中国半导体新格局及嵌入式软件发展机会

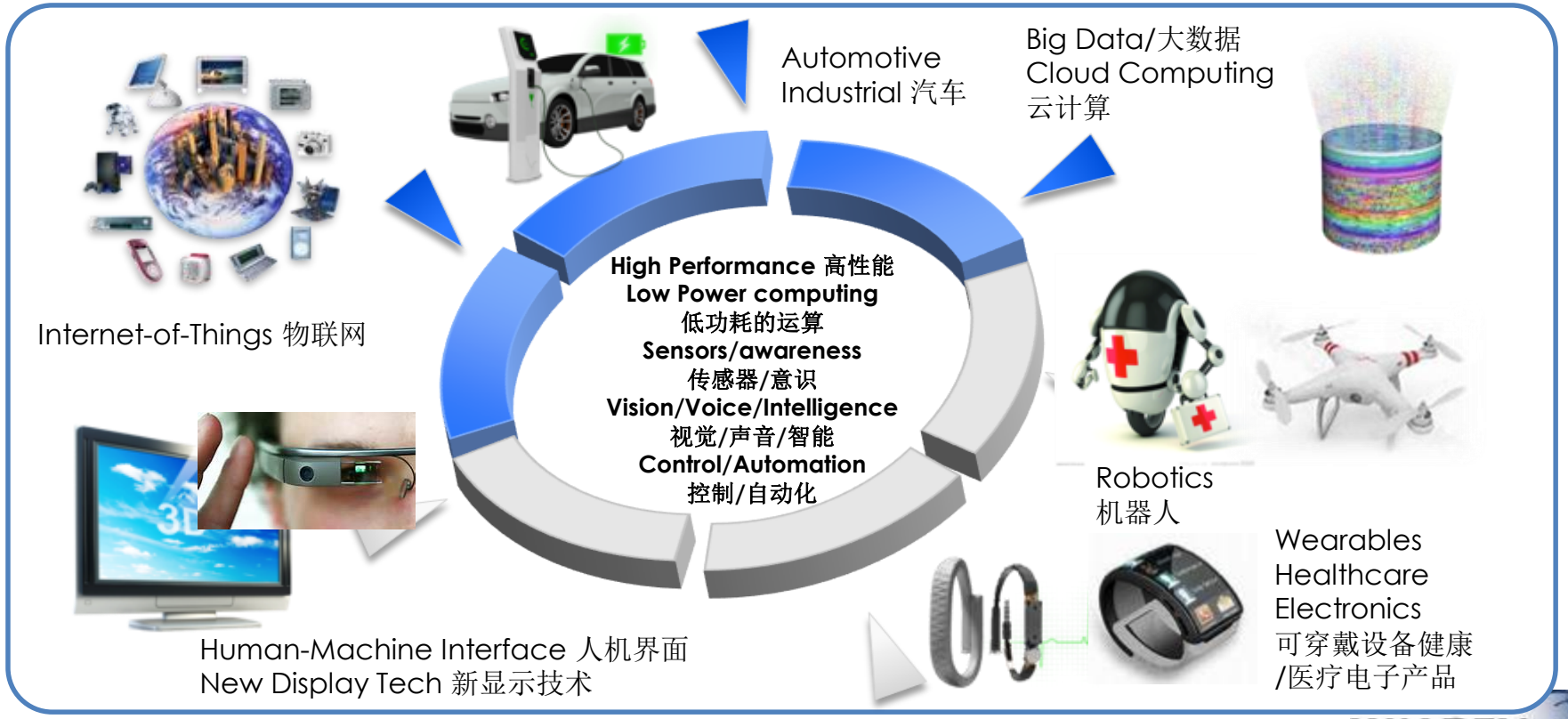
王林

2015.12. 北京

嵌入式系统联谊会
www.esbf.org.cn

华登国际 投资电子产业链

- Invest in Semiconductor value-chain
  - Core technologies: Semiconductors / sensors / Electronic Materials
  - Innovative Electronic Systems 创新的电子系统
  - Algorithm/Software/IP 算法/软件/ IP



28年持续投资半导体产业

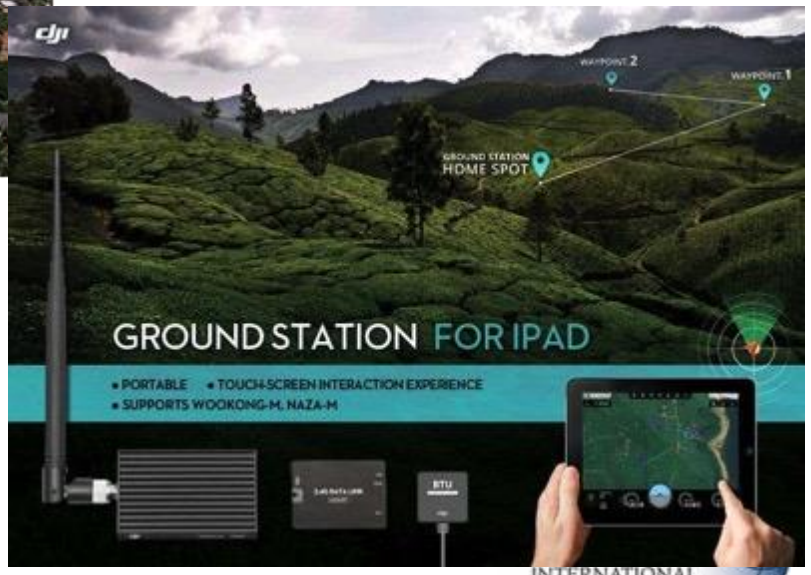
华登整合资源，支持中国半导体产业链

GoPro：可穿戴运动摄像机的领先者

GoPro
Be a HERO.

WALDEN INTERNATIONAL

DJI 大疆：创意无极限

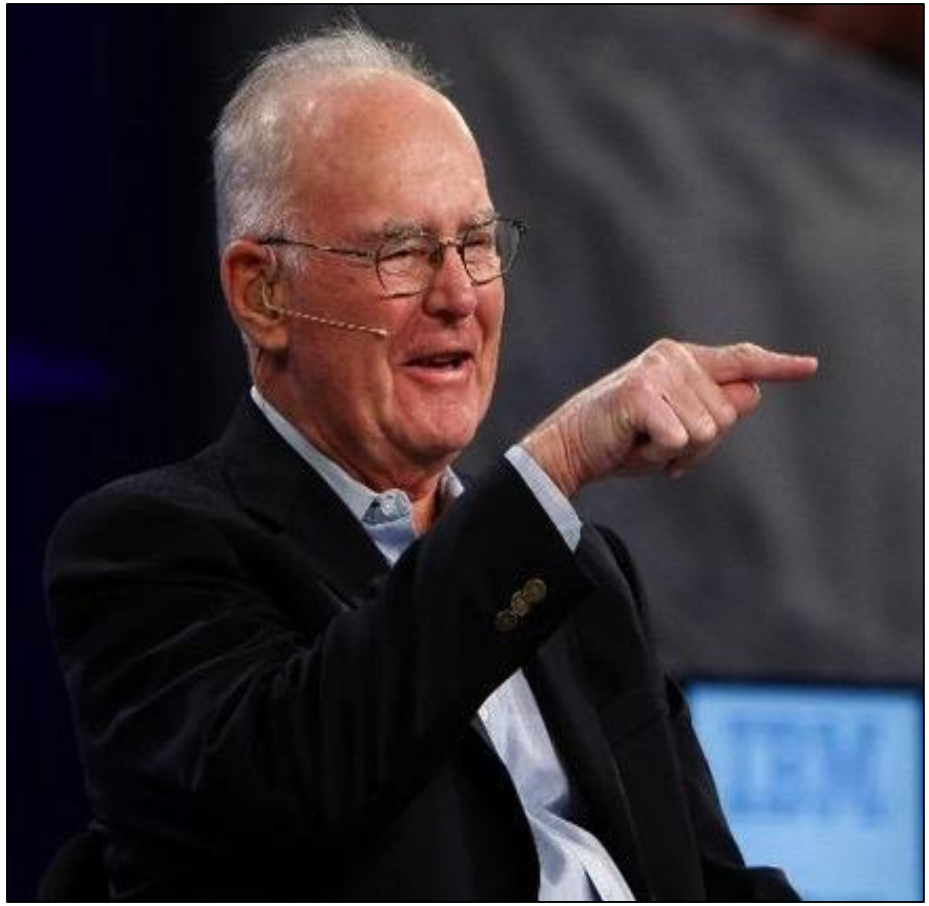


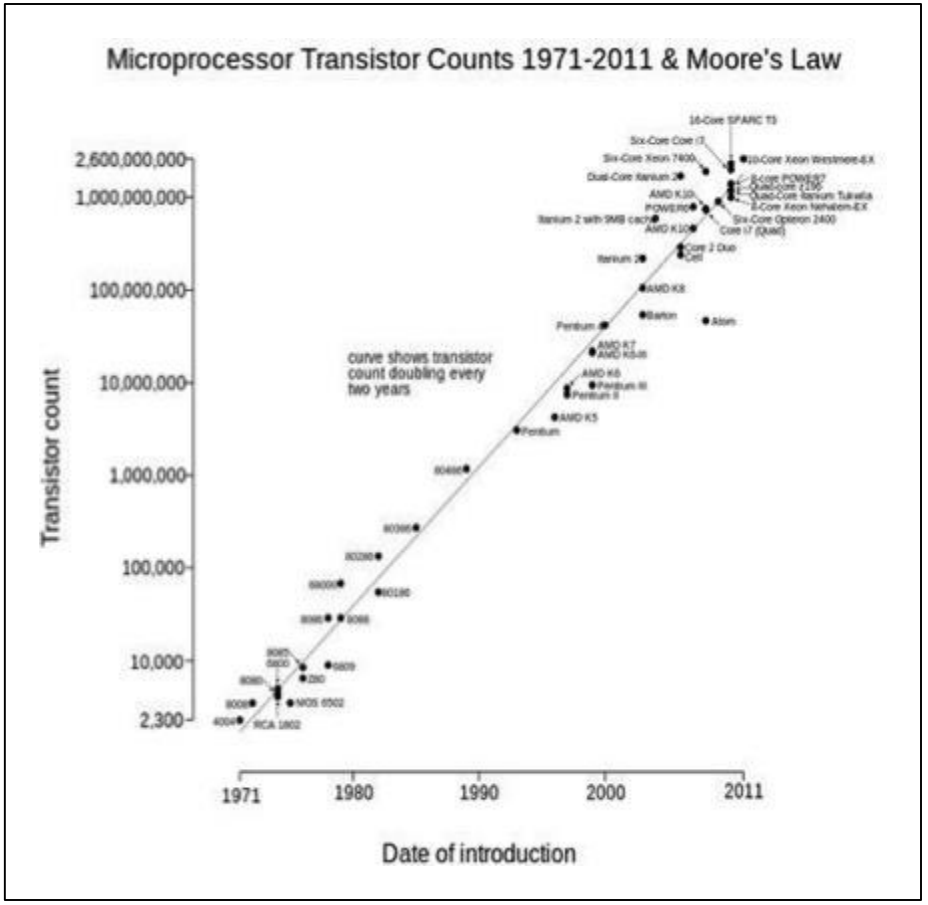
dji FLIGHT CONTROL EXPERTS

大疆创新

今年是摩尔定律发表50周年

April 19, 2015, the 50th anniversary of Moore's Law.





