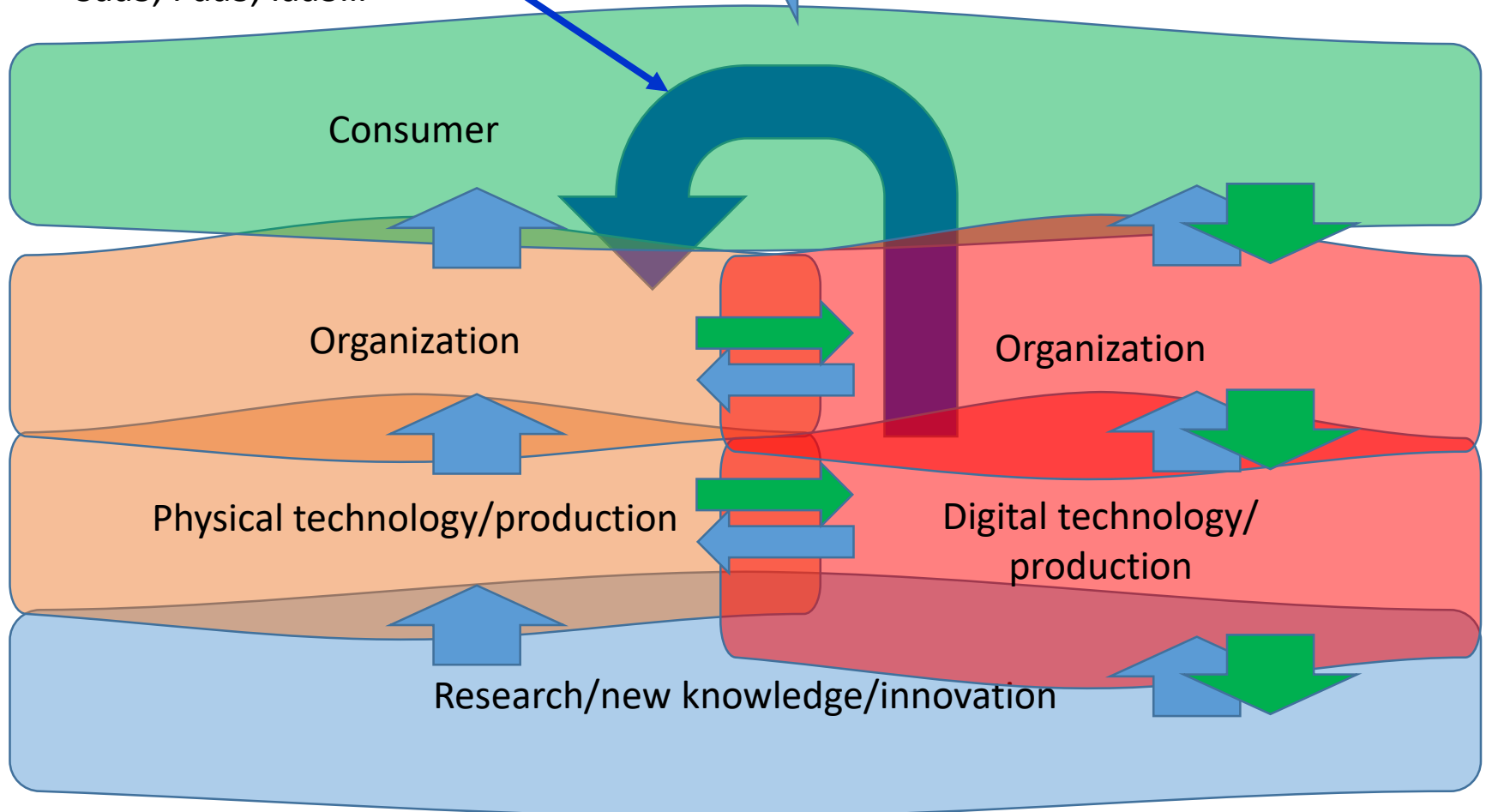
Change of value flows

Industrial economy

Digital service is the main vehicle to deliver the value!
- SaaS, PaaS, IaaS...

