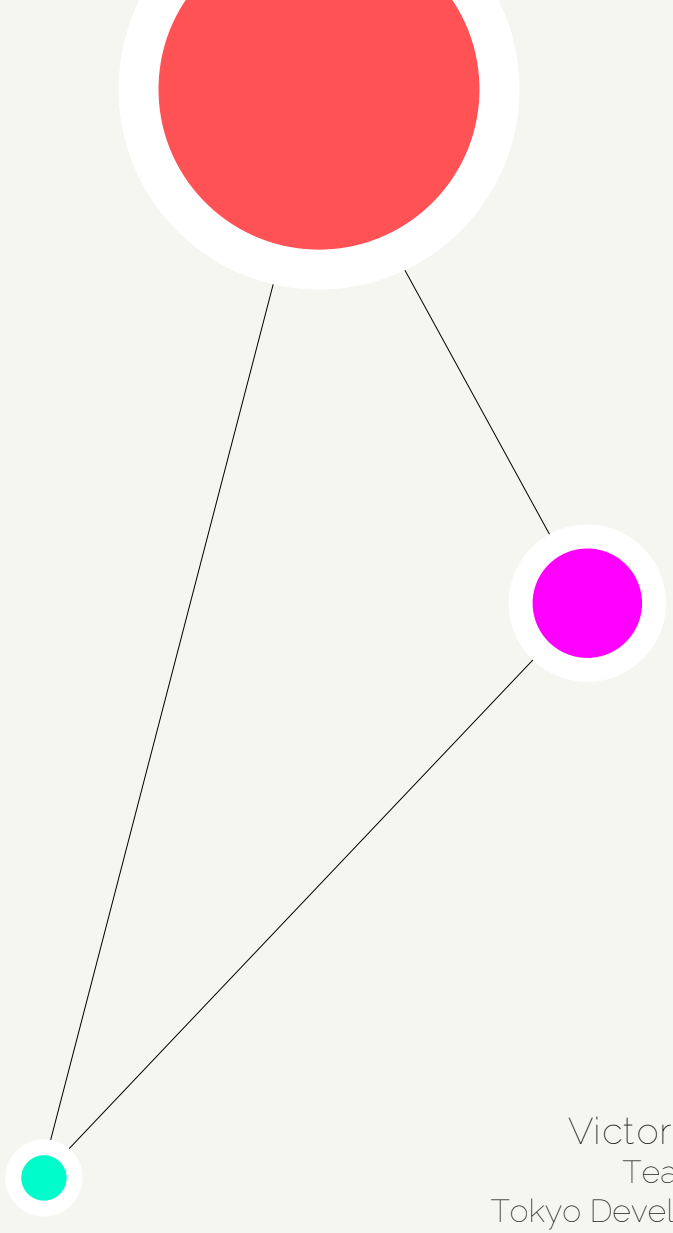
Boosting Japan's Startup Ecosystem

The great potential for Japanese innovation rebound

Tokyo Development Learning Center

WORLD BANK GROUP



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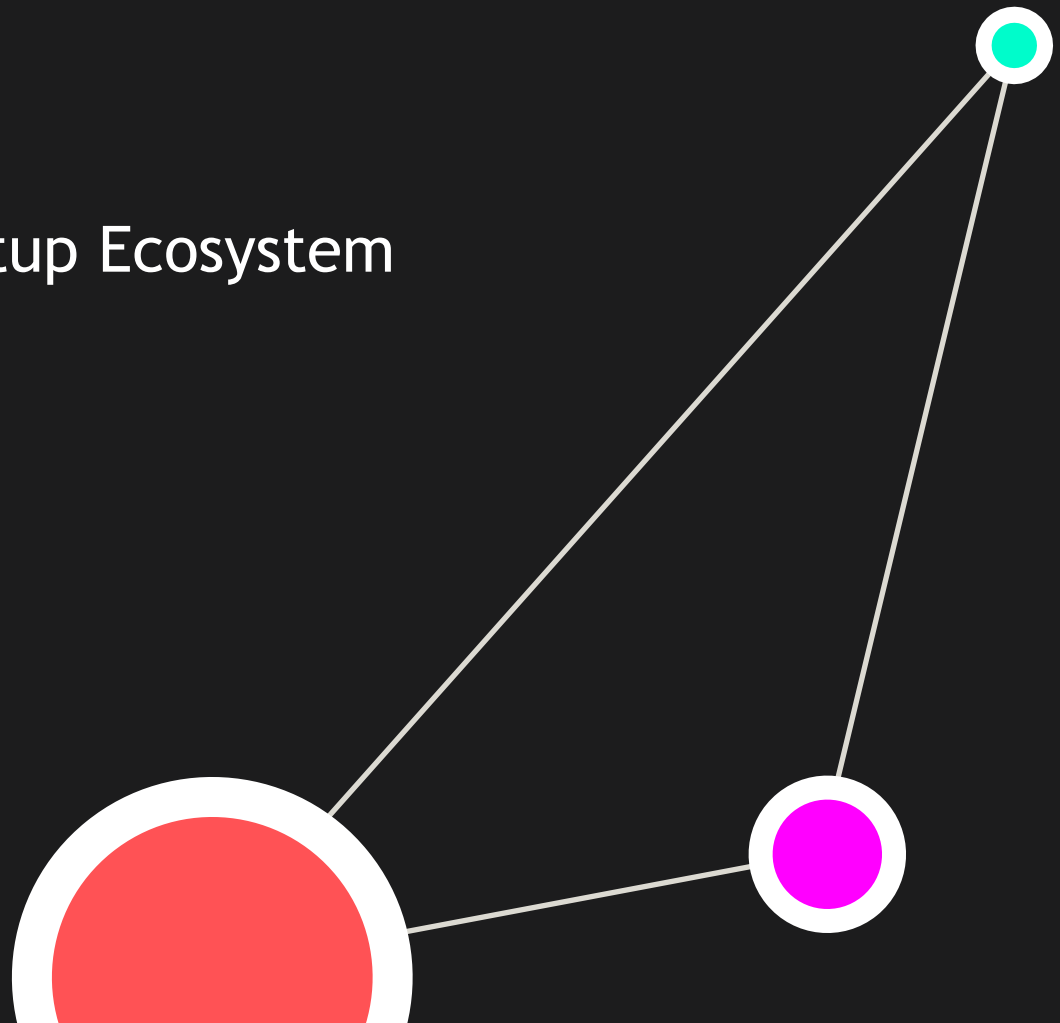
Team Lead
Tokyo Development Learning Center

Agenda

1. Analysis of Japan’s Startup Ecosystem
    a. Context
    b. Tokyo Startup Ecosystem
2. Key Gaps and Recommendations



Notes

The findings of this presentation is supported by the secondary data sources, complemented by some primary data.

The main data sources used for the analysis of Japan were compiled through a survey of Japanese start-up founders and ecosystem stakeholders, which was conducted by the Cabinet Office under the guidance of the World Bank team (Dataset #1).

Dataset #1

Sample size:
3,914 start-ups and an overall 6,086 ecosystem entities (including start-ups)

Geographical location:
Tokyo, Kansai (Kobe, Kyoto, and Osaka), and Fukuoka

Sample information:
each company's founding year, address, type of business, founder's information (such as education and previous jobs), and the associated investors and accelerators

Data from New York ecosystem was collected by Endeavour Insights in 2014 and it includes an overall of 9,168 ecosystem entities (including start-ups)

Dataset #2

Sample size:
3,131 startups and 5,991 associated investors in the following deep-tech sectors: Artificial Intelligence (AI), Robotics, Space-Tech and Quantum Computer (QC)

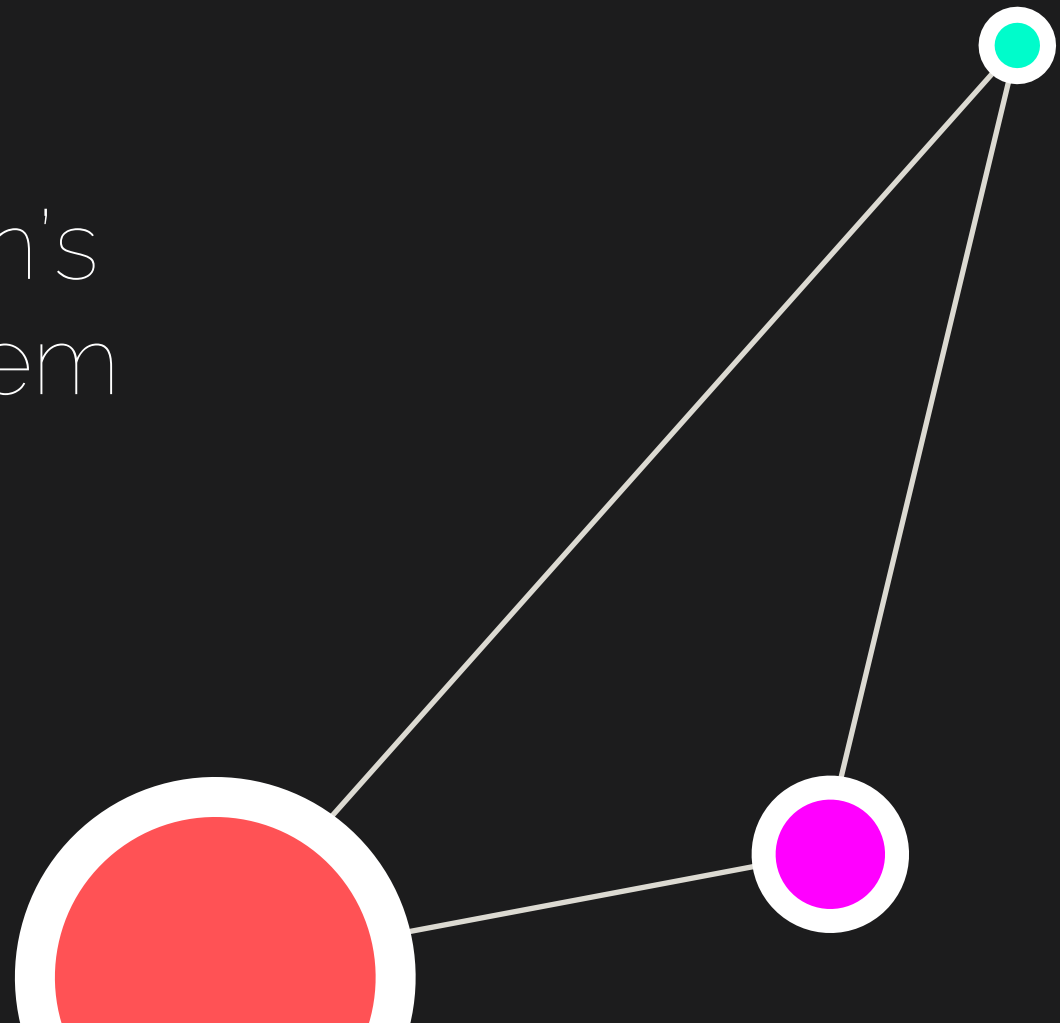
Sample information:
Start-up location (global), investor location (global), investment relations within cluster and among clusters (global)

Dataset #3

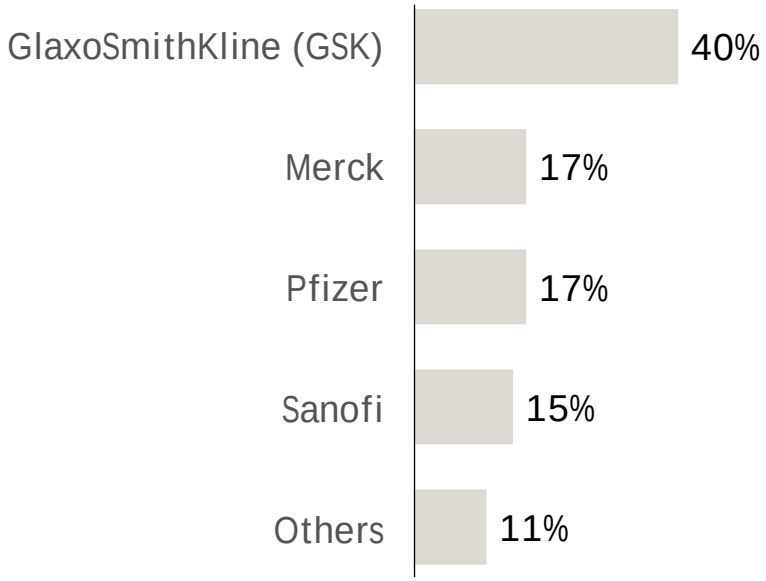
Sample size:
65 accelerator programs (global)

Sample information:
accelerator programs, location, management entities, supporting entities, type of accelerator, associated start-ups and mentors

