

The Puzzle of Japanese Innovation & Entrepreneurship

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xSig 2017**

Michael A. Cusumano

**Tokyo University of Science, Special Vice President
Founding Director, Tokyo Center for Entrepreneurship & Innovation
MIT Sloan School of Management & Engineering, Professor (on leave)**

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cusumano@mit.edu**

1991



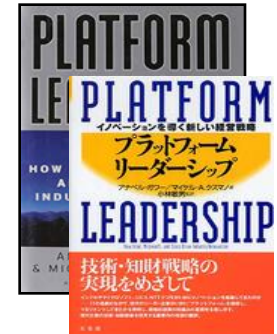
1995



1998



2002



2004



2010



AGENDA

- 1. MIT REAP: Philosophy and Framework**
- 2. Japan & Tokyo: Ecosystem Profile & History**
- 3. I-Cap vs. E-Cap: Japan & Global Comparisons**
- 4. MIT REAP: Tokyo Team & Cusumano Activities**
- 5. Conclusion**



1. MIT REAP:

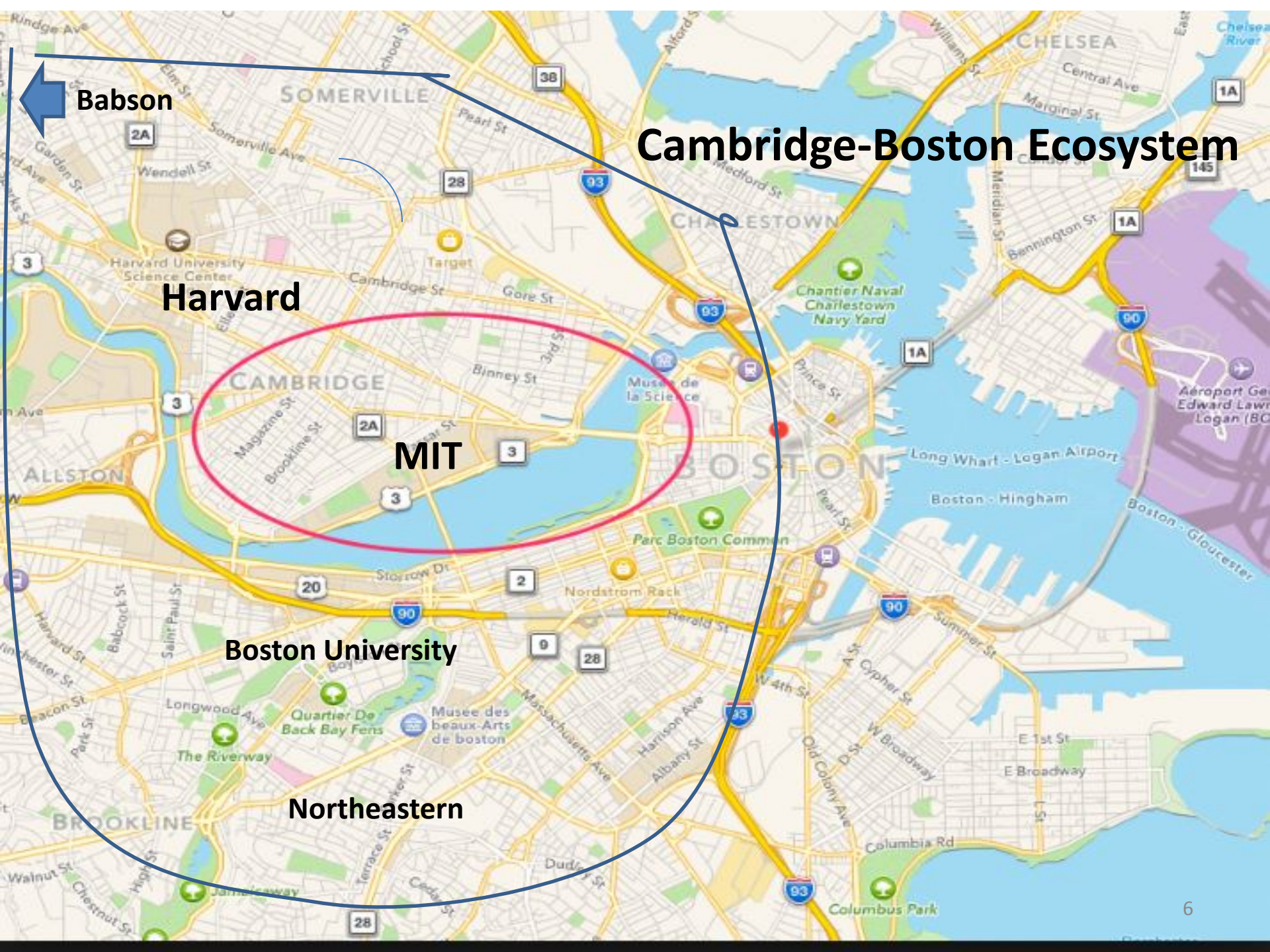
Philosophy and Framework

MIT REAP Initiative

(Regional Entrepreneurship Acceleration Program)

地域起業家加速プログラム

- Established 2011 by MIT Sloan School of Management
- Identify & share best practices in entrepreneurship from MIT-Cambridge & other US and global ecosystems
 - 2-year educational program, each cohort with 8 country-city teams
 - 4 meetings over 2 years, 3 at MIT & 1 at a team site
- **2015-2017 Cohort: 8 teams from Japan, China, Thailand, Wales, Norway, Israel, Saudi Arabia, Chile**
- **Tokyo University of Science = Host for Japan team. All teams met in Tokyo in January 2017**



Cambridge-Boston Ecosystem

Harvard

MIT

Boston University

Northeastern

MIT Entrepreneurship Results

- **Over 30,000 companies founded by MIT alumni** since 1945, with 4 million employees & annual sales ca.\$2.5 trillion
- MIT graduates create hundreds of new companies each year
- Many MIT departments, labs, and centers encourage entrepreneurship among students, faculty, alumni, community:
 - Classes & workshops (MIT Sloan School, Media Lab, School of Engineering)
 - Trust Center for MIT Entrepreneurship
 - MIT \$100K Entrepreneurship Competition (business plan competition)
 - MIT Venture Mentoring Service
 - MIT Technology Licensing Office
 - Deshpande Center for Technological Innovation (commercialize lab projects)
 - MIT Media Lab Entrepreneurship Program
 - MIT Legatum Center for Development and Entrepreneurship
 - MIT Enterprise Forum (education of alumni + business plan competitions)

MIT's perspective on innovation-driven entrepreneurial ecosystems



Innovative Capacity & Entrepreneurial Capacity Are Distinct Regional Assets

I-Capacity

Ability to develop new to the world innovations from inception through to the market.

Strong I-Cap:
Universities, Central R&D,
Network of researchers,
Medical Centers



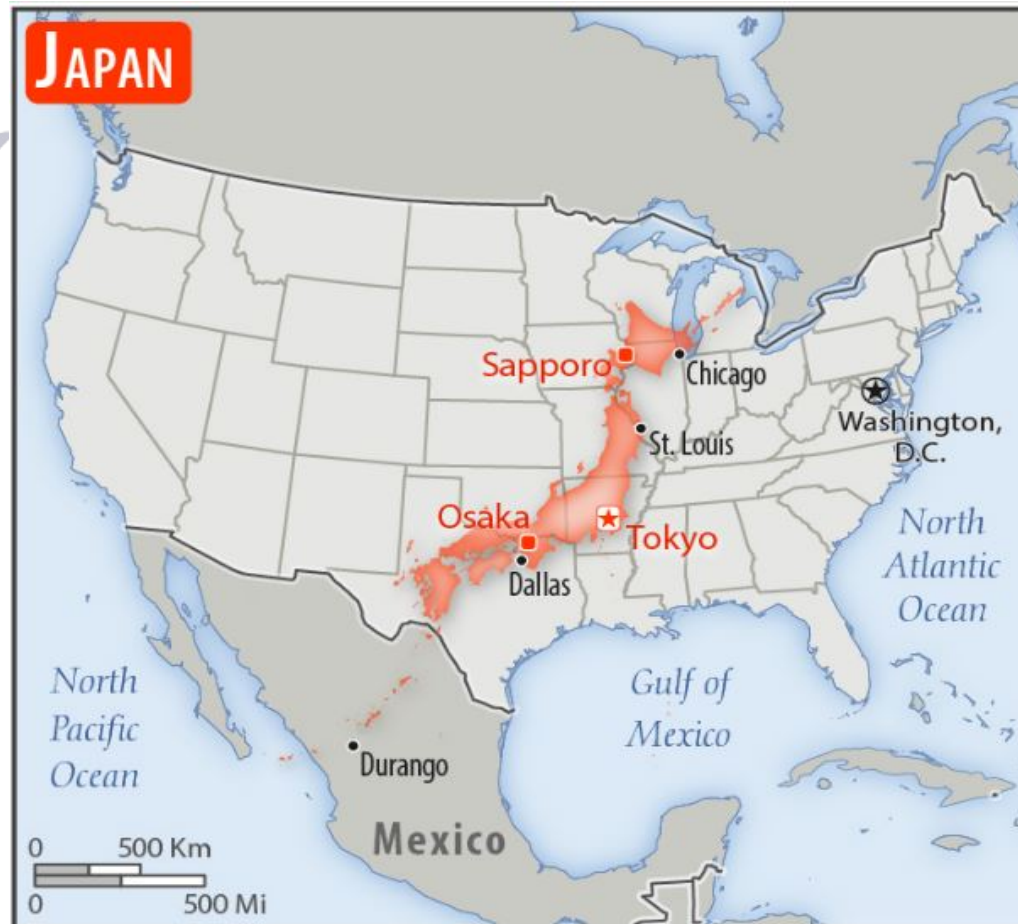
E-Capacity

Ability to start and build new to the world businesses from inception to maturity.