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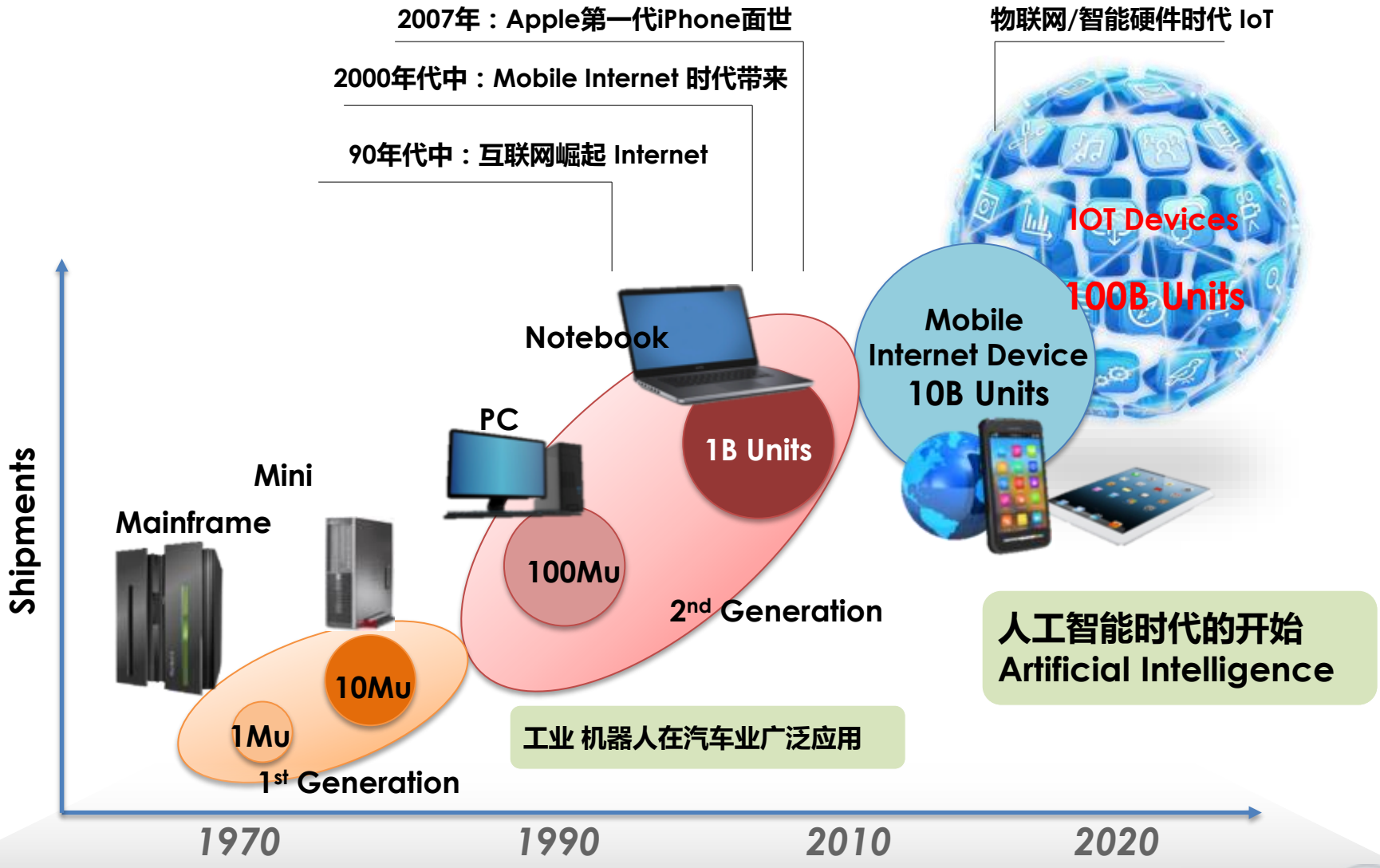
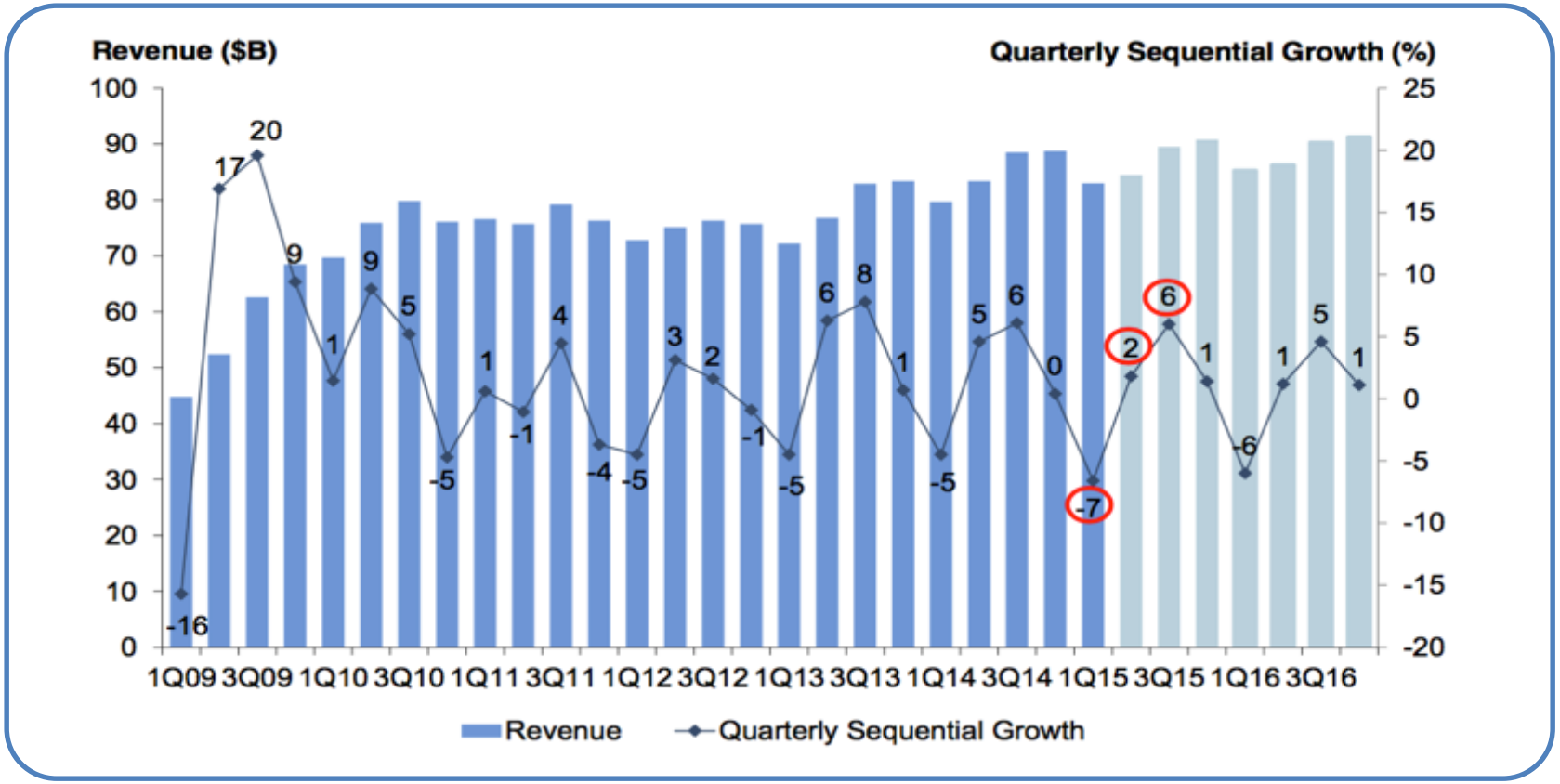
半导体的成长给人类带来了自动化和信息化