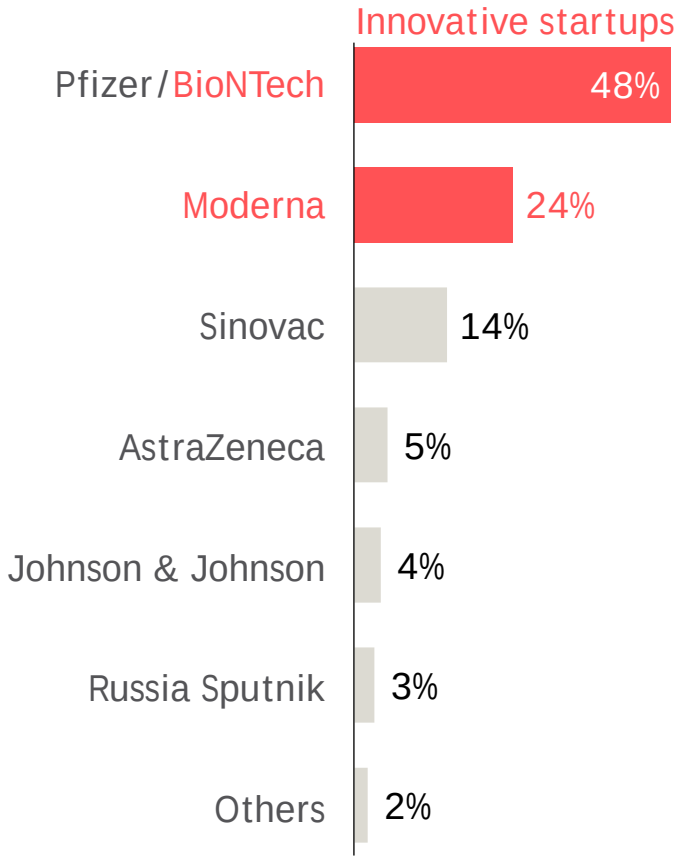
1 Analysis of Japan's startup ecosystem



Vaccine Manufacture Share by Global Value (2019)



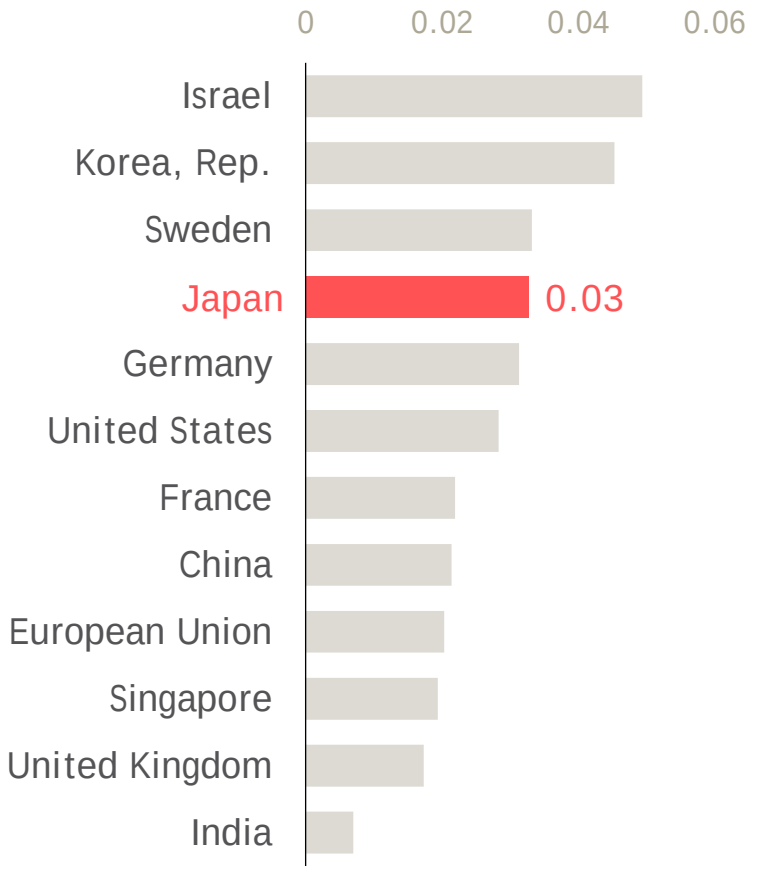
Global COVID-19 Vaccine Market (Q1,2021)

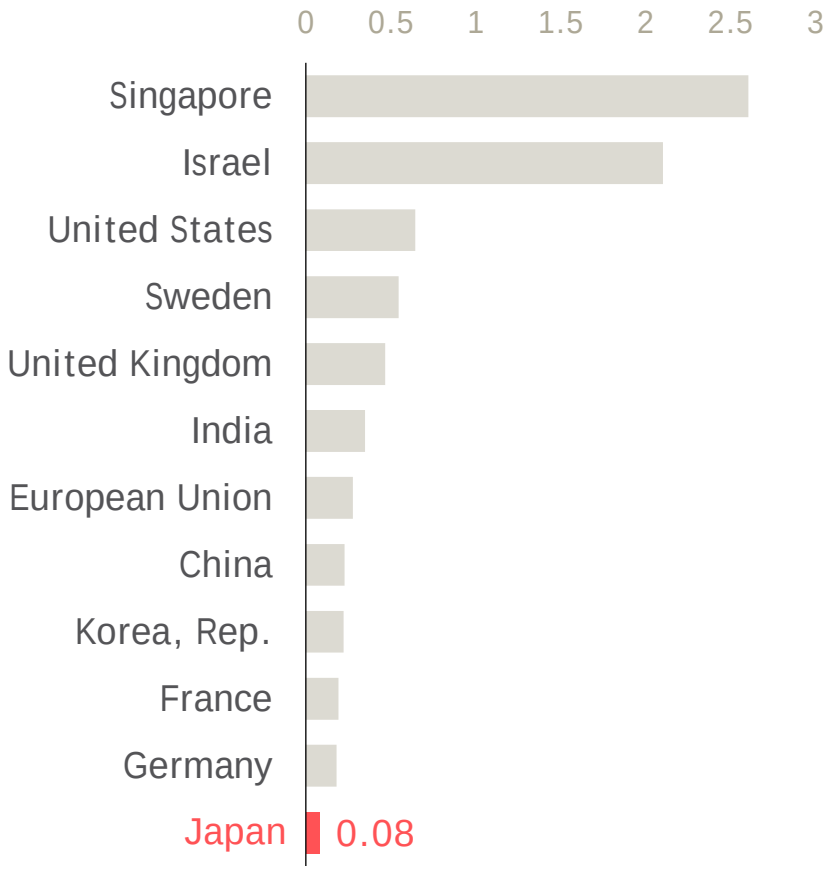


Innovation is increasingly focused on start-up development and commercialization

COVID-19 mRNA vaccinations were largely a product of startup innovation

Sources: (left) WHO
(right) Morningstar (Estimates)





Note: Japan data includes all start-up funding

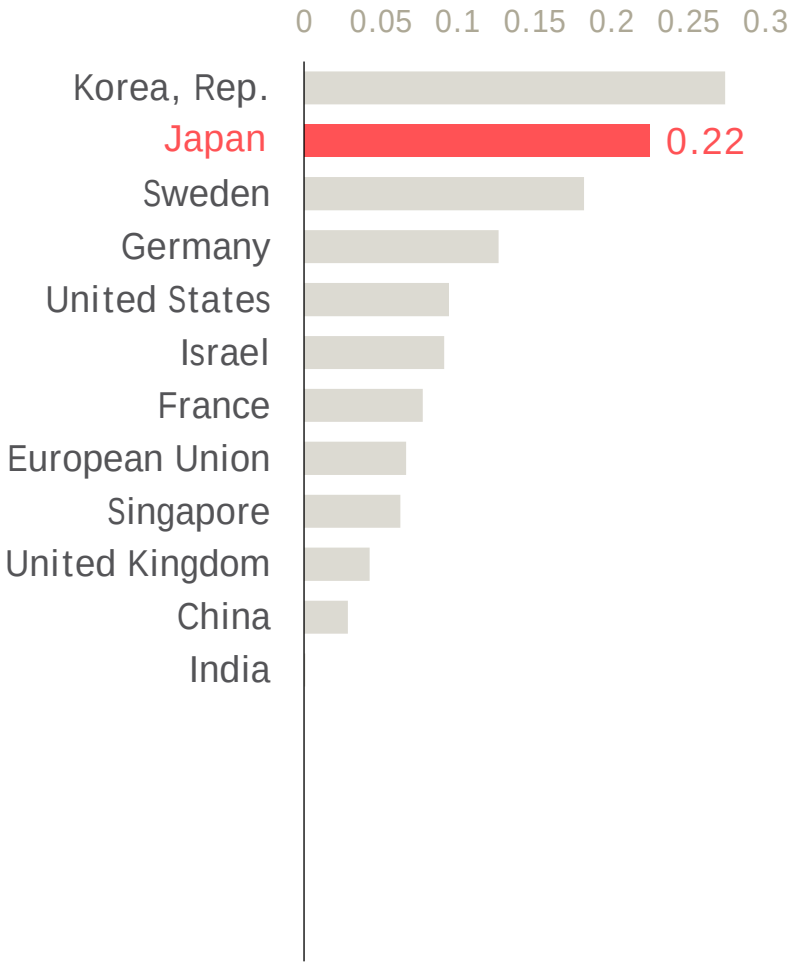
Inputs:

R&D vs VC Intensity

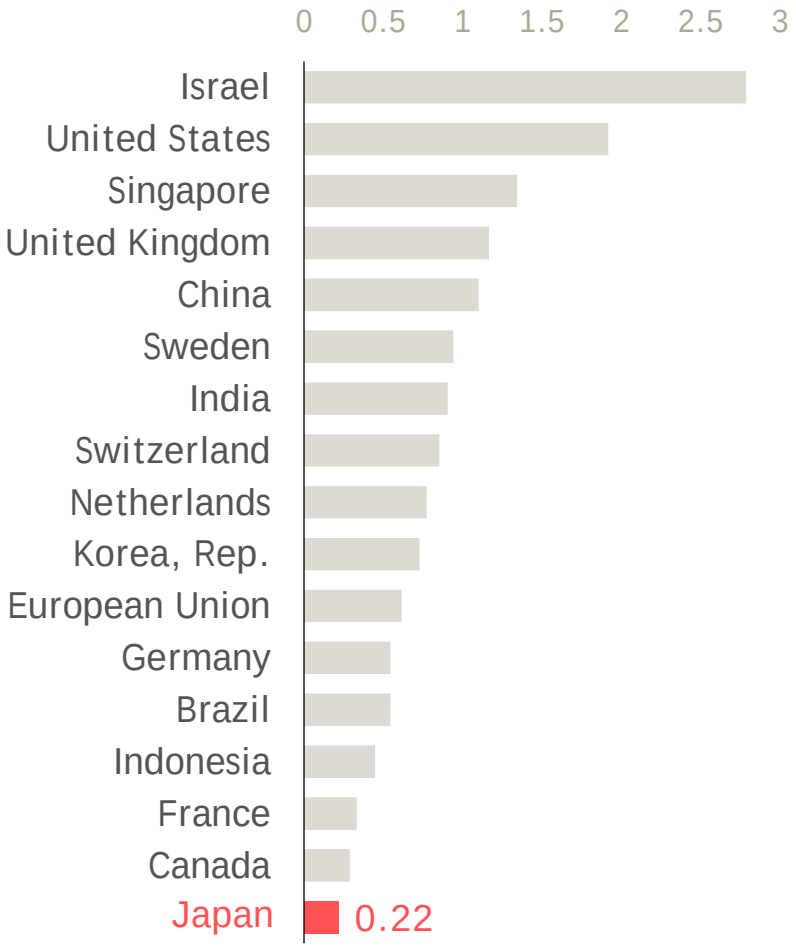
Japan's Innovation Ecosystem is missing a start-up ecosystem at par to compete internationally (1/2)

Sources: (right) for the United States—National Venture Capital Association (NVCA), 2020; for China—Sheng, 2020; for the European Union and the United Kingdom—Dealroom, 2020; for India—Sheth, Krishnan, and T, 2020; for Japan—INITIAL, 2021; for Israel, Republic of Korea, and rest of the world—Rowley, 2020; for Singapore—Pillai, 2019; KPMG 2019
(left) OECD Main Science and Technology Indicators (2019)

Patents Granted Per Capita



Unicorns per GDP % (US$ Billions)



Note: For this analysis, unicorns refer to any start-up with a valuation >1B (US$), private or public.