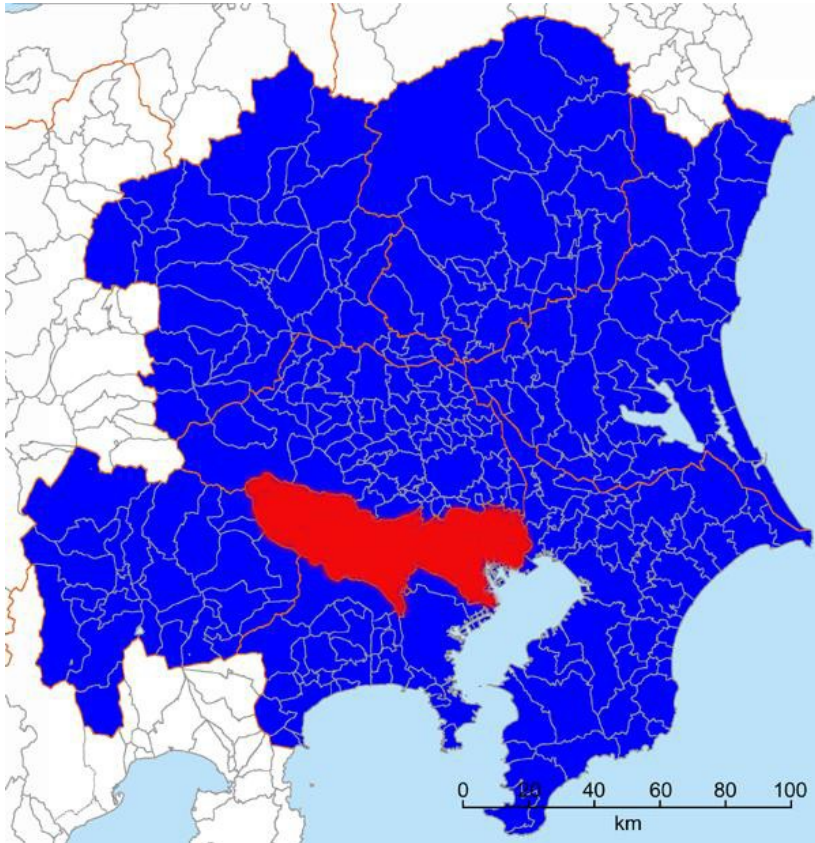


Strong E-Cap:
Entrepreneurs, Mentors,
Founding Teams
Investors at all stages

2. Japan & Tokyo: Ecosystem Profile & History



Tokyo Metro Area Profile



- **Tokyo Prefecture = 13M population**
- **Tokyo Metro Area Figures**
 - Size: 13,500 km² (4% of all Japan)
 - **Population: 38M (30%)**
 - Companies: 1.65M (30%)
 - Universities: 255 (33%)
 - Private Univ.: 223 (37%)
- **Economy**
 - **GDP: US\$2 trillion (45%)**
- **Entrepreneurship**
 - Tokyo Area: 1.5M entrepreneurs
 - Kansai Area: 0.5M entrepreneurs

The Tokyo Innovation Ecosystem

No.1 Population (of the megapolis area)
in the world

No.1 TripAdvisor World City Survey

Gross Metropolitan Product Equivalent to
No.14 in National GDPs

No.4

Global Power City Index
(The Mori Memorial Foundation)

Benchmarking Global
City Competitiveness
(Economist Intelligence Uni)

No.6

TOKYO

Number of Fortune
Global 500 company
headquarters in the world **No.2**

Global Cities of the Future
Overall Megacities **No.3**
(Financial Times)

Number of companies with
capital of over 1B Yen **2,748**
(46% of Japan's total)

Number of foreign-affiliated
companies **2,376**
(76% of Japan's total)

City	Country	Companies
Beijing	 China	51
Tokyo	 Japan	38
New York	 US	20
London	 UK	18
Paris	 France	18

History of Japanese Entrepreneurship

1860s: Japan “opened” to West. High rates of literacy & sophisticated economy enabled “rapid late development”

1890s

Mitsui,
Mitsubishi,
Sumitomo
– *banking,
trading,
mining*

WW I

Toshiba,
NEC, Hitachi
Shiseido,
Panasonic
Nikon,
Kobe Steel –
*basic & heavy
industry*

1930s

Toyota
Nissan,
Fujitsu,
Canon,
Ricoh --
*engineering
& autos*

Post WWII

Honda, Sony, NTT etc. –
consumer electronics

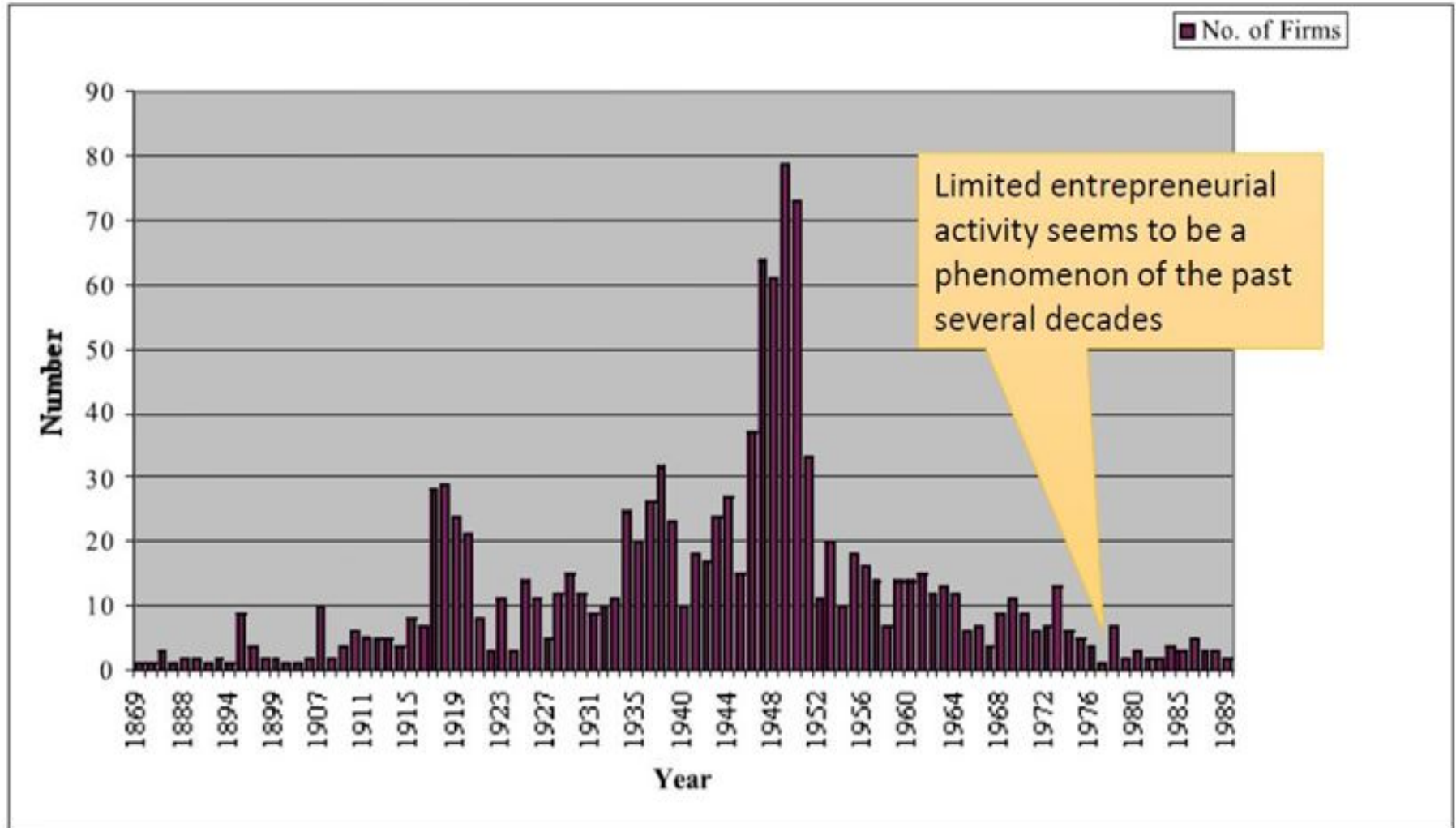
1960s-1980s

Success & economic growth
=> *few new entrepreneurs*

1990s-2000s

*telecom, internet,
social*

Prewar & Post-WWII Booms in Japanese Entrepreneurship



Source: Tokyo Stock Exchange, Ministry of Finance (Japan) and Mizuho Securities, Co., Ltd.

<http://www.mizuho-sc.com/english/ebond/companies/list.html>

*Of the 1353 non-financial companies listed on the first section of the TSE, we obtained data for all but 84.

“Iconic” Japanese Product Innovations

Sony transistor radio (1955)



Instant noodles (1958)



Anime (1960s)



Shinkansen bullet train (1964)



VCRs – Sony’s Betamax & JVC’s VHS (1975-76)



Sony Walkman (1979)



Sony PlayStation (1990)



Blue LED 1993

NTT Docomo i-mode cell phone (1999)



Shuji Nakamura



Shuji Nakamura in 2015

Serious Science: *17 Nobel Prizes Since 2000*

1. Yoshinori Ohsumi, Physiology or Medicine, 2016
2. Takaaki Kajita, Physics, 2015
3. Satoshi Ōmura, Physiology or Medicine, 2015
4. Shuji Nakamura*, Physics, 2014
5. Hiroshi Amano, Physics, 2014
6. Isamu Akasaki, Physics, 2014
7. Shinya Yamanaka, Physiology or Medicine, 2012
8. Akira Suzuki, Chemistry, 2010
9. Ei-ichi Negishi, *born in Manchuria*, Chemistry, 2010
10. Osamu Shimomura, Chemistry, 2008
11. Toshihide Maskawa, Physics, 2008
12. Makoto Kobayashi, Physics, 2008
13. Yoichiro Nambu*, Physics, 2008
14. Koichi Tanaka, Chemistry, 2002
15. Masatoshi Koshiha, Physics, 2002
16. Ryōji Noyori, Chemistry, 2001
17. Hideki Shirakawa, Chemistry, 2000

But Difficulty with Tech Transitions

- Japanese gov't focused on elementary and secondary education; universities lagged behind best in world
- Weak basic research outside the top universities, mixed education quality, slow technology transfer to industry
- Firms late to shift from mainframes to PCs; late to Internet
- Firms focus on “monozukuri” (making things) rather than on “connecting things” (software, digital, networks)
- Software programming seen more as a “factory skill” rather than an enabler of creativity & entrepreneurship

Summary Observations

- **Yes, Japan's economy has stagnated for 30 years**
 - Slow or negative growth
 - Declining population (low birth rates, no immigration)
 - Competition from Korea, then China
- **Yes, rural & regional cities have struggled some, along with small firms that supply big firms**
- **But Japan & Tokyo still enormously wealthy & talented**
 - Rich in culture & history
 - Full of energy & resources for science & business
 - **Great potential to generate more entrepreneurs!**