Internet economy

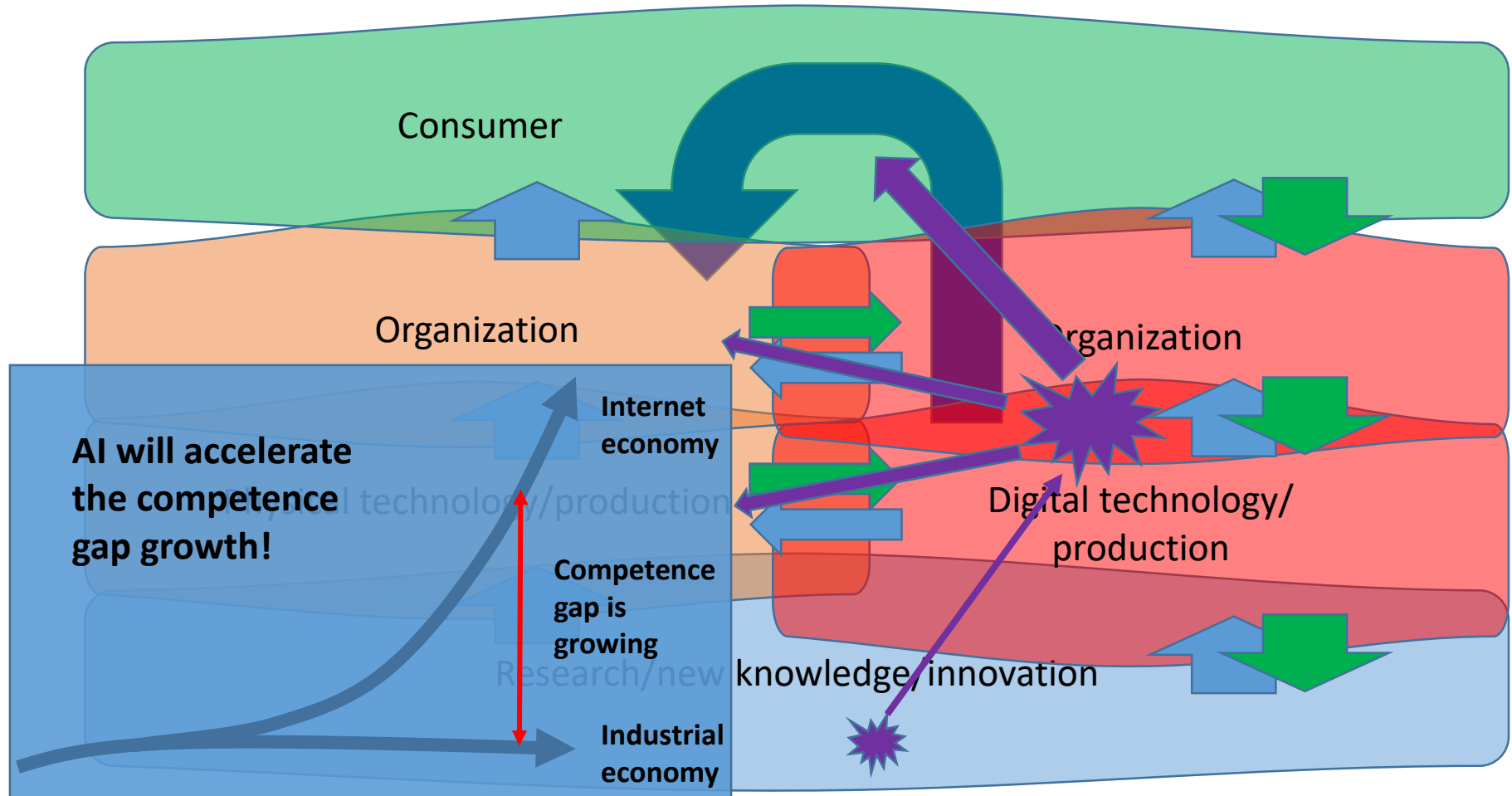
Internet economy is very productive and gains market share in the service society!