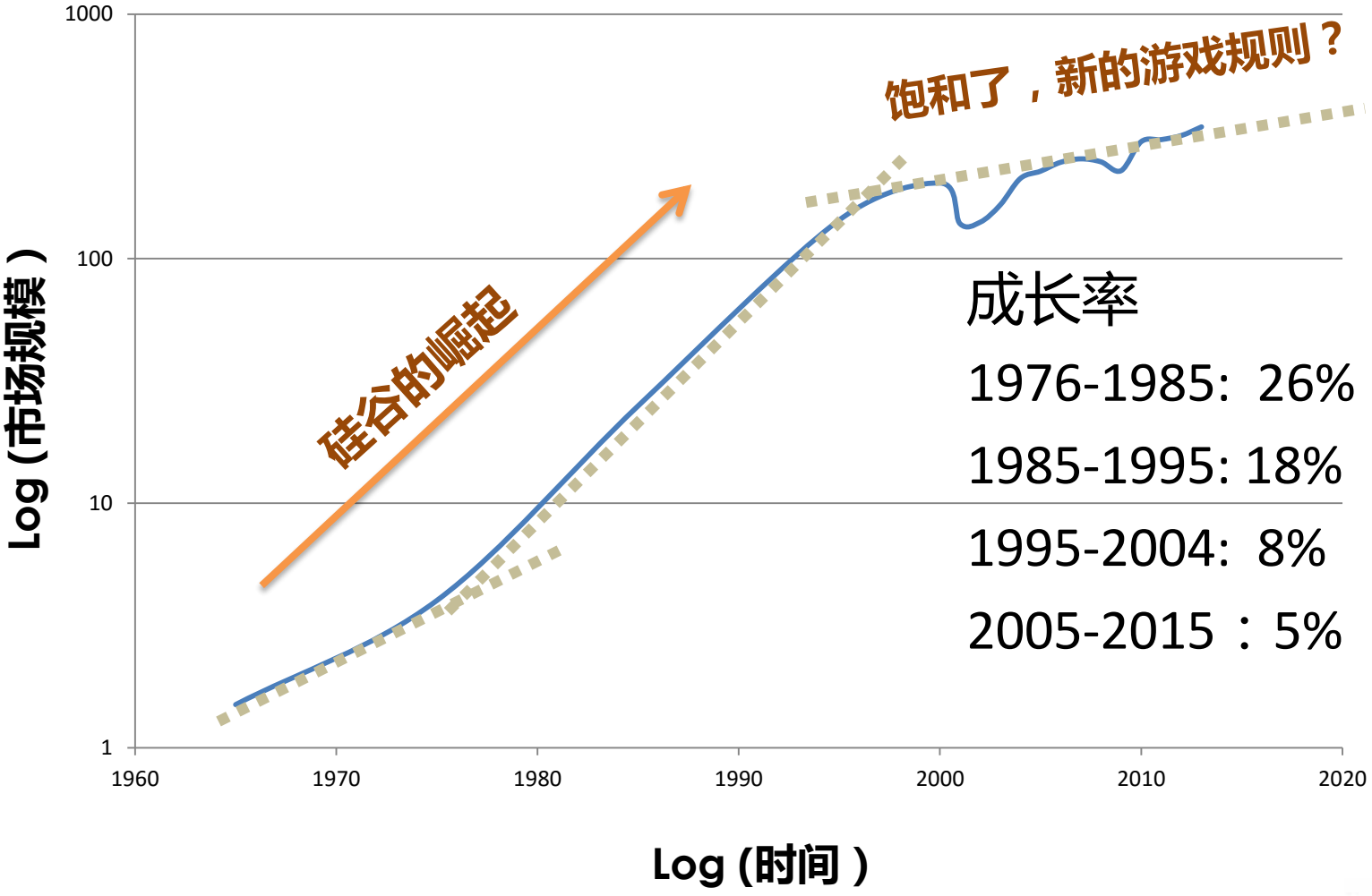
全球半导体产业发展：缓慢增长

- 2015上半年市场基本没有增长，结果令人不满意
- 市场寄希望于下半年的反弹



Source: Gartner, 2015.6.

成长率



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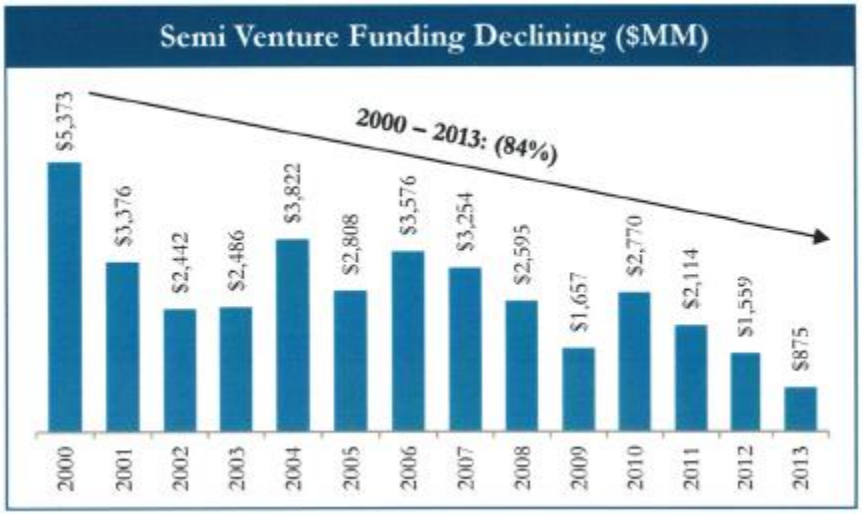
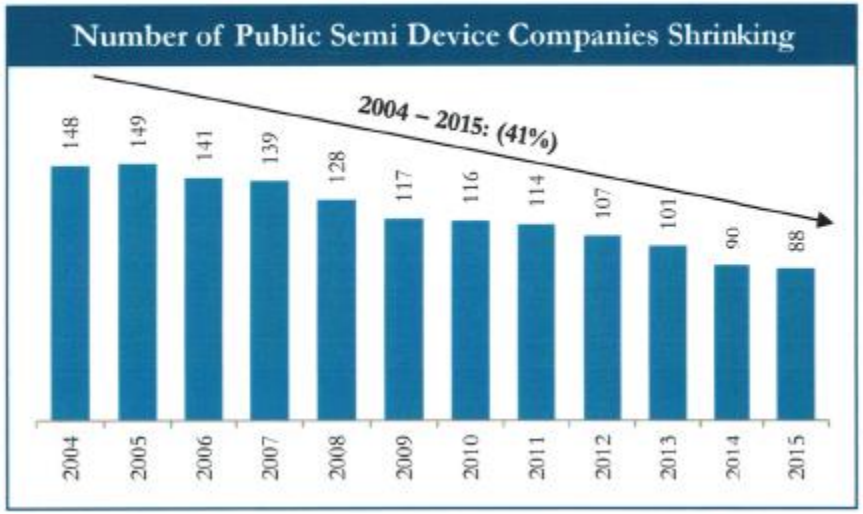
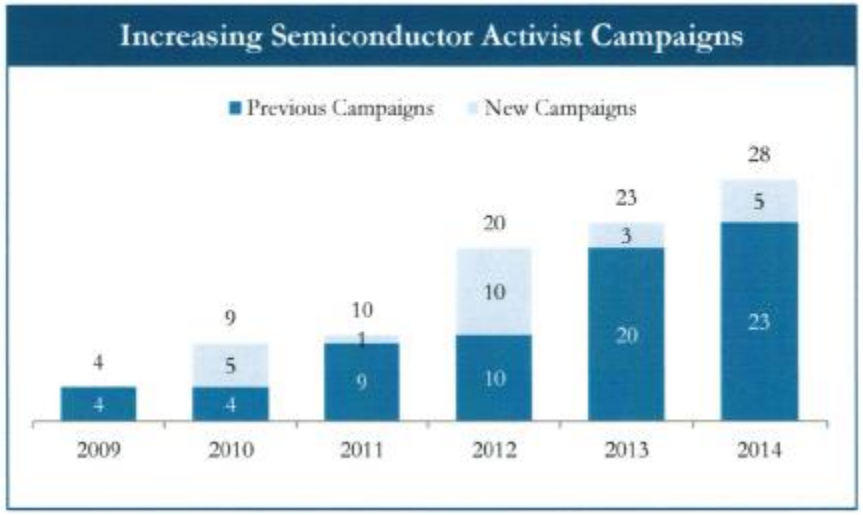
全球半导体产业进入成熟期





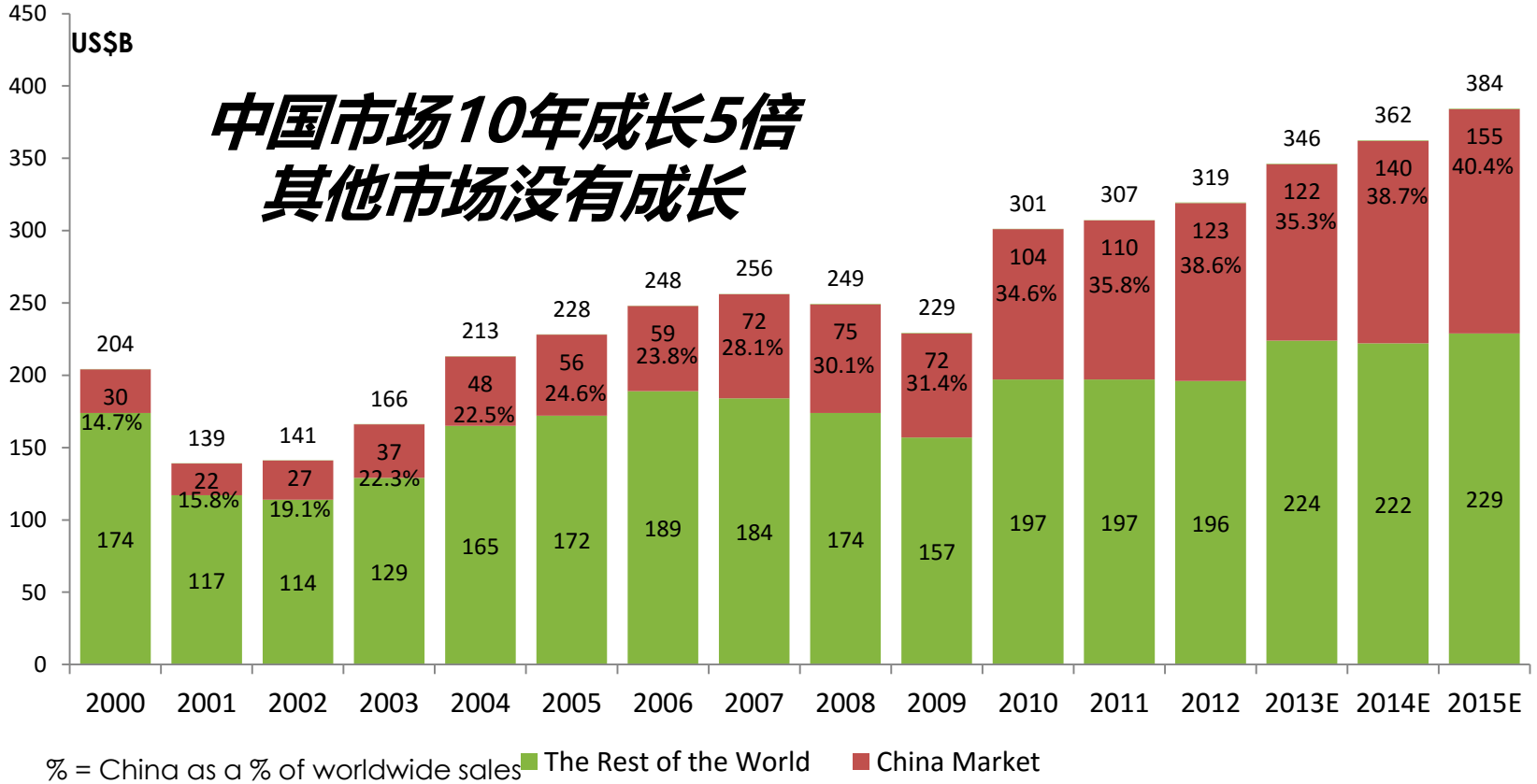


国际巨头以并购来应对


MEDIATEK
38亿美金
MStar semiconductor
intel
167亿美金
ALTERA
DIODES INCORPORATED
1.51亿美金
BCD
GLOBAL FOUNDRIES
-15亿美金
IBM
半导体业务
NXP
118亿美金
freescale
Infineon
30亿美金
International IOR Rectifier
QUALCOMM
25亿美金
csr
ON
ON Semiconductor
4亿美金
Aptina IMAGING
MICROCHIP
3.3亿美金
ISSC
ISSC Technologies Corp.
AVAGO TECHNOLOGIES
370亿美金
BROADCOM.