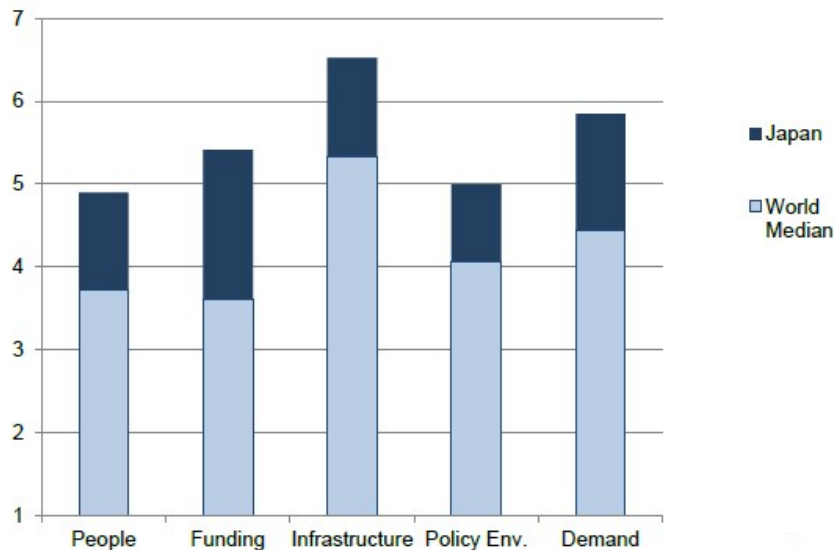


3. I-CAP vs E-CAP: Japan & Global Comparisons

Global Macro-data:

High I-Cap & Comparatively Low E-cap of Japan

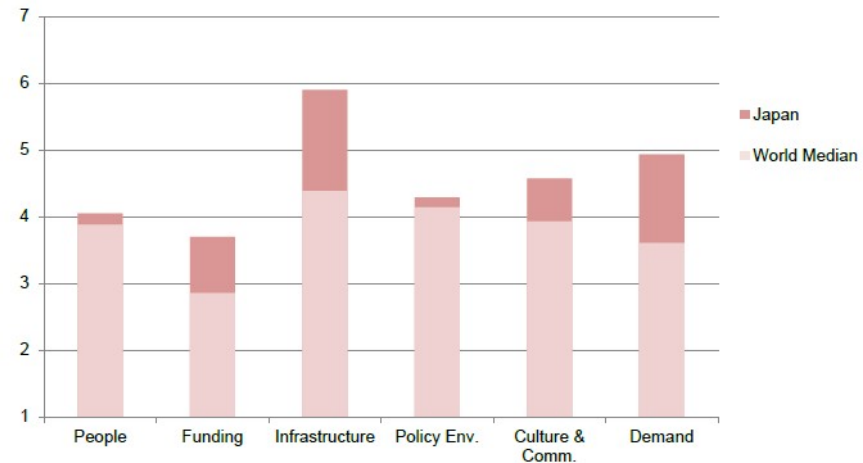
Japan's I-Capacity vs. World Median



Source: World Economic Forum Global Competitiveness Index – Executive Opinion Survey (2013)

How link i-cap & e-cap to stimulate economic growth?

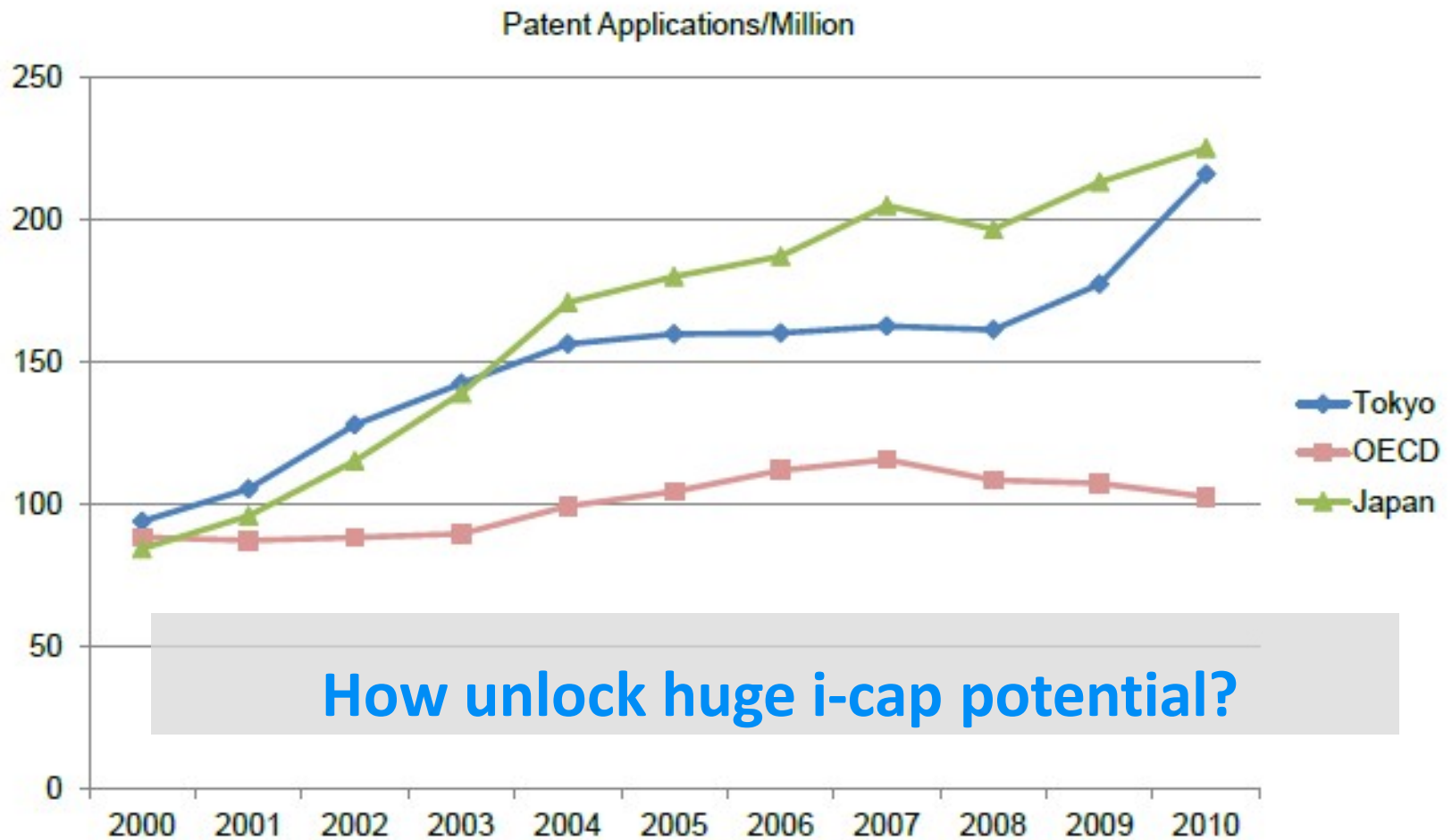
Japan's E-Capacity vs. World Median



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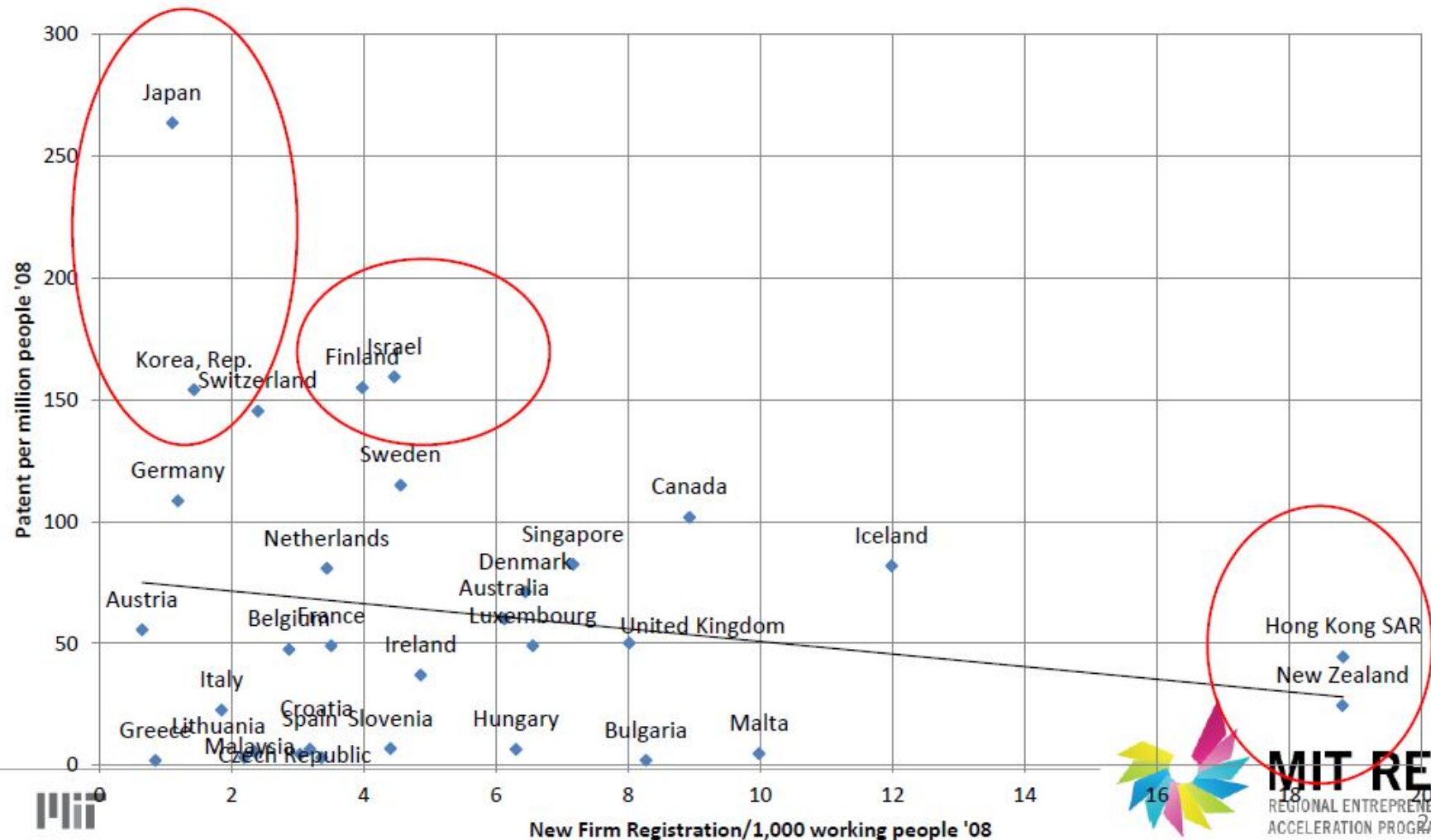
I-Capacity Performance of Tokyo