Industrial economy

Internet economy

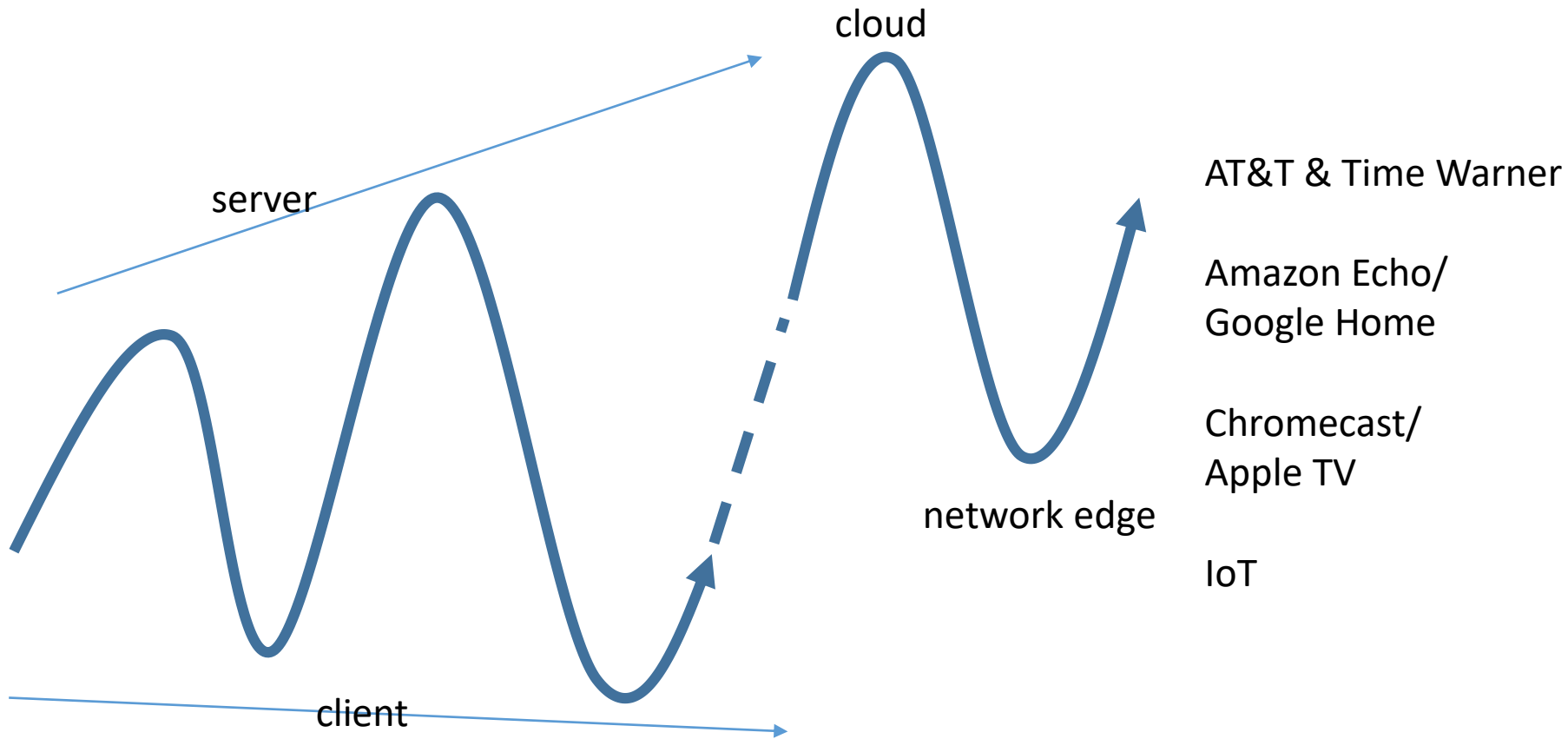
The leading Internet economy players are the strongest AI developers...
... and they will first utilize the new technology in their own business!