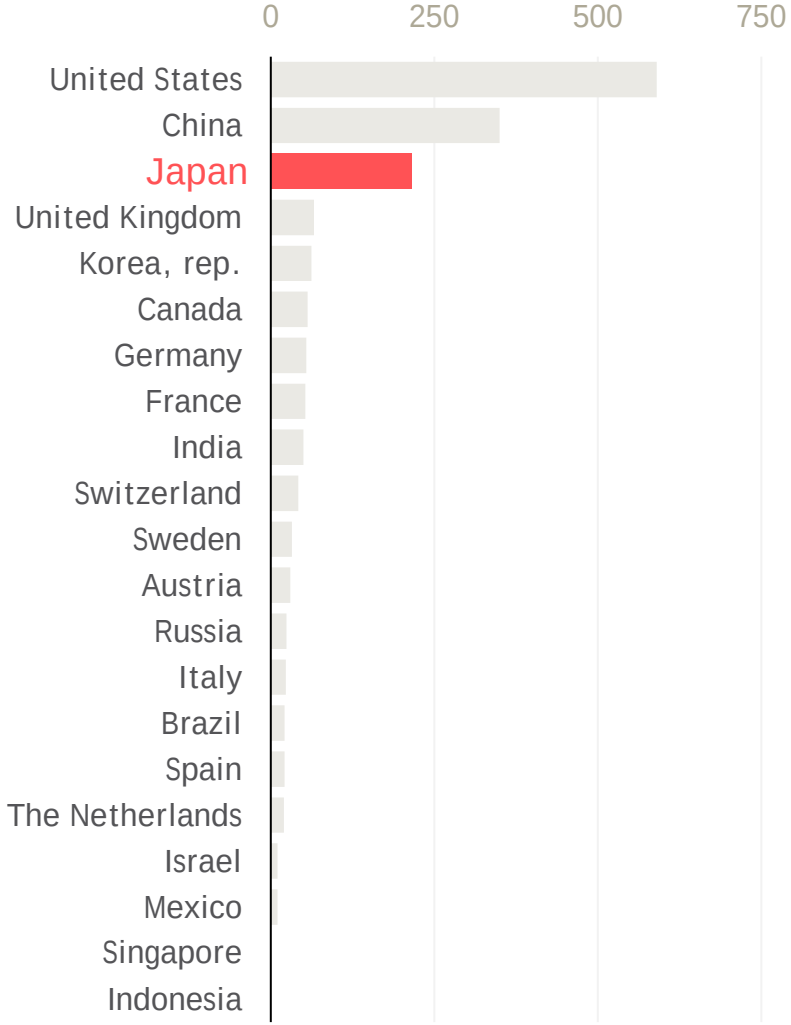
Outputs:

Patents vs Unicorns Intensity

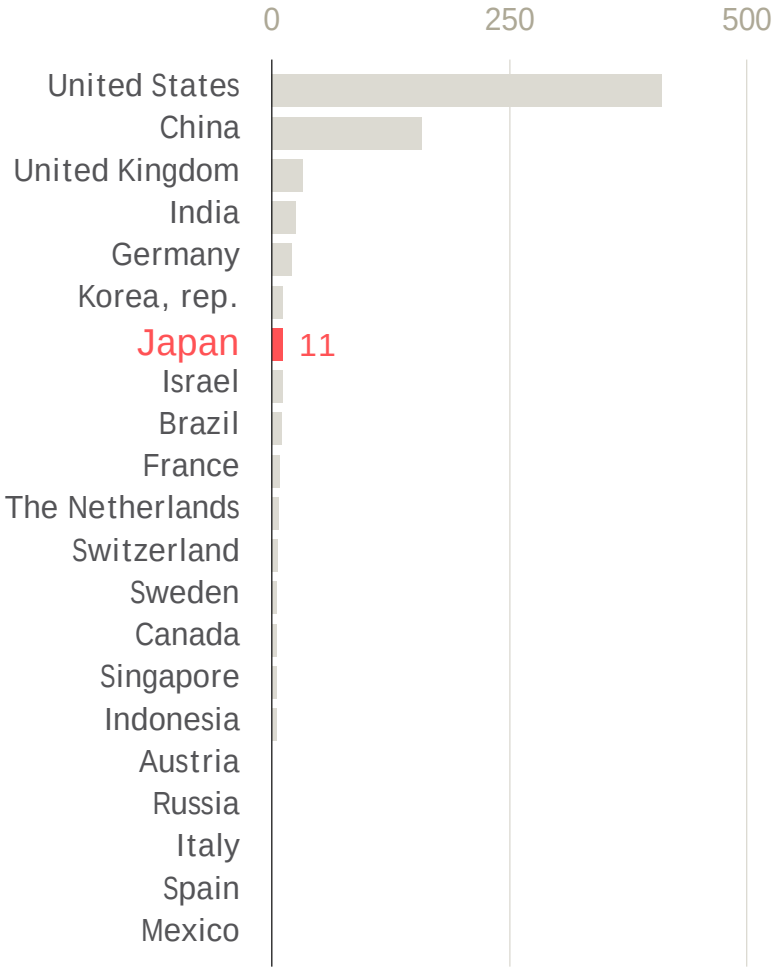
Japan's Innovation Ecosystem is missing a start-up ecosystem at par to compete internationally (2/2)

Sources: (left) CBInsights, 2021; INITIAL, 2021; World Bank database
(right) WIPO Country Profiles

Forbes Global 2000 Companies



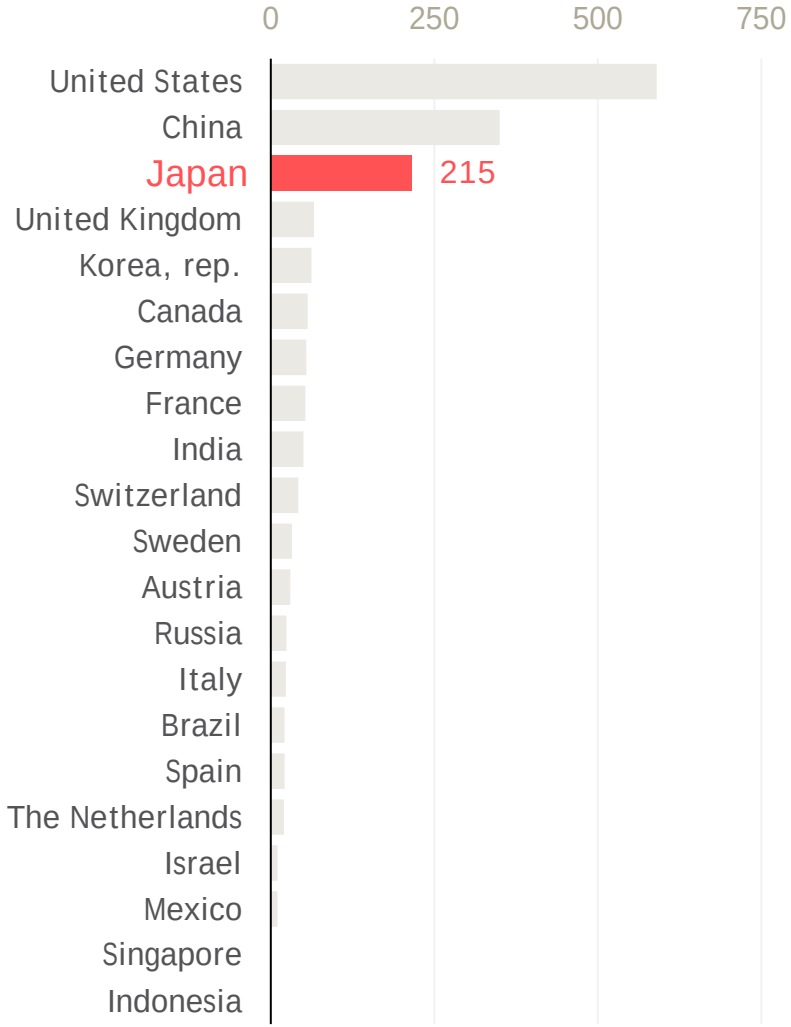
Unicorns (>US$ 1 Billion)



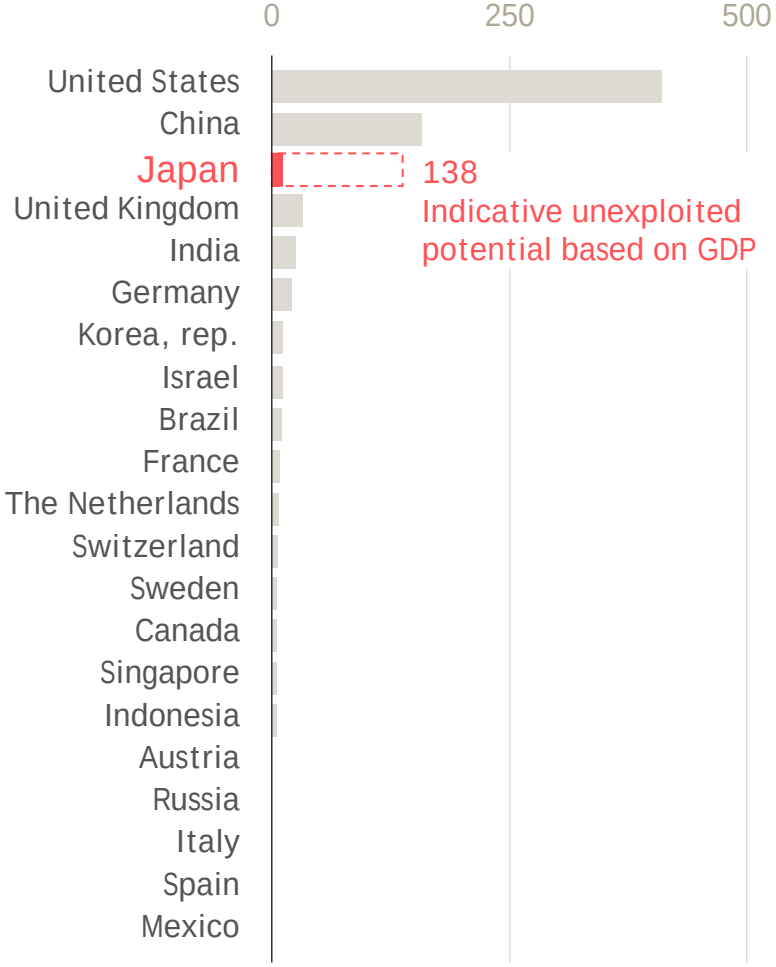
Boosting Japan's start-up ecosystem presents a great potential for its forward-looking competitiveness

Sources: (left) CBInsights, 2021; INITIAL, 2021. (right) Forbes, 2021.

Forbes Global 2000 Companies



Unicorns (>US$ 1 Billion)



Boosting Japan's start-up ecosystem presents a great potential for its forward-looking competitiveness

Sources: (left) CBInsights, 2021; INITIAL, 2021. (right) Forbes, 2021.

Start-ups need an ecosystem to grow

4 core elements of the start-up ecosystem for policy action

Community / Social Network

Social networks of specialized actors that tie all elements of the ecosystem. They help identify entrepreneurial opportunities, access to finance, access to information and create resources and spillovers, strategic alliances, and status signaling