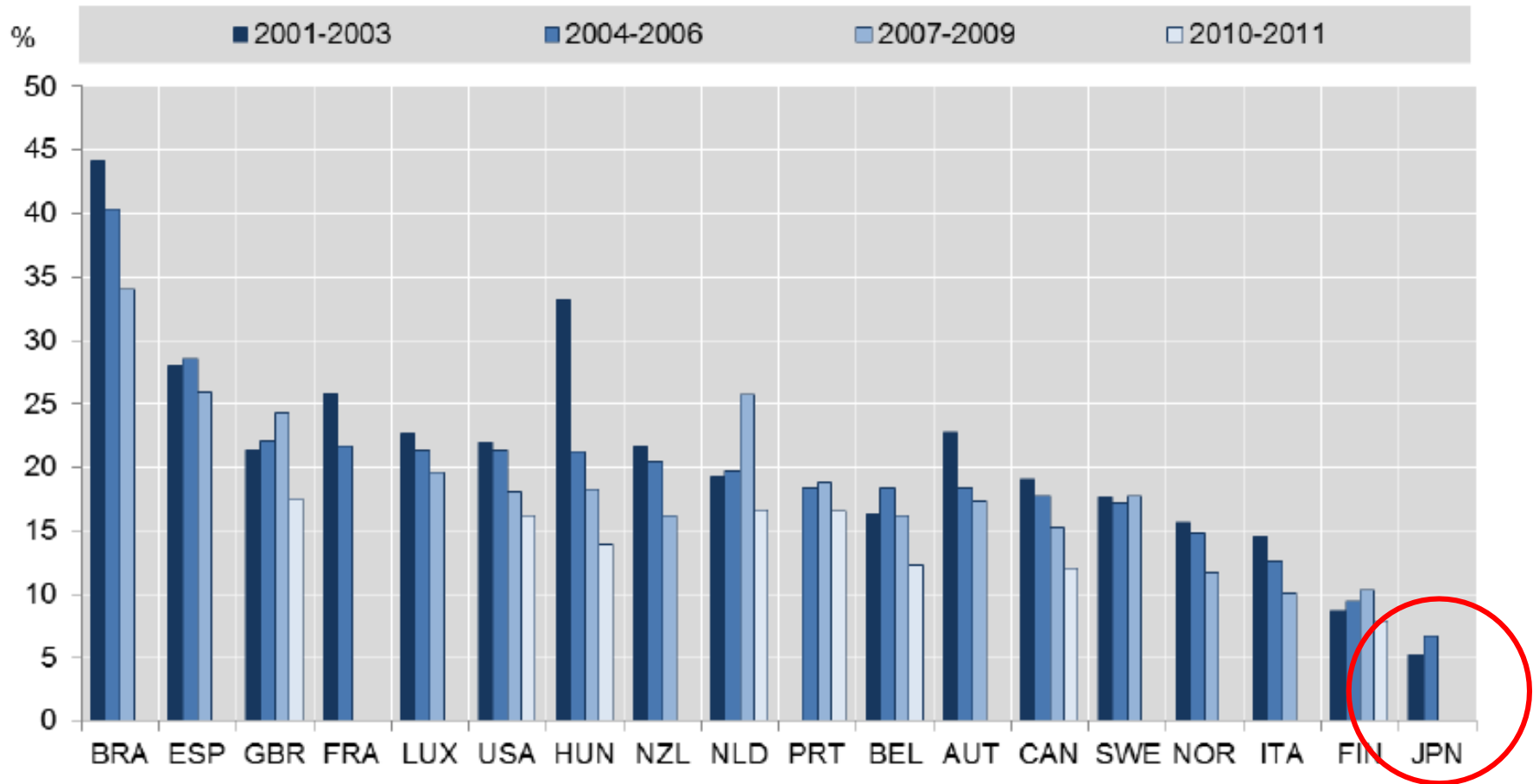
Source: OECD Regions and Cities Database

Innovation and Entrepreneurship are Related but Different

Patent Rate (I-Capacity) vs. Business Formation Rate (E-Capacity)

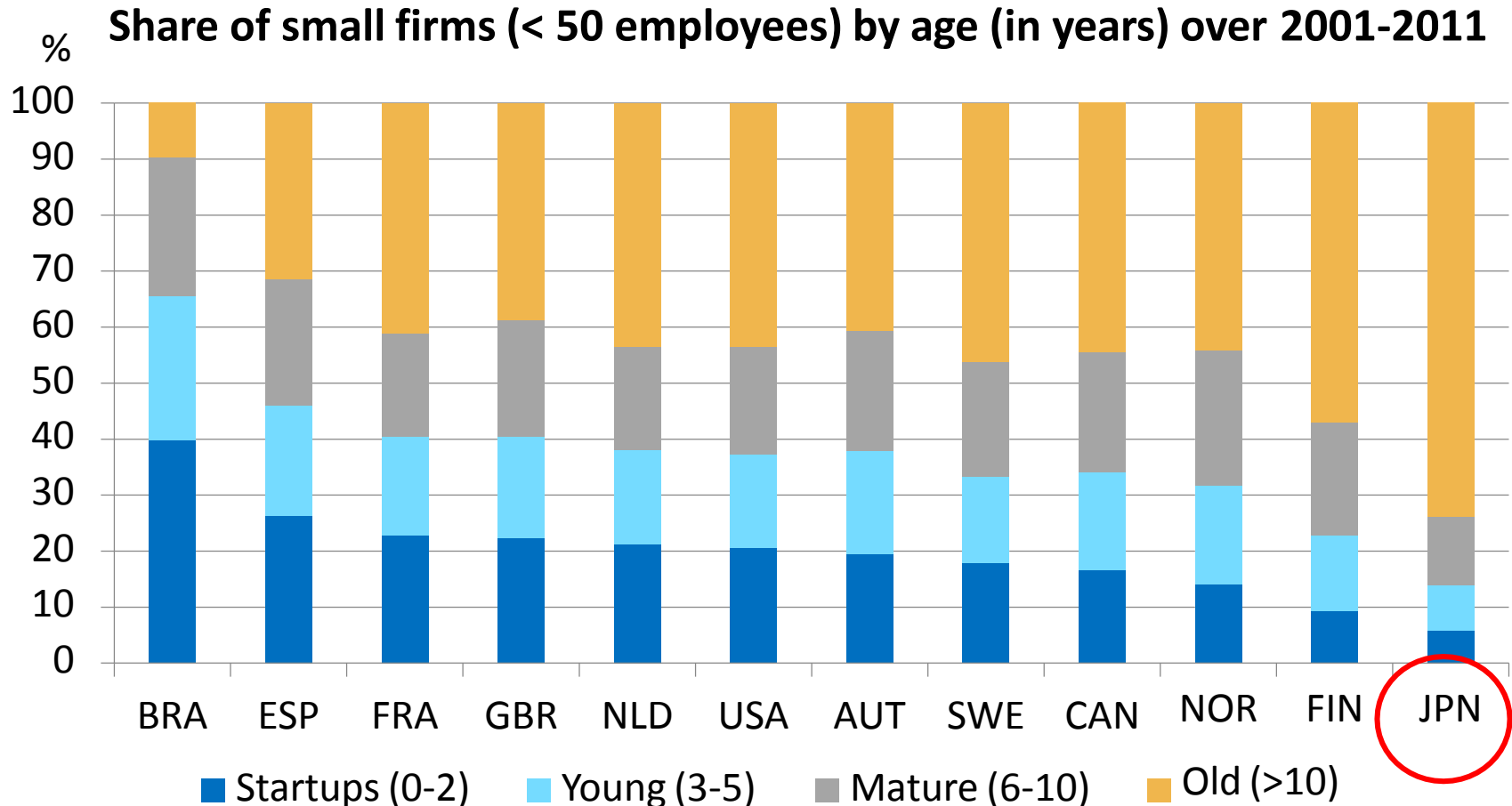


Low Startup Ratio in Japan



Source: Criscuolo, C., P.N. Gal and C. Menon (2014), "The Dynamics of Employment Growth: New Evidence from 18 Countries", *OECD Science, Technology and Industry Policy Papers*, No. 14, OECD Publishing. <http://dx.doi.org/10.1787/5jz417hj6hg6-en>

Small Firms in Japan are Old, Lacking Dynamism?!



Culture and Community Capacity

Prime Minister Abe: "Japan needs to become more accepting of initial failure."

	Japan	USA	Germany	UK	China
Early-stage entrepreneurial activity (TEA) (% of adult population)	3,8	13,8	5,3	10,7	15,5
Necessity-driven (% of TEA)	18,8	13,5	23,2	12,9	33,2
Opportunity-driven (% of TEA)	76,2	81,5	75,8	83,6	65,7
High status of entrepreneurs*	55,8	76,8	79,1	74,9	72,9
Good Career Choice*	30,9	64,7	51,7	60,3	65,7
Perceived opportunities*	7,3	50,8	37,6	40,9	31,9
Perceived capabilities*	12,2	53,3	36,4	46,4	32,9
Fear of Failure*	54,5	29,7	39,9	36,8	39,5

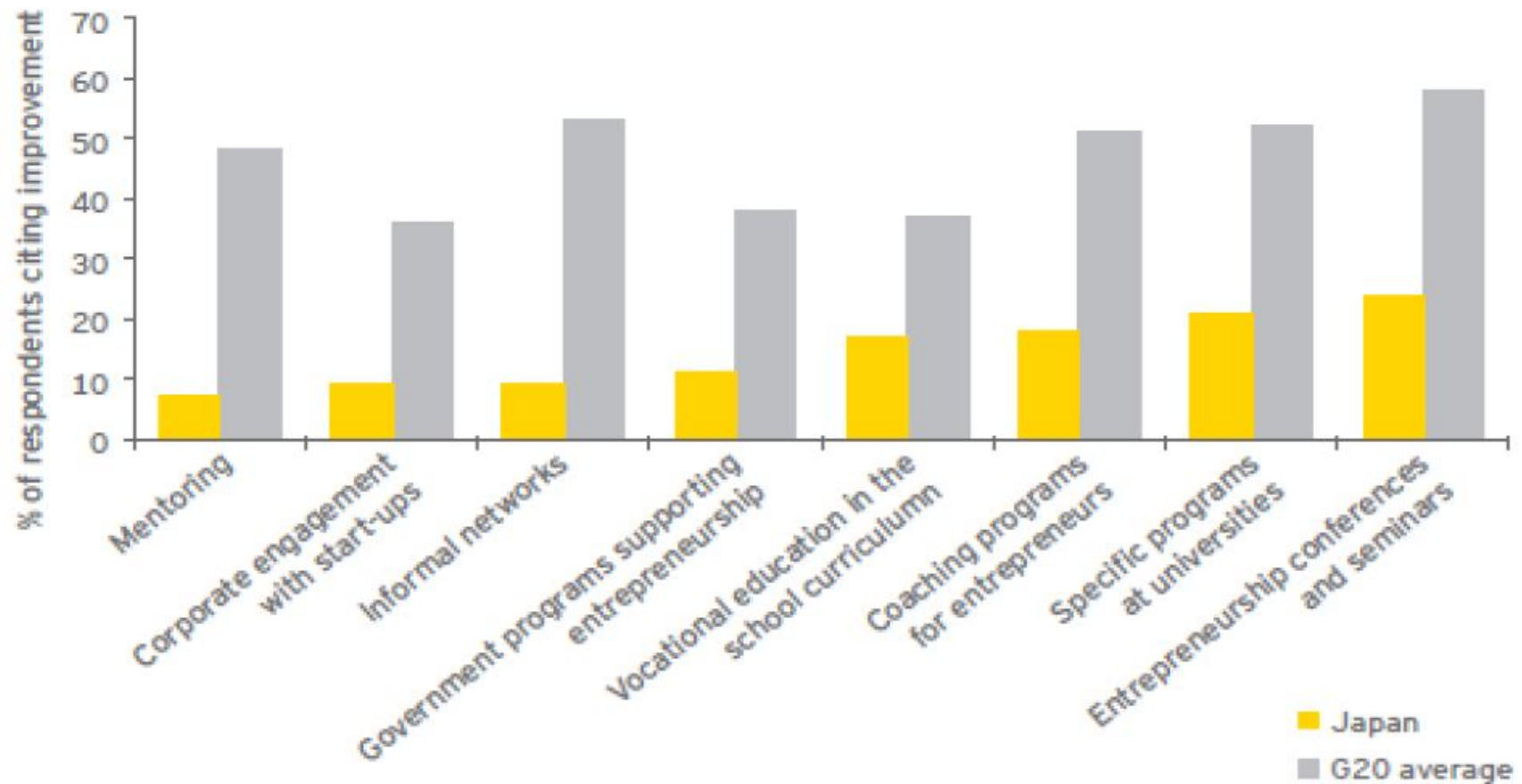
* % of population aged 18-64

Source: Global Entrepreneur Monitor 2014; Generation Entrepreneur 2013.