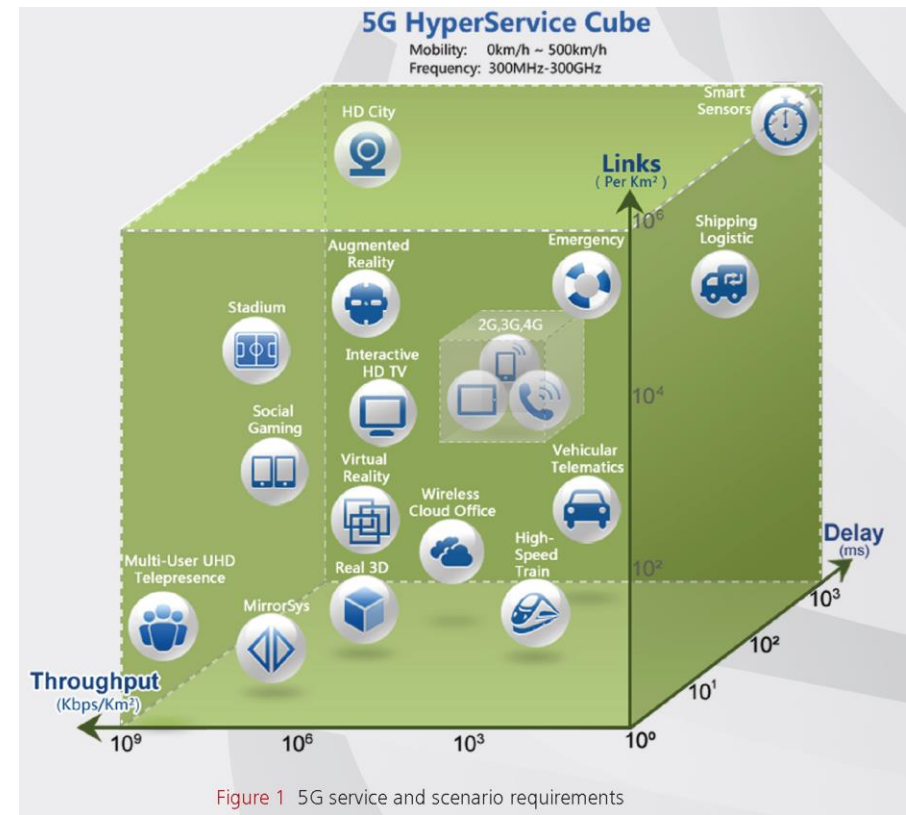
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Intelligent networks

- Internet economy, platformization and machine learning will start to turn networks to smart and then to intelligent networks
- IoT will be in the key role to make this happen



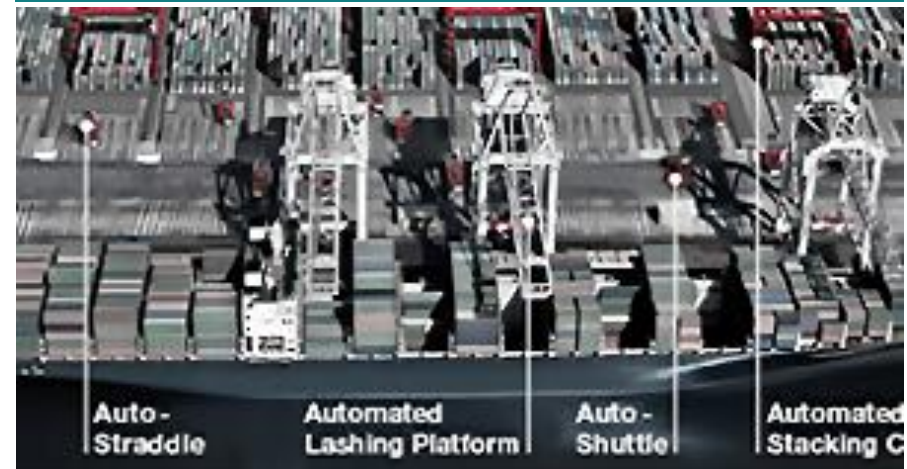
- Network is not anymore only the transport and communication media
- It will have more intelligence to act:
 - To define context
 - To secure access
 - To optimize traffic – to save resources and energy
 - To act as user interface or as reflex
- Smart cities
 - 5G will provide the foundational infrastructure for building smart cities, which will push mobile network performance and capability requirements to their extremes.