Investment

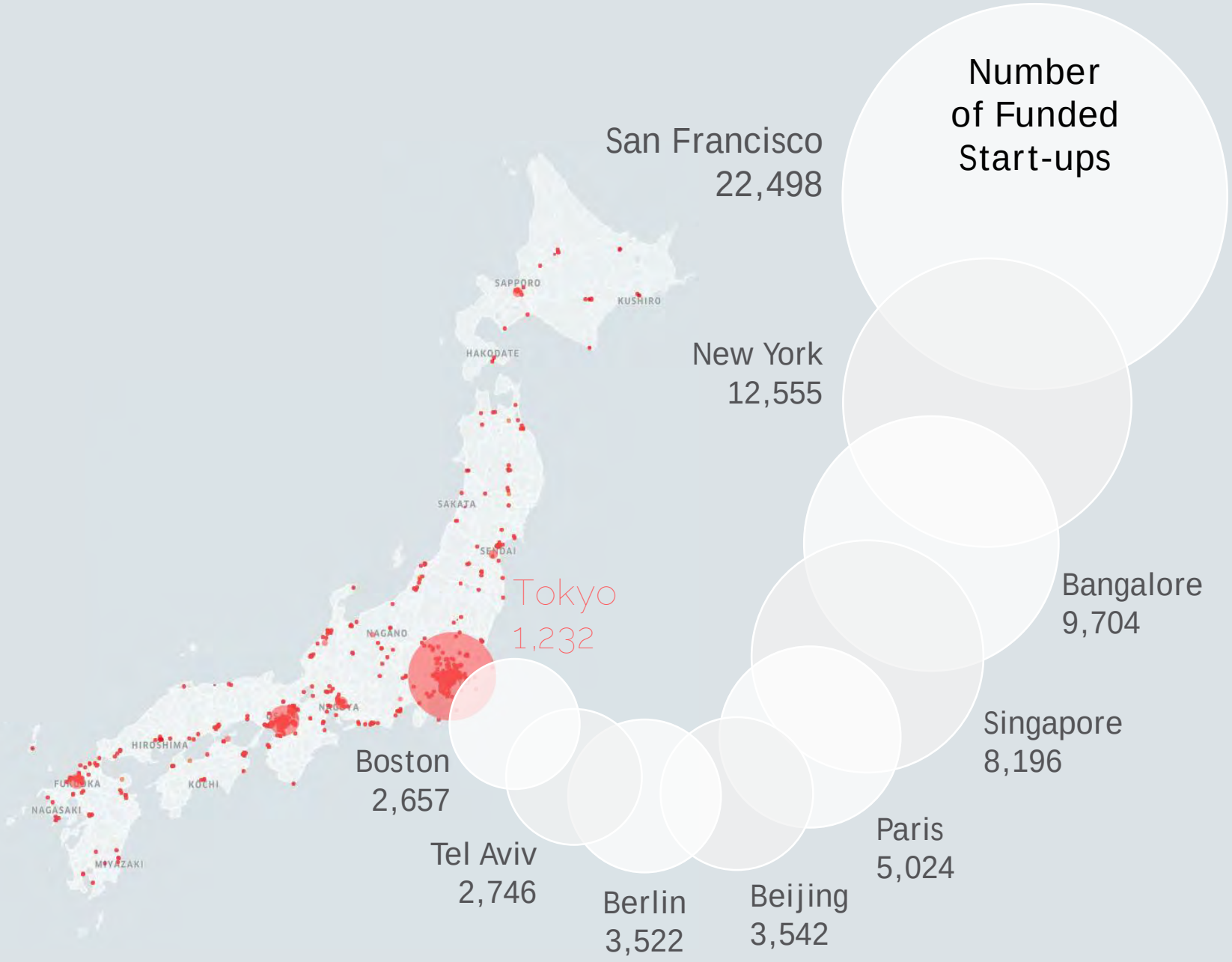
Specialized funding to allow start-up growth. Venture Capital (VC) and angel investors in all stages of the ladder of investment (from seed to scale-up). This is complemented with other funding sources and resources: government grants, corporate funding, finance institutions, etc.

Support Infrastructure

Support programs for start-ups to grow. Accelerators and mentors are arguably the most active and renowned actors, supporting entrepreneurs and start-ups in the early stages of development, provision of small amounts of seed investment, and active mentorship and networking.

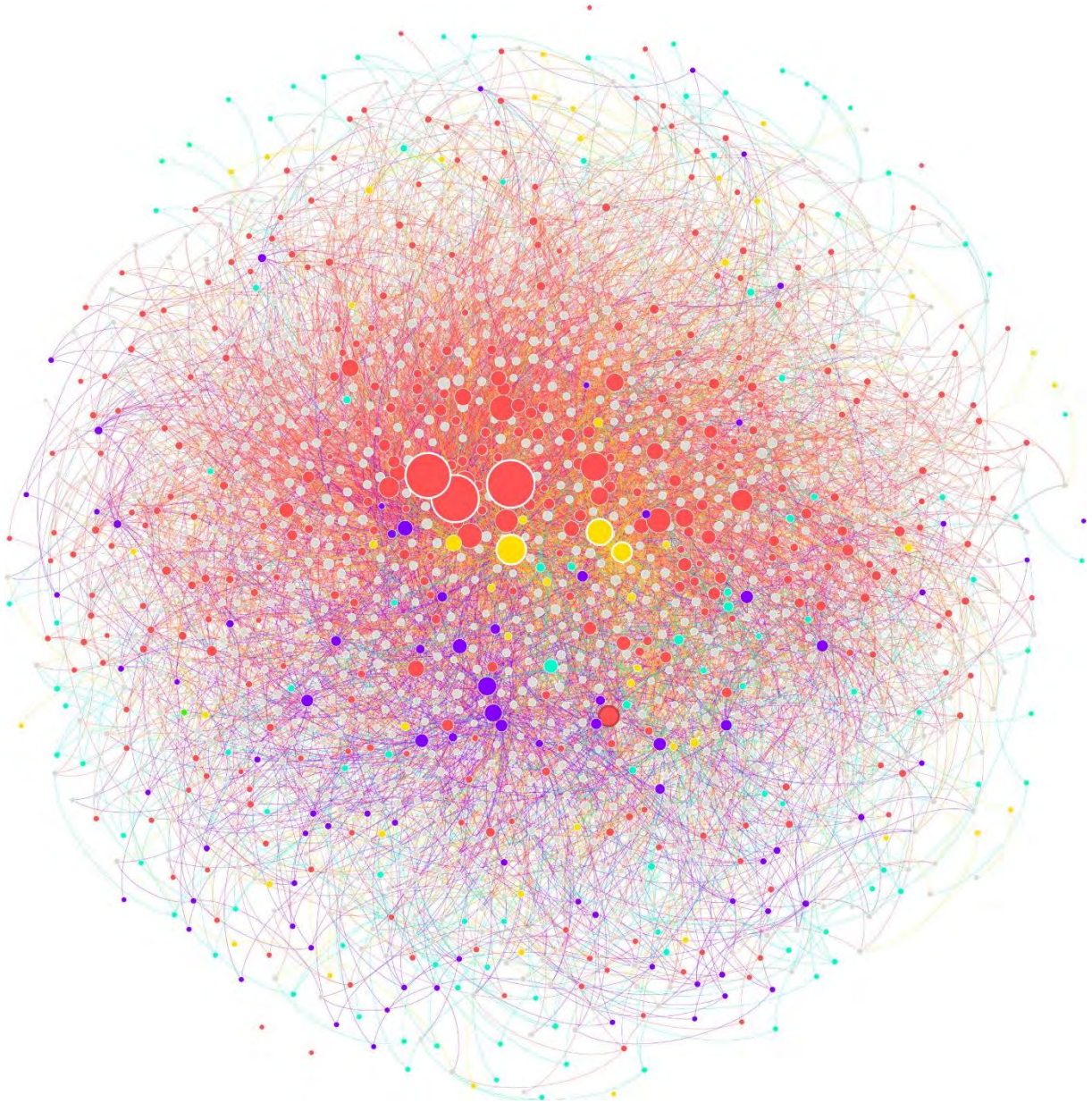
Skills infrastructure

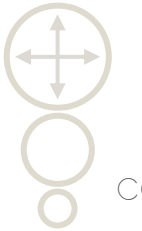
Institutions that provide relevant skills for entrepreneurs to create competitive ventures. Formal education actors (e.g., universities) with practical entrepreneurial hands-on programs (curricular or extra-curricular). Informal flexible actors (e.g., accelerators, bootcamps) for non-university population.



Tokyo is today the only true startup ecosystem in Japan, but it is small on global terms

Sources: Tracxn database, updated to April 2021, Dataset #1 for Japan





Influence based on number of connections

Investors

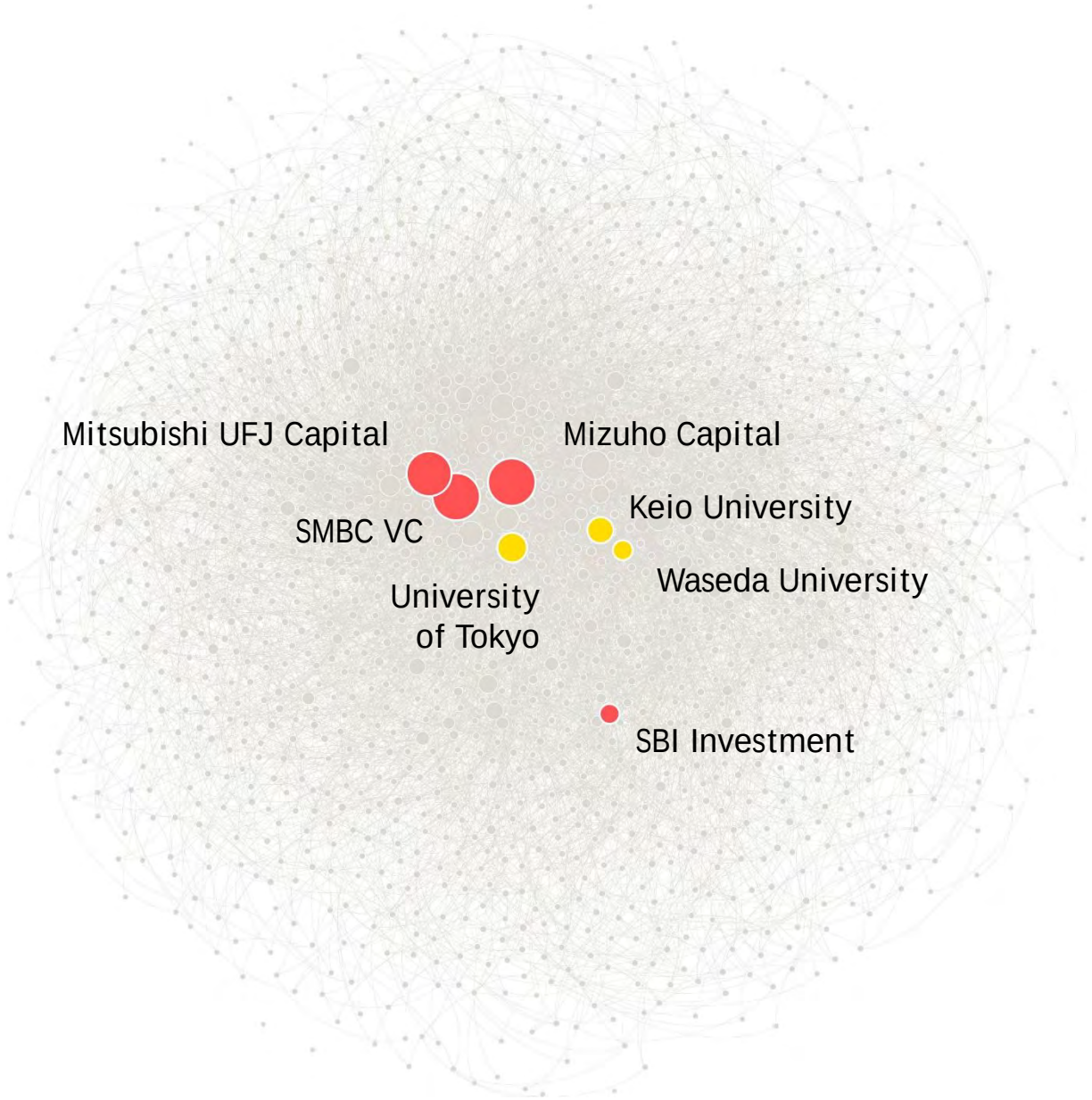
Universities

Accelerators

Start-ups

Tokyo Ecosystem is dominated by traditional institutions that do not cater to start-up needs

Sources: Dataset #1



Influence based on number of connections

Investors

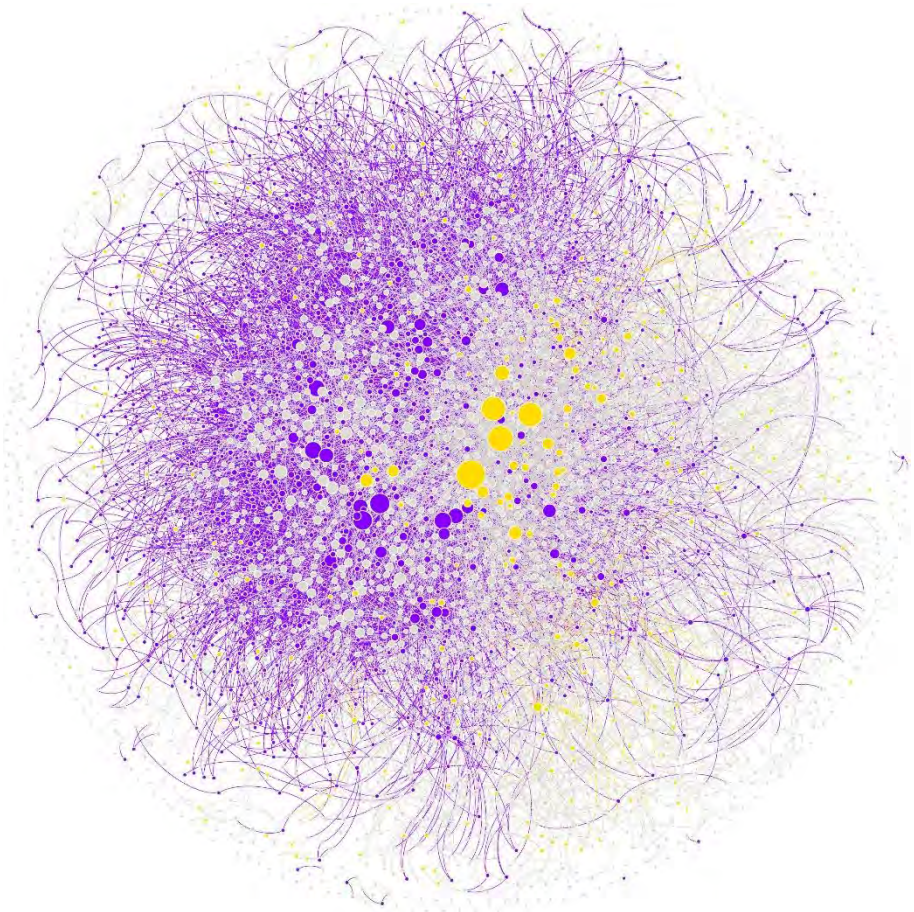
Universities

Tokyo Ecosystem is dominated by traditional institutions that do not cater to start-up needs