并购的驱动因素

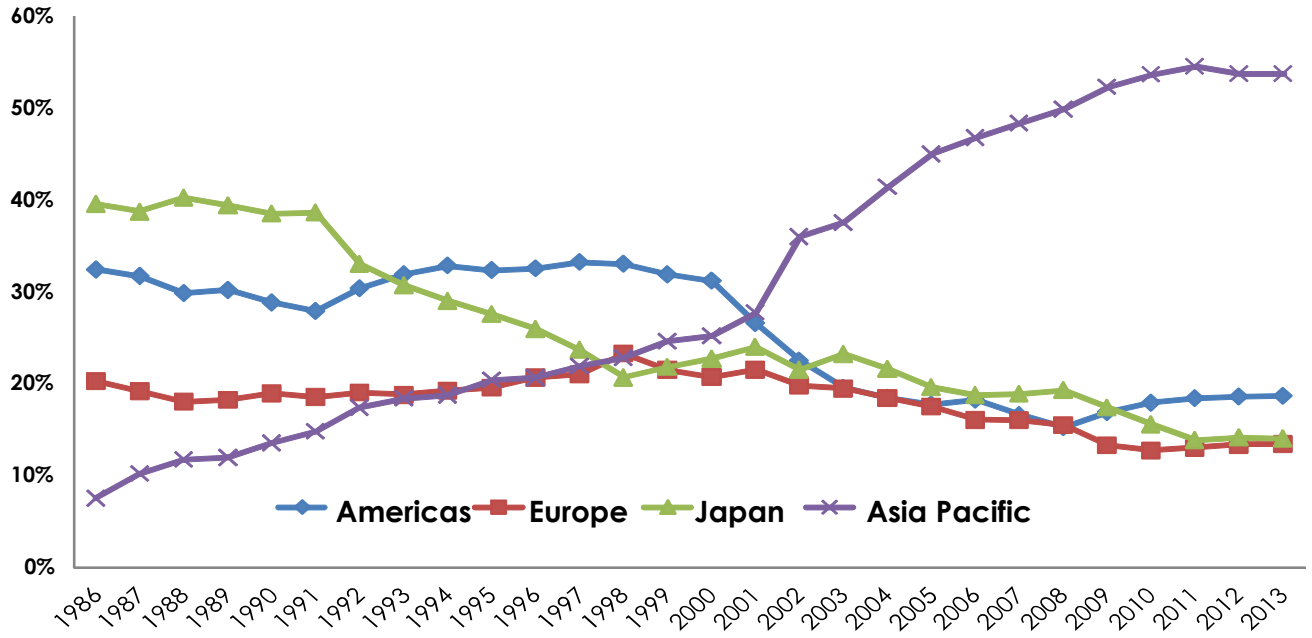
- 集成电路创新逐渐放缓，高毛利无法维持
- 中国等新兴国家的追赶
- 全球制造市场的迁移：美国 ➔ 日本➔ 台湾➔ 中国



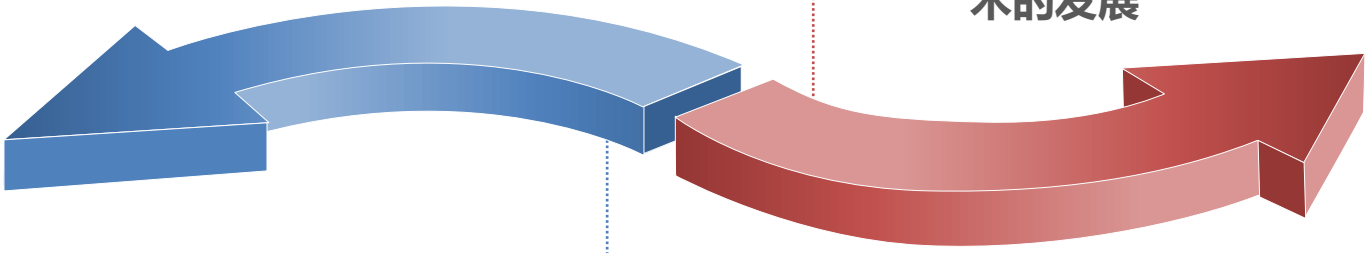
Data source: PWC "China's impact on the semiconductor industry"

中国是半导体创业的最后一块处女地

- 半导体板块的迁移明显，昔日的半导体巨头已很难维持强劲增长
- 欧洲、日本的半导体企业衰退明显
- 韩国依靠三星独自支撑，台湾的电子ODM产业链逐渐向大陆迁移
- 中国成为唯一的亮点