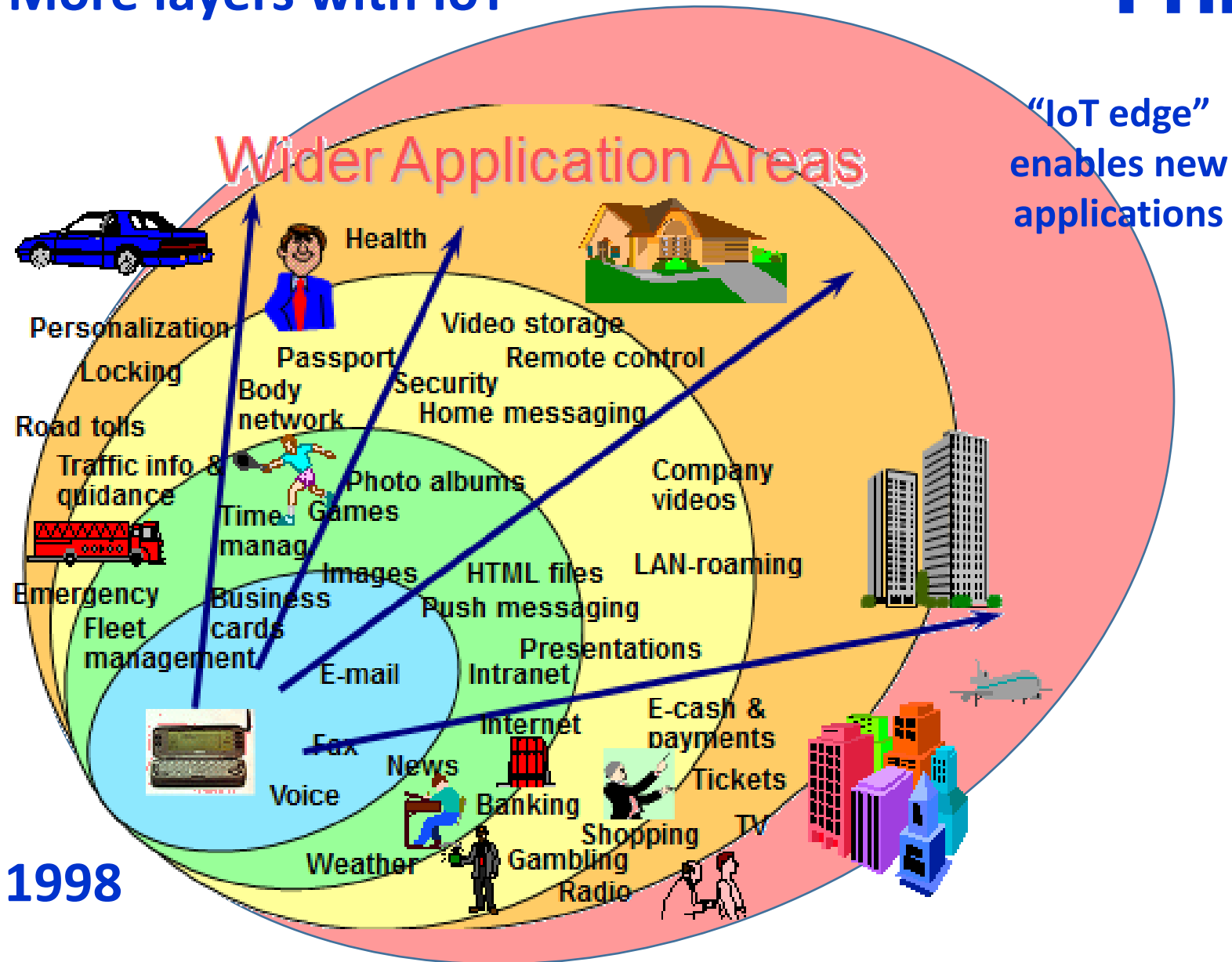
<http://www.huawei.com/5gwhitepaper/>

Intelligent “edge domains”

