

NAR Labs

National Applied Research Laboratories

National Center for
High-performance Computing

金融科技與金融市場

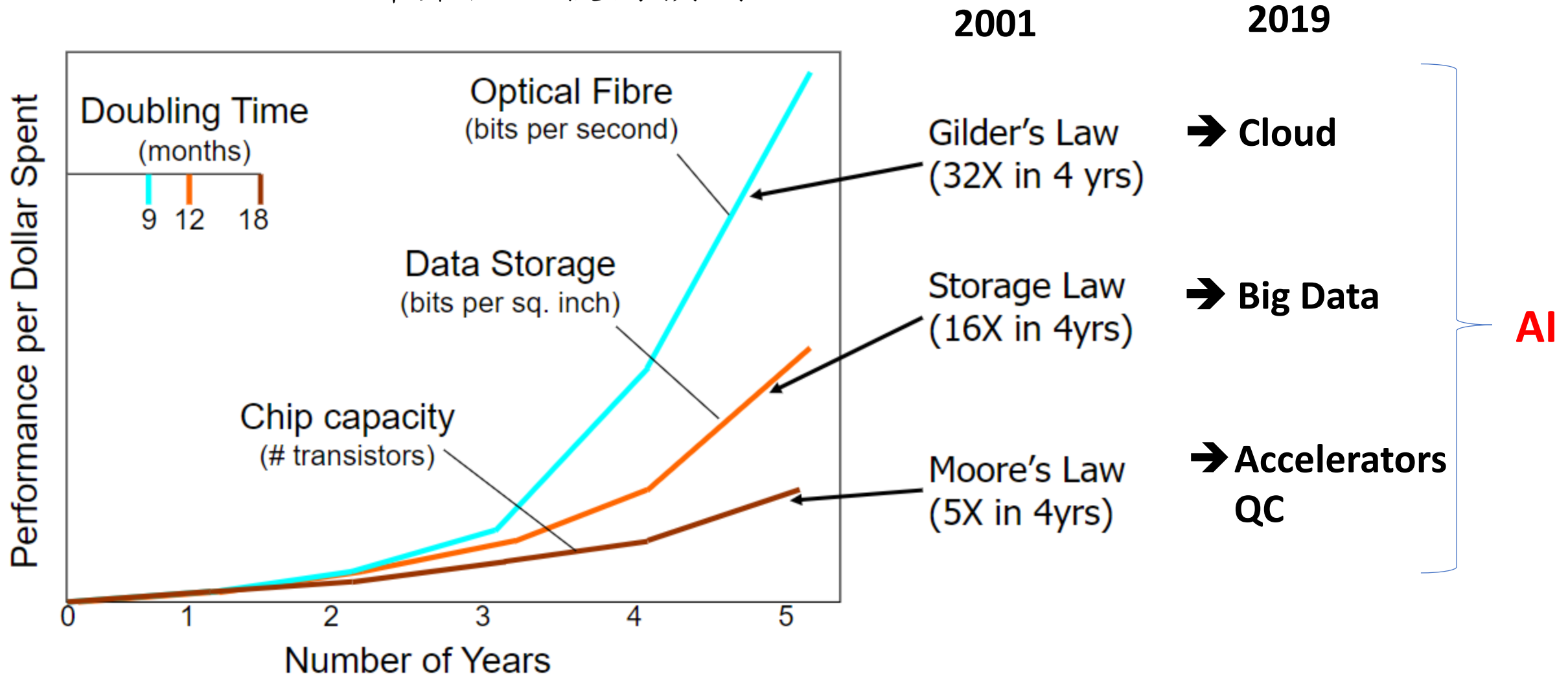
AI Challenge for Financial Services

林芳邦

2019/05/25

第15屆金融與經濟政策研討會

2001 ICT 計算核心技術預測

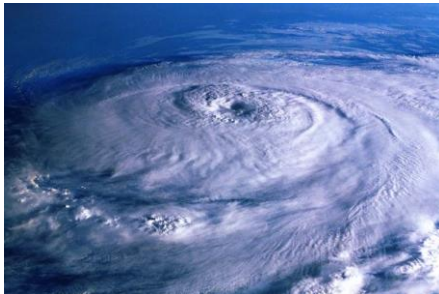


Source: "Triumph of Light", George Stix, Scientific American, January 2001

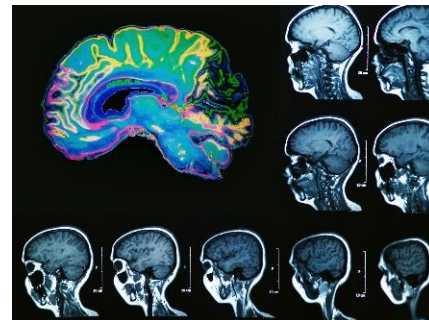
The Rising of AI Supercomputing

- **AI Applications** extended to a broader spectrum - from tradition science to daily life services.
- AI Economical Opportunities based on **Talent, Data, Compute**