Notable Program in Tokyo:
Entrepreneur Mentoring Initiative in Japan

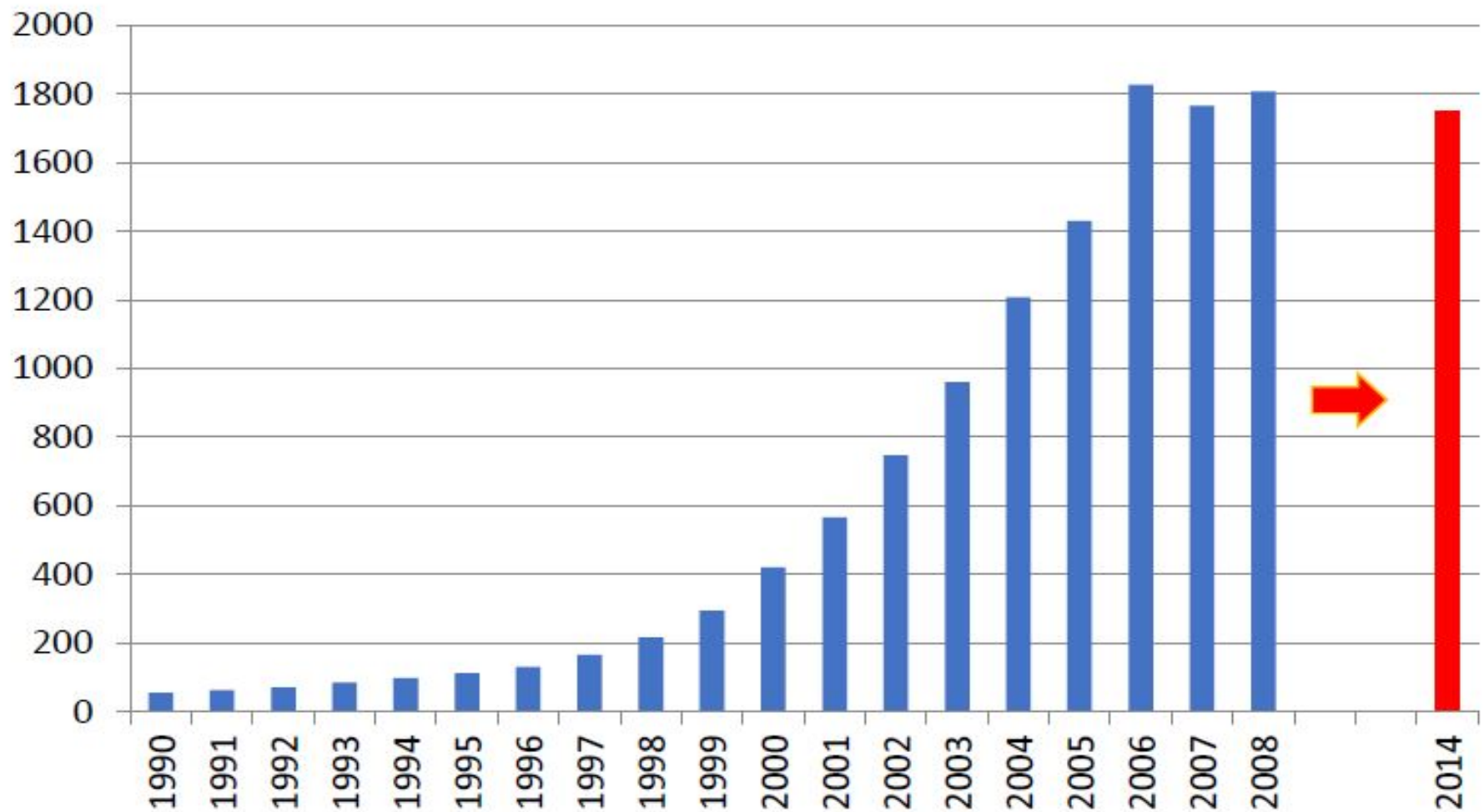
Entrepreneurial Education at Universities

Improvement in entrepreneurial education in the last three years



Changing Role of Universities

Increasing number of Spin-Offs



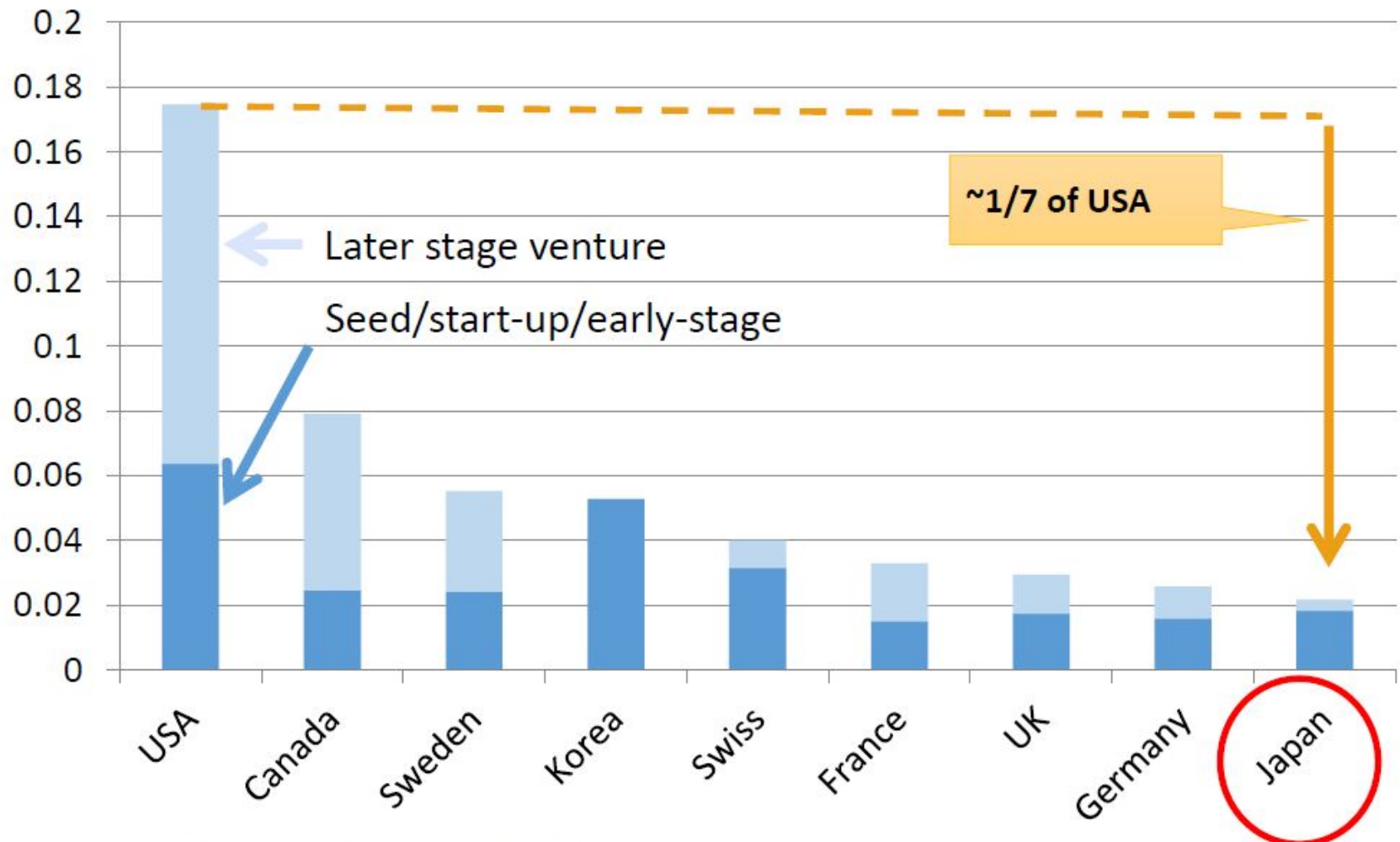
Source: Nomura Research Institute 2014.

