PwC Strategy

Singapore's tech-enabled start-up ecosystem

April 2015

Commissioned by Google Asia Pacific Pte Ltd

pwc

About this study

Objective of this Study

"To identify the key challenges of accelerating and supporting the growth of technology-enabled start-ups in Singapore and why this matters"

Definitions

Start-up: A young company that is designed for high growth

Technology-enabled: An enabling technology is an invention or innovation that upon application can bring significant transformation in what a user is able to do

Methodology

The purpose of this report is to represent the views of the ecosystem, and is not necessarily a representation of the view of PwC.

Primary research has been conducted by means of face-to-face interviews with many ecosystem stakeholders, with a focus on entrepreneurs who founded tech-enabled start-ups.

The secondary research used for this report comprised of global third party sources (e.g. Global Entrepreneurship Monitor) and Singapore-specific sources (e.g. INSEAD's "High Tech SMEs in Singapore" Report).

All currencies in this report represent US$ unless specified otherwise

This report should be read in conjunction with the output from the 'Start-up Singapore' event in December 2014, which turns this into actions and recommendations
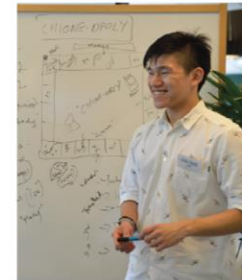
Contents

At a glance

At a glance – our views

- Singapore has yet to produce a world-beating tech start-up. The good news is that with the $200m acquisition of Viki and market participants talking about Garena's >$2.5bn valuation, Singapore has demonstrated it is a home base from where large valuations and even the magic milestone of a $1bn valuation can be reached

- Exits and valuations like these show there are opportunities for tech-enabled start-ups in Singapore, which we verified with our survey of the Singapore tech-enabled start-up ecosystem

- Based on our modelling, we forecast the economic contribution of tech-enabled start-ups to potentially contribute up to 2% of GDP by 2035, meaning it will contribute as much as, for instance, the accommodation and food services sector contributes to Singapore's GDP today

- This report presents the views and suggestions of ecosystem stakeholders, brought forward in our study of the tech-enabled start-up ecosystem in Singapore

- The tech-enabled start-up ecosystem in Singapore is starting from a fairly good base... but more can be done

Source: PwC Market intelligence

At a glance – summary of the views and suggestions from the ecosystem

Key takeaways from stakeholder interviews and analysis

Stakeholder-suggested further actions

Culture & mindset
Singaporeans are increasingly entrepreneurial. More could be done to celebrate success of home-grown start-ups

- Increase media coverage and communication on successful entrepreneurs and start-ups
- Encourage early exposure to entrepreneurship courses
- Promote the benefit of equity over short-term salary

Skills
Nurturing talent is critical for the next stage of growth of start-ups in Singapore

- Undertake initiatives to develop the right skill sets available for Singapore, especially for scaling up businesses

Funding
VC activity in Singapore has increased rapidly over the years but there is a need for more growth-stage capital

- Provide the business case for the availability of growth-stage funding
- Work to increase maturity level of local exit and/or IPO market

Market environment
Singapore has the potential to serve as hub for Southeast Asia but its cost base is high and overseas expansion is challenging

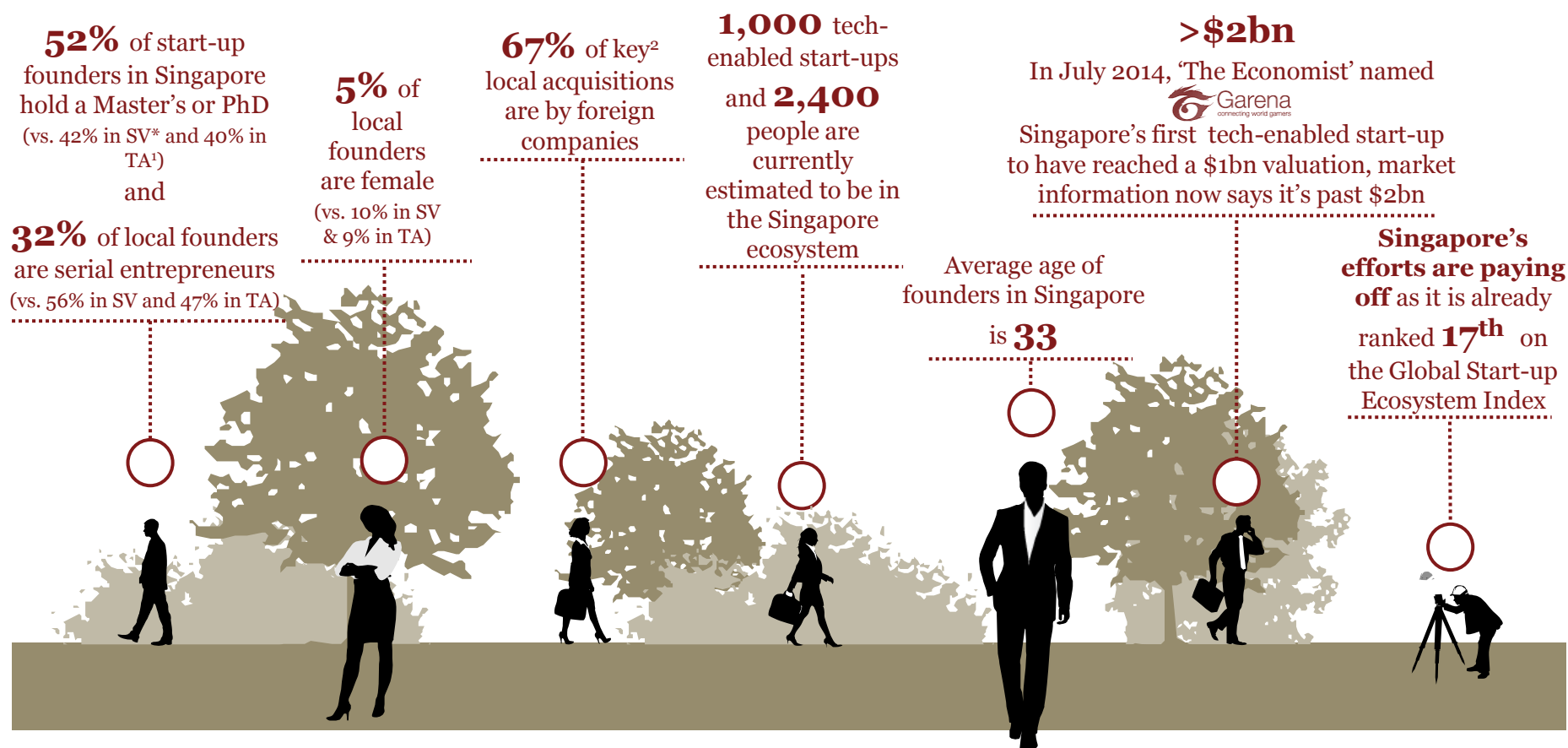- Continue to strengthen support network for local tech-enabled start-ups (e.g. for prototyping, accessing low cost offshore labour, mentoring)

Government & regulation
A range of public policies and funding support have been helpful for start-up creation

- Adjust public sector procurement practices to build confidence for start-ups to win business

Source: PwC interviews and analysis

Introducing the ecosystem

At a glance - Singapore's tech-enabled start-up ecosystem in numbers

52% of start-up founders in Singapore hold a Master's or PhD (vs. 42% in SV* and 40% in TA[1]) and

32% of local founders are serial entrepreneurs (vs. 56% in SV and 47% in TA)

5% of local founders are female (vs. 10% in SV & 9% in TA)

67% of key[2] local acquisitions are by foreign companies

1,000 tech-enabled start-ups and **2,400** people are currently estimated to be in the Singapore ecosystem

>$2bn
In July 2014, 'The Economist' named Garena *connecting world gamers* Singapore's first tech-enabled start-up to have reached a $1bn valuation, market information now says it's past $2bn

Average age of founders in Singapore is **33**

Singapore's efforts are paying off as it is already ranked **17th** on the Global Start-up Ecosystem Index

Note: [1]SV and TA are abbreviations of Silicon Valley and Tel Aviv.
[2]Based on a non-exhaustive database of 'key' start-up acquisitions in Singapore, based on news articles and press releases on the relevant acquisitions
Source: Start-up Ecosystem Report 2012, Start-up Genome and PwC analysis

Singapore's tech-enabled start-up ecosystem is complicated...

Government & government initiatives
e.g. IDA, MOM, ESVF, NRF TIS
Set the preconditions for tech-enabled start-ups, from favourable start-up policies to labour conditions to a favourable tax-environment and grants to start-ups. There are more than seven government bodies supporting start-up accommodation and acceleration

Labour Market
Supply a strong labour force needed by entrepreneurs and their tech-enabled start-ups to build their vision and grow strong companies. With <2% unemployment, labour availability is very tight
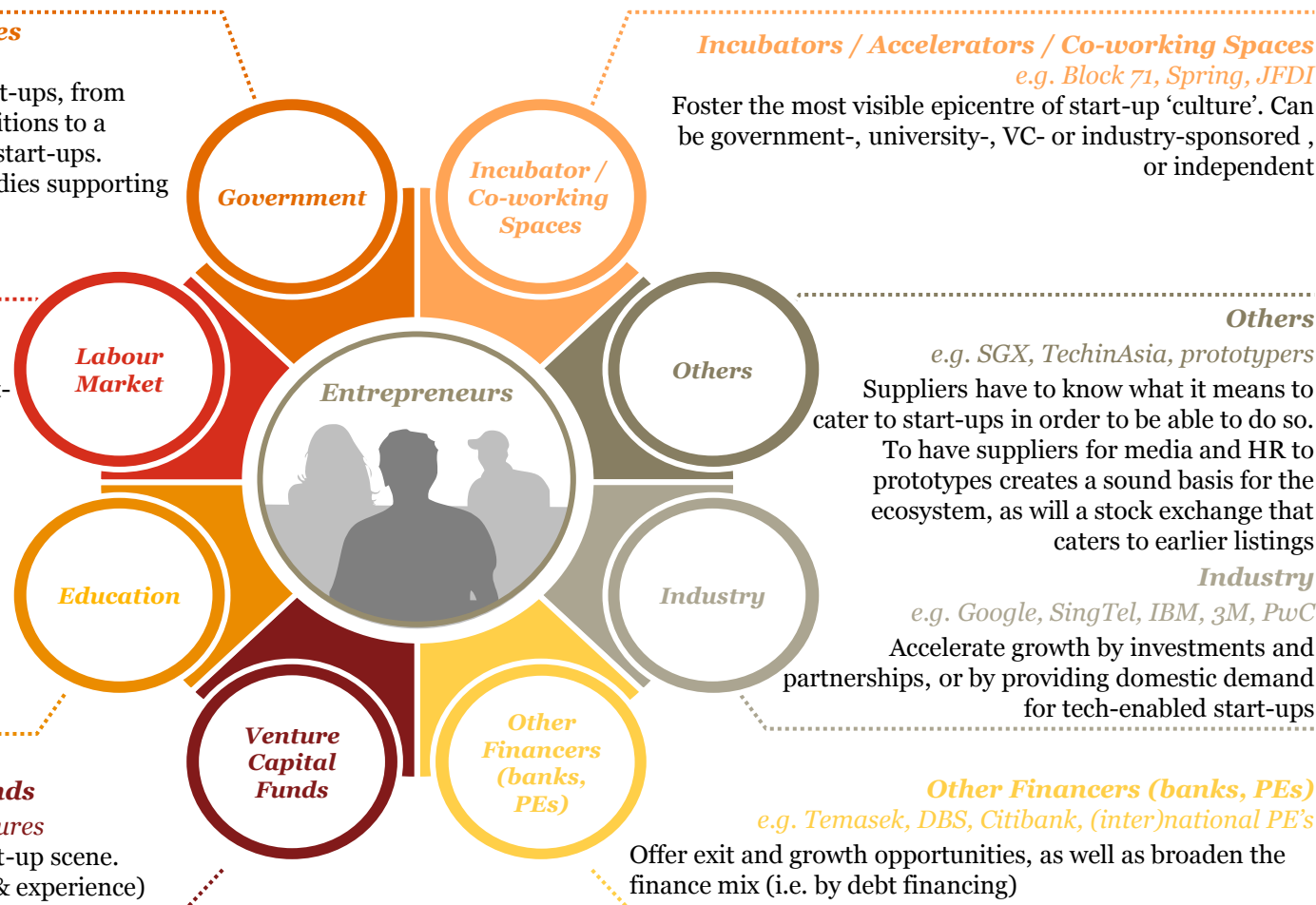
Education
e.g. MoE, SP, NUS Overseas, SMU's Inst. of Innovation & Entrepreneurship
Engage students at an early stage with more entrepreneurship courses, to supply and grow the future pool of founders
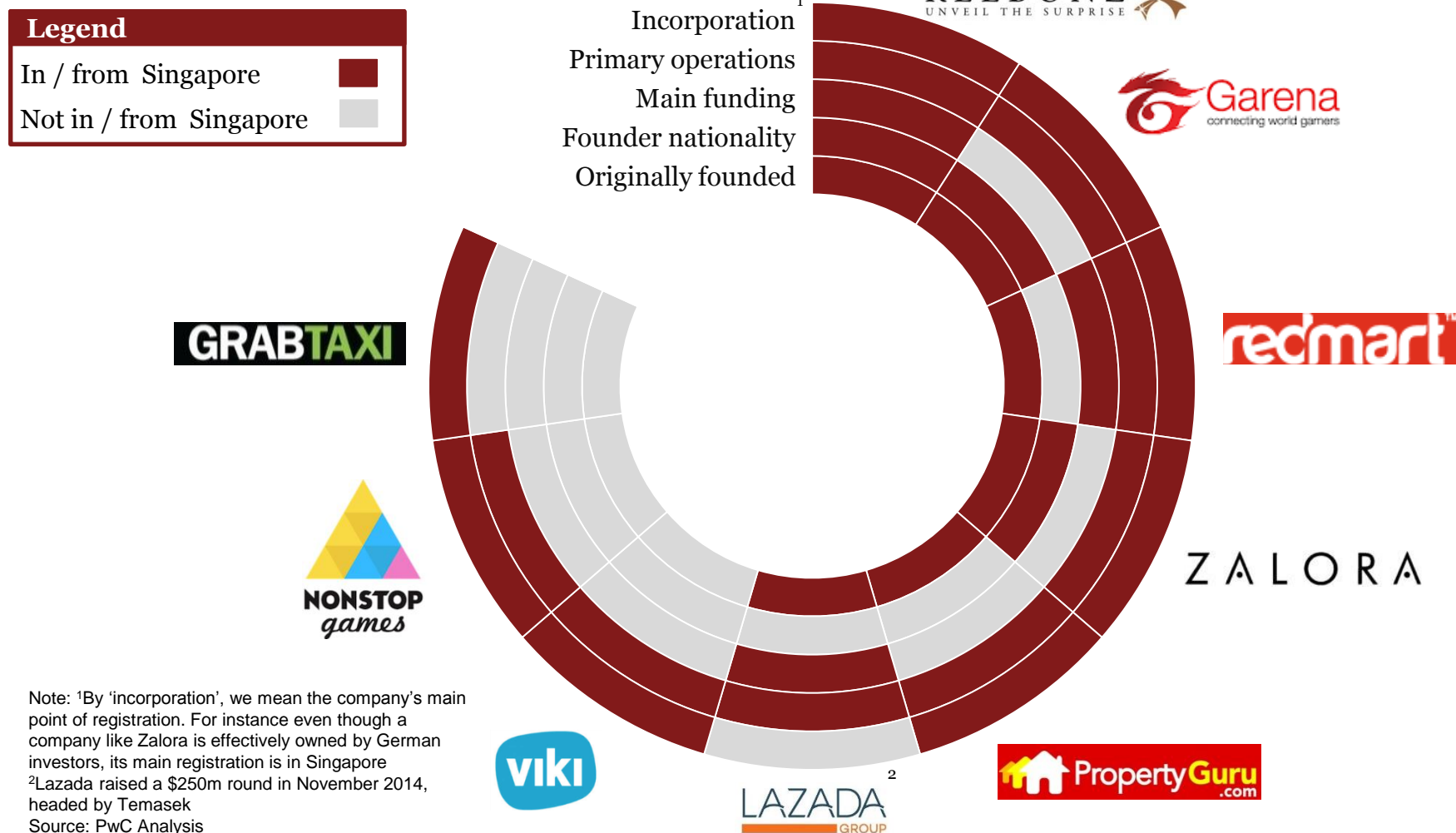
(Inter)National Venture Capital Funds
e.g. Red Dot -, Jungle -, Golden Gate Ventures
Provide the lifeblood for a sustainable start-up scene. Mature funds provide smart money (cash & experience)

Incubators / Accelerators / Co-working Spaces
e.g. Block 71, Spring, JFDI
Foster the most visible epicentre of start-up 'culture'. Can be government-, university-, VC- or industry-sponsored , or independent

Others
e.g. SGX, TechinAsia, prototypers
Suppliers have to know what it means to cater to start-ups in order to be able to do so. To have suppliers for media and HR to prototypes creates a sound basis for the ecosystem, as will a stock exchange that caters to earlier listings

Industry
e.g. Google, SingTel, IBM, 3M, PwC
Accelerate growth by investments and partnerships, or by providing domestic demand for tech-enabled start-ups

Other Financers (banks, PEs)
e.g. Temasek, DBS, Citibank, (inter)national PE's
Offer exit and growth opportunities, as well as broaden the finance mix (i.e. by debt financing)

Circles: Government | Incubator / Co-working Spaces | Others | Industry | Other Financers (banks, PEs) | Venture Capital Funds | Education | Labour Market | Entrepreneurs

Singapore is just one city operating as part of a broader _regional_ Southeast Asian ecosystem

... and the definition of what represents a "Singaporean" business is multi-faceted

Legend

In / from Singapore	▉
Not in / from Singapore	▢

Incorporation [1]
Primary operations
Main funding
Founder nationality
Originally founded

Note: [1]By 'incorporation', we mean the company's main point of registration. For instance even though a company like Zalora is effectively owned by German investors, its main registration is in Singapore
[2]Lazada raised a $250m round in November 2014, headed by Temasek
Source: PwC Analysis

Though parts of this ecosystem may still be considered nascent, Singapore is already ranked among the top 20 start-up ecosystems globally...

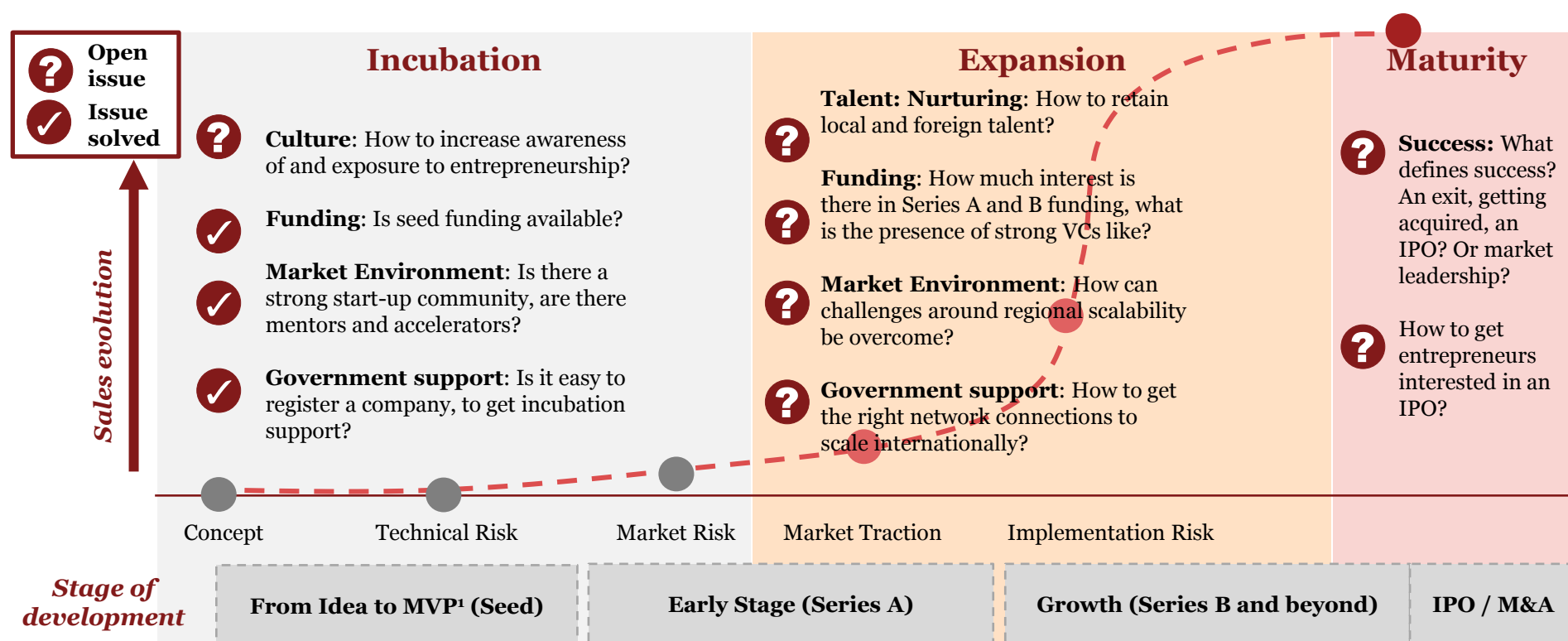## The Global Start-up Ecosystem Index

Ecosystem	Ranking	Startup Output Index	Funding Index	Performance Index	Talent Index	Support Index	Mindset Index	Trendsetter Index	Differentiation from SV Index
Silicon Valley	1	1	1	1	1	1	1	1	1
Tel Aviv	2	2	1	12	5	5	9	17	18
Los Angeles	3	4	6	2	3	13	11	4	11
Seattle	4	19	7	6	2	4	6	11	14
New York City	5	3	4	8	12	9	8	7	8
Boston	6	10	1	7	7	8	7	5	20
London	7	7	5	10	9	2	3	14	17
Toronto	8	6	9	3	10	3	15	12	5
Vancouver	9	13	12	9	4	14	2	9	19
Chicago	10	8	15	5	14	7	13	18	9
Paris	11	14	13	4	17	6	12	15	6
Sydney	12	5	14	16	6	12	16	1	3
Sao Paulo	13	9	10	15	19	11	5	16	4
Moscow	14	16	19	18	11	10	14	8	2
Berlin	15	15	11	13	13	20	18	5	16
Waterloo	16	11	16	14	18	17	17	10	13
Singapore	17	18	8	19	8	16	20	19	12
Melbourne	18	12	17	20	15	18	19	3	15
Bangalore	19	17	18	17	18	15	10	20	10
Santiago	20	20	20	11	20	19	4	13	7

"While Silicon Valley took decades to cement its position as the world's top start-up ecosystem, Singapore by comparison begun its journey six years ago and has [already] cracked into the top 20. With key strengths in funding and talent, Singapore now ranks 17th."

- TechinAsia

Source: Start-up Genome, Start-up Ecosystem Report 2014

... although the focus for support historically has been primarily at the incubation stage, and less on expansion

? Open issue		
✓ Issue solved		

Incubation

? **Culture**: How to increase awareness of and exposure to entrepreneurship?

✓ **Funding**: Is seed funding available?

✓ **Market Environment**: Is there a strong start-up community, are there mentors and accelerators?

✓ **Government support**: Is it easy to register a company, to get incubation support?

Expansion

? **Talent: Nurturing**: How to retain local and foreign talent?

? **Funding**: How much interest is there in Series A and B funding, what is the presence of strong VCs like?

? **Market Environment**: How can challenges around regional scalability be overcome?

? **Government support**: How to get the right network connections to scale internationally?

Maturity

? **Success:** What defines success? An exit, getting acquired, an IPO? Or market leadership?

? How to get entrepreneurs interested in an IPO?

Sales evolution

Concept　　Technical Risk　　Market Risk　　Market Traction　　Implementation Risk

Stage of development

From Idea to MVP¹ (Seed)	Early Stage (Series A)	Growth (Series B and beyond)	IPO / M&A

> *To accelerate the development of the ecosystem, there may be a need to further support start-ups in their later growth stages, specifically with more mid-stage funding, a healthy talent pipeline and support in international expansion*

Note: ¹MVP = Minimum Viable Product, the product with the highest return on investment versus risk. The term is especially popular for first commercial products for tech-enabled start-ups
Source: PwC interviews and analysis

Economic contribution

2 Economic contribution

Contents │ At a glance │ Introducing the ecosystem │ **Economic contribution** │ Key drivers and challenges │ Appendices

There is very limited data available on the Singapore tech start-up ecosystem today

Other start-up ecosystems have better processes / tools for collecting data: Tel Aviv

- Tel Aviv's "Mapped In Israel" aims to keep tab of all the country's start-ups via crowdsourcing, and according to estimates covers 20% of all tech-enabled start-ups

- Currently, there are 1,265 start-ups from Isreal listed on AngelList[1], though estimates for the ecosystem are around 5,000 (estimated by Coca Cola and Orange Telecom incubators)

Tel Aviv's 'Mapped in Israel'
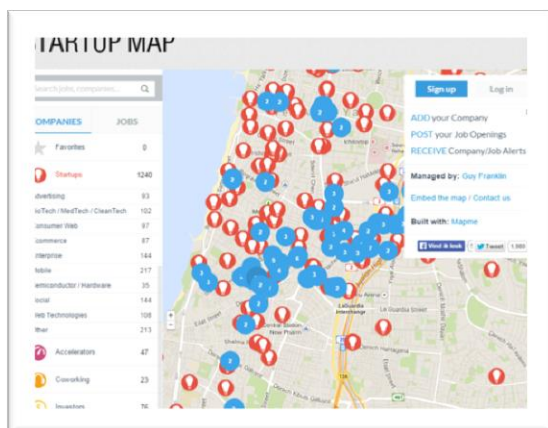
AngelList provides the closest estimate for the size of Singapore's start-up ecosystem

- There is no central source specifically gathering data on Singapore's tech-enabled start-ups ecosystem

- In January 2015, there were 741 Singaporean start-ups registered on AngelList, and 168 on Techlist.asia

- Company (formation) data aggregators like ACRA and SingStat have no separate information on tech-enabled start-ups, which requires making assumptions

- There is no academic research available past 2009

- The Global Entrepreneurship Monitor only researches Total Entrepreneurial Activity, not 'number of start-ups'

- Government agencies like IDA and ACE have no aggregated data

"Data on Singapore's start-up network is immature, it's simply too early, and if there is data, it is not clear – and there is no demand for it by regional VCs either."
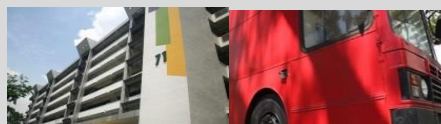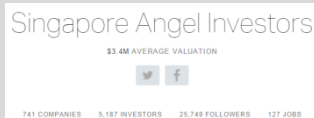
- Entrepreneur

Note: [1]AngelList (angel.co) is a US-based website for startups, angel investors, and job-seekers looking to work at startups
Source: AngelList, MappedinIsrael, Acra, SingStat, IDA, ACE, Spring, GEM 2013, PwC interviews and analysis

2 Economic contribution

Contents │ At a glance │ Introducing the ecosystem │ **Economic contribution** │ Key drivers and challenges │ Appendices

We estimate there to be circa 1,000 tech-enabled start-ups in Singapore today, as no one source provides a decisive number

Data sources

Aggregation of bottom-up data points

Circa 1,000 tech-enabled start-ups in Singapore today

Interviews with entrepreneurs and venture investors
Ballpark figures between 500 and 1,500

The number of Singaporean tech-enabled start-ups estimated "World Start-up Report" in early 2014: *800*

The number of Singaporean Start-ups currently on AngelList *~740*

The number of start-ups in Block71 (including graduates), the Hub and other incubators and co-working spaces: *~hundreds*

Tel Aviv Benchmark

- Ranges from 700 in Tel Aviv alone to 5,000 tech-enabled start-ups in Israel

- Assumption: *The Tel Aviv / Israeli ecosystem is ~5× the 'size' of Singapore's ecosystem*

Given the lack of existing data, we have made a number of assumptions to illustrate the potential impact of start-ups
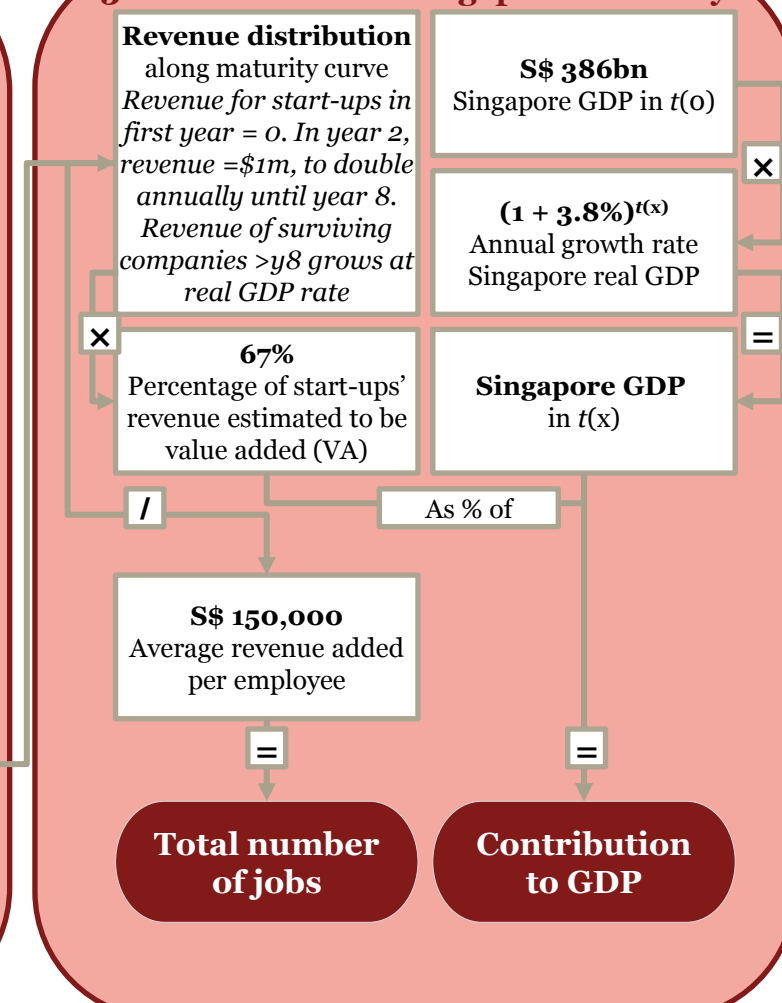
1: Pool of founders

19,350
Avg. # of IT & Engineering graduates per year

×

20 years
Lifespan over which graduate may become entrepreneur

×

25%
% Share of tech-enabled start-ups among all start-ups

×

$(1 + 0.8\%)^{t(x)}$
Annual growth rate of Singaporean population

=

Pool of potential founders
50,300 in $t(0)$

Source: PwC analysis. Underlying formulas may be found in the Appendix
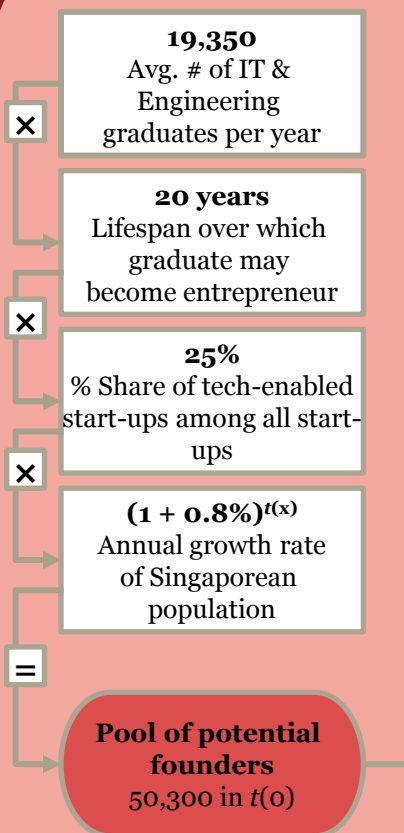
2: Number of (new) start-ups per year

×

2.5%
Conversion rate of potential founders to entrepreneurs

/

2
Average number of founders per start-up in Singapore

=

610
Number of newly founded start-ups in given year (610 = y1)

1,000
Estimated number of tech-enabled start-ups in Singapore in $t(0)$

Initial even distribution along **maturity curve**

Progression along start-up survival curve
Survival rate after first year= 100%
2y = 20% | 3y = 10% | 4y = 5% | 5y = 1%
After surviving first 5y, companies live on ∞

+

=

593
Number of companies that do not make it to the next year after $t(0)$

×

33%
Percentage of founders that become serial entrepreneurs

Total number of start-ups in $t(x)$

3: Contribution to Singapore economy

Revenue distribution
along maturity curve
Revenue for start-ups in first year = 0. In year 2, revenue =$1m, to double annually until year 8. Revenue of surviving companies >y8 grows at real GDP rate

×

67%
Percentage of start-ups' revenue estimated to be value added (VA)

/

S$ 386bn
Singapore GDP in $t(0)$

×

$(1 + 3.8\%)^{t(x)}$
Annual growth rate Singapore real GDP

=

Singapore GDP in $t(x)$

As % of

S$ 150,000
Average revenue added per employee

=

Total number of jobs

=

Contribution to GDP

Based on these assumptions, tech-enabled start-ups would contribute circa 2% to GDP by 2035, which is on par with the contribution of the tourism sector today

Projected economic contribution of tech-enabled start-ups[1]

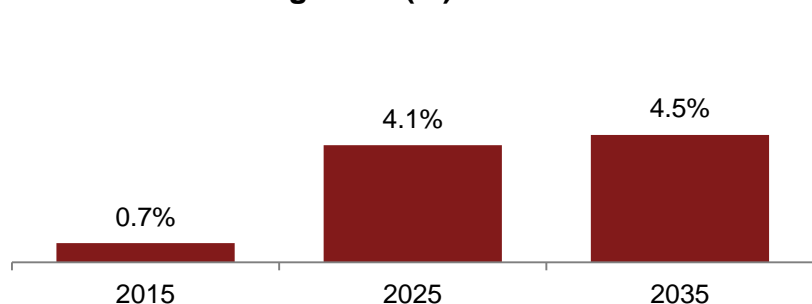**Tech-enabled start-ups' direct contribution to GDP (%)**

Estimated S$ 16bn in value add (wages + profit)

- 2015: 0.1%
- 2025: 0.9%
- 2035: 2.0%

Contribution to GDP growth (%)

- 2015: 0.7%
- 2025: 4.1%
- 2035: 4.5%
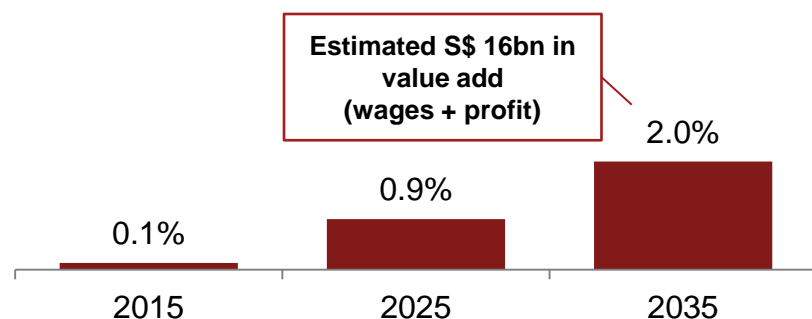
Projected tech-enabled start-ups' contribution in a national perspective

2013 Contribution to GDP per industry (%)

Industry	%
Manufacturing	18%
Wholesale & Retail Trade	17%
Business Services	15%
Finance & Insurance	11%
Other Services Industries	11%
Transportation & Storage	7%
Taxes on Products	6%
Construction	5%
Ownership of Dwellings	4%
Information & Communications	4%
Accommodation & Food Services	2%
Utilities	1%

At 2% in 2035, contribution would be similar to that of today's accommodation & food services
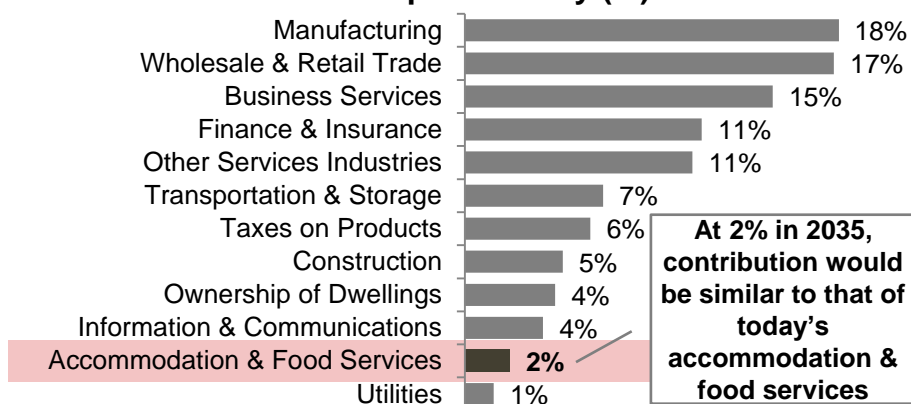
2013 Contribution to GDP growth per industry (%)

Industry	%
Finance & Insurance	29%
Business Services	27%
Other Services Industries	19%
Wholesale & Retail Trade	12%
Construction	8%
Ownership of Dwellings	8%
Taxes on Products	7%
Transportation & Storage	5%
Information & Communications	3%
Accommodation & Food Services	3%
Other Goods Industries	0%
Utilities	-1%
Manufacturing	-21%

2025-35 contribution to GDP growth is ~similar to that of today's transportation & infocomm sectors

Note: [1]Tech-enabled start-ups are active across all industries, e.g. from RedMart (groceries) to Lazada (broader e-commerce) to GrabTaxi (transportation)
Source: University of Maryland R.H. Smith School of Business, PwC interviews and analysis

The tech-enabled start-up ecosystem would also make a major contribution to job creation

Projected economic contribution of tech-enabled start-ups

Successful start-ups
(# of companies that have survived >8 years)

Estimated revenue of these 271 companies:
S$ 23bn

271

84

5

2015   2025   2035

Jobs in tech-enabled start-ups ('000s)

Compared with 2014 figures, the 168,000 jobs
would correspond to 4.9% of total
employment

168

54

5

2015   2025   2035

Projected tech-enabled start-ups' contribution in a national perspective

Number of companies in Singapore, selected industry

35,000

200

Security industry in 2014   Total companies formed in 2013
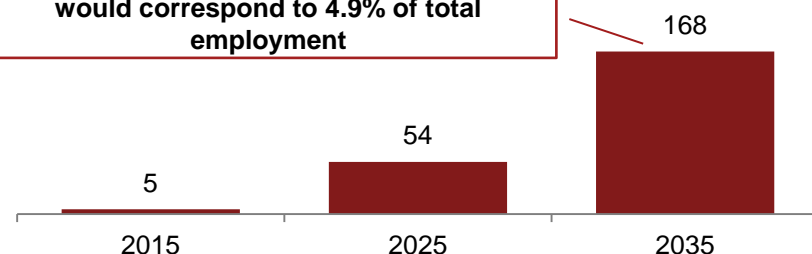
Jobs added to Singapore's economy in selected industries from 2012 to 2013, in thousands

Tech-enabled start-ups are projected to add over a
year of jobs contribution in the next two decades

136

42

5

Financial & Insurance services   Goods producing industries   2013 Total jobs added
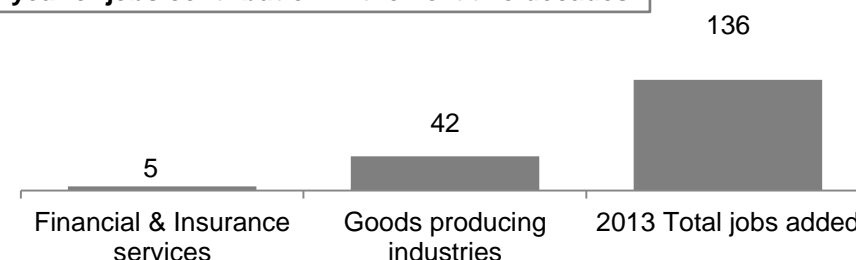
Source: ACRA, Economic Development Board, SingStat, PwC analysis

Beyond direct GDP contribution there may be an even larger impact of emerging tech-enabled start-ups on the Singapore economy

In addition to additional sustenance to the perception of Singapore as a global technology and R&D leader, having a mature ecosystem for tech-enabled start-ups in Singapore may lead to:

I Increased labour productivity across all kinds of industries

Increased labour productivity

- After monetising on high growth, labour productivity of tech-enabled companies is likely to be higher than that of for non-tech companies
- Knowledge transfer from technological innovations by tech-enabled start-ups trickles down to an overall increase in, most notably, labour force productivity, as:
    - tech start-ups tend to foster a competitive environment
    - technological improvements generally increase productivity

The larger impacts of a successful ecosystem

- 75% of the value added of the internet is in traditional industries that do not consider themselves internet companies
- Tech-enabled solutions help non-tech companies to improve their productivity

II More jobs both in Singapore and across Southeast Asia

Potential of >250,000 jobs in and beyond Singapore

- In addition to the direct jobs Singaporean tech-enabled start-ups may create, beyond the employment of their founders and their employees lies a realm of indirect jobs for service partners, prototypers, beta testers and other suppliers to the ecosystem
- Tech-enabled start-ups in Singapore are likely to work with talent across the region and build local teams throughout Southeast Asia in order to have teams closer to consumer markets
- Indirect jobs are related to the number of direct jobs by means of a direct-indirect jobs multiplier. It is projected that for every direct job in tech-enabled start-ups in Singapore, more than 2.5 jobs would be created in indirect jobs throughout Southeast Asia
- Any job loss in traditional industries due to traditional companies being overtaken by more innovative business models will be offset by this high multiplier
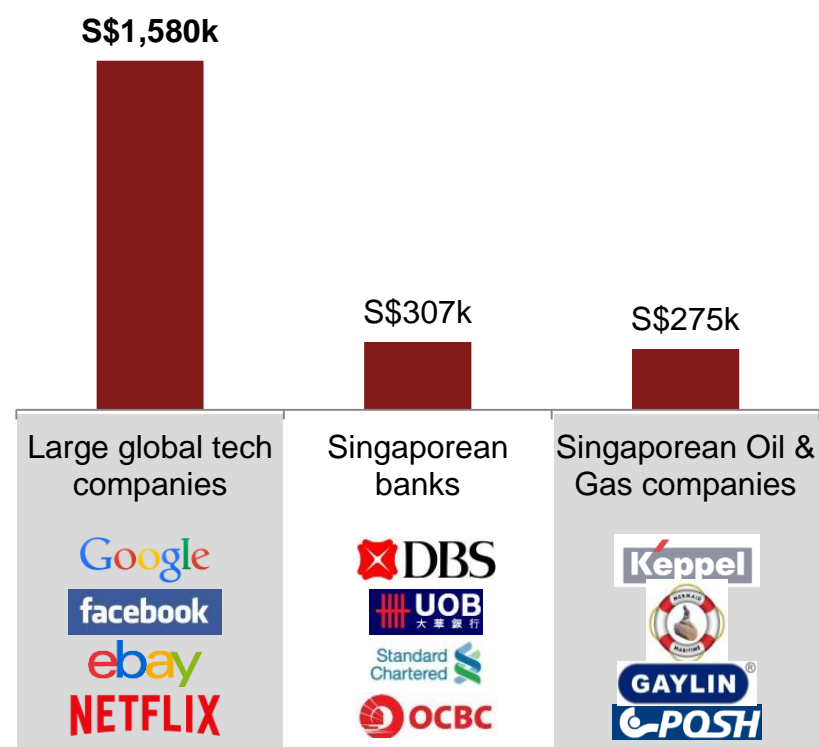
Source: University of Maryland R.H. Smith School of Business, MGI: The Internet Matters, PwC interviews and analysis

I   It has been shown that long-term, global tech businesses can also enhance labour force productivity – some of today's young start-ups already come close to their mature industry peers

Average labour productivity[1]

(average of selected companies per sector)

Industry	Tech-enabled start-ups	Established companies
Retail: groceries	redmart S$ 250k[2]	ntuc SHENGSIONG (avg) S$ 292k
Retail: apparel	ZALORA S$ 40k	FJ BENJAMIN S$ 155k
Transportation	GRABTAXI S$ 35k[3]	COMFORTDELGRO S$ 195k
Tele-communication	MyRepublic S$ 240k	m1 starhub SingTel (avg) S$ 702k

S$1,580k

S$307k

S$275k

Large global tech companies	Singaporean banks	Singaporean Oil & Gas companies
Google facebook ebay NETFLIX	DBS UOB Standard Chartered OCBC	Keppel GAYLIN POSH

Note: [1] Labour productivity is measured as revenue per employee
[2] PwC estimate based on stated revenue growth since February 2013
[3] PwC estimate
Source: Annual reports (full year 2013 figures), PwC analysis

II Based on these estimates, tech-enabled start-ups may bring over 150,000 jobs to Singapore and could spark >2.5× that in indirect jobs throughout the region

Large, successful new tech-enabled start-ups will likely account for an expansion of the ecosystem they are in and account for positive net job creation

Research	Industry	Employment multiplier[1]
Columbia University	Broadband	2.42
Josh Bivens	Communication sector	2.52
U.S. Bureau of Economic Analysis	Internet and other information services	3.41
Average		**2.78**
Following the ratio of direct to indirect jobs, if Singapore's tech-enabled start-ups were to account for 100,000 jobs by 2035…		

…this could result in net >250,000 indirect jobs in Singapore and throughout Southeast Asia

- Indirect jobs may be in Singapore (e.g. prototypers, beta-testers, copywriters, tech journalists) **or regional**, **growing Singapore's sphere of influence** by creating jobs (e.g. offshore programmer hubs) overseas
- Were all these indirect jobs to be in Singapore, in terms of 2013 median Singaporean wages it could **add S$ 12.3bn in wages & benefits**

Becoming home to the new billion-dollar tech start-up would raise the perception of Singapore's economy regionally, as it would bring jobs across Southeast Asia

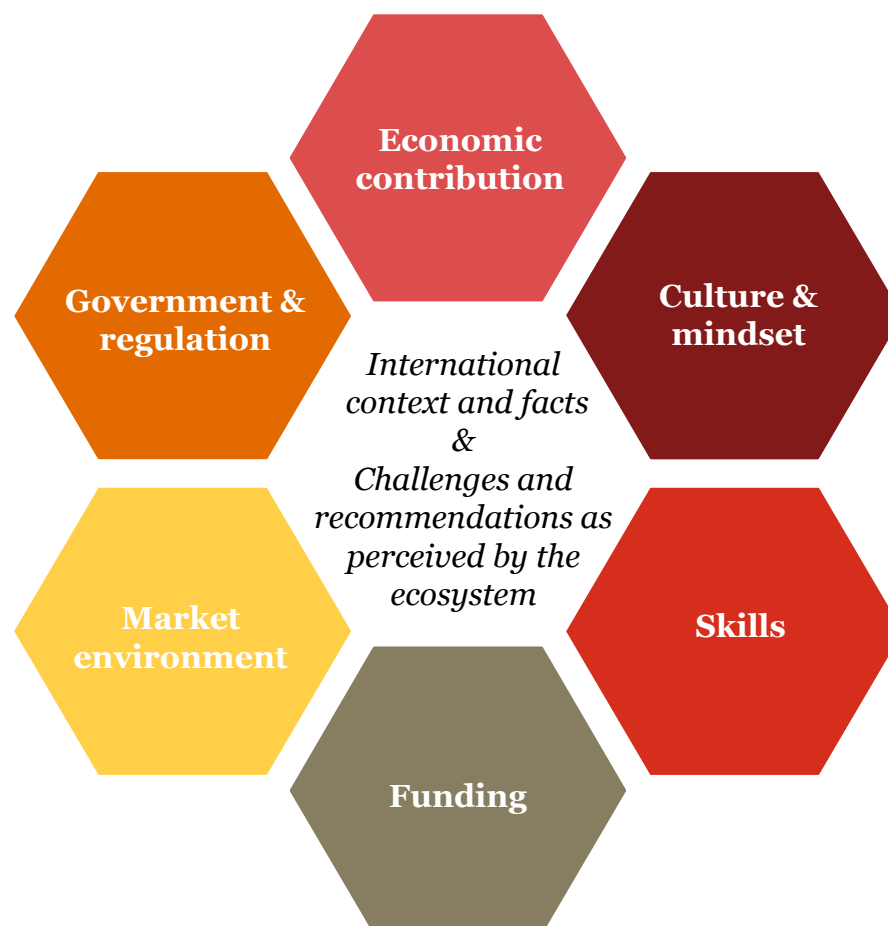| Start-up	Current # employees	Estimated # indirect jobs
ZALORA	1,500	
GRABTAXI	500	
redmart	200	~6,000
MyRepublic	80	

Note: [1]The Employment multiplier means that for every job created in one sector, an 'x'-amount of jobs is created in other industries.
Source: University of Maryland R.H. Smith School of Business, StatisticBrain, Singstat, PwC Analysis

Key drivers and challenges

In conducting our research, we have identified the key challenges and recommendations raised by the ecosystem stakeholders

- For the purpose of this research, we have spoken with 70+ people in Singapore's tech-enabled start-up ecosystem, ranging from entrepreneurs to investors to incubators to government officials to university professors

- In order to represent the findings in the context of Singapore's nascent ecosystem, we have aimed to provide an international, fact-based context per selected topic

- Around each selected topic, we show quotes from ecosystem stakeholders related to the international benchmarking data, followed by perceived challenges and recommendations by the ecosystem stakeholders

Economic contribution

Government & regulation

Culture & mindset

International context and facts & Challenges and recommendations as perceived by the ecosystem

Market environment

Skills

Funding

Culture & mindset

A 'lack of an entrepreneurial culture' has often been cited as a barrier to developing prosperous start-ups in Singapore. It has often been said that this sentiment (compounded with the high cost of living in Singapore) pushes many locals towards "safer" jobs with larger MNCs and government organisations.

This might be changing. Overall, Singapore is presently witnessing increasing levels of entrepreneurial activity, with Total Entrepreneurial Activity (TEA[1]) above 10 since 2012, double that of Germany and higher-ranked countries with mature ecosystems like Israel and the UK.
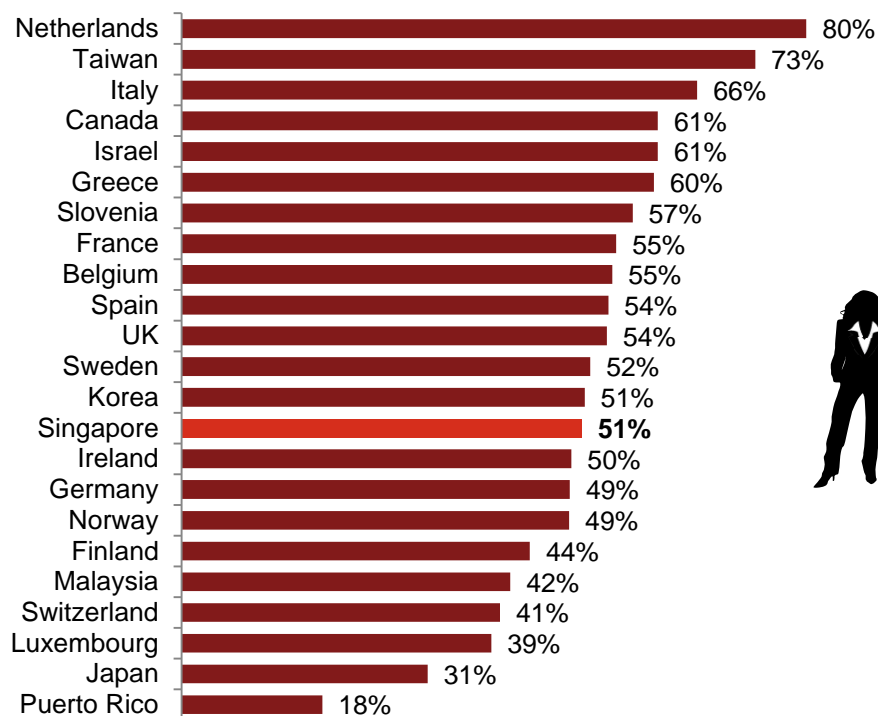
Note: [1]TEA is defined as the number of people out of 100 who are trying to start a business (nascent entrepreneurs) or are running one that was less than 42 months old (new firm entrepreneurs)

Many in Singapore view entrepreneurship as a good career choice – but less so than in key benchmark countries

Though data shows entrepreneurship is considered to be a good career choice...

...interviewees say it is not often considered to be an attractive career, as it is thought other jobs may provide higher stability

Entrepreneurship as a good career choice (% of respondents)

Country	%
Netherlands	80%
Taiwan	73%
Italy	66%
Canada	61%
Israel	61%
Greece	60%
Slovenia	57%
France	55%
Belgium	55%
Spain	54%
UK	54%
Sweden	52%
Korea	51%
Singapore	**51%**
Ireland	50%
Germany	49%
Norway	49%
Finland	44%
Malaysia	42%
Switzerland	41%
Luxembourg	39%
Japan	31%
Puerto Rico	18%

Source: Global Entrepreneurship Monitor Singapore 2013, PwC interviews

"My parents' generation believes that only government positions, lawyers, doctors or jobs in large Western or Japanese MNCs are good and worth striving for. Entrepreneurship does not fall in that category."

- Entrepreneur

"Here in Singapore, entrepreneurship isn't [perceived as] an attractive career choice. In fact, others have asked my parents and me if the reason [why I'm running my own start-up] is because I couldn't get a job offer from elsewhere."

- Entrepreneur

"A lot of focus has been on start-up creation. But it would also be great to see a lot of Singaporeans join the start-ups they are passionate about – not everybody needs to be a founder."
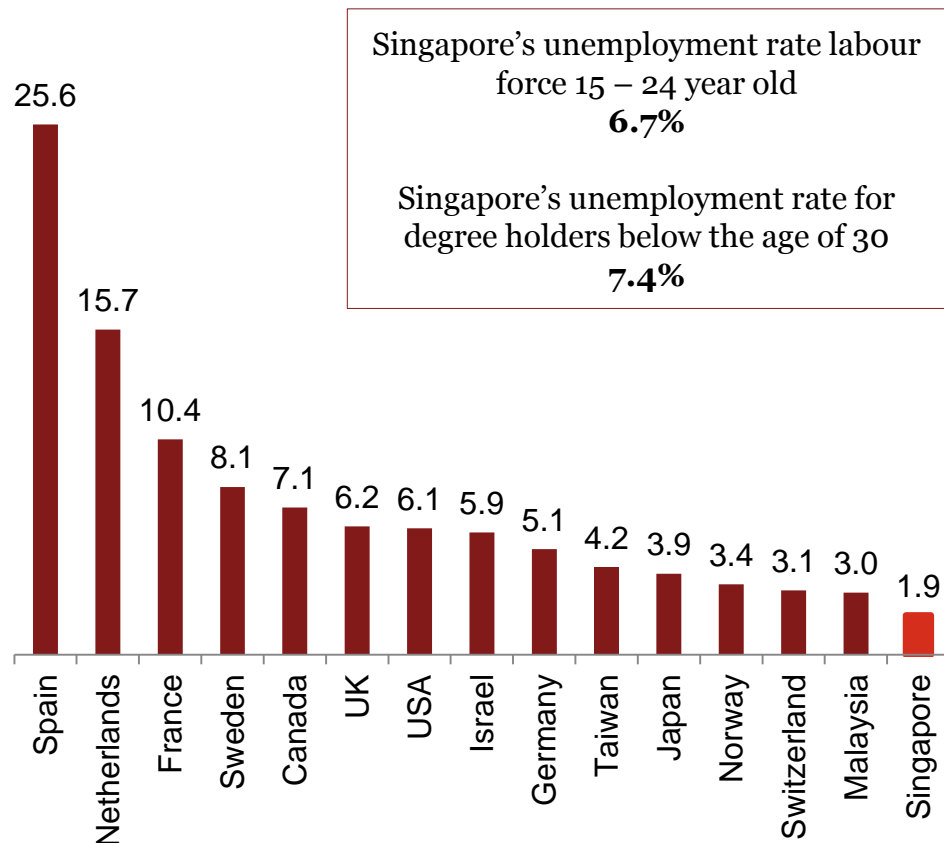
- Venture Capital investor

Very low unemployment rates in Singapore means opportunities in other industries (e.g. working for an MNC or the government) are attractive...

Unemployment rates (in %)

Singapore's unemployment rate labour force 15 – 24 year old
6.7%

Singapore's unemployment rate for degree holders below the age of 30
7.4%

Country	Rate
Spain	25.6
Netherlands	15.7
France	10.4
Sweden	8.1
Canada	7.1
UK	6.2
USA	6.1
Israel	5.9
Germany	5.1
Taiwan	4.2
Japan	3.9
Norway	3.4
Switzerland	3.1
Malaysia	3.0
Singapore	1.9

The 2013 average gross monthly salary for computer science graduates from NUS, NTU and SMU[1] was ~S$ 3,500

- Unemployment in Singapore is relatively low compared to international benchmarks
- Combined with the booming employment market and availability of alluring, steady-income corporate jobs provides those with a degree with less incentive to start a company of their own than in countries with a less favourable jobs market
- The rate of new business start-ups in Europe has increased since the 2008 financial crisis, which is partly driven by a tighter graduate recruitment market

"Many young Singaporeans would prefer to take up stable nine-to-five jobs than take the risk and start businesses of their own. In some ways, we are victims of our own spectacular economic progression over the last 50 years."
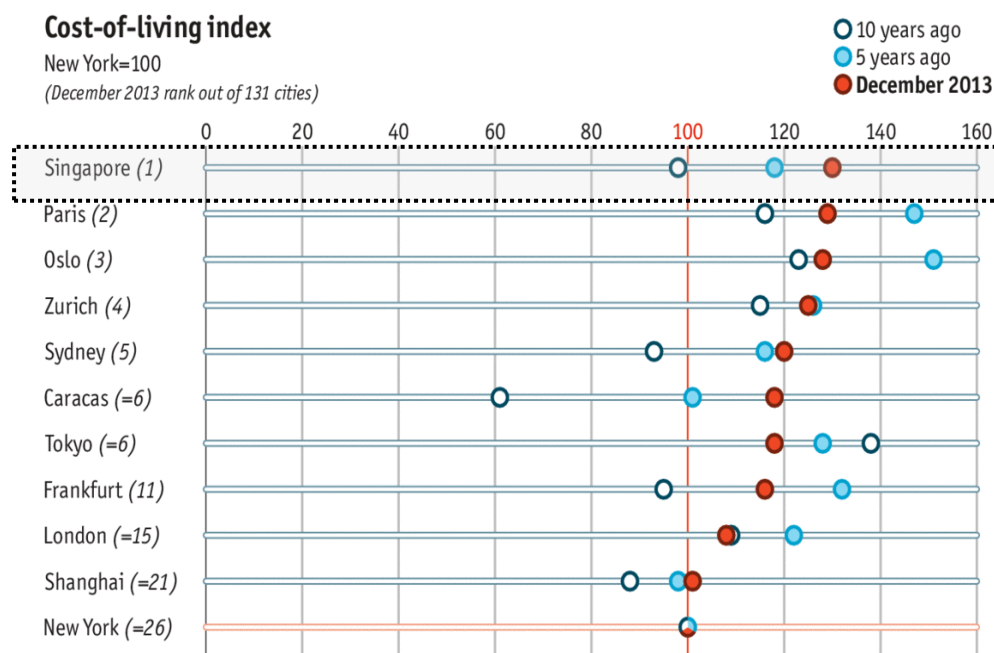*- Incubator manager*

Note: [1]The Graduate Employment Survey is a survey of the graduates of the National University of Singapore, Nanyang Technological University and Singapore Management University. For SMU, the mean gross salary for its Information Systems Management programme is included. For NUS and NTU, the Computer Engineering graduates' mean gross salaries are included.
Source: Graduate Employment Survey Results 2013, Country Stat, Channel News Asia, PwC interviews

... and the high cost of living may also drive some to choose a safer professional career

Singapore has topped 131 cities globally to become the world's most expensive city to live in

Cost-of-living index
New York=100
(December 2013 rank out of 131 cities)

○ 10 years ago
◔ 5 years ago
● December 2013

Singapore (1)
Paris (2)
Oslo (3)
Zurich (4)
Sydney (5)
Caracas (=6)
Tokyo (=6)
Frankfurt (11)
London (=15)
Shanghai (=21)
New York (=26)

"Cost of living is very high in Singapore... If my start-up does not work, I can't pay my HDB loan."

- Entrepreneur

"Social pressure requires to have an own flat, not a rented one, and car; this is only financeable with a decent salary."
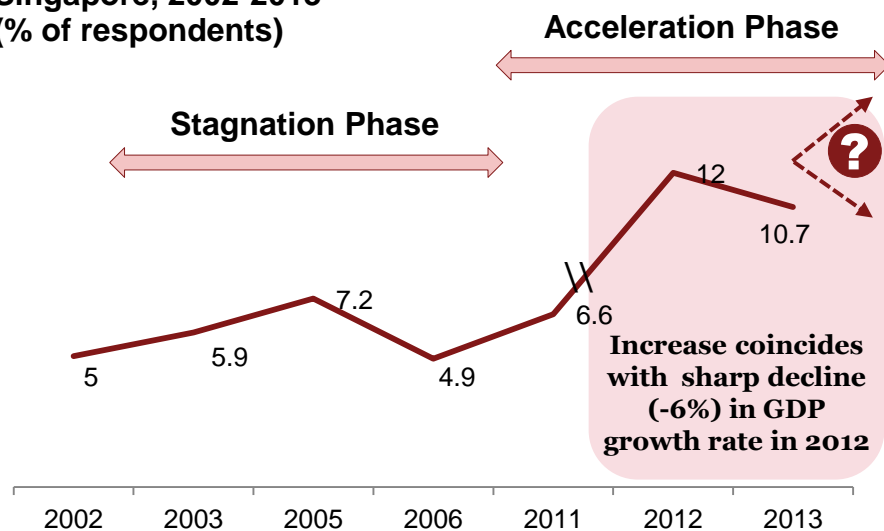*-INSEAD "High Tech SMEs in Singapore" Report*

Source: Economic Intelligence Unit Cost of Living Index, 2014, PwC interviews, INSEAD Report on High-tech SME Gap in Singapore, MOF speech, HDB InfoWeb

There are signs that Singapore's entrepreneurial activity has been increasing (now above levels in the UK and Israel)
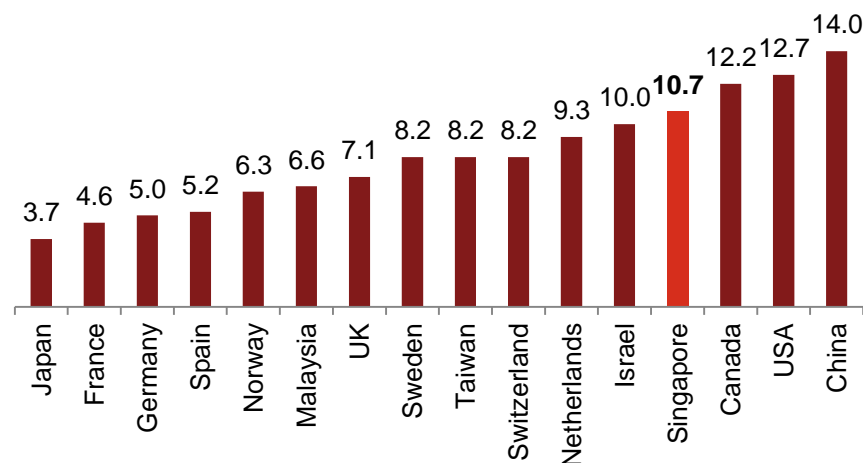
Total entrepreneurial activity in Singapore has nearly doubled in the last few years...

...and is comparable to levels in other relatively mature start-up ecosystems

Total early stage Entrepreneurial Activity in Singapore, 2002-2013 (% of respondents)

Total early stage Entrepreneurial Activity (TEA), 2013 (% of respondents)

Acceleration Phase

Stagnation Phase

12

10.7

?

7.2

6.6

5.9

5

4.9

Increase coincides with sharp decline (-6%) in GDP growth rate in 2012

2002   2003   2005   2006   2011   2012   2013

Japan 3.7 · France 4.6 · Germany 5.0 · Spain 5.2 · Norway 6.3 · Malaysia 6.6 · UK 7.1 · Sweden 8.2 · Taiwan 8.2 · Switzerland 8.2 · Netherlands 9.3 · Israel 10.0 · **Singapore 10.7** · Canada 12.2 · USA 12.7 · China 14.0

Source: Global Entrepreneurship Monitor Singapore, 2013

Some view "fear of failure" as a barrier to entrepreneurship, but surveys show there are signs this is picking up

Singaporeans often cite fear of failure as a key discouraging factor...

Singaporeans are not considered risk-taking....

> "As a nation, Singapore does not have a strong culture of risk-taking. The general population tends to be risk-averse, preferring to choose financial security and a stable career instead of striking out as an entrepreneur."
>
> - Joshua Yim, IE "Encouraging Entrepreneurship", 2013

... which may be attributed to the high consequences of failure in Singapore, relative to other countries

> "For a Singaporean male, the costs of failure can be relatively high. We graduate later than females and are still expected to settle down and be able to afford an HDB before 30. It's tough to accumulate significant savings with a failed start-up."
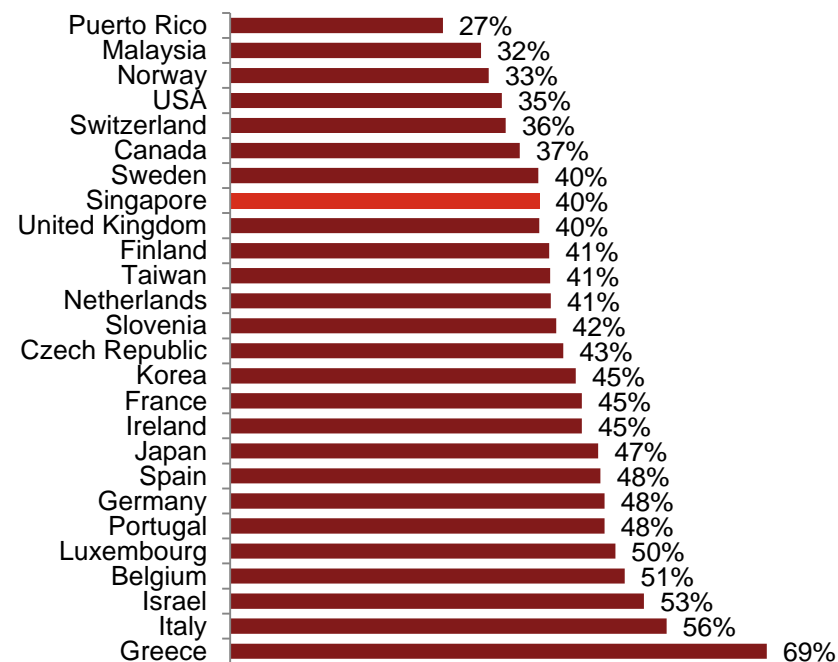>
> - Entrepreneur

> "If you start your own business and fail in the US, you are seen as a hero, and [there will be] large corporates eager to hire you with lucrative job offers. In Singapore [however], failed entrepreneurs disappear."
>
> - Entrepreneur

... however, some surveys suggest Singapore benchmarks favourably on risk

Fear of failure as a barrier to entrepreneurship (% of respondents[1])

Country	%
Puerto Rico	27%
Malaysia	32%
Norway	33%
USA	35%
Switzerland	36%
Canada	37%
Sweden	40%
Singapore	40%
United Kingdom	40%
Finland	41%
Taiwan	41%
Netherlands	41%
Slovenia	42%
Czech Republic	43%
Korea	45%
France	45%
Ireland	45%
Japan	47%
Spain	48%
Germany	48%
Portugal	48%
Luxembourg	50%
Belgium	51%
Israel	53%
Italy	56%
Greece	69%

Note: [1]The respondents for this indicator are individuals who had earlier indicated in the GEM survey that they perceived good opportunities to start a business.
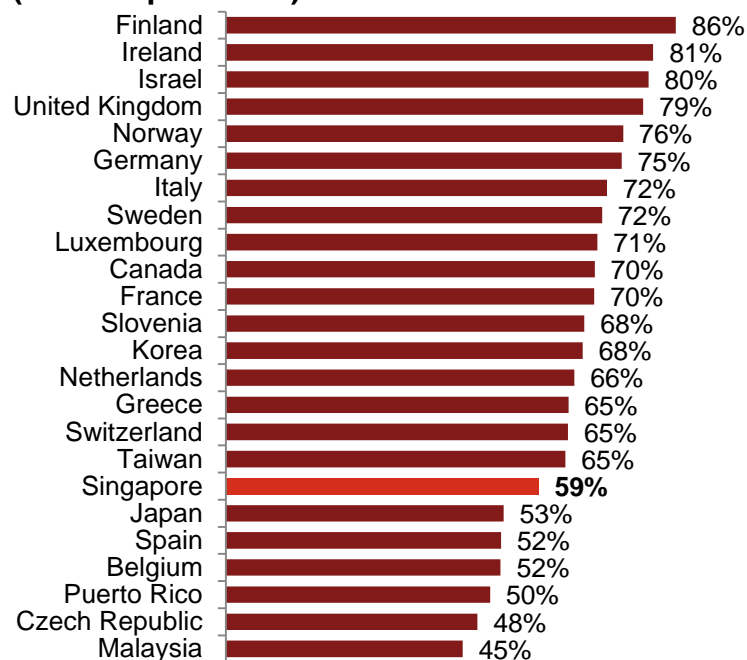Source: Global Entrepreneurship Monitor 2013, PwC interviews

Ecosystem recommendation:
The sense is that increased media attention and celebrating success of start-up growth stories would help convince graduates to choose a career as an entrepreneur

Limited media attention and social status granted to entrepreneurs is a possible impediment...

...and there are also few well-publicised success stories to inspire potential candidates

Successful Entrepreneurs enjoy High Status (% of respondents)

Country	%
Finland	86%
Ireland	81%
Israel	80%
United Kingdom	79%
Norway	76%
Germany	75%
Italy	72%
Sweden	72%
Luxembourg	71%
Canada	70%
France	70%
Slovenia	68%
Korea	68%
Netherlands	66%
Greece	65%
Switzerland	65%
Taiwan	65%
Singapore	**59%**
Japan	53%
Spain	52%
Belgium	52%
Puerto Rico	50%
Czech Republic	48%
Malaysia	45%

"There are not enough success stories of entrepreneurs around and the few [that exist] are not well marketed. Hence, university graduates do not feel attracted to entrepreneurship or working in start-ups."

- INSEAD "High Tech SMEs in Singapore" Report

"Showcasing successful entrepreneurs is key. We need to feature the success stories of trailblazers that others can look to and be inspired by."

- Joshua Yim, IE "Encouraging Entrepreneurship", 2013

"What young kid knows someone his age in Singapore who drives a Ferrari because they went for equity in a start-up rather than for a 'steady job with a multinational'?"

- Venture Capital investor

3.2 Skills

Contents | At a glance | Introducing the ecosystem | Economic contribution | **Key drivers and challenges** | Appendices

Skills

Talent is the lifeblood of the tech industry. Most founders cite talent shortage in Singapore as a key bottleneck hindering growth. Interestingly, we found this to be a global phenomenon faced by many technology firms.

Singapore's tech-enabled start-ups have a choice in hiring either local or foreign talent. At present, the Singapore education system is producing a diverse mix of high-quality graduates. However, this capacity is limited and there is stiff competition for tech talent from large corporations and overseas destinations.

Looking outwards, local start-ups have tapped on foreign talent for growth. Furthermore, local tech-enabled start-ups are also exploring alternatives such as outsourcing and offshoring.

3.2 Skills

Contents | At a glance | Introducing the ecosystem | Economic contribution | **Key drivers and challenges** | Appendices

The 'talent gap' is not a Singapore-specific issue and is a constraint for tech-enabled start-ups across the world

A shortage of tech talent is cited as a key challenge by all stakeholders across the ecosystem…

"Hiring is a significant issue… While it is still easier to hire foreign talent in Singapore, relative to Silicon Valley, the gap is narrowing and we are losing our comparative advantage."

- Venture capital investor

'We were looking for programmers in Singapore to build our website but could not find enough people who were interested in the job.'

- Entrepreneur

"The Singapore education system produces high-quality talent, but a majority of the local graduates lack the tech skills required by us [start-ups]."

- Professor Entrepreneurship

…this is comparable with situations faced by tech-entrepreneurs in other countries

**London: a lack of talent is said to be the biggest threat to the country's booming technology sector…**

43%
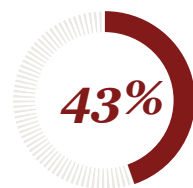
43% pointed to talent shortage as the biggest problem to the future of technology growth

- Tech London Advocates Survey, 2014

US: Studies show that local graduate production is insufficient to meet industry job demands…

By 2020, the number of Computing Science graduates in the US will only be able to meet 42% of annual job opening demands

42%
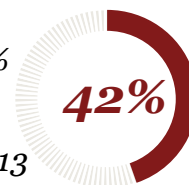
- Kleiner Perkins Caufield & Byers Study, 2013

"It is difficult to find talent and good people everywhere. The reality of the situation is that we are facing a global lack of tech talent"

- Entrepreneur

Source: Tech London Advocates Survey, Kleiner Perkins study, PwC interviews

Imported talent can be found in founding teams of nearly half of top venture-backed companies in Silicon Valley

Some of the largest and internationally renowned tech companies in Silicon Valley were founded by migrants

WhatsApp Jan Koum Ukraine	**Sun Microsystems** Vinod Khosla India	**Razer** Tan Min Liang Singapore

- According to the Kauffman Foundation, immigrants are more than twice as likely as native-born Americans to start companies

- In a 2011 study conducted by the National Foundation for American Policy, immigrants were on the founding teams of nearly half of VentureSource's top-ranked venture-backed companies

Note: An 'entrepass', a special visa for entrepreneurs looking to set up a company in Singapore, is available
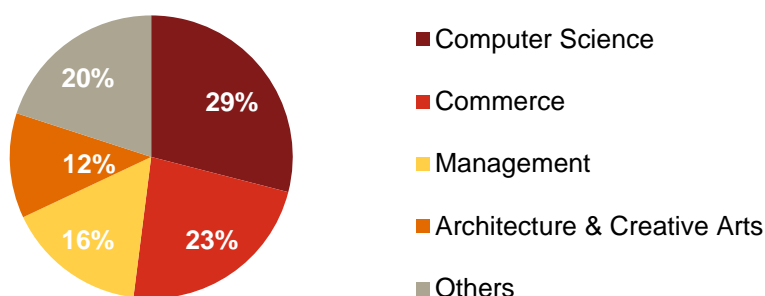Source: PwC Analysis

Singapore is producing many good engineers and computer scientists, which are typical backgrounds for entrepreneurs globally

Degrees such as Computer Science, Business Management and Engineering are most prevalent among start-up entrepreneurs

Educational background of entrepreneurs (%)[1]

- Computer Science — 29%
- Commerce — 23%
- Management — 16%
- Architecture & Creative Arts — 12%
- Others — 20%

US: In a 2008 report released by the Kaufmann Institute, data showed that nearly half of the degrees held by US-born tech founders were in STEM-related disciplines and another third were in business, accounting and finance.
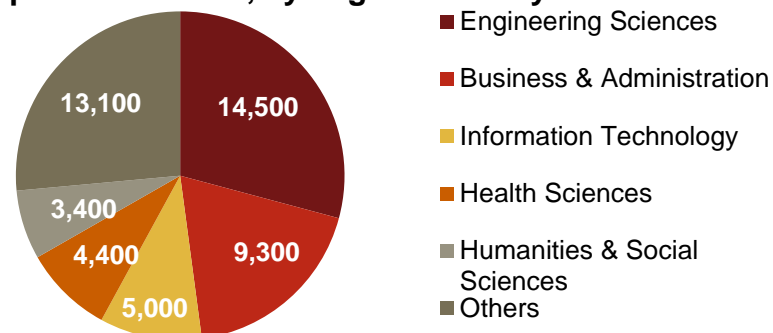
In Singapore, more than half of the cohort graduate with highly relevant degrees

Graduates with degrees in Engineering Sciences, Business & Administration and Information Technology constitute 58% of the local graduate cohort

Singapore Graduates, by degree of study

- Engineering Sciences — 14,500
- Business & Administration — 9,300
- Information Technology — 5,000
- Health Sciences — 4,400
- Humanities & Social Sciences — 3,400
- Others — 13,100

"The Singapore education system is technically sound... It produces high-quality graduates, in both technology and other fields."

- Co-founder

Note: [1]Data for Australia. No data available for Singapore
Source: PwC 'The Start-up Economy', 2013

3.2 Skills

Contents | At a glance | Introducing the ecosystem | Economic contribution | **Key drivers and challenges** | Appendices

The Singaporean pool of talent is relatively small, especially given competition from MNCs, the public sector and overseas destinations

There is a relatively limited pool of talent as Singapore produces just about 50,000 graduates annually...

...and start-ups are competing against large corporates, the public sector...

Although 26% express "interest" in entrepreneurship, the majority continue to pursue professional careers

Career Interest in Entrepreneurship (% of students)

- 11%
- 13%
- 51%
- 26%

- ■ Professional
- ■ Entrepreneurship
- ■ Leadership
- ■ None of the above
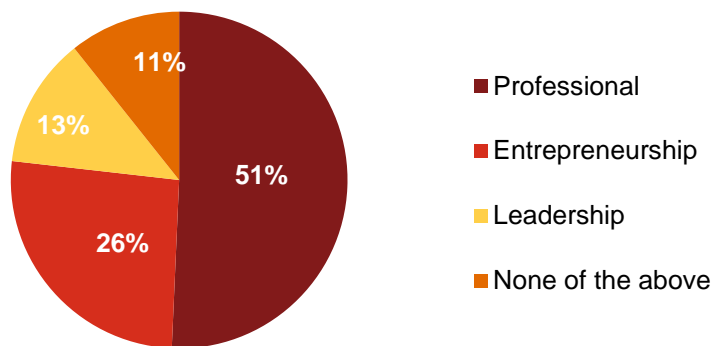
"Banking and finance [jobs] are the 'holy grail' in Singapore. They are perceived to be so prestigious that even tech graduates gravitate towards those jobs!"
- Start-up employee

Source: The Sunday Times 2012, PwC interviews

...and overseas destinations for talent

Primary reasons for going abroad include better pay and quality of life

"Programmers in Silicon Valley earn about 30% more than they do in Singapore. Here, fresh graduates are lucky to get S$2,000 a month."
- Co-founder

"Going back to Singapore would mean taking a pay cut, longer working hours and less work-life balance."
- Australia Permanent Resident, The Sunday Times, 2012

Countries with the largest number of Singaporeans

50,000	40,000	27,000

3.2 Skills

Contents │ At a glance │ Introducing the ecosystem │ Economic contribution │ **Key drivers and challenges** │ Appendices

To fill the gap, Singapore is well-positioned to further tap into the regional talent pool, and can balance labour needs by offshoring

More flexible immigration rules would allow tech-enabled start-ups to better leverage on regional talent	Solutions such as outsourcing and offshoring are increasingly adopted by start-ups

Talent →

Outsource work →

Develop key skills in and attract talent to Singapore

Regional talent has a competitive edge on technical skills due to early exposure to programming…

"In many neighbouring countries, coding is introduced to children at the primary school level, which helps to produce higher quality tech talent"

       - University representative

… and tech start-ups are hungry for tech talent

"It is easier to have our employees sitting beside us in Singapore, instead of [us] having to manage them remotely."

       - Entrepreneur

"We can easily find highly trained programmers in neighbouring countries like Vietnam, Indonesia or Philippines. While it has become more difficult to bring them in, it's definitely not impossible, especially if you have a good understanding of the application process."

       - Entrepreneur

Outsource work to talent outside of Singapore

Some companies outsource jobs to freelancers…

"What my company does [to circumvent the talent issue] is to source for freelance programmers overseas, and manage them remotely. The quality of work isn't always the best, but sometimes you just have to make do."

       - Entrepreneur

… others, like RedMart and Roomorama, have chosen to set up offshore centres

"I have located my programming hub in Yogyakarta as it is too difficult to hire tech talent in Singapore"

       - Founder

"We did offshoring and have completely moved our customer service centre into Philippines"

       - Founder

Source: PwC interviews

Ecosystem recommendation:
Exposure to entrepreneurship could further strengthen entrepreneurial intentions in Singapore

Entrepreneurs cite exposure as the dominant factor to pursue a career in start-ups

Some entrepreneurs benefited from entrepreneurship education...

"While I was still in SMU [local university], I took an class taught by a professor who was a former Silicon Valley entrepreneur. By the end of those 13 weeks, I was inspired to found my own start-up."

- Founder

... some found start-up internships to be effective

"I was on track to graduate and work for a large corporate but my experience with the NUS NOC programme changed me for life. I spent a year interning for a US start-up and it convinced me to try my hand at tech-entrepreneurship as well."

- Founder

Studies suggest exposure increases belief in oneself of possessing adequate skills to be engaged in entrepreneurial activity

Individuals involved in TEA are more likely to have received training in starting a new business than the rest of the working population

Proportion of Individuals with Exposure to Entrepreneurship Education or Internships Involved in TEA
(% of respondents who received entrepreneurial training)

Non entrepreneurs	(Recent) entrepreneur
17%	41%
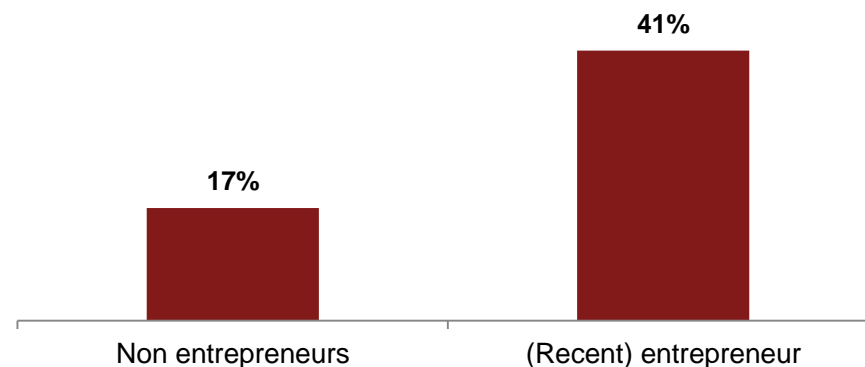
"The impact of training appeared to have the greatest effect on early-stage entrepreneurial activity in innovation-driven economies"
- Global Entrepreneurship Monitor Singapore, 2013

Source: Global Entrepreneurship Monitor Singapore 2013, PwC interviews

3.3 Funding

Contents | At a glance | Introducing the ecosystem | Economic contribution | **Key drivers and challenges** | Appendices

Funding

Public funding is more prevalent at the seed stage and has been vital to the overall development of the ecosystem through the creation of many new start-ups.
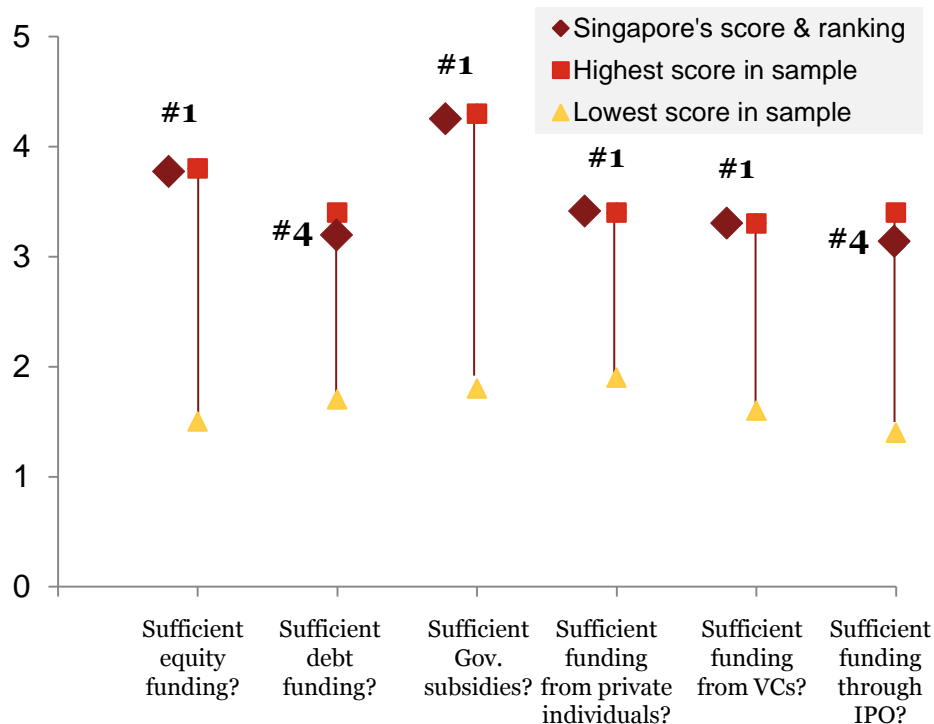
Some stakeholders are concerned this discourages "fast failure" and damages the return on investment (ROI) at later funding stages.

While there is a perceived lack of funding options at the Series A and B stages, research shows that VC activity in Singapore has been on the rise and that Singapore-based VCs are actively investing in local tech-enabled start-ups. There is further potential for funding in Singapore to mature to levels that are comparable to other global ecosystems such as Silicon Valley and Tel Aviv, and this may require greater maturity of the local exit options and IPO market.

Overall, funding for tech-enabled start-ups is perceived to be adequate

Singapore entrepreneurs are generally happy with financial support in the local ecosystem...

Entrepreneurial financial support – Singapore's rating and position amongst selected economies[1]

Legend:
- ◆ Singapore's score & ranking
- ■ Highest score in sample
- ▲ Lowest score in sample

Categories:
- Sufficient equity funding? — #1
- Sufficient debt funding? — #4
- Sufficient Gov. subsidies? — #1
- Sufficient funding from private individuals? — #1
- Sufficient funding from VCs? — #1
- Sufficient funding through IPO? — #4

...and are aware that funding in Singapore is comparable to other mature ecosystems

Funding Index Ranking of Start-up Ecosystems

- 1 — Silicon Valley / Tel Aviv
- 8 — *Singapore*
- 5 — London
- 14 — Sydney

Funding Index is a measure of how active and comprehensive the risk capital is in the start-up ecosystem

"People [here] like to compare Singapore's budding ecosystem to India's. In my opinion, funding [in Singapore] is not as difficult to get compared to in India. There are many angel investors here and government grants are also easily available."

- Start-up Mentor

Note: [1]Selected economies include the US, UK, France, Germany, Finland, Canada, Italy, Japan, Korea, Malaysia, Netherlands, Spain, Taiwan and others
Source: Global Entrepreneurship Monitor Singapore 2013, Start-up Genome, PwC interviews

At the seed stage, government funding is generous and has played a crucial role in the creation of successful local tech start-ups

The present system has already contributed to the launch of several successful local start-ups...

Named by Singapore Business Review as one of "Singapore's 20 hottest start-ups to watch in 2014", the following start-ups benefited from various government funding schemes in their early-stage funding

Events marketplace	*Health monitoring connectivity solutions*	*Short films streaming platform*
ACE Grant	National Research Foundation	ACE Grant

"*While government grants have been vital in the seeding of many local tech-enabled start-ups, there is a risk of fostering a culture of "grant-repreneurs" in the current ecosystem*"

- Venture Capital investor

... however, there is potential for additional benefits to be realised

More could benefit from greater flexibility in their KPIs

"*While I understand that there is a need to be accountable for the use of taxpayers' money, the milestone model locks the company into meeting the negotiated KPIs and prevents us from pivoting when we need to.*"

- Entrepreneur

Others also cite lower interest rates to be desirable

"*Some government grants require us to issue convertible bonds instead of equity. Using a bond will place charges on our assets. In addition, these agencies charge interest at 5%, which is a [relatively] high cost for start-ups to bear*"

- Entrepreneur

Source: Singapore Business Review, PwC interviews

Entrepreneurs perceive a shortage of growth-stage funding. The good news is that VC investment in Singapore does seem to be growing

Entrepreneurs *perceive* that there is a lack of later stage funding in Singapore…

Entrepreneurs feel there are few VCs in SG that invest at series A and B…

> *"While we have a large network of angel investors and early-stage VCs, the Series A and B stage is still quite underdeveloped to support our expansion. There are only about 10-15 VCs here who invest upwards of $5M."*   - Entrepreneur

…and that there is a lack of exit options that may discourage investment

> *"… I think VCs are not willing to invest [at Series B] is because of limited deal flow and an underdeveloped exit market, in terms of buy-outs and IPOs for start-ups."*   - Entrepreneur

2 …across an increasing number of deals and at the highest average deal size in years …

Venture Capital investments into Singapore

	No. of deals	Average deal size ($m)
2007	8	$1.5
2008	11	$6.7
2009	18	$2.7
2010	19	$1.9
2011	27	$3.4
2012	41	$1.0
2013	73	$6.2

1 Interestingly, in 2013, $ 450m has been invested into Singapore…

Percentage of venture capital investments into Singapore coming from Singaporean VC funds (2013)
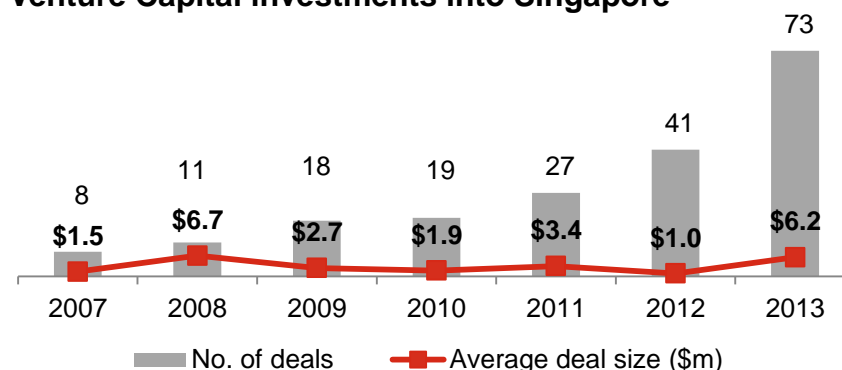
Singapore 27%   Outside of Singapore 73%

80% of $ 133m invested in 2013 by Singapore-based VCs was deployed in Singapore
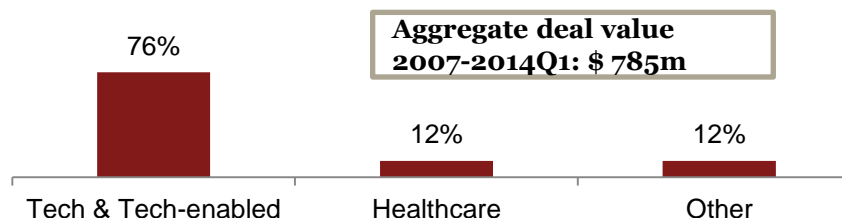
Aggregate deal value 2013: $ 454m[1]

3 …and overall, investments in tech and tech-enabled businesses lead venture capital deal value

Proportion of aggregate venture capital deal value into Singapore (2007- 2014 average)

Aggregate deal value 2007-2014Q1: $ 785m

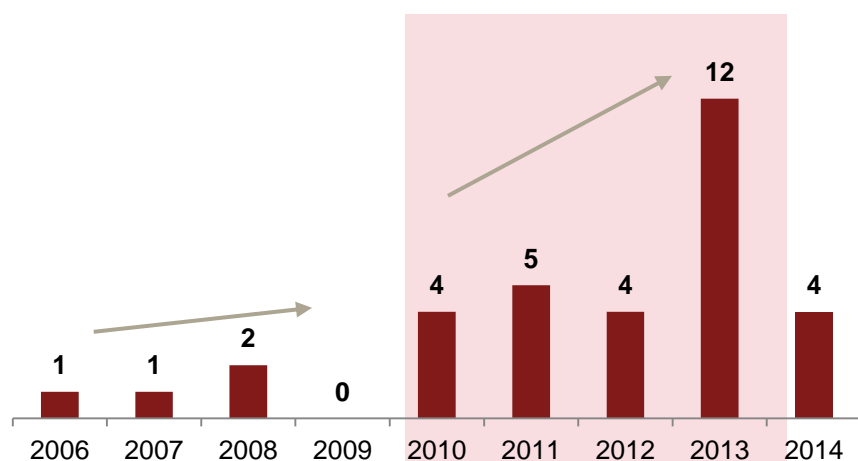| Tech & Tech-enabled	Healthcare	Other
76%	12%	12%

Note: [1]Time will tell whether the 2013 level of investments into Singapore will be sustainable, or whether 2013 may have proven to be an extraordinary good year
Source: Preqin, PwC interviews

Tech-enabled start-up acquisitions in Singapore are on the rise, both by local and foreign companies

Acquisitions of tech-enabled start-ups per year have increased since 2010...

Number of start-up acquisitions[1] per year

Bar chart values by year:
- 2006: 1
- 2007: 1
- 2008: 2
- 2009: 0
- 2010: 4
- 2011: 5
- 2012: 4
- 2013: 12
- 2014: 4

Non-liquid investments saw a global drop in 2009 due to very high financial uncertainty

...mostly by foreign companies

Proportion of local and foreign acquirers for Singapore start-ups (%)

Pie chart:
- 33%
- 67%

■ Local company   ■ Foreign company
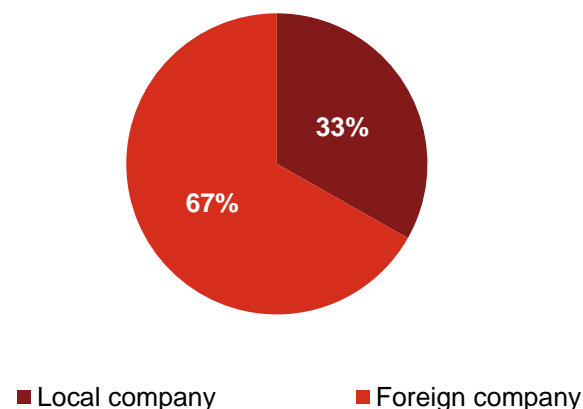
Local acquirers are spending >80% of their money in Singapore

Source: [1]TechinAsia: Based on a non-exhaustive database of 'known' start-up acquisitions in Singapore, based on news articles and press release of the relevant acquisitions.

3.3 Funding

Contents │ At a glance │ Introducing the ecosystem │ Economic contribution │ **Key drivers and challenges** │ Appendices