Sources: Dataset #1

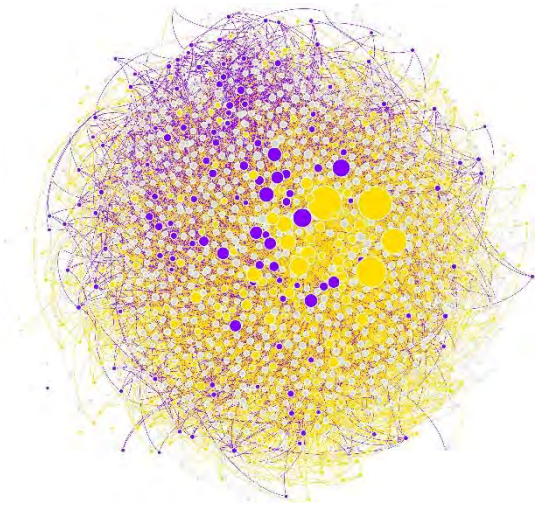
New York

70% 30%



Tokyo

24% 76%



Specialized

Non-specialized

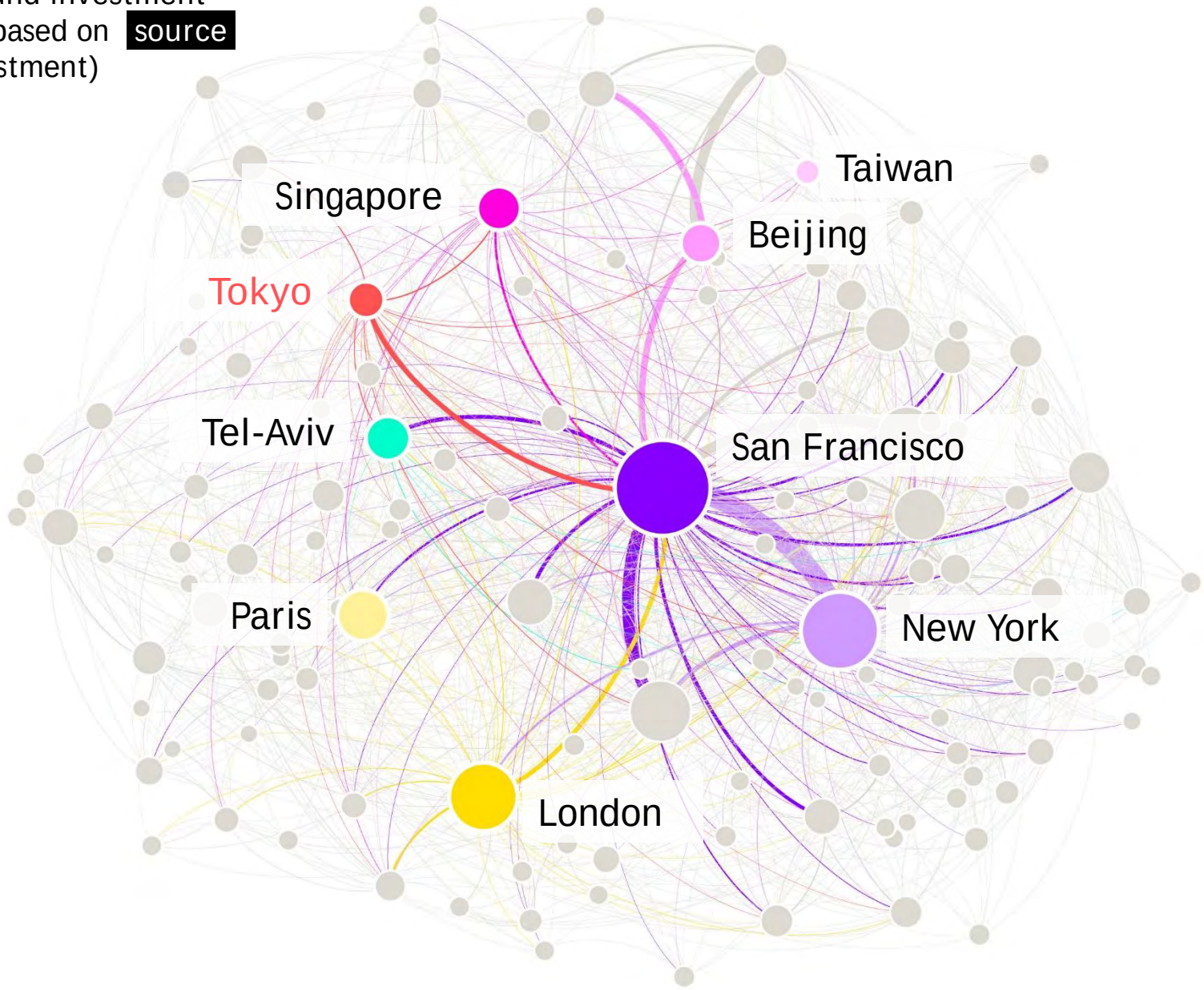
Start-ups

The start-up “growth-driven” specialized ecosystem in Tokyo is small and has little influence

Tokyo presents the reverse image of New York and other leading global start-up ecosystems

Sources: Dataset #1

Outbound investment
(color based on source
of investment)

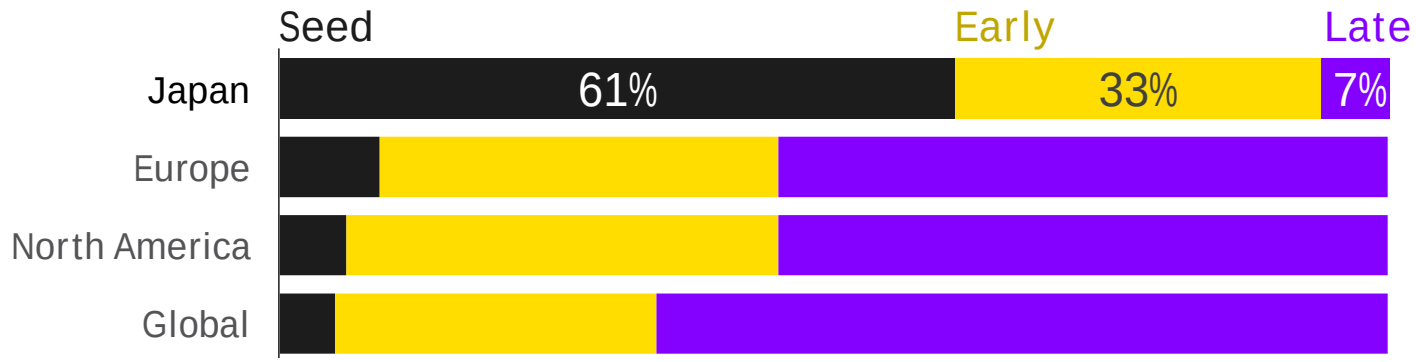


The ecosystem is predominantly domestic;
it has very little international connectivity

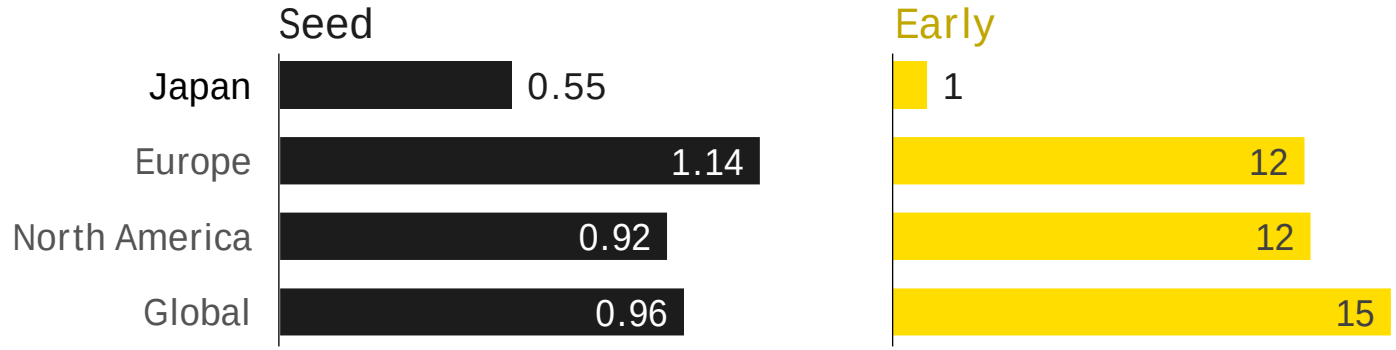
Tokyo only relevant link is with San Francisco for accessing innovation through investment

Sources: Dataset #2, last updated in 2019.

Distribution of VC Investment Stages



Average Deal Size per Investment Stage Category, US$ Millions

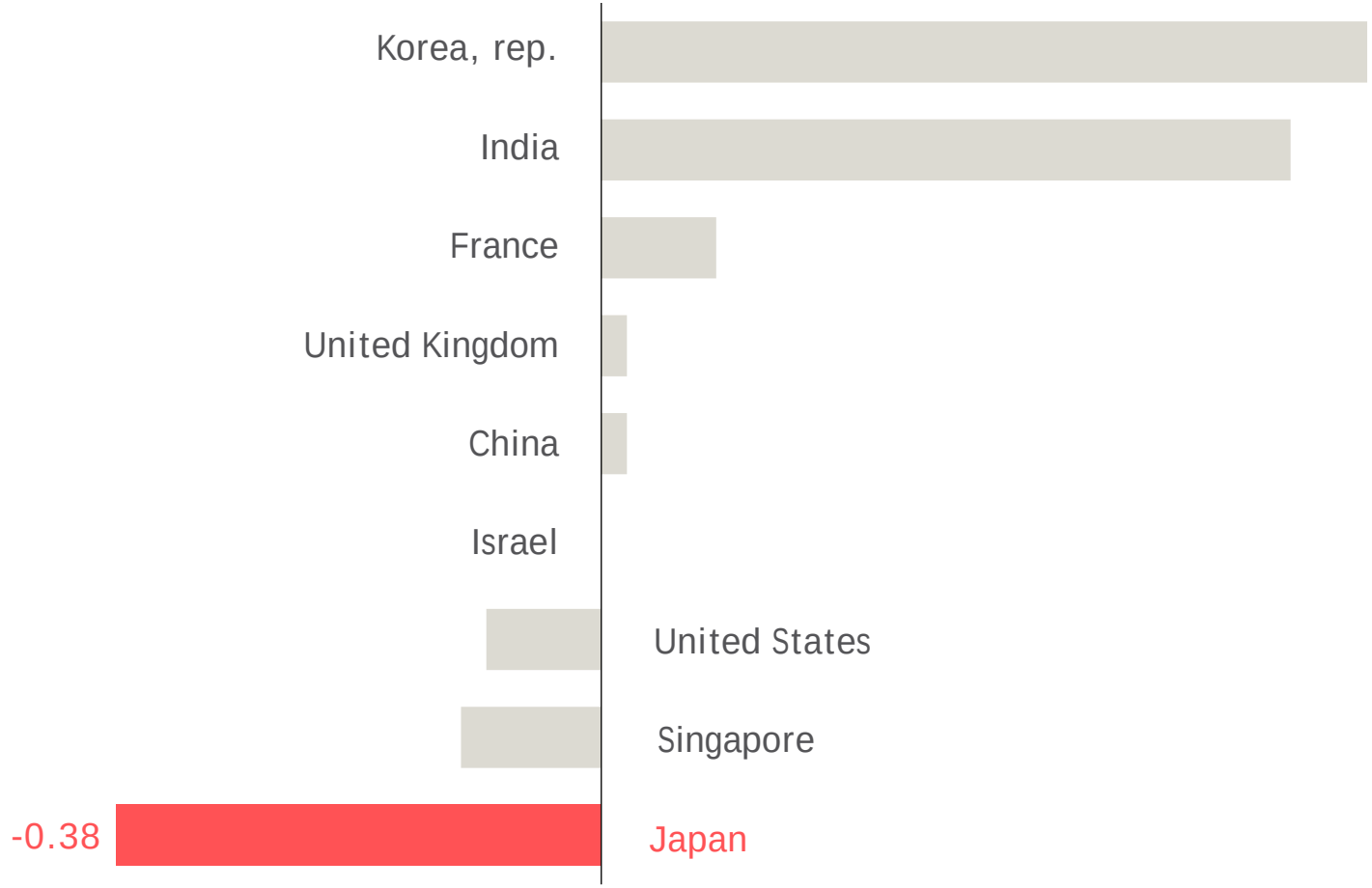


Investment

Growth-oriented capital is limited (bellow 25% of start-up investment), and disproportionally deployed in small stages and ticket sizes