Traditional Science



Smart Medicine



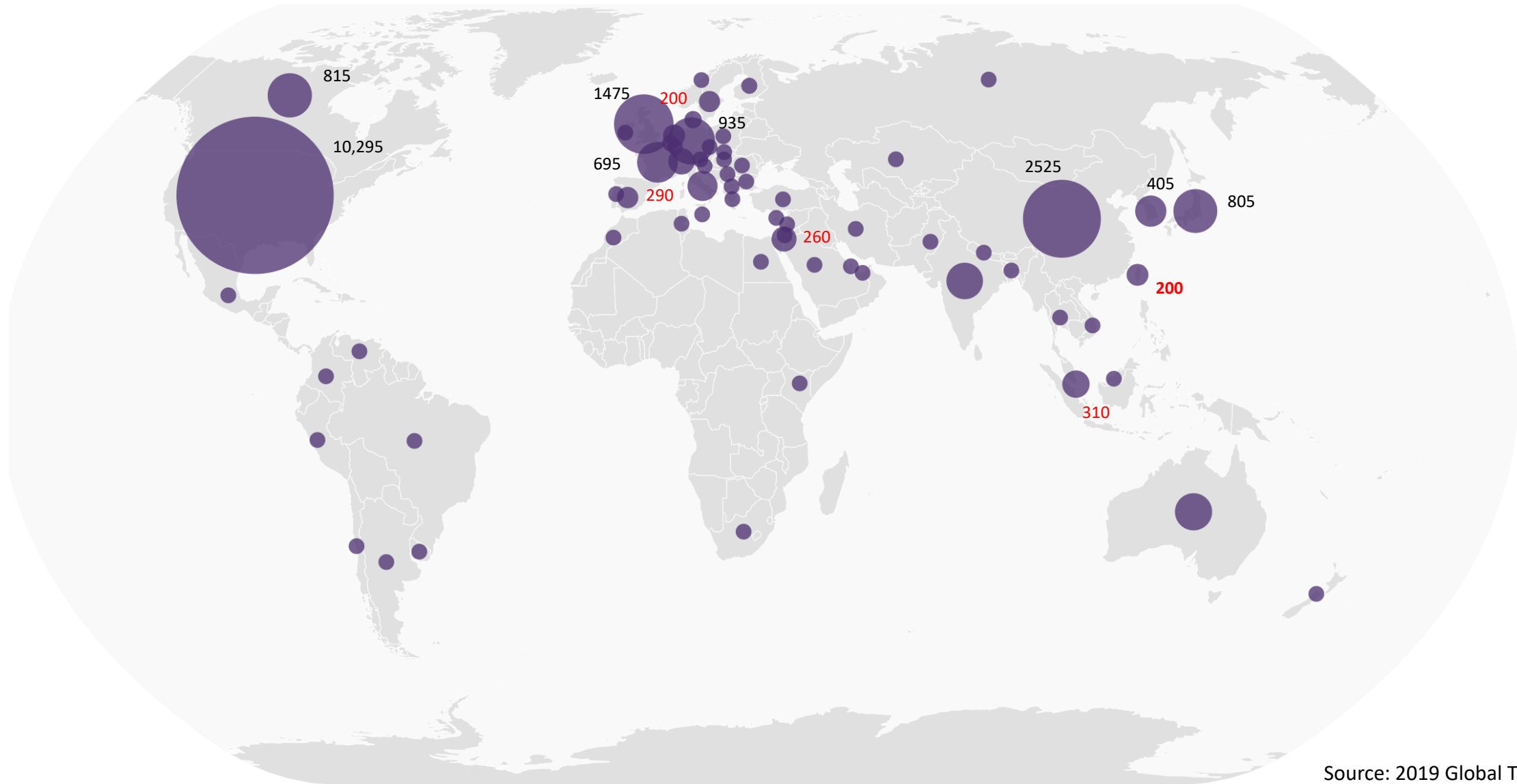
Intelligent
Manufacture



Smart Applications
in Cities



Where AI talents are?