大学発ベンチャー創出数（大学別）

順位	大学名	平成27年度 大学発VB数	平成26年度 大学発VB数	平成20年度 大学発VB数
1	東京大学	198	196	125
2	京都大学	86	84	64
3	大阪大学	77	77	75
4	筑波大学	73	70	76
5	早稲田大学	65	67	74
6	九州大学	63	62	55
7	東京工業大学	53	56	57
8	東北大学	50	53	57
9	北海道大学	48	43	43
10	九州工業大学	43	40	45
11	デジタルハリウッド大学	42	34	19
12	慶應義塾大学	40	38	51
13	広島大学	39	40	38
14	名古屋大学	33	35	28
14	龍谷大学	33	33	27
16	岡山大学	29	23	28
16	立命館大学	29	28	35
18	会津大学	27	27	23
19	光産業創成大学院大学	26	27	3
20	神戸大学	24	28	33
21	三重大学	21	18	18
21	鹿児島大学	21	20	10
21	東京農工大学	21	22	25
21	名古屋工業大学	21	22	14
25	静岡大学	20	20	22
25	大阪府立大学	20	20	18
27	同志社大学	19	18	16
28	京都学園大学	18	17	－

ソース:経産省2016

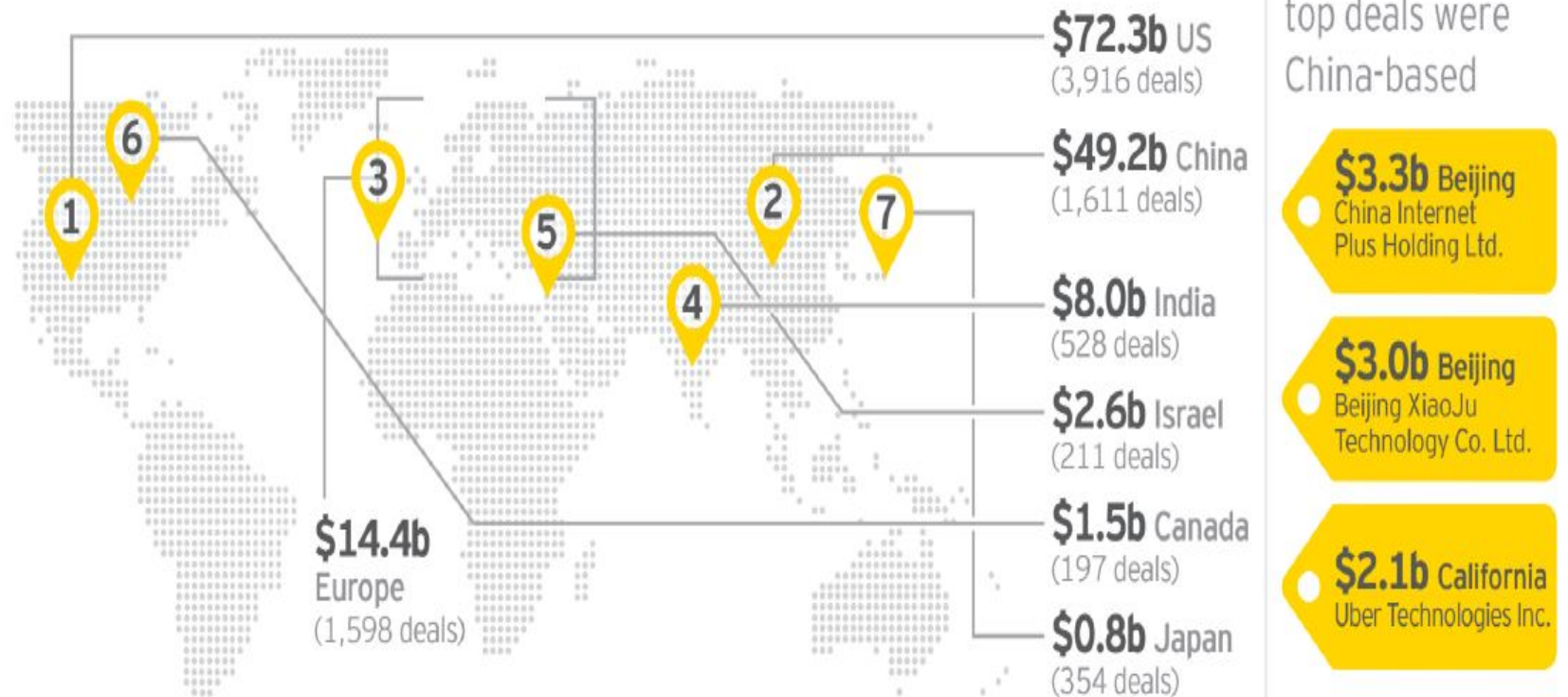
Venture Capital Investment as Percentage of GDP, 2013



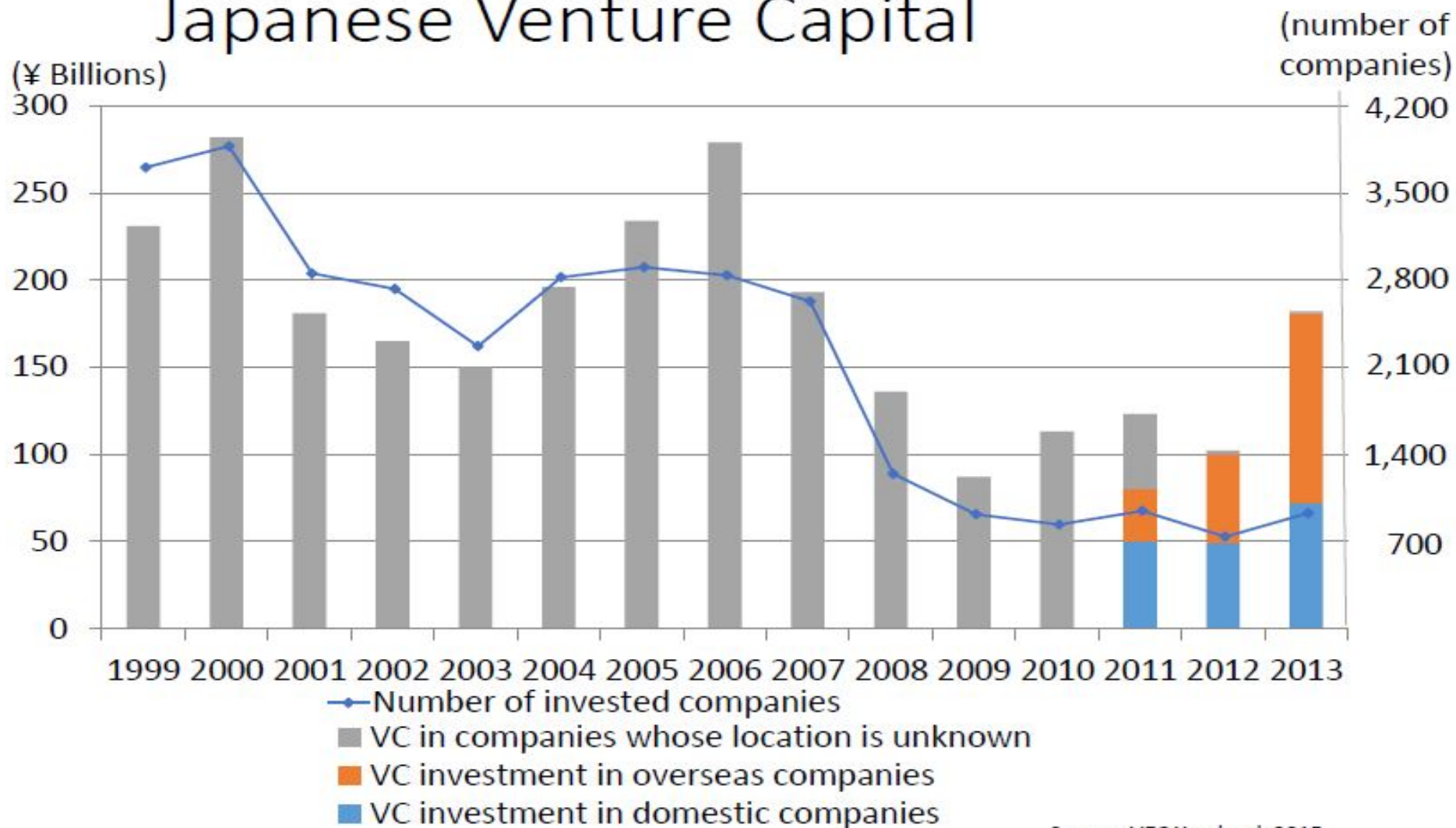
2015 Venture Capital Investments

USA = 90x Japan (40% of USA population)

The US dominates global VC activity by deals and value

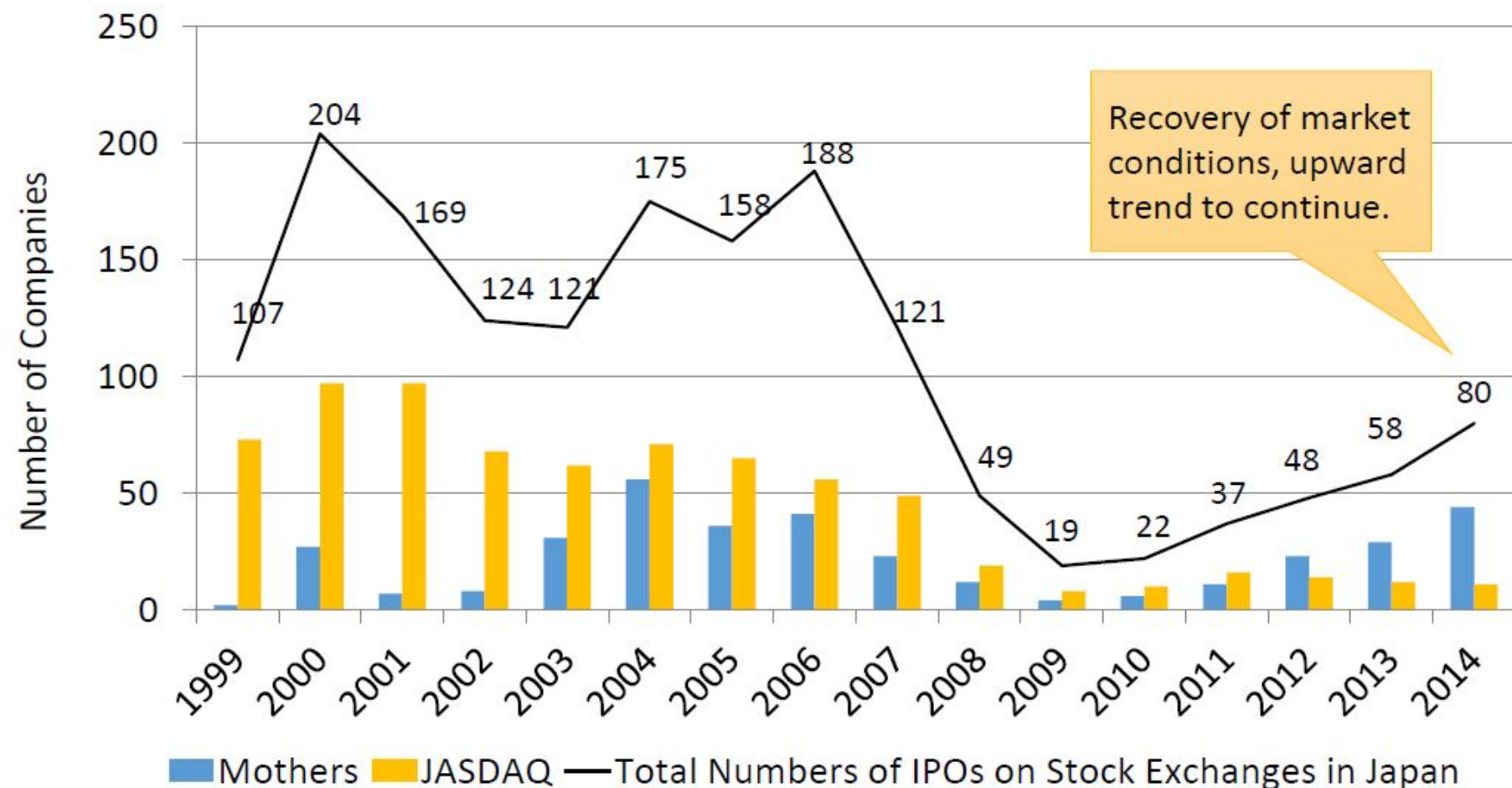


Trend of Investments and Loans by Japanese Venture Capital



Source: VEC Yearbook 2015.