Sources: For Europe and global—CBInsights, 2020; for North America—CBInsights, 2019; for Japan—Venture Enterprise Center (VEC), 2020

Investment Balance Gap (received vs provided) in Unicorns

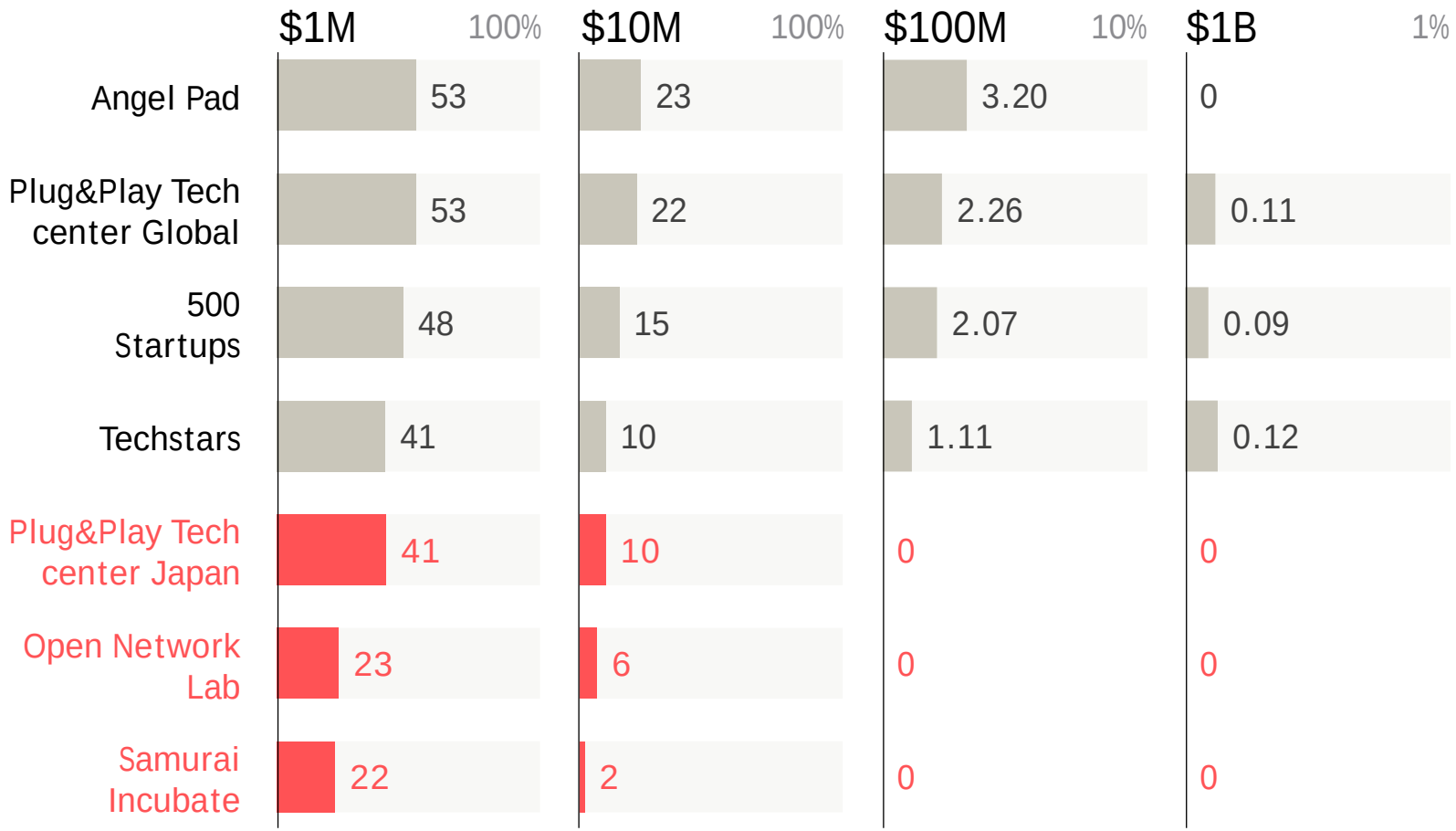


Investment

Beyond supply problems; the pipeline of start-ups is also not satisfying the needs of Japanese investors and corporations

Sources: CBInsights, 2021, February data; author's analysis.

Percentage of start-ups having raised funding over…

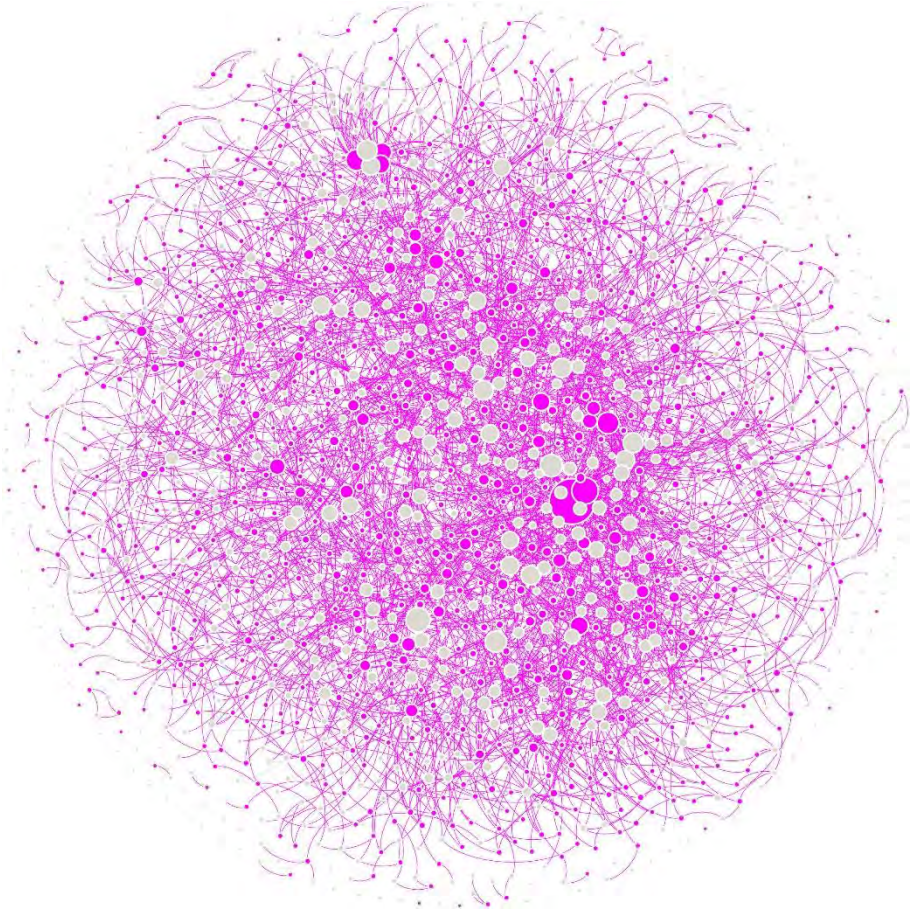


Support Infra.

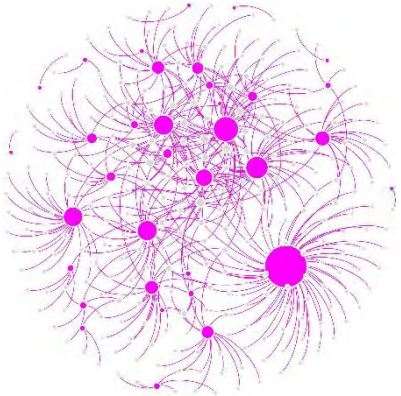
There are no mature scale-up accelerators that can help start-ups to grow at global scale

Sources: Accelerator websites: 500 startups; Techstars; AngelPad; Plug and Play Tech Center Global; Plug and Play Tech Center Japan; Samurai incubate; Open Network Lab; Pitchbook database; and Tracxn database, Dataset #3.

New York



Tokyo



Angel investor

Start-ups

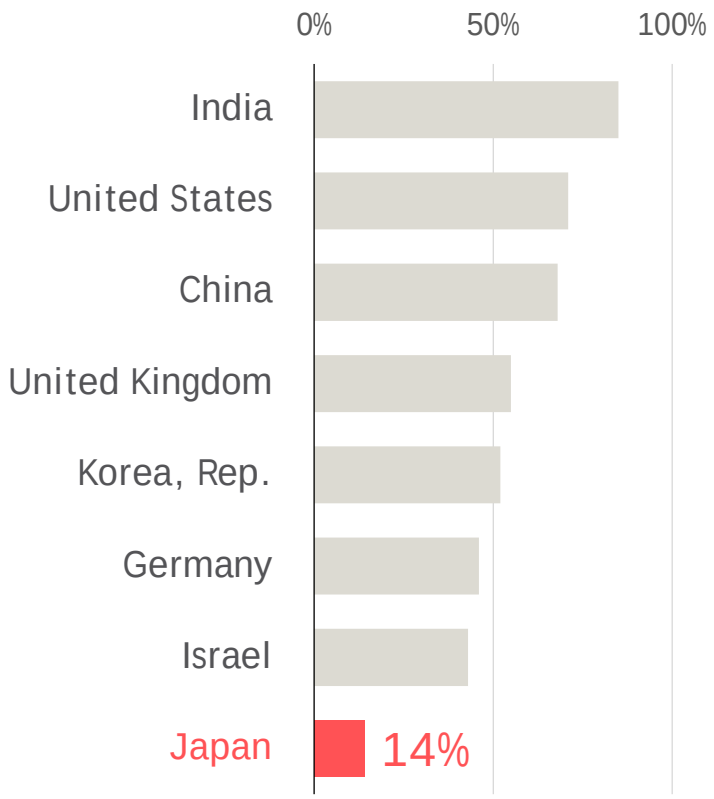
Support Infra.

Compared to global ecosystems like New York's, Tokyo lacks a population of domestic mentors and angels