AI Startups – where the AI talents go ?

A. The race for leadership

Global distribution of AI startups

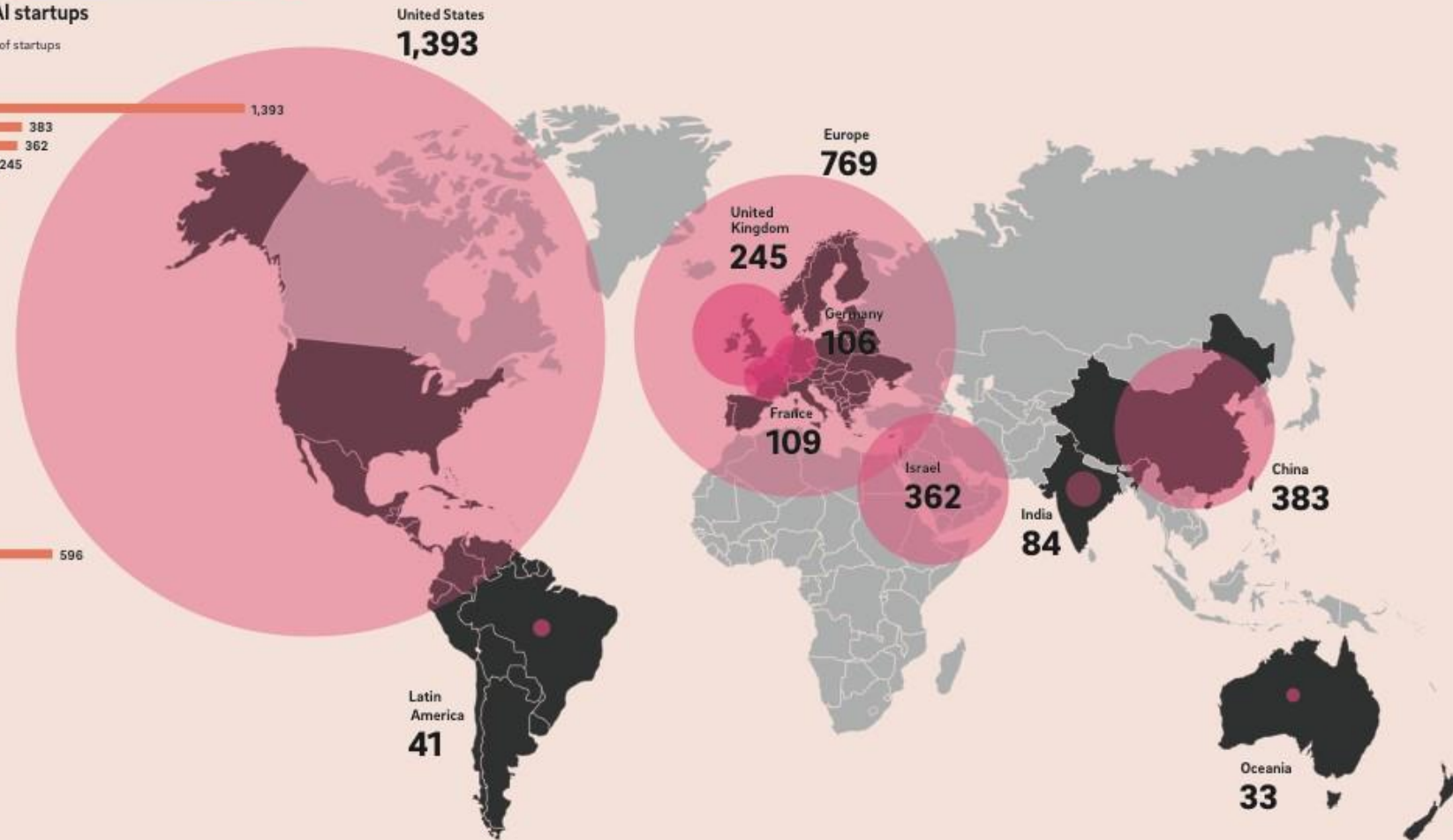
Top countries and cities by number of startups