Historical Trend of IPOs in Japan

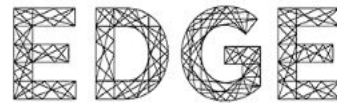


Abenomics Goal:

By 2020: Startup Ratio of 10%



**BUT: How accelerate growth of high-potential startups?
Stimulus programs: complementary or counteracting?**



PROGRAM

Enhancing Development
of Global Entrepreneur Program

The University of Tokyo Tokyo University of Agriculture and Technology

Tokyo Institute of Technology Shiga University of Medical Science

Kyoto University Osaka University

Nara Institute of Science and Technology Hiroshima University

Kyushu University Osaka Prefecture University Keio University

Waseda University Ritsumeikan University

Creating an innovation ecosystem in Japan

To promote the active development of ventures in Japan, the EDGE program (Enhancing Development of Global Entrepreneur Program), run by the Ministry of Education, Culture, Sports, Science and Technology, aims to create ventures based on the results of research and development carried out at universities, etc., foster human resources to promote the creation of new businesses with the help of the existing companies, and form an innovation ecosystem with related personnel and institutions.

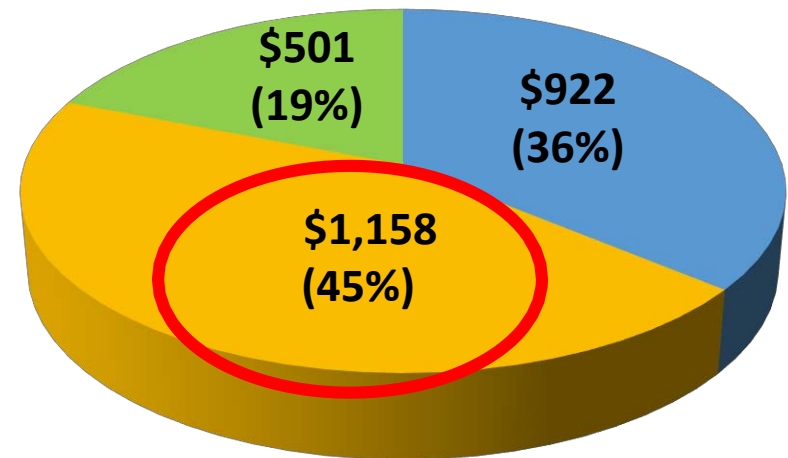
Aggressive Economic Growth Policy Triggered Cash Inflow to VC Funds

Government backed investment funds

- ✓ The Innovation Network Corporation of Japan (INCJ)
 - Capitalized at US\$3B
 - Invests in start-ups & VCs
- ✓ SME Support Japan
 - Has invested US\$580 M in more than 90 funds since 1999
 - Invests in private VCs up to 50% of fund size

Newly launched VC funds (2013-2014/10)
US\$ 2,581 M

Size of raised funds, in M US\$



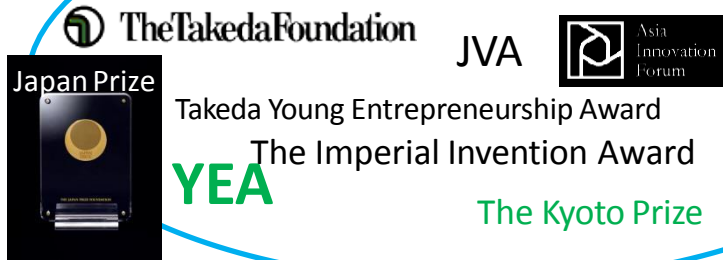
■ Financial ■ Independent ■ CVC

Existing Prizes Mapped by Different Stakeholders

200 prizes

35 from
universities

Foundations, NGOs etc.



NES
Startup
Competition

Samurai
Incubate
Inc.



Infinity Venture Pitch

Innovation
Ecosystem
Stakeholder
Model



Corporate/ Finance

Designing The Future
KDDI



UVGP



NEC C&C Prize

IBM
blue
hub

TAP
Tokyu
Accelerate
Program



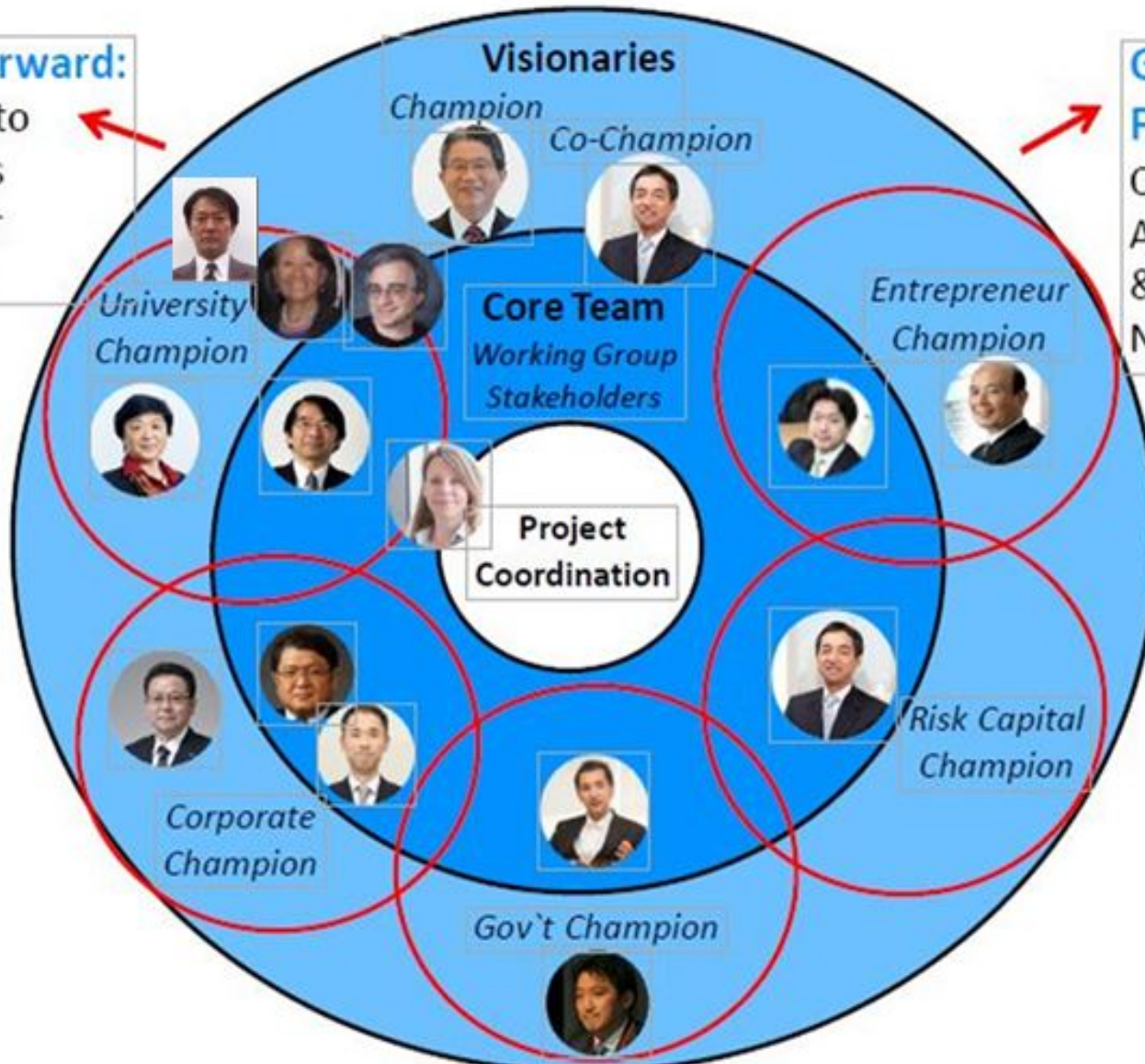


4. MIT REAP: Tokyo Team & Cusumano Activities

Tokyo REAP Team

Going Forward:

Outreach to
Advocates
& Broader
Network!



Going Forward:

Outreach to
Advocates
& Broader
Network!

Universities & “Open Innovation”

- Gap between basic & applied research, and commercialization is getting smaller, especially in science-driven fields. 基礎研究と応用研究との間のギャップは、特に科学主導の分野ではますます小さくなっている
- Universities need to link science & engineering education with management, and build closer ties to companies and VCs!
大学は科学と工学の教育を経営教育と結びつけ、企業やVCと親しい関係を構築する必要がある



M. Cusumano Activities at 理科大

- 顧問 (理事長と学長)(2014-16)
 - 特任副学長 (2016-17)
 - 特任副学長/顧問 (2017-2018)
1. 経営学部 of 顧問 ➡ 初年度の大学生を倍増させて約500人、起業家精神を重視する新しいカリキュラム (2016.4)
 2. MIT REAP の協力で ➡ 起業推進委員会 (本部) と *Tokyo Entrepreneurship & Innovation センター* を構築 (2016.12)
 3. 大学院専門職イノベーション研究科技術経営専攻 ➡ 新“MOTカリキュラム”と経営学部大学院合併 (2018.4)

神楽坂キャンパス 富士見校舎



新設 ビジネスエコノミクス学科



膨大なデータから有益なデータを選び、明確に読み解き、戦略を構築する。科学的根拠を提示した上で意思決定の選択を導いていく。データサイエンスなど最先端で実践的な授業により、分析のスペシャリストを育成します。

ビジネスエコノミクス学科 >

革新 経営学科



問題を発見し、ビジネスプロセスの流れを構築し、どのツールを選択して解決するか決定する。刻一刻と変化する経済の流れを読む。起業体験もまじえた授業により、新しい事業・仕事を創っているスペシャリストを育成します。