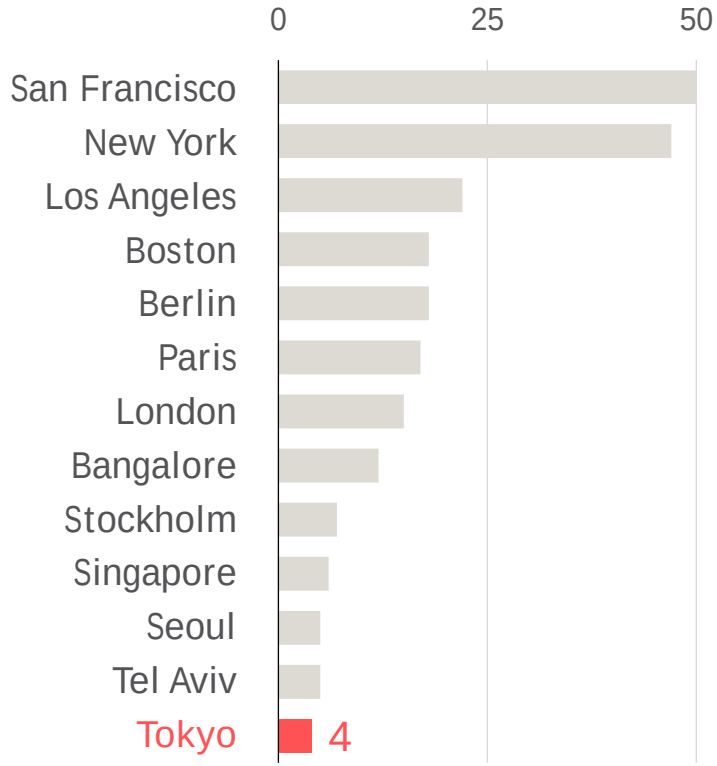
Sources: Dataset #1

GEM SURVEY—

Adults with the Knowledge, Skill, and Experience for Starting Businesses



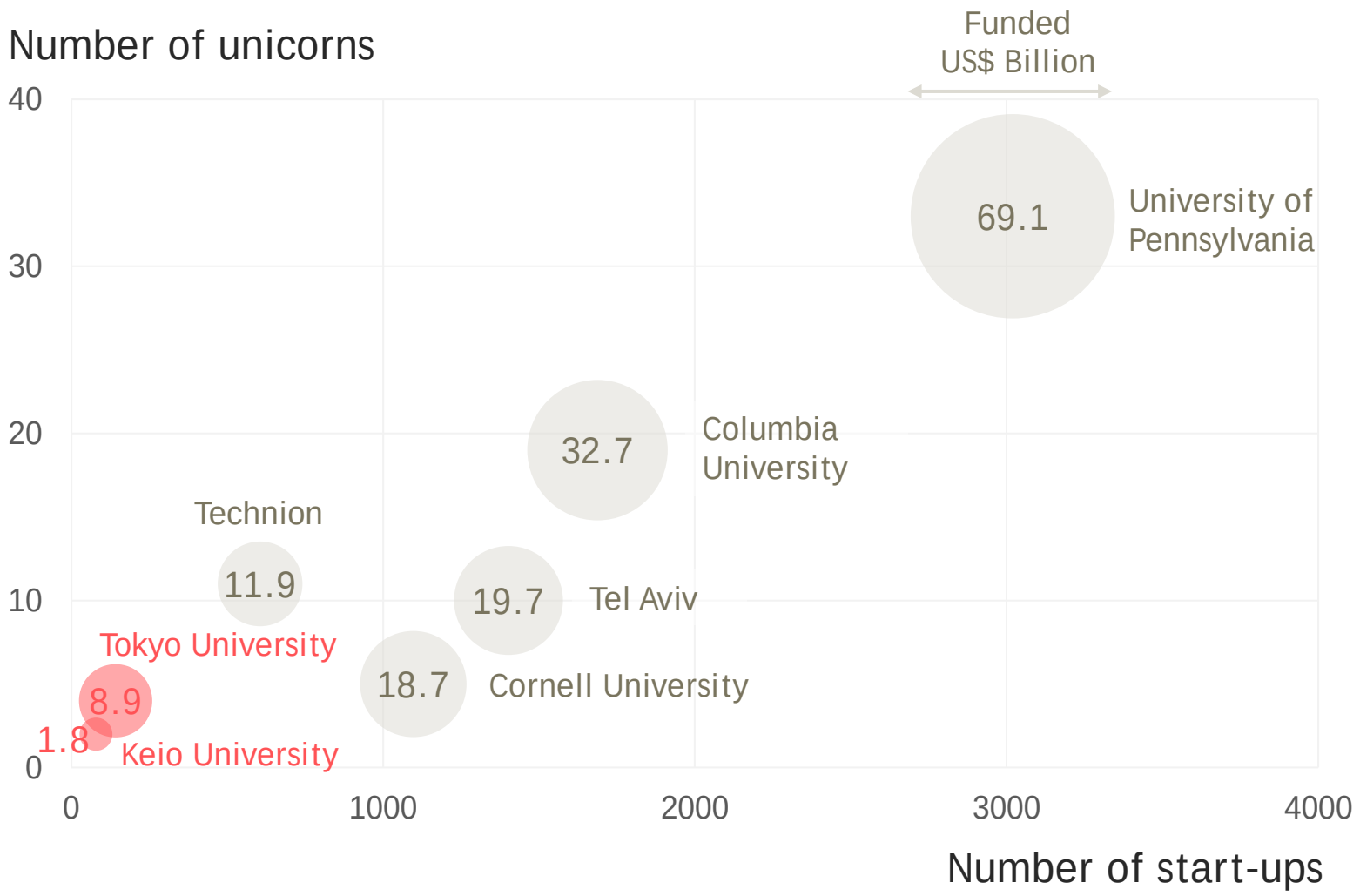
Coding Boot Camps across Global Ecosystems



Skills and Talent

Japan's Universities provide limited entrepreneurship education and there is not rapid training offering for non-university population

Sources: Course Report
Bosma and Kelly 2019.
Note: GEM = Global Entrepreneurship Monitor.

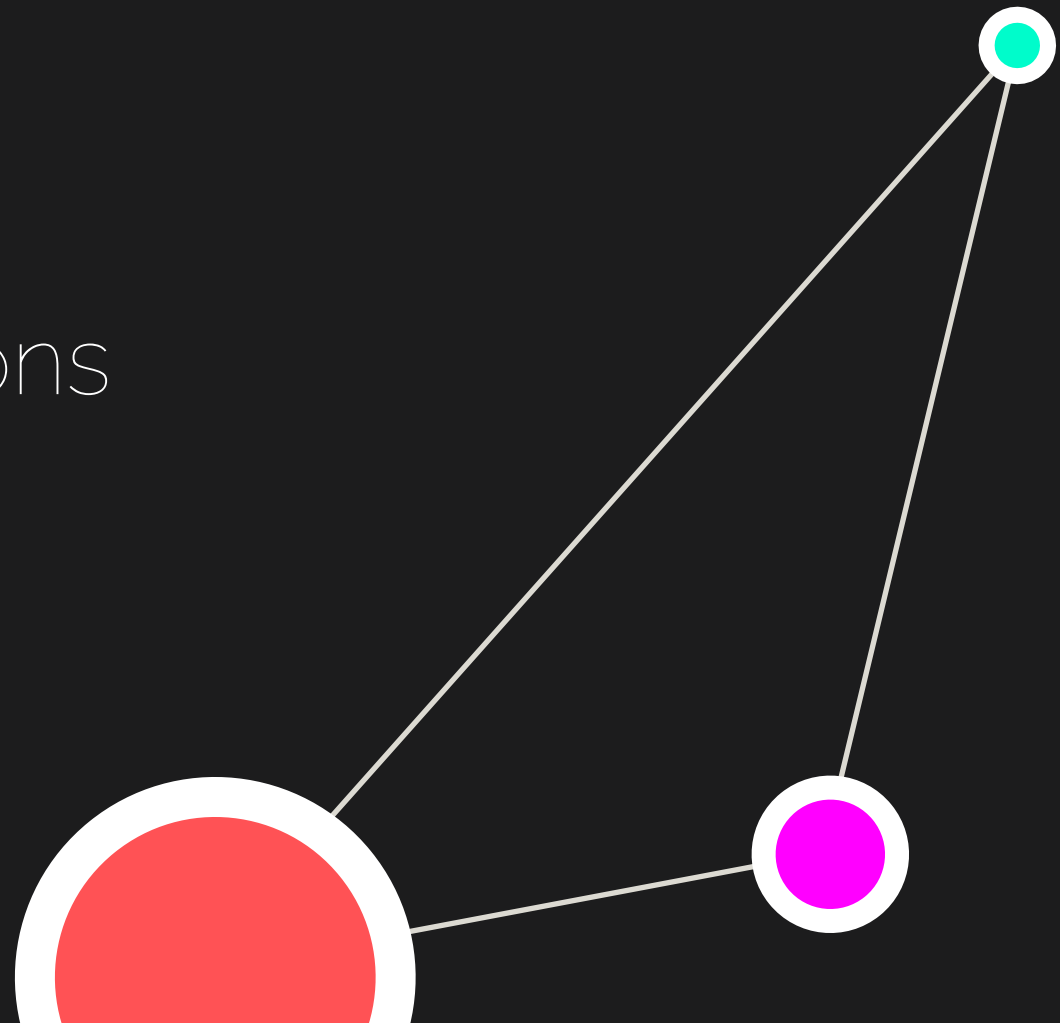


Skills and Talent

When compared to leading universities from around the world, Japan's top universities lad behind in terms of startup and unicorn production, as well as startup funding

Sources: Tracxn database for U.S. universities (June-July 2021); Crunchbase database for Japanese universities (May 2021).
Note: University of Pennsylvania and Columbia University combine data from undergraduate programs and their business schools.

2 Key Gaps and Recommendations



Recommendations

- Investment
- Support Infrastructure
- Skills and Talent

	1	2	3
GAPS	OVERALL SMALL VC SIZE	LIMITED INT'L FUNDS AND GLOBAL GROWTH EXPERIENCE	SCALE-UP
Action	Catalyze and attract new funds at every stage, with focus on mid-late stage	**Attract int'l funds** and talent	Catalyze scale-up funds **(domestic and int'l) and** increase the quality of investable pipeline
Policy	Co-invest (directly, fund of funds)* and catalyze new funding	Market regulation and transparency Tax incentives for talent acquisition Incentives through co-investment	Co-invest*, catalyze new funding Set up goals and partnership with Japanese scale-up funds
Example	Israel (Yozma and Heznek) fund co-investment programs* Germany co-investment growth facility*, French seed Tech (seed co-investment*),UK Future Fund	US SEC and EC guidelines Singapore VC tax incentives UK and Germany's VC investment tax relief programs Korea fund of funds and foreign VC investment fund	Pan-European Investment Fund France late-stage VC co-investment funding*, UK Future Fund

Note: Policy examples are illustrative

Note*: Co-investment between government and private investors

Recommendations

- Investment
- Support Infrastructure
- Skills and Talent

GAPS	1 OVERALL SMALL VC SIZE	2 LIMITED INT'L FUNDS AND GLOBAL GROWTH EXPERIENCE	3 SCALE-UP
Potential 3yr target	Increase VC investment by x 4 (US$ 16 billion)	Increase presence of international VC investment (inbound) to 25% of startup funding (US$ 4 billion) and make investment balance positive (-38% -> +) **Create int'l** effective VC guidelines	Increase late scale-up funding to 40% (US$ 6.5 billion); Create 140 unicorns and 2,800 start-ups > US$ 100M
Policy in practice	Public co-investment fund* of US$ 5 Billion (fund of funds and co-investment)	EC guidelines and rules for VC transparency; VC investment tax relief; Set US$ 1 Billion of co-investment* for attraction of international VCs	Set US$ 2 Billion for scale-up funding; Redirect public funds (e.g., INCJ) towards scale; Modify incentives for early IPO

Note: Targets are illustrative of potential of ecosystem; policy in practice are examples of applied policies to achieve potential target.

Note*: Co-investment between government and private investors

Recommendations

Investment

Support Infrastructure

Skills and Talent

	1	2	3
GAPS	SMALL SIZE AND LACK OF GLOBAL ACCELERATORS	LIMITED NUMBER OF DOMESTIC MENTORS AND EXPERIENCED START-UP SCALE-UP TALENT	CORPORATE AND PUBLIC PROGRAMS ARE NOT GROWTH-ORIENTED
Action	Co-investment* of international accelerators and build deep-tech vertical programs (domestic and scale-up)	**Attract int'l mentors and** start-up talent through hands-on co-creation programs to develop local talent capabilities	Catalyze corporate and public startup growth-oriented programs
Policy	Co-invest*, catalyze new funding and presence of int'l accelerators Catalyze domestic deep tech accelerators with partnership guidance	Attraction of talent through hands-on co-creation programs to develop local talent capabilities Tax incentives and promotion of international mentors' programs	Direct and facilitate accelerators partnership with corporate and public S&T programs Public procurement catalyzation of new startup markets Deep tech public-PPP challenges and regulatory sandboxes
Example	Israel, Finland, France, Korea subsidies and co-funding of accelerator programs France vertical deep tech accelerator program	UK Global Entrepreneurship Program (GEP) Korea K start-up Grand Challenge, France Concours i-Lab France early-stage tax exemptions, UK Angel co-investment fund, Korea secondary market for angels	Israel and Massachusetts provision of finding to MNC to build innovation hubs NASA catalyzation of space transportation market COVID warp speed, DARPA challenges Korea regulatory sandboxes

Note*: Co-investment between government and private investors

Note: Policy examples are illustrative

Recommendations

- Investment
- **Support Infrastructure**
- Skills and Talent

	1	2	3
GAPS	SMALL SIZE AND LACK OF GLOBAL ACCELERATORS	LIMITED NUMBER OF DOMESTIC MENTORS AND EXPERIENCED START-UP SCALE-UP TALENT	CORPORATE AND PUBLIC PROGRAMS ARE NOT GROWTH-ORIENTED
Potential 3yr target	Permanent presence with funds of 5 global accelerator full-fledge programs	Increase angel investors (2% -> 10%) Attract 250 foreign startups for at least 1 yr. in Japan	Create 1 R&D start-up hub and 1 sandbox area per S&T cluster, **Set a "DARPA challenge"** program Increase public procurement for S&T key agencies (e.g., JAXA) to 20%
Policy in practice	Fund 5 accelerator programs for 2 yrs. for a 4 yr. presence and co-invest* in funds (set a seed fund of US$ 100M). Include requirement of deep-tech programs	Set 2 (Tokyo and Kansai hub) main challenge/foreign start-up residence program with Japanese startups; Set US$ 50M for angel co-investment fund*	Fund creation and operation of 5 R&D centers, Set 5 sandbox regulatory areas Create a "DARPA challenge" program Set targets of >20% for S&T agencies procurement with startups

Note: Targets are illustrative of potential of ecosystem; policy in practice are examples of applied policies to achieve potential target.