中国集成电路行业创新的驱动力



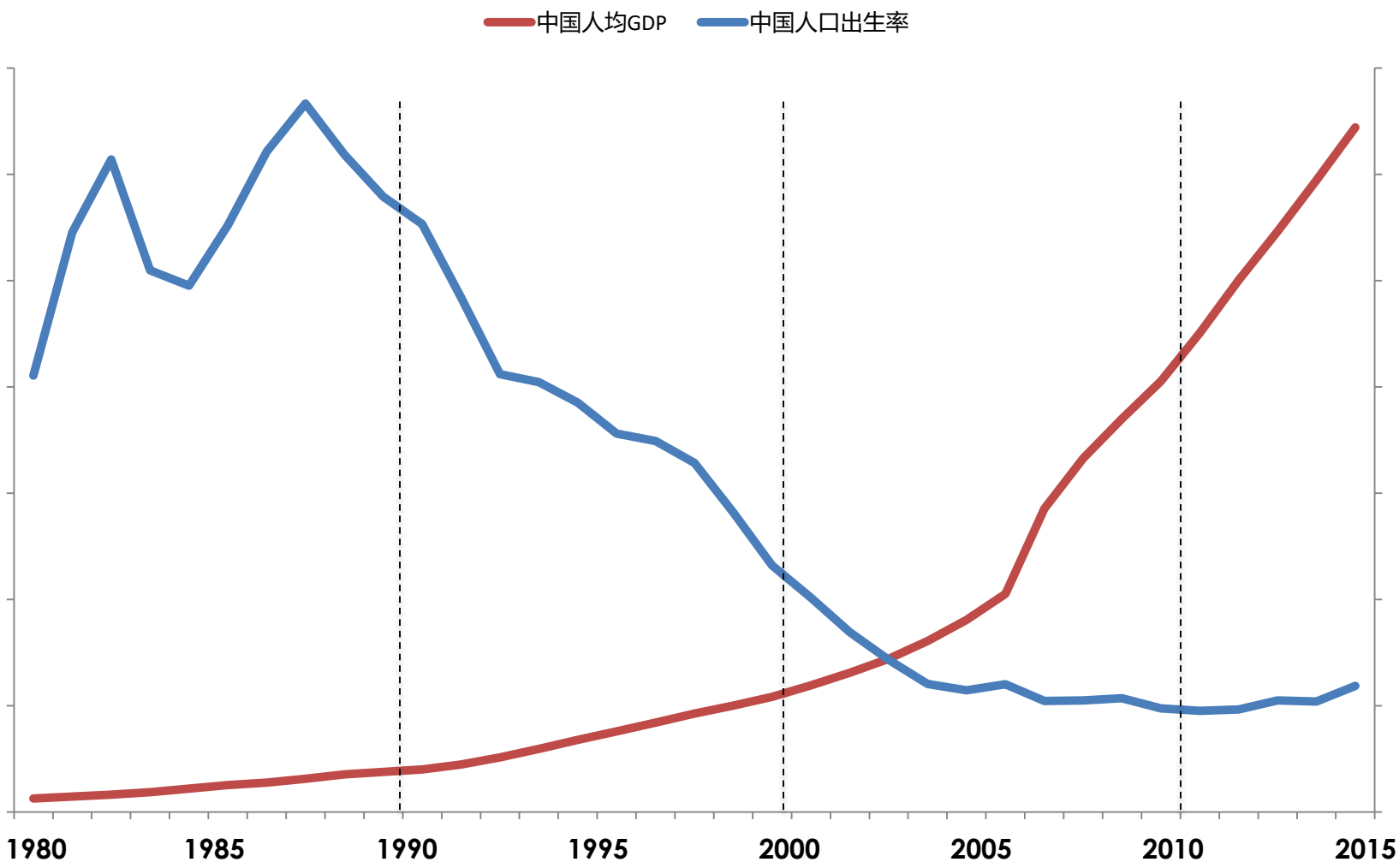
新兴应用，技术驱动

IOT时代的到来驱动了新技术的发展

巨大市场，需求驱动

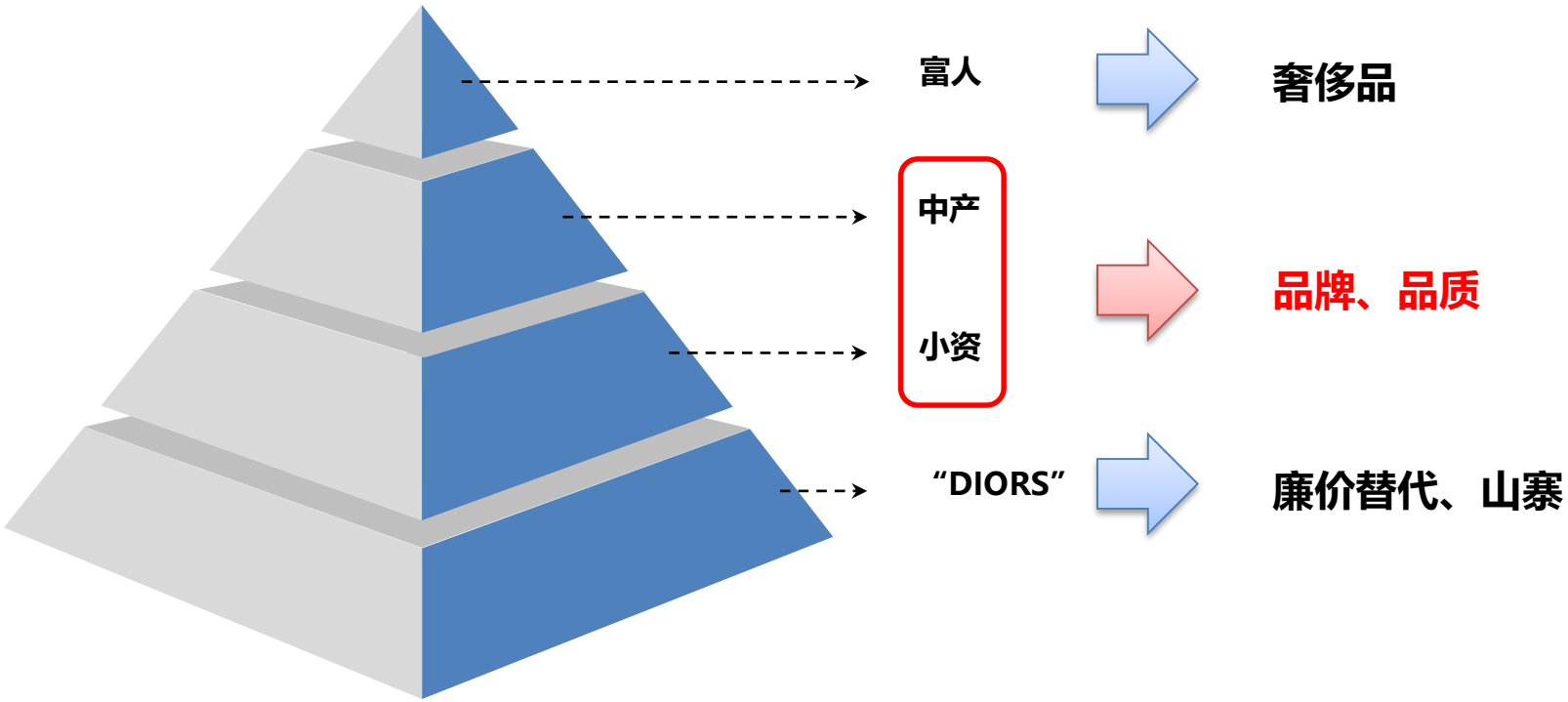
经济的飞速发展带来消费升级、工业升级等需求的驱动

中国代际人口分布



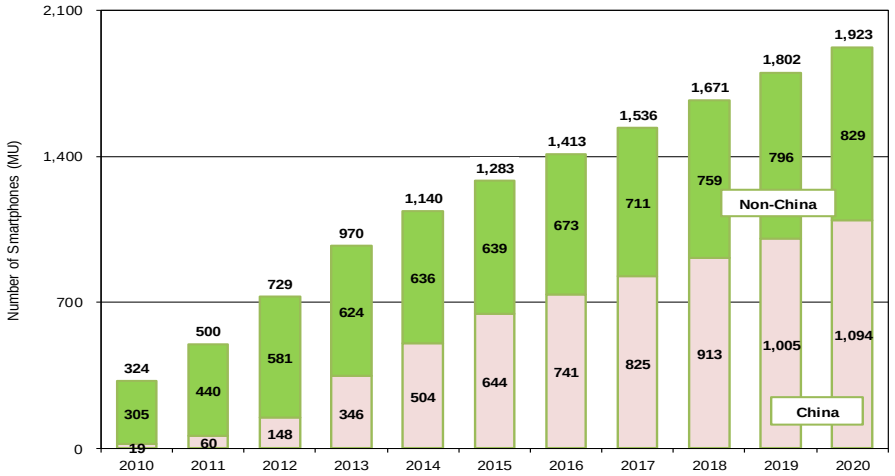
创业者需服务国内市场

- 小资与中产越来越成为国内的消费主力
- “廉价替代”已不能满足他们的需求，有品牌、高品质、高性价比的精品会脱颖而出

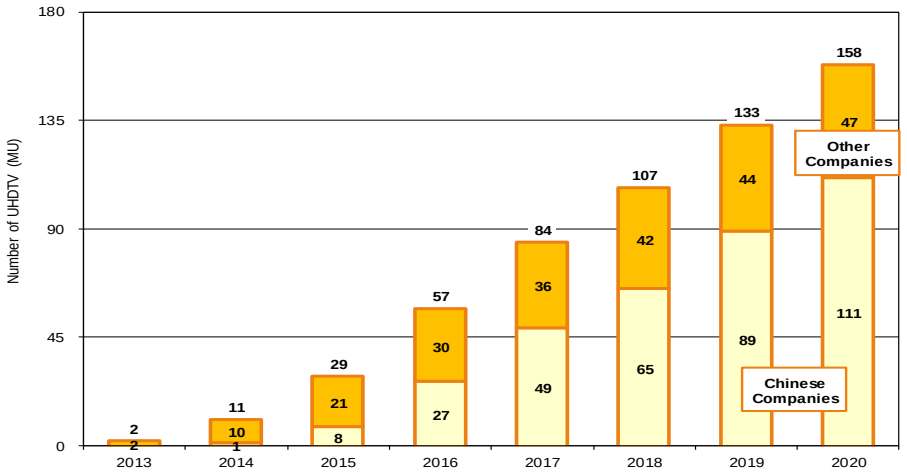


巨大的国内市场和众多Tier-1客户

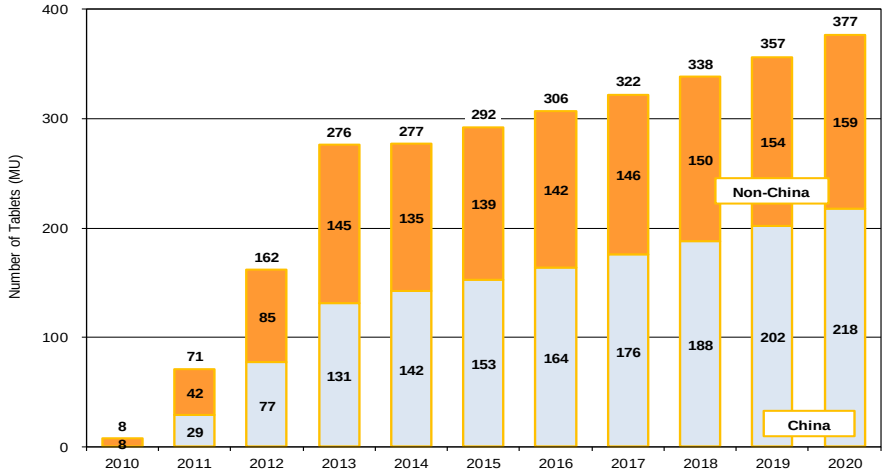
Cell phones 手机



Television 电视



Tablets 平板电脑



HUAWEI ZTE HIKVISION lenovo联想 只要你想 MEIZU mi alhua TECHNOLOGY mindray Haier Midea

软硬结合成为顶级系统厂家的选择

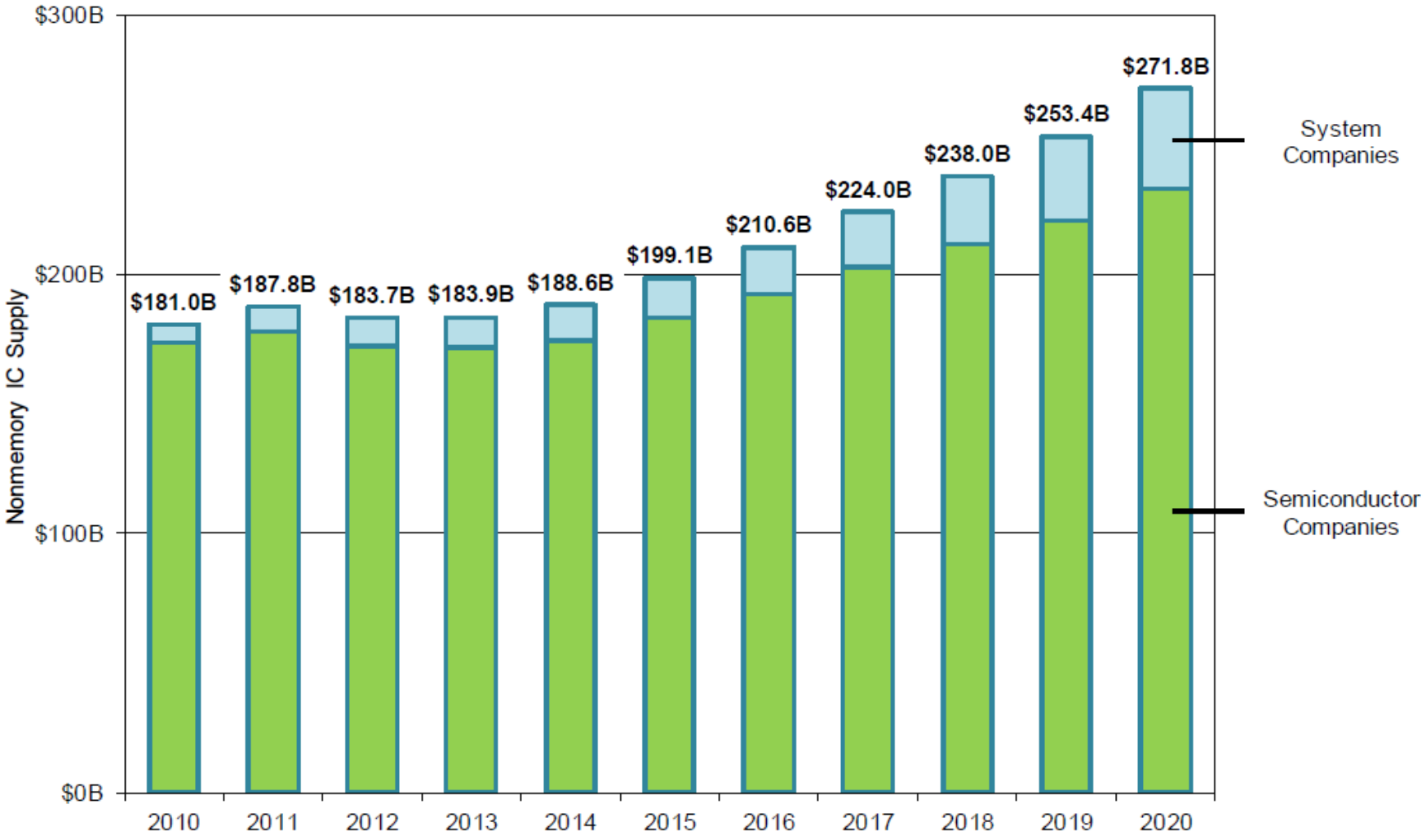
- 越来越多的顶级系统厂家选择从纯软件走向软硬结合
- “廉价替代”已不能满足他们的需求，有品牌、高品质、高性价比的精品会脱颖而出

(in Million USD)

Companies	R&D[1]	IC Products Value[2]
Apple	615	6,982
Huawei	257	2,168
Bosch	107	1,184
Seagate	54	410
Western Digital	46	325
Google	44	98
Amazon	19	41
Total	1,142	11,208