Top Countries



Top regional hubs

Cities' extended urban areas^{1,2}

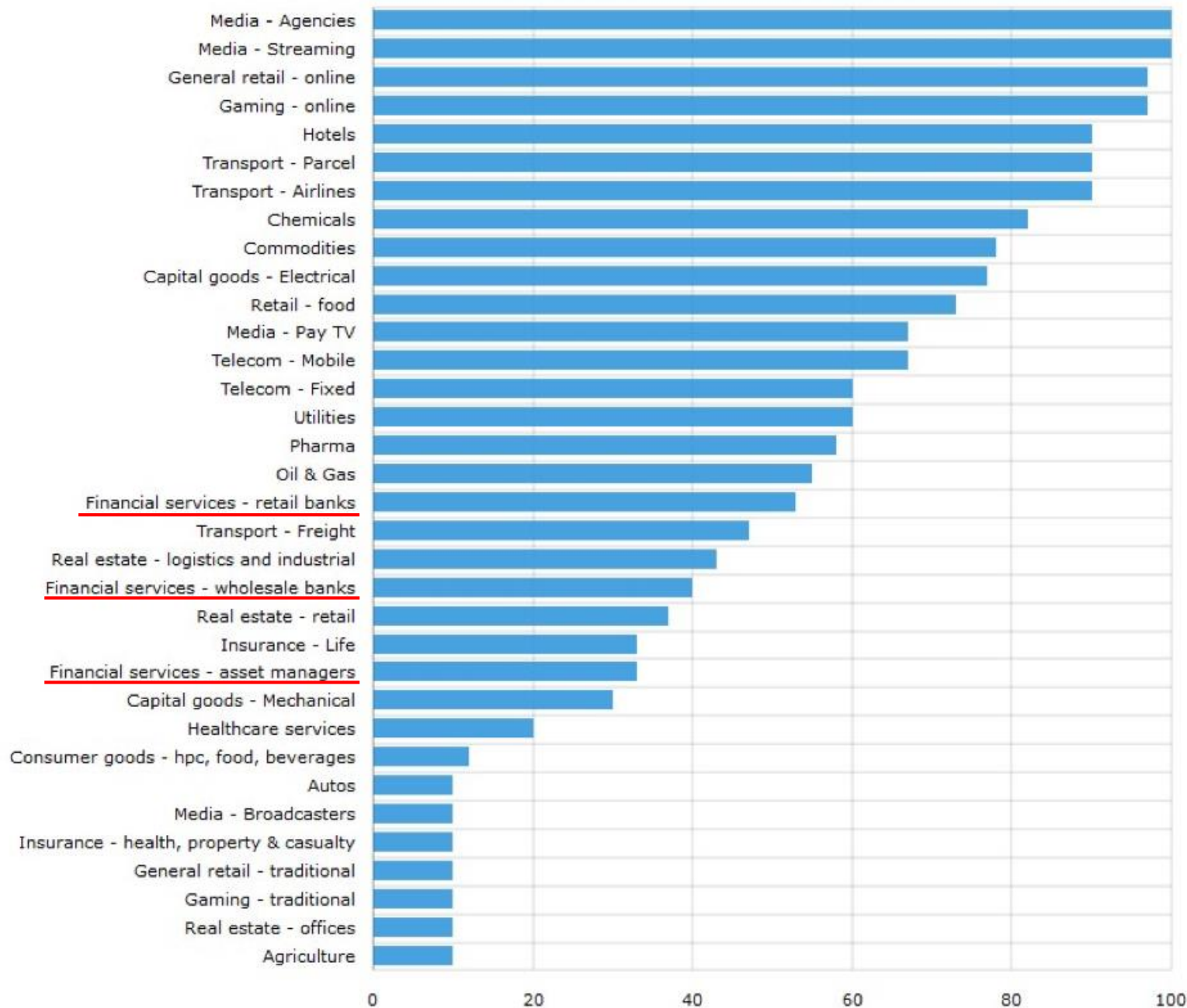


¹ Regional hubs comprise a core city plus its extended urban area and wider agglomeration; e.g. San Francisco plus Bay Area, London plus Oxford & Cambridge et al., Beijing plus Tianjin, Shenzhen plus Guangzhou et al., etc.

² Ranking excluding 180 startups for which information on city was not available – Among them, 130 are located in Israel

Source: Asgard, CB Insights, Crunchbase, Israel startups shemlist, AI list Nordics and Baltic, Machine Intelligence 2.0, Chinese AI list, European AI landscape, German AI landscape, Israel AI startup map, Japanese AI list, UK AI list, French AI ecosystem, Korean AI list, own research.