Note*: Co-investment between government and private investors

Recommendations

Investment

Support Infrastructure

Skills and Talent

	1	2	3
GAPS	LACK OF PRACTICAL ENTREPRENEURSHIP PROGRAMS	LIMITED R&D COMMERCIALIZATION IMPACT	LIMITED INFORMAL EDUCATION AND TALENT CONVERSION FROM CORPORATES
Action	Create practical education ecosystem programs in all university campuses	Expand programs reach and partner with accelerators (vertical deep tech)	Attract and build domestic **and int'l informal** educational programs and incentives to enable talent mobility
Policy	Catalyze comprehensive programs of ecosystem development through partnership funding incentives Create new campus project to develop new practical entrepreneurship education	Market regulation and Increase funding and program size and reach Expand partnerships with corporate and public R&D	Grants and investment, direct partnership Tax incentives and benefits platform mobility for entrepreneurship conversion
Example	Berkeley, MIT, Sweden Stockholm School of Entrepreneurship (SSES) university ecosystem of support programs Korea university-entrepreneurship center, specialized incubator universities program and AI schools	Chicago mHUB, Massachusetts Life Science Center; Israeli Life Science Funds Korea in-house venture development and Leading Universities for Startups	UK apprenticeship and practical education programs Finland startup grants

Note: Policy examples are illustrative; deep-tech verticals may include Artificial Intelligence (AI), quantum computing, regenerative medicine, autonomous driving, blockchain, cybersecurity, virtual reality, lithium-ion batteries, drones and conductive polymers.

Recommendations

Investment

Support Infrastructure

Skills and Talent

	1	2	3
GAPS	LACK OF PRACTICAL ENTREPRENEURSHIP PROGRAMS	LIMITED R&D COMMERCIALIZATION IMPACT	LIMITED INFORMAL EDUCATION AND TALENT CONVERSION FROM CORPORATES
Potential 3yr target	Create a university ecosystem support program (e.g., Berkeley, MIT) in top 5 univs. and curricular classes available for all students Establish a new deep-tech practical entrepreneurship university program	Create deep tech accelerators programs and VC co-investment funds* for top 10 verticals Establish a corporate-public-**startup** "mHUB" per startup hub	Attract 1 large-scale (300 students/yr.) bootcamp and 1 **int'l accelerator** per start-up cluster; Create 250 new start-ups from corporate employees
Policy in practice	Fund creation of ecosystem programs in partnership with int'l universities Create a new university program deep tech-practical education (e.g., Florida- Softbank)	Fund creation of mHUB platforms in top 5 clusters Fund creation of 10 deep tech vertical accelerator programs with specialized accelerator (2 yr. funding for 3 yr. program)	Fund establishment and 1 yr. operation of 5 practical bootcamps entrepreneurship training; Provide subsidies and grants for creation of 250 new startups from corporate mid-career employees;

Note: Targets are illustrative of potential of ecosystem; policy in practice are examples of applied policies to achieve potential target. Deep-tech verticals may include Artificial Intelligence (AI), quantum computing, regenerative medicine, autonomous driving, blockchain, cybersecurity, virtual reality, lithium-ion batteries, drones and conductive polymers.

Note*: Co-investment between government and private investors

Policy in Focus #1

Universities to extend hands-on simulation-based entrepreneurship education available for all its students

Illustrative examples of activities and comprehensive university programs

- Entrepreneurship curricular courses available for all students
- Business plans competitions and hackathons,
- Camps and Pitch competitions,
- Acceleration and incubation
- Invention
- Mentors, angels and fellows
- R&D commercialization support
- Grants, seed and VC support investment
- Alumni and post-doc VC funds

EXAMPLE IN FOCUS

Start-up Practical Education Ecosystem

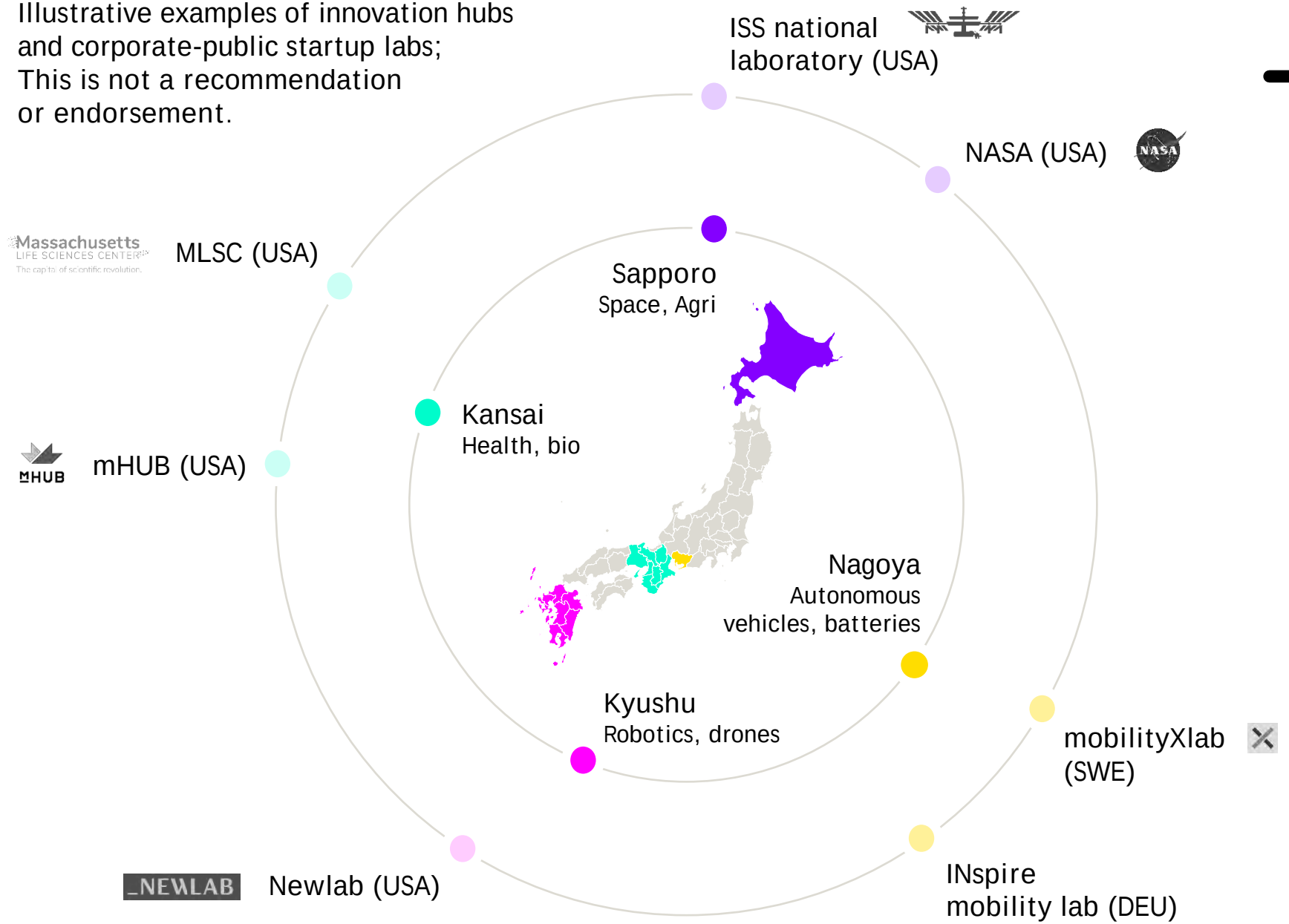
1. Startup Support: post-doc entrepreneurship, free ventures, Xaccelerator, Berkeley startup cluster, SkyDeck.

   SkyDeck ->accelerator, incubator, mentoring, global innovation program and investment fund

2. New product R&D support: invention lab, fellows, Innovate Berkeley, theme programs
3. Investor funds: Grants, Seed fund, Alumni fund, Research fund, SkyDeck fund, angel network
4. University ecosystem: academic programs, product/market fit support, legal, recruiting and intellectual property support

Source: Berkeley University.

Illustrative examples of innovation hubs and corporate-public startup labs; This is not a recommendation or endorsement.



Policy in Focus #2

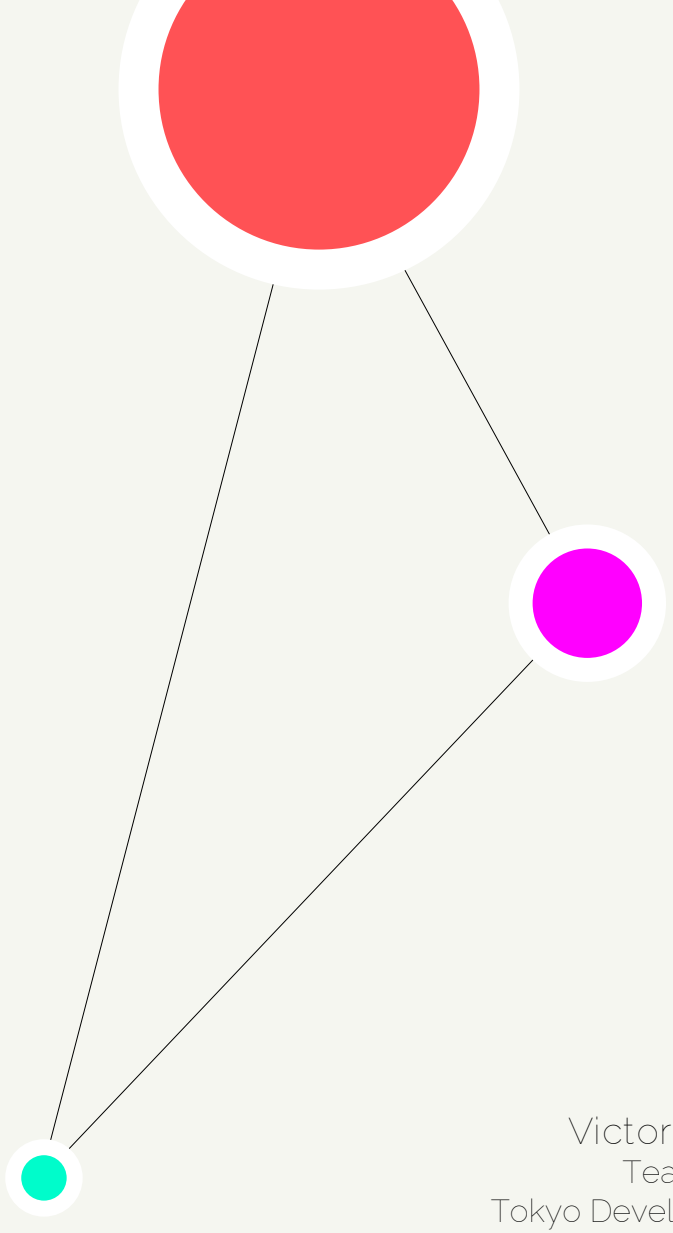
Expand Beyond Tokyo to diversify and Grow Japan's deep-tech start-up ecosystem leveraging S&T Cluster Potential

Boosting Japan's Startup Ecosystem

The great potential for Japanese innovation rebound

Tokyo Development Learning Center

WORLD BANK GROUP



Victor Mulas
Team Lead
Tokyo Development Learning Center

Technical Notes

Slides 12, 13, 14 and 19:

Dots represent ecosystem stakeholders. Lines represent connections between stakeholders and start-ups based on stakeholder role (e.g., investor connection is an investment, accelerator connection is participation in the acceleration, school connection is education of start-up founder in such school).

Slide 15

Data here are artificial intelligence, robotics, space technology, and quantum computer. Only the frontier use of those technologies is included. The use of technologies that is accessory (e.g., a noncore use of the technology for the business model) is not included. Startups and investors are clustered by location of origin. The dots represent these clusters. The size of the dots is proportionate to the number of startups and investors in each cluster. The larger the size of a cluster the larger the number of start-ups (receiving investment) and investors (making investments) a cluster has.

Slide 16

For benchmarking purposes, stages have been unified to the international standard followed by CBInsights: seed stage for deals below US$3M; early stage for deals between US$3 million and US$5 million and late stage for deals above US$5 million, INITIAL data are based on funding received by start-ups per investment series, which have been adapted to follow the CBInsights value criteria. For Japan ticket size atge, VEC classifications may differ as the value of each state referred to is not disclosed. Instead, VEC methodology refers to the stage of the company, which may not correspond with CBInsights' classification, especially for early and late stages. For benchmarking purposes, VEC classifications of early stage and expanding stage have been merged into early stage.

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