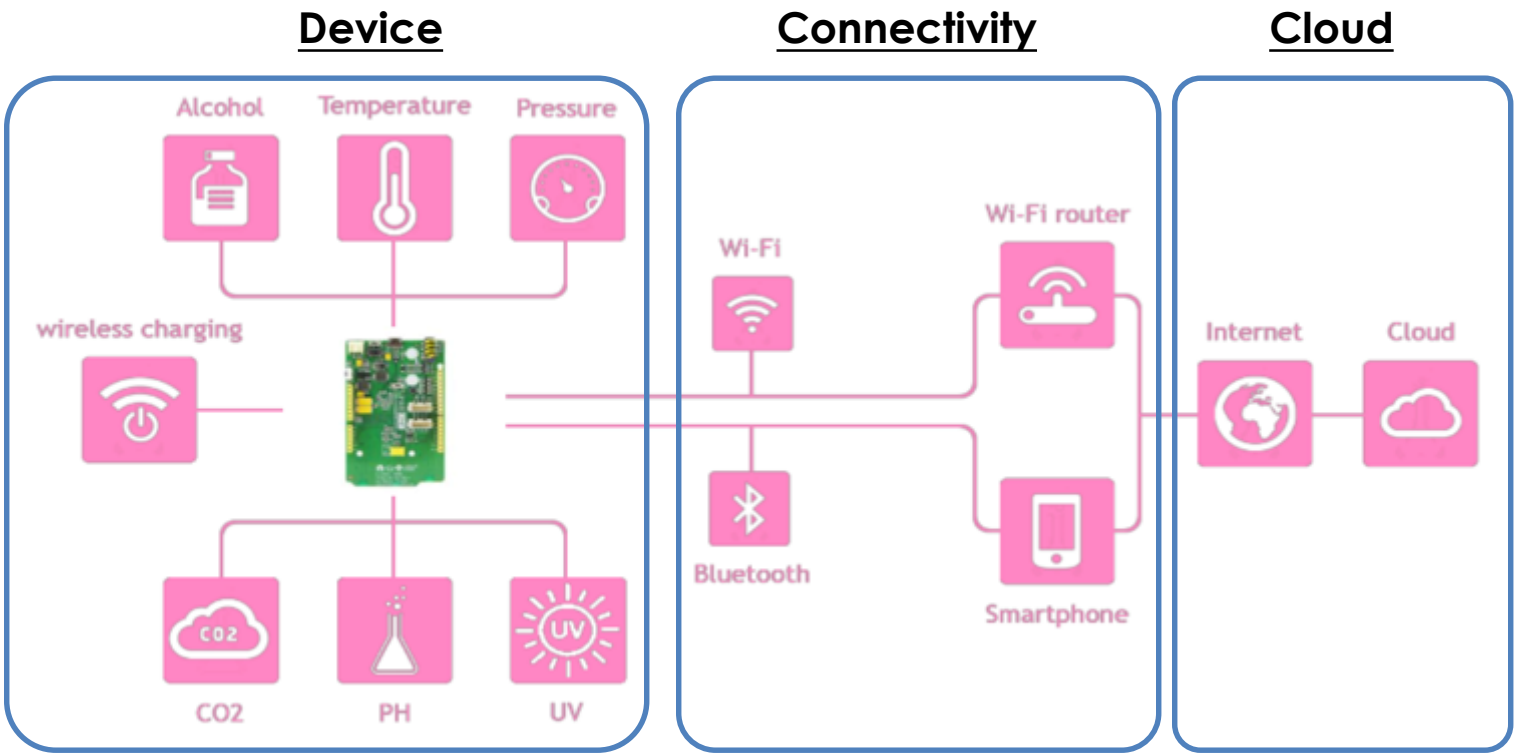
[1] IC Development [2] Base on transfer price

软硬结合的趋势


$300B
$200B
$100B
$0B
Nonmemory IC Supply
$181.0B
$187.8B
$183.7B
$183.9B
$188.6B
$199.1B
$210.6B
$224.0B
$238.0B
$253.4B
$271.8B
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
System Companies
Semiconductor Companies

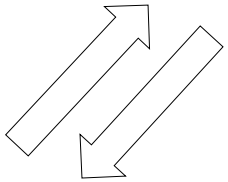
IOT时代下集成电路行业的创新机会

- 端：传感器、高效CPU、低功耗、算法
- 连接：稳定、高效、可组网、低功耗的互联方式
- 云：强大的IDC、高速率Fiber传输、存储、高并发、IaaS/PaaS

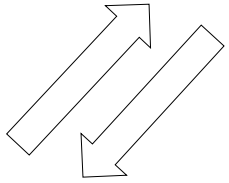


Enter the Era of Artificial Intelligence

Cloud (Information/Services)



Platform Devices (PC, Smartphones, Home , Car, Robots)



Terminal Devices (Appliances、 Wearables, Sensors, etc)

The Cloud

Google Data Center

The Mobile Platform

Cloud

健康管理，机会层出不穷

Digital Health

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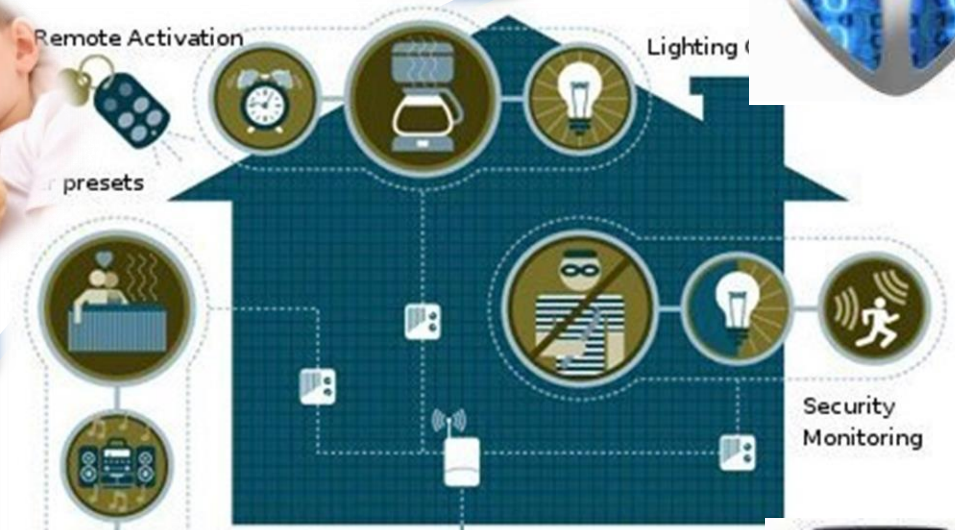
The Home Platform

Cloud

Comfort

Energy saving



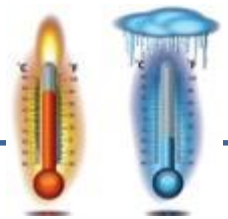
Entertainment

Google acquired Nest to build home platform

Rokid – 家庭 AI 平台

人工智能的的要素

感知




- 利用各种各样的传感器来随时随地采集环境的动态信息
- 包括可穿戴设备等各种智能硬件正是物联网的感知 “前端”

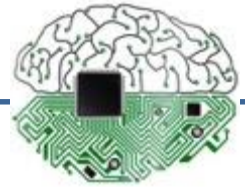
传输



- 通过多样的网络将感知的各种信息进行实时传送
- 各种数据交换的管道，连接“前端”与“大脑”
- 如同 “神经”

智能





- 利用计算机技术，及时地对海量的数据进行信息控制
- 听觉，视觉，语言等感官智能，深度学习，人工智能
- 真正达到了人与物的沟通、物与物的沟通，物联网的 “大脑”

Smart Cars

An Emerging Platform

Your Autopilot has arrived

Tesla <newsletter@teslamotors.com>
To hingwongjz@sbcglobal.net

Oct 16 at 4:42 AM

Starting today, every Model S comes equipped with Tesla Version 7 software and Autopilot capabilities. Model S is designed to keep getting better over time. Our latest software update allows Model S to use its unique combination of cameras, radar, ultrasonic sensors, and data to steer down the highway, change lanes, and adjust speed in response to traffic. Once you've arrived at your destination, Model S scans for a parking space and parallel parks on your command.

Model S can't make traffic disappear, but Version 7 software makes it a lot easier, safer, and more pleasant to endure.

To experience Model S for yourself, book a test drive at your nearest store.

Mobileye – a $10B automotive vision company

The Next Big Thing

Infotainment
信息娱乐

Automotive
Ethernet
汽车以太网

ECU (electronic
control unit)
电子控制单元

ADAS (advanced
driver assistance)
高级驾驶辅助

Functional Safety
安全

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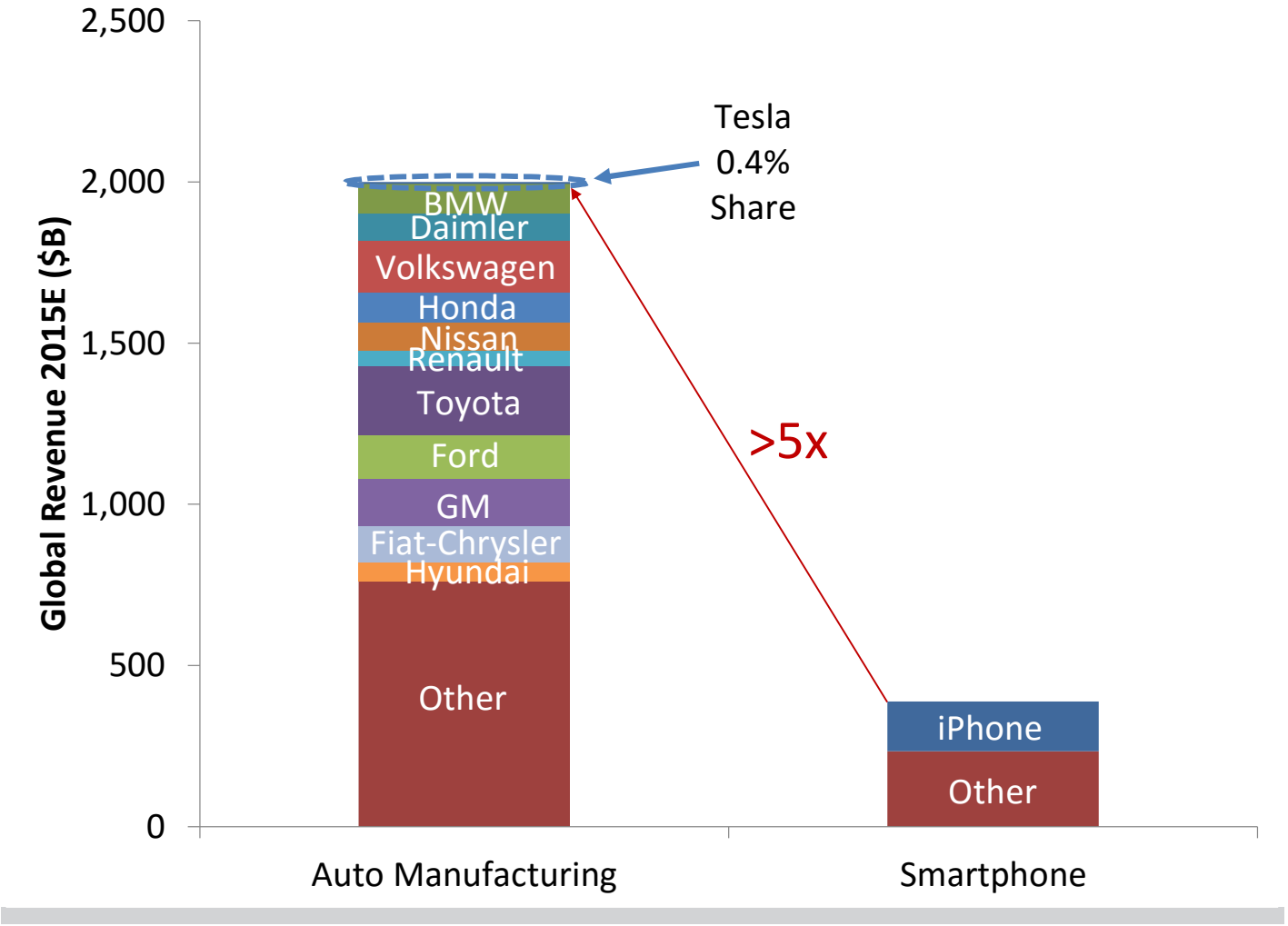
Apple 造车?