Digitalization index from M&S



Where is (digital) data ?

- **Exponentially increasing** due to the advance of Cloud, Mobile devices, IOT etc.
- In Financial services, **banks** are the lead in terms of **digitalization maturity** providing rich and quality data.

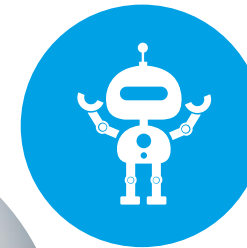
AI Grand Plan in Taiwan

5 Strategies (~US\$528.7 million for 5 years)

Computation/Storage
Infrastructures and
Platforms

NCHC

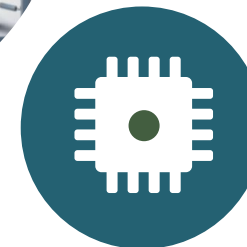
(~US \$160 million for 4 years)



Robot Makerspace

AI Research Centers

(NTU, NCKU, NCTU, NTHU)



AI chip

Moonshot Program

TWCC (Taiwan Cloud Computing)- National Infrastructure for AI

- Single portal Services
- Provide cloud-based AI, Big Data & Storage
- Scalable Framework



From HPC to Ai

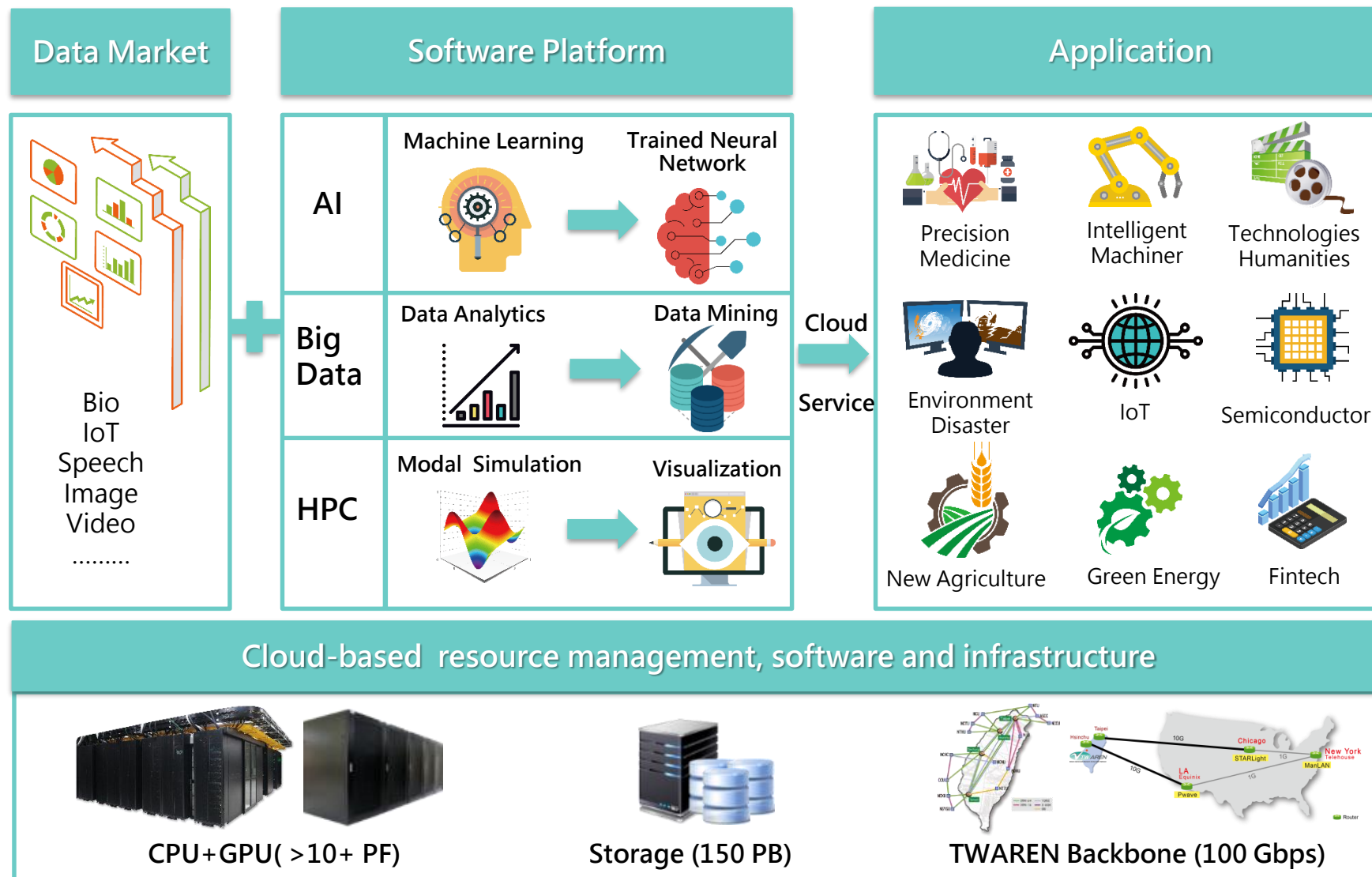
台灣杉二號
TAIWAN↑A 2

The NCHC is accelerating
AI innovation in Taiwan

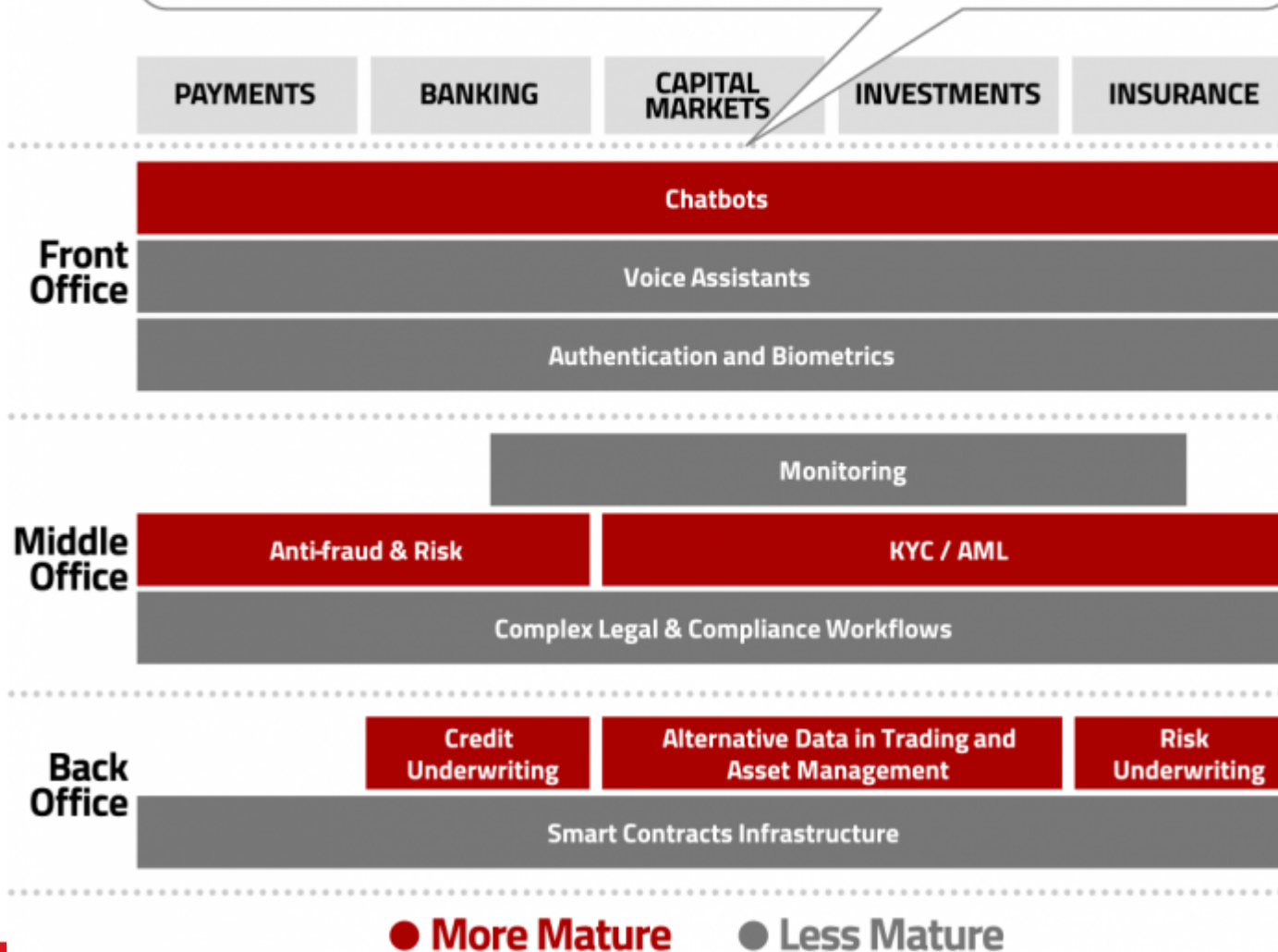


Rank 20th
in TOP500

TWCC (Taiwan Cloud Computing)- National Infrastructure for AI



Maturity of artificial intelligence applications across the financial industry



SOURCE: Autonomous © May 2018 The Financial Brand

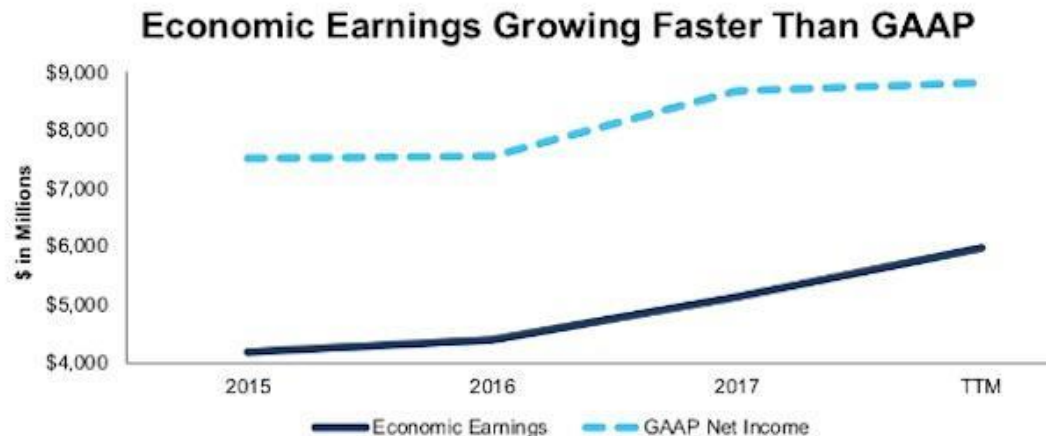
Front Office – \$490 billion in savings. Almost half of this (\$199 billion) will come from reductions in the scale of retail branch networks, security, tellers, cashiers and other distribution staff.

Middle Office – \$350 billion in savings. Just simply applying AI to compliance, KYC/AML, authentication and other forms of data processing will save banks and credit unions a staggering \$217 billion.

Back Office – \$200 billion in savings. \$31 billion of this will be attributed to underwriting and collections systems.