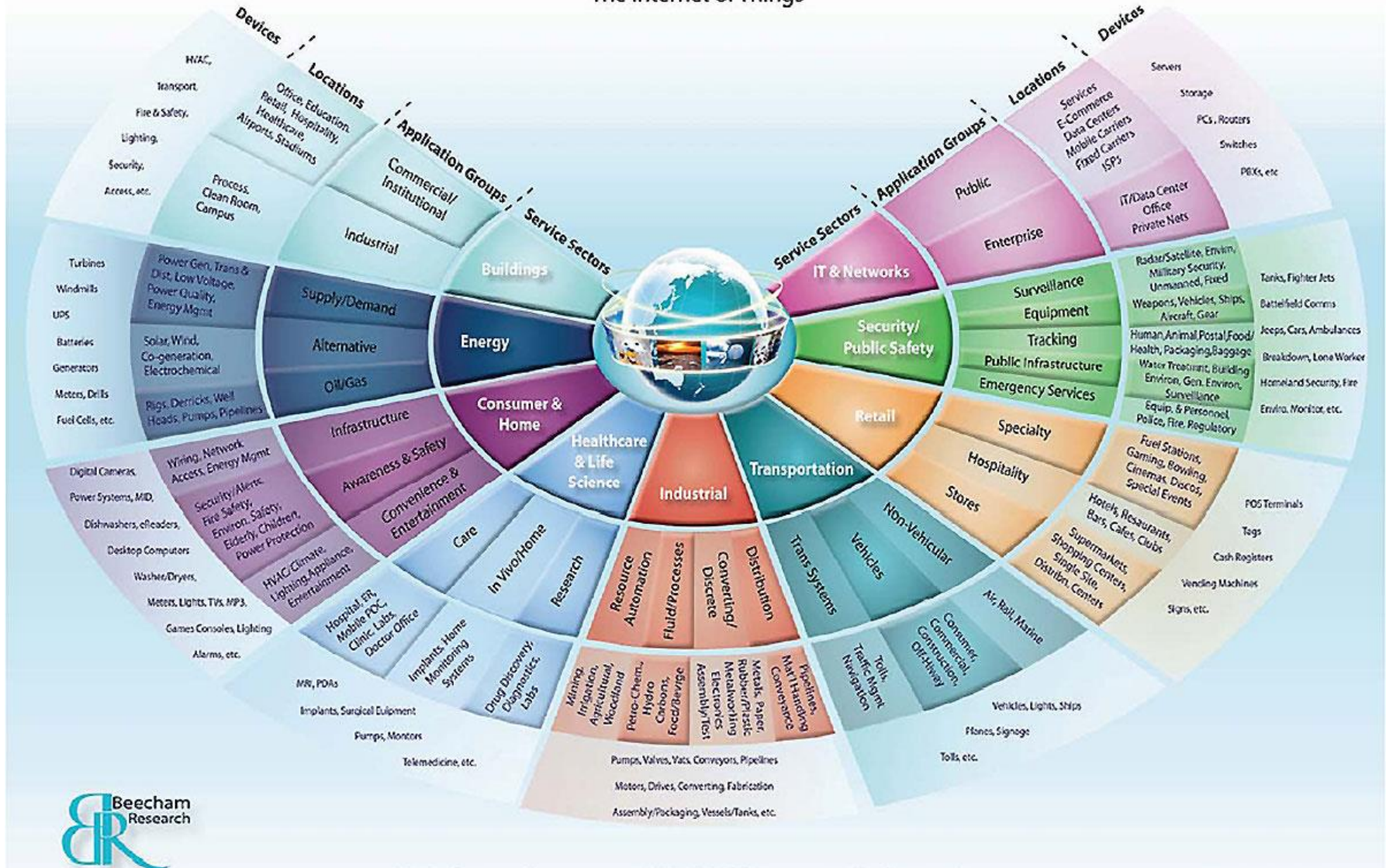
- Smart city
- Smart media company
- Smart airport
- Smart harbor
- Smart traffic
- Smart home
- ...