Source: FactSet, J.D. Power, Jefferies

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Pepper (日本软银) the robot with cloud support from IBM Watson computer

Watson has a giant knowledge database and voice interface that beat humans in Jeopardy!

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333-1
333-2
333-3
333-4
HYUNDAI

WALDEN
INTERNATIONAL


Boston Dynamics

服务机器人

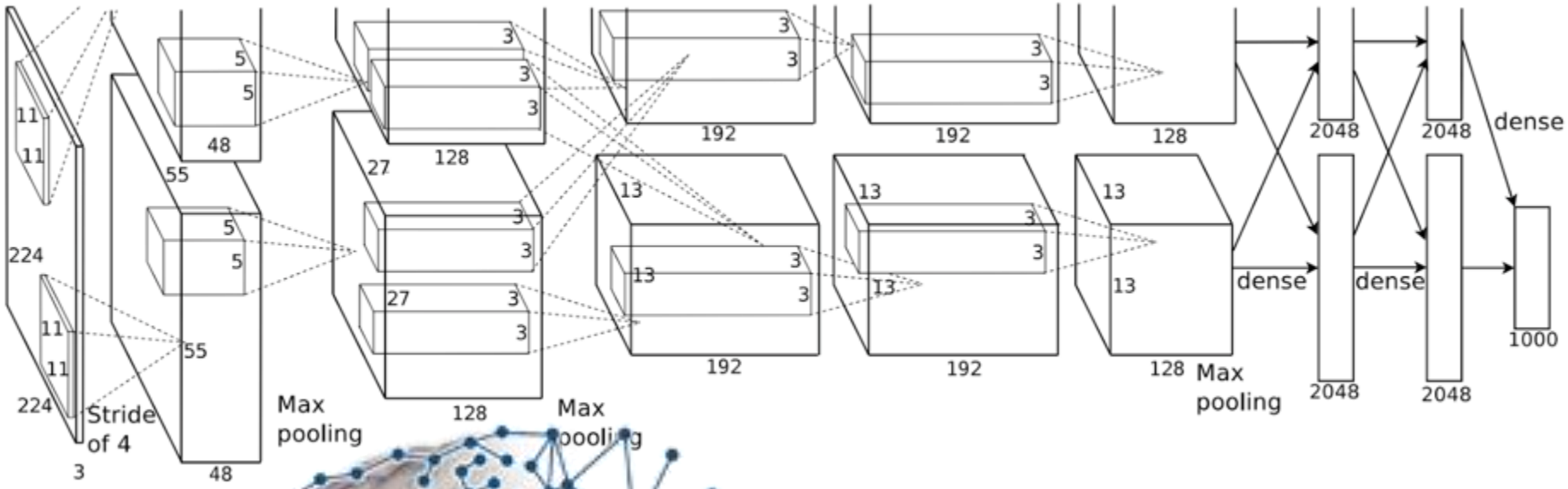
- 社会背景：老龄化、一胎化、孤独、恶劣的环境
- 日本在服务机器人的研发上投入巨大

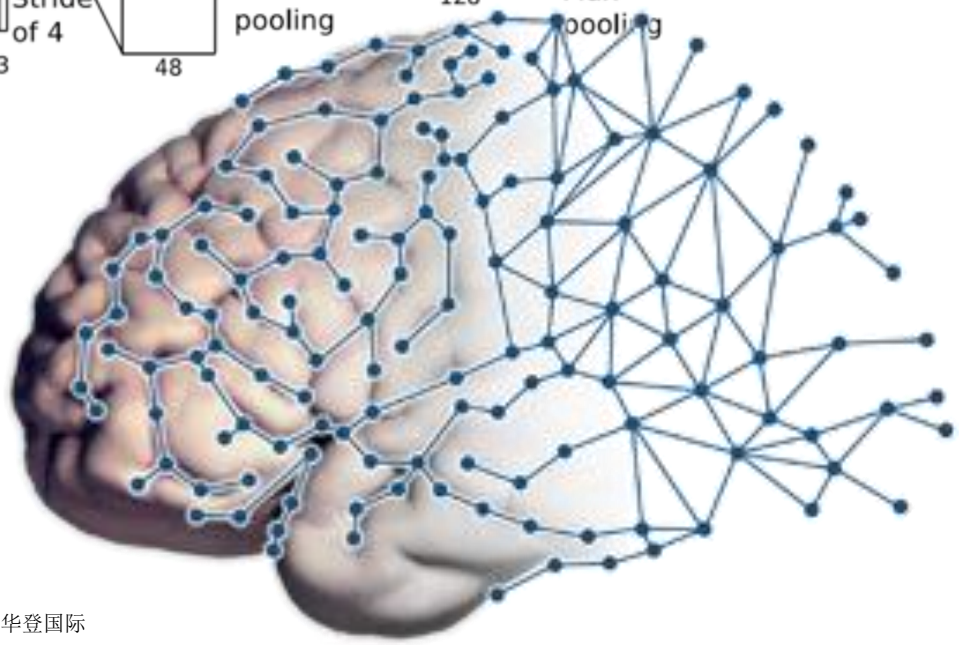
人工智能发展历程

- 计算智能：超强的计算能力，IBM深蓝计算机
- 感知智能：语音语义/机器视觉/深度学习，Google Car
- 认知智能：自主学习/拟人情绪，未来的方向

Deep Learning: Neural Network in Spotlight

The AlexNet CNN (Convolutional Neural Network) for Deep Learning





New Class of Compute:

- Vision
- Language
- Emotion

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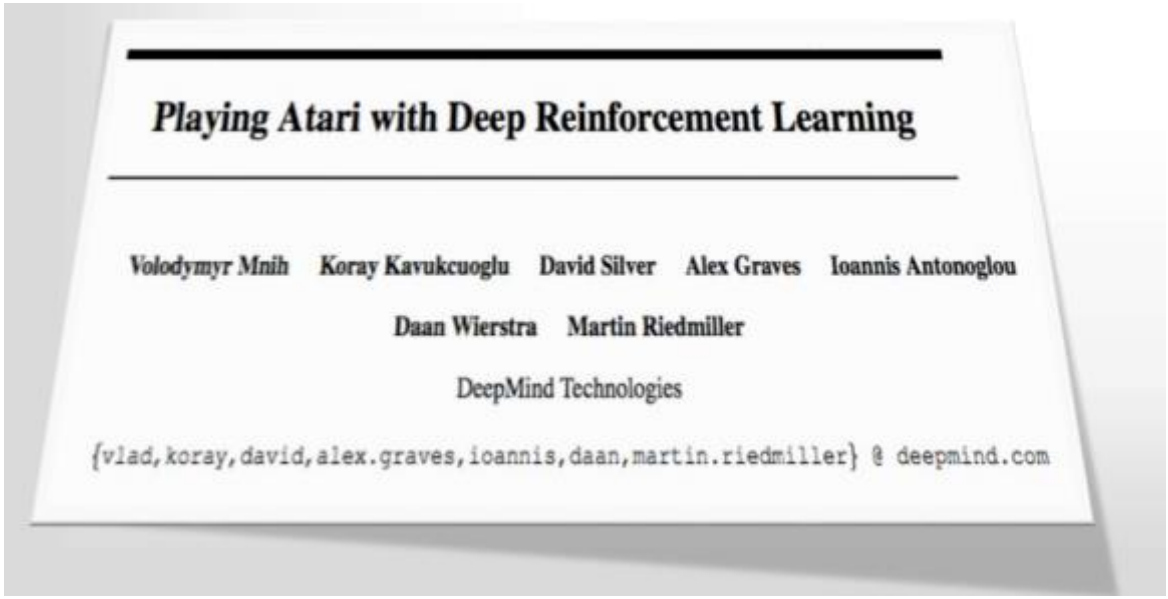
Google: Deep Learning

- 深入研究人工智能：物联网的“后端”运算
- Ray Kurzweil加盟Google任职工程总监
- 2013年12月，Google连续收购8家机器人公司
- 2014年1月，Google收购DeepMind， 6.5亿美金

DeepMind，50多人，30多个Ph.D
没有任何商业产品，只有一篇还未发表的论文



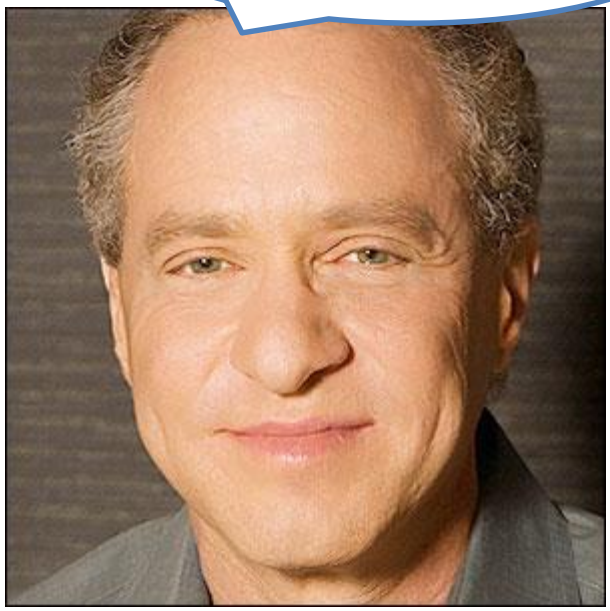
Playing Atari with Deep Reinforcement Learning