Successful story of RBC on AI transformation

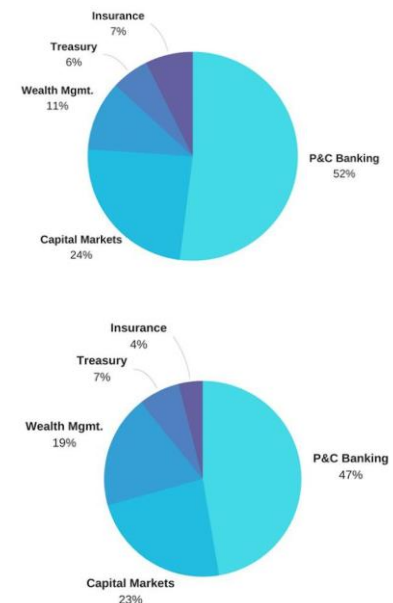
- RBC (Royal Bank Canada, RY) (source: David Trainer)
 - Serves **16 million customers** worldwide and is the largest bank by market capitalization in Canada.
 - 2014 Appoint **David MacKey** as CEO (began career as programmer) who believe in AI for growth.
 - Developing the AI-powered NOMI tool for its **retail customers** to help them better manage their finances by **tracking spending** and **suggesting opportunities for saving**
 - Building **research labs** and partnering with universities to drive advancement in AI.
 - Incorporating AI into **capital markets research** since 2016



Economic earnings per share have grown by 21%, nearly double the 11% growth in GAAP EPS

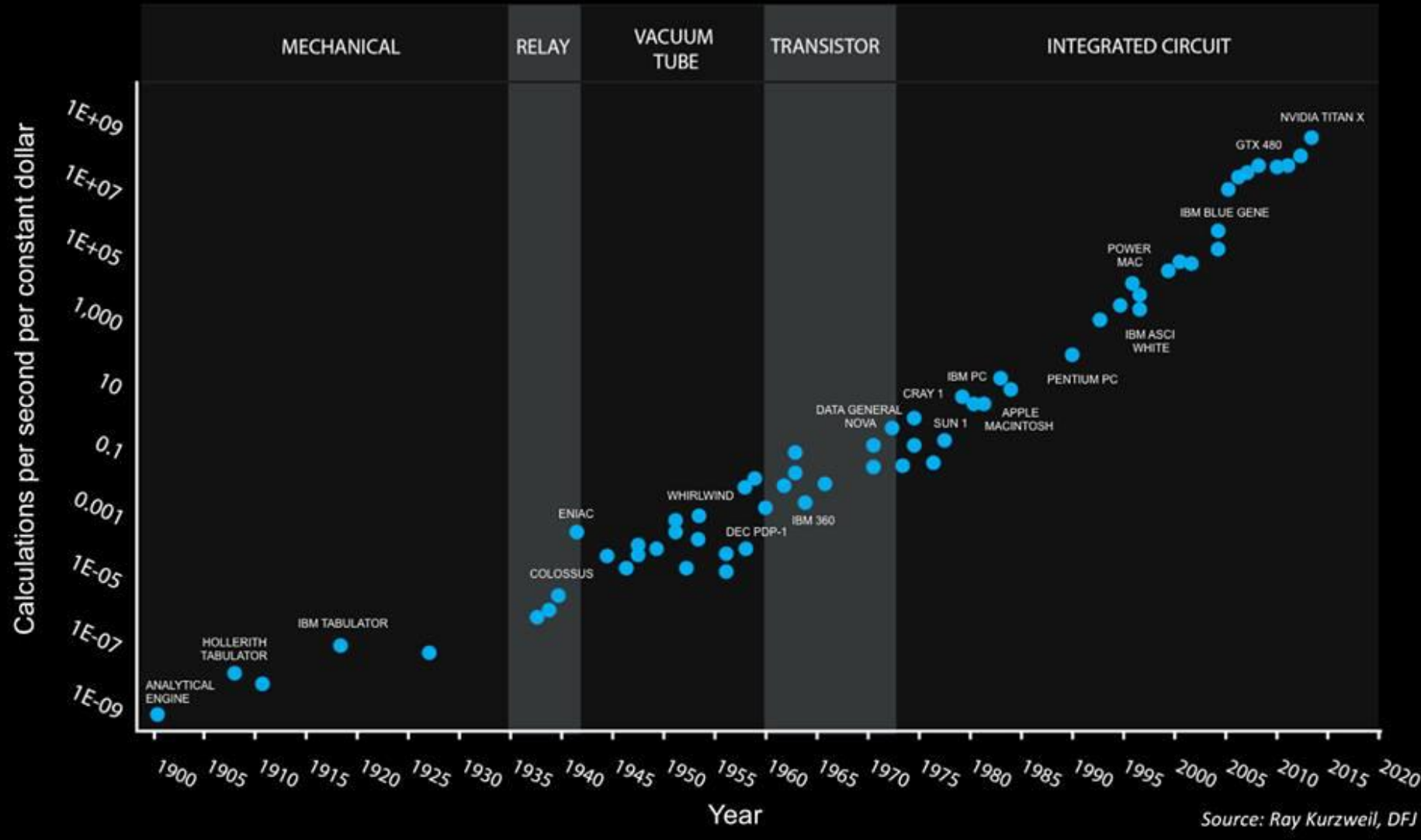


AI drive growth



Wealth management grow nearly 10%

120 Years of Moore's Law



Source: Steve Jurvetson, Ray Kurzweil

What's Next ?

Moore's Law – The number of transistors on integrated circuit chips

矽直徑~ 0.2奈米
Intel Ice Lake (2019)10奈米製程
(~50原子寬)

台積電 7 奈米製程
(~35 原子寬)

有終點？單原子製程？

→ 量子計算 (QC)

Shor's Algorithm proves RSA can be decoded within second, also for solving linear equations, i.e. AI!!

NAR Labs

Commitment • Passion • Innovation

Thank you!