- The enterprise Internet of Things will be the largest of the three main IoT sectors — enterprise, home, government — as defined by BI Intelligence, Business Insider's research service: [The Enterprise Internet Of Things Report](#)



The Internet of Things



<https://jessgrooman.wordpress.com/2013/08/03/how-to-assess-the-business-imperative-for-the-internet-of-things/>

Huawei:

- “The Internet of Things (IoT) is forging the digital economic era. Consumers are replacing vendors as the architects of production, and their demands are creating services from what used to be products. ICT will emerge as a factor of production rather than remain a support system, and the integration of the physical and digital worlds will deepen.
- **IoT exists in a massive, sophisticated ecosystem that requires joint investment and collaboration between ICT solution providers, enterprises, research institutes, and governments.** This in turn requires complex partnership agreements to ensure that this ecosystem thrives.”

<http://www.huawei.com/minisite/iot/en/>

Gartner Says the Internet of Things Will Transform the Data Center

- By 2020 the IoT Will Include 26 Billion Units, Creating New Challenges for All Aspects of the Data Center
- Data Center Trends to be Discussed at the Gartner Infrastructure, Operations and Data Center Summit 2014, May 21-22 in Sydney
- The Internet of Things (IoT) has a potential transformational effect on the data center market, its customers, technology providers, technologies, and sales and marketing models, according to Gartner, Inc. Gartner estimates that the IoT will include 26 billion units installed by 2020, and by that time, IoT product and service suppliers will generate incremental revenue exceeding \$300 billion, mostly in services.
- "IoT deployments will generate large quantities of data that need to be processed and analyzed in real time," said Fabrizio Biscotti, research director at Gartner. "Processing large quantities of IoT data in real time will increase as a proportion of workloads of data centers, leaving providers facing new security, capacity and analytics challenges."

Big data >>> real time data >>> forecasts with AI = productivity increase!

Why artificial intelligence will finally unlock IoT

- Connected devices that leverage AI to help with real-time analytics are here today, and widespread adoption is on the rise. Well-reported examples include smart thermostats like Nest that utilize AI to learn user temperature preferences and adjust energy use accordingly. Additionally, all cars sold by Tesla operate as a network. When one car learns something, the entire fleet learns and benefits.
- ...
- The same report also predicts that by 2019, the **enterprise IoT market alone will be bigger than the smartphone and tablet markets combined.**
- Within the enterprise sector, AI is already making a mark through aiding real-time decision-making. AI's capabilities are especially valuable to businesses in effectively dealing with matters connected to these components simultaneously: time, money and risk. This can include sales forecasting, information management and various forms of automation.
- ...
- **IoT and AI enthusiasts should look forward to a future where these as two technologies evolve their symbiotic relationship.**

<http://readwrite.com/2016/10/17/why-artificial-intelligence-will-finally-unlock-iot/>

- Understanding the possibilities
- Understanding your or your customers business case
 - E.g. real growth or just extending the time window
- Access to latest, fast developing technology – even access to competencies
- Lasting partnerships and business ecosystems

>>> Customer success management via value adding!

What is your painting?



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Thank you!

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