Volodymyr Mnih Koray Kavukcuoglu David Silver Alex Graves Ioannis Antonoglou

Daan Wierstra Martin Riedmiller

DeepMind Technologies

{vlad,koray,david,alex.graves,ioannis,daan,martin.riedmiller} @ deepmind.com



人工智能开源 - Google

谷歌开放人工智能系统 走安卓路线

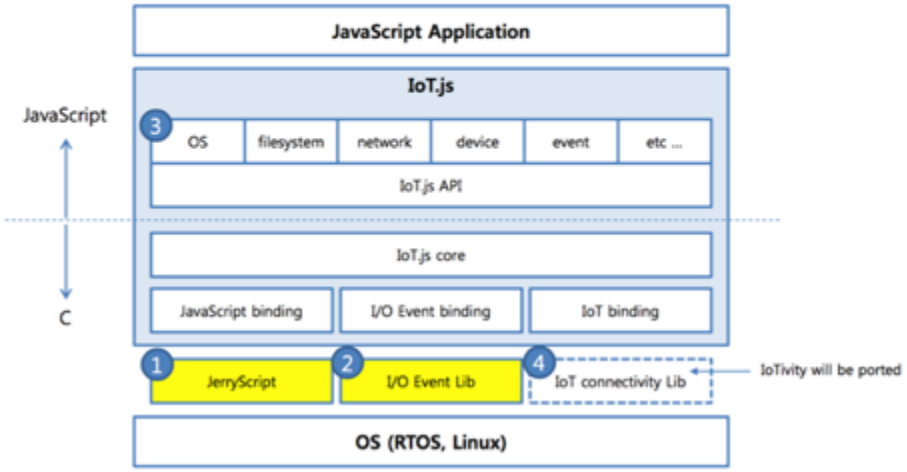
谷歌多年来一直都把精力放在机器学习的研究上，并且在自家产品中不断装备这些黑科技。而就在周一，谷歌新推出了一种开源的机器学习系统，名为TensorFlow。这个系统可在小到一部智能手机、大到数千台数据中心服务器的各种设备上运行。这个系统是基于谷歌在2011年开发的深度学习基础架构DistBelief而构建起来的，但将这种第一代架构向前推进了几步。

Samsung的动作

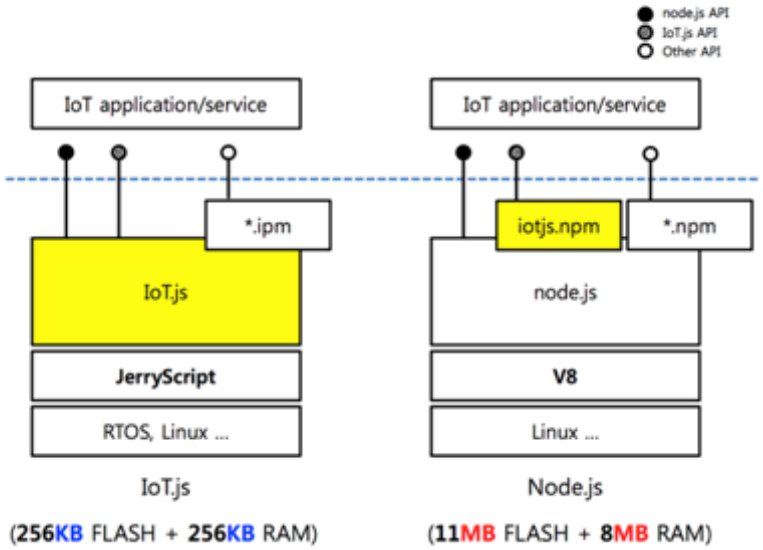
三星开源了IoT.js和JerryScript。
IoT.js是一个使用JavaScript语言编写的物联网应用平台；
JerryScript是一个适用于嵌入式设备的小型JavaScript引擎。

Architecture

• 1 JerryScript + 2 Async. I/O event library + 3 Framework + 4 Connectivity

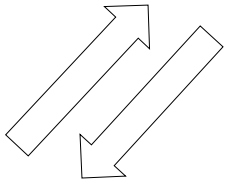


IoT.js vs Node.js

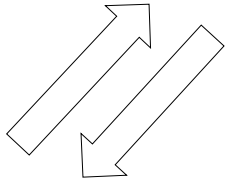


Enter the Era of Artificial Intelligence

Cloud (Information/Services)



Platform Devices (PC, Smartphones, Home , Car, Robots)



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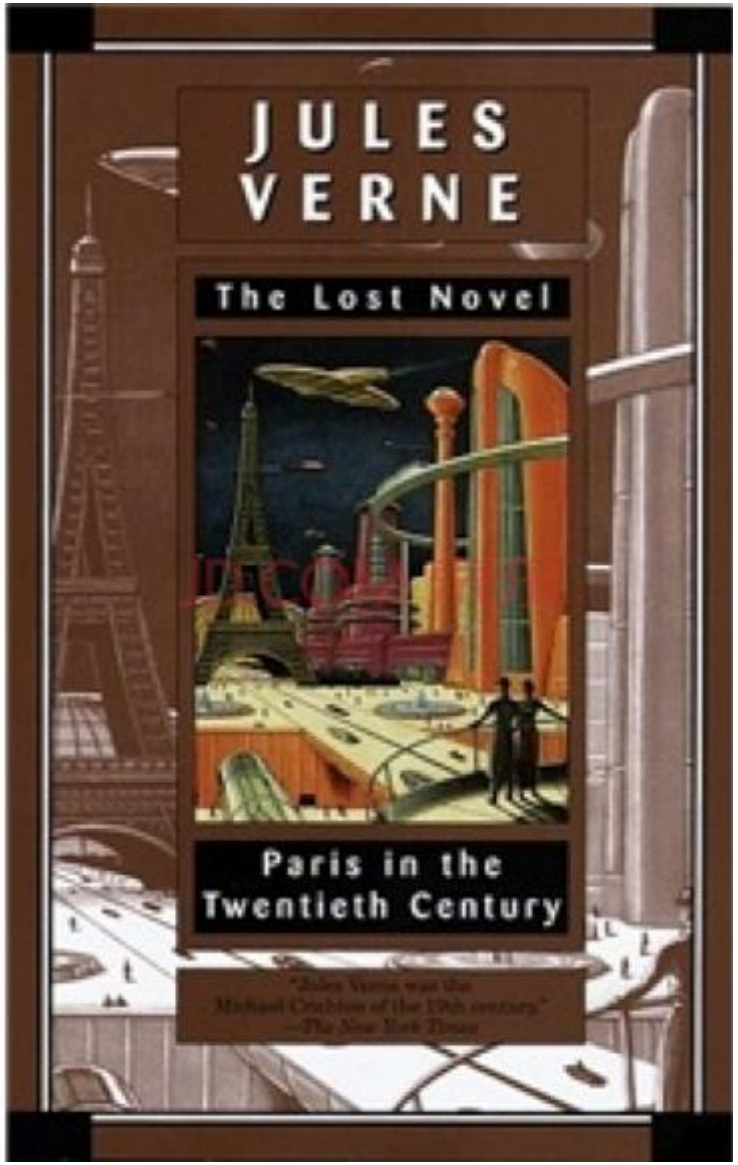

“Paris in the Twentieth Century”
-by Jules Verne, 1863

描述了：

- 摩天大楼
- 空调
- 电视
- 电梯
- 汽车
- 传真

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How far does this lead us ?

登峰造极的可穿戴设备？！
The ultimate wearables

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未来的智能机器装备？！
Industry 4.0？

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And they are all connected

万物皆有灵性，“圣树”控制一些切互联

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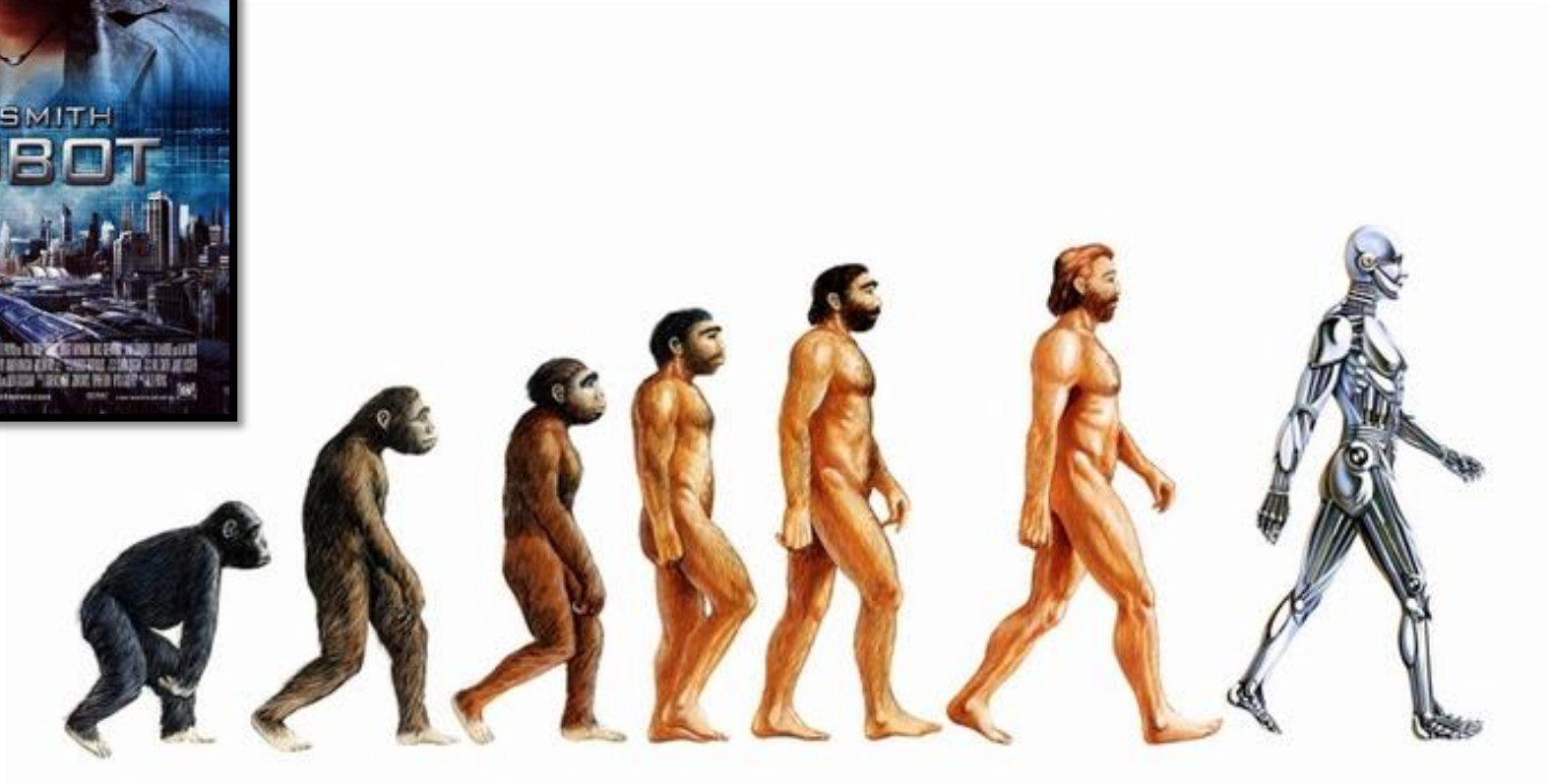
Machines Will be Smarter than Humans



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It’ll come sooner than you think