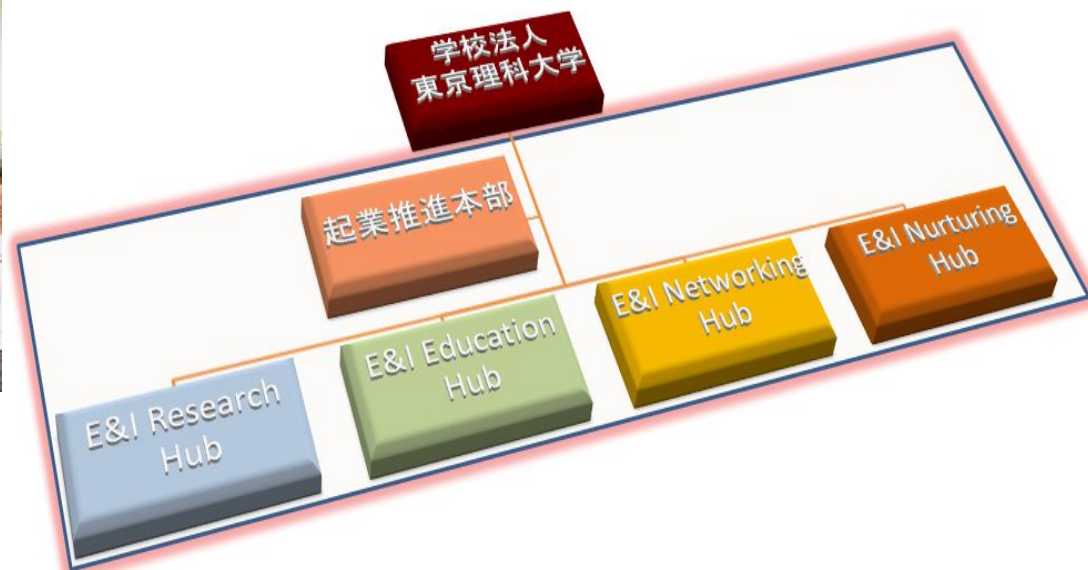
経営学科 >

授業は“MITスタイル”を採用



教壇に向かって学生が横並びにすわる従来の教室ではなく、U字型に並ぶ教室を新校舎では採用しました。U字型であるため、授業中、教授が学生の近くまで自由に動きまわることができます。

机の前に立てられた一人ひとりの名札を確認しながら、教授と学生が活発に対話できるMITのスタイルを取り入れました。



東京理科大学 TOKYO E&I Center

BOOSTED by MIT REAP TEAM TOKYO

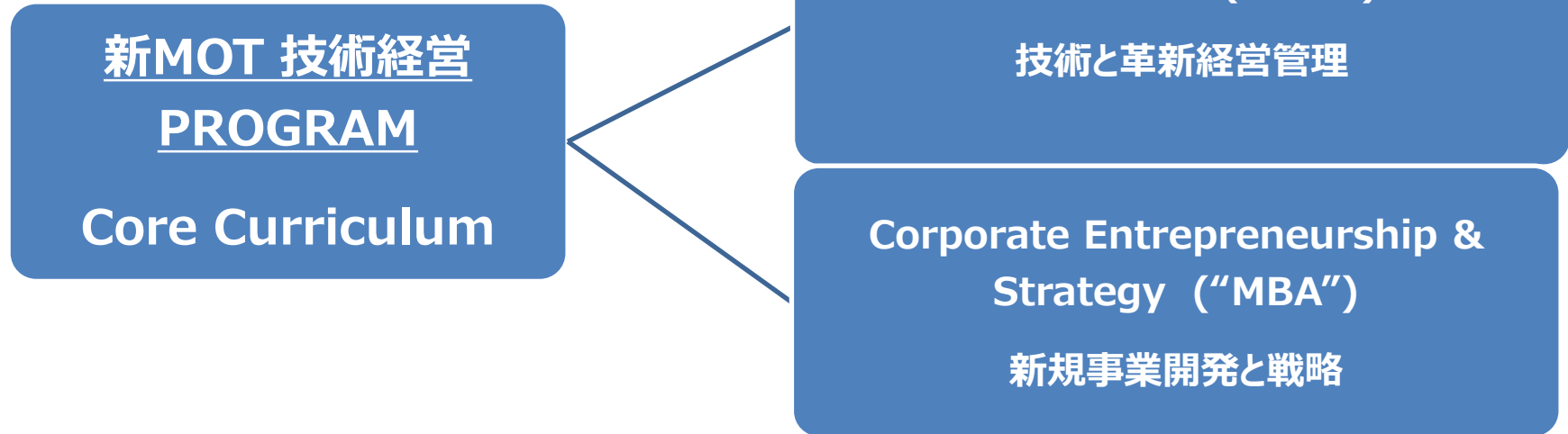
Video: <https://www.youtube.com/watch?v=v8Kkp40HNzk>

Website: <http://www.tus.ac.jp/teic/>



TEIC@TUS
TOKYO ENTREPRENEURSHIP &
INNOVATION CENTER
TOKYO UNIVERSITY OF SCIENCE

Start: APRIL 2018



“MTI” – 技術と革新経営管理

- **Career path target**: Technical executives and senior managers (CTO, Chief Innovation Officer, Chief Information Officer, R&D Director, Senior Program and Product Managers)

“MBA” – 新規事業開発と戦略

- **Career path target**: Corporate executives and senior managers (CEO, CFO, CMO, Directors of Strategic Planning, New Business Development, Business Unit General Manager)



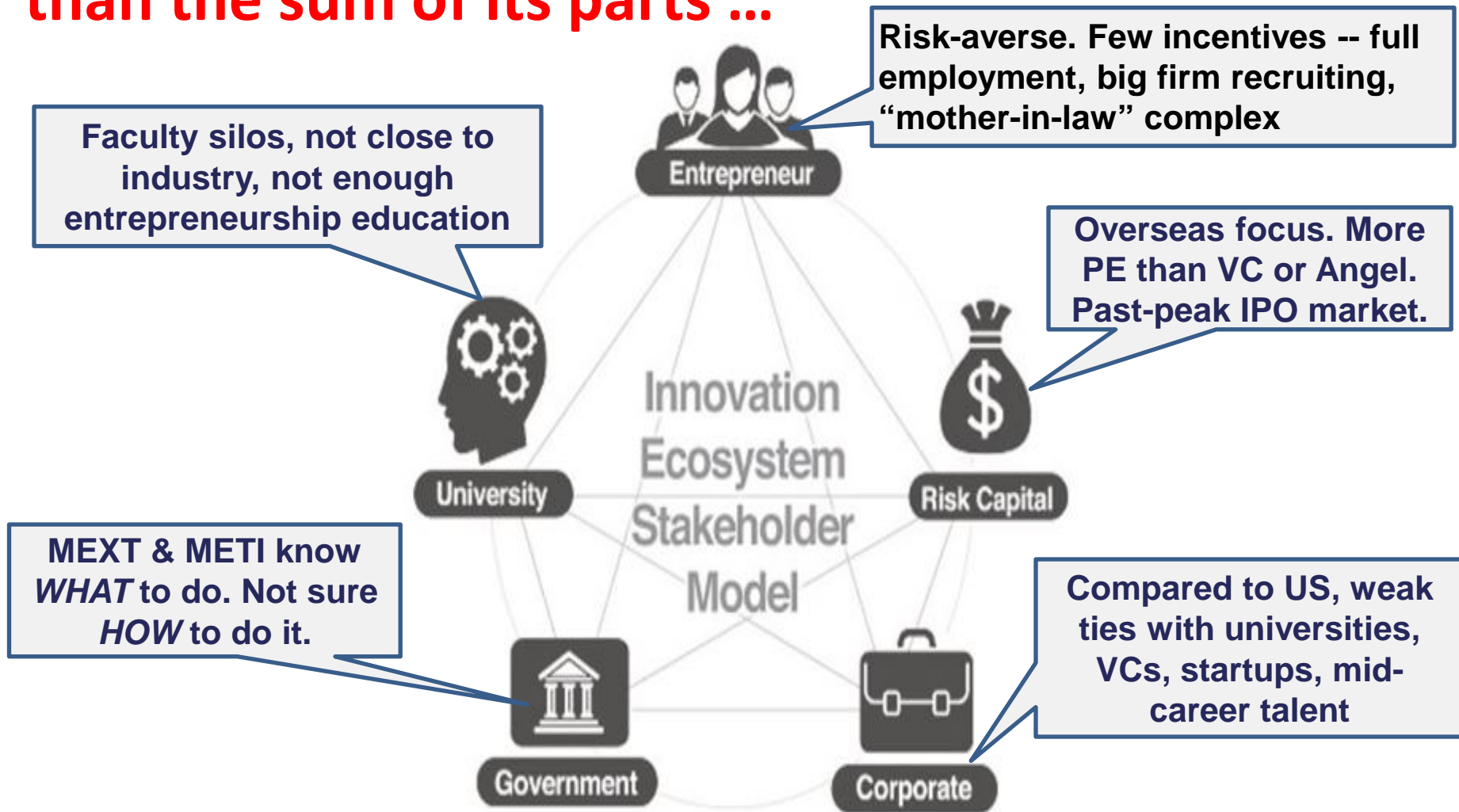
5. Conclusions

Japan's Challenge & Opportunity

日本の挑戦と機会

- Japan leads in **Innovation Capacity**イノベーション能力 :
creating patents (universities & companies), and
product & technology development in big firms
 - **Many great entrepreneurs in Japanese history!**
 - **But stagnant economy over past 3 decades**
- Japan behind in **Entrepreneurship Capacity** 起業能力:
commercializing innovations & creating new businesses
 - **How encourage more “open innovation” in big firms?**
 - **How nurture more growth-oriented startups?**

Japan's Ecosystem: The "Whole" seems less than the sum of its parts ...

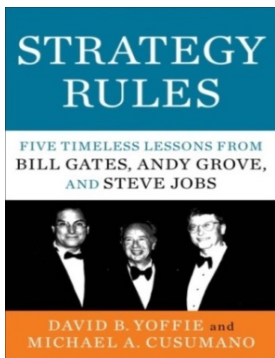


日本の生態系:「全体」は、その部分の合計よりも小さく見える...

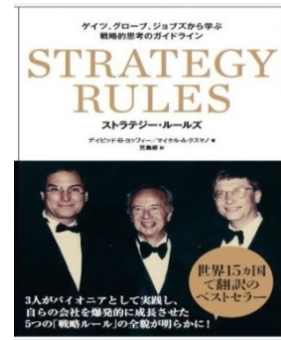
... But Japan is Improving!

- **Government:** EDGE from MEXT & other programs from METI & Prime Minister's Office to encourage entrepreneurship
- **Universities:** Introducing more classes & activities. Tokyo University already has a vibrant tech-driven ecosystem. Others?
- **Entrepreneurs:** Private & public efforts to incubate & accelerate startups. Now 200+ business plan competitions!
- **Corporate:** See need for more internal ventures & startups
- **Risk Capital:** More attention to early stage ventures in Japan

Opportunity for Japanese universities to do more!



Now is “the Moment” for Japan!



Andy Grove (former Intel CEO) quoted in *Strategy Rules*:

“There is at least one point in the history of any company when you have to change dramatically to rise to the next level of performance. ***Miss that moment and you start to decline.***”

どのような企業にも、少なくとも一度は、業績を飛躍させるための激的な変化が求められるときがある。
その瞬間を逃せば、衰退が始まる。

今がその瞬間。今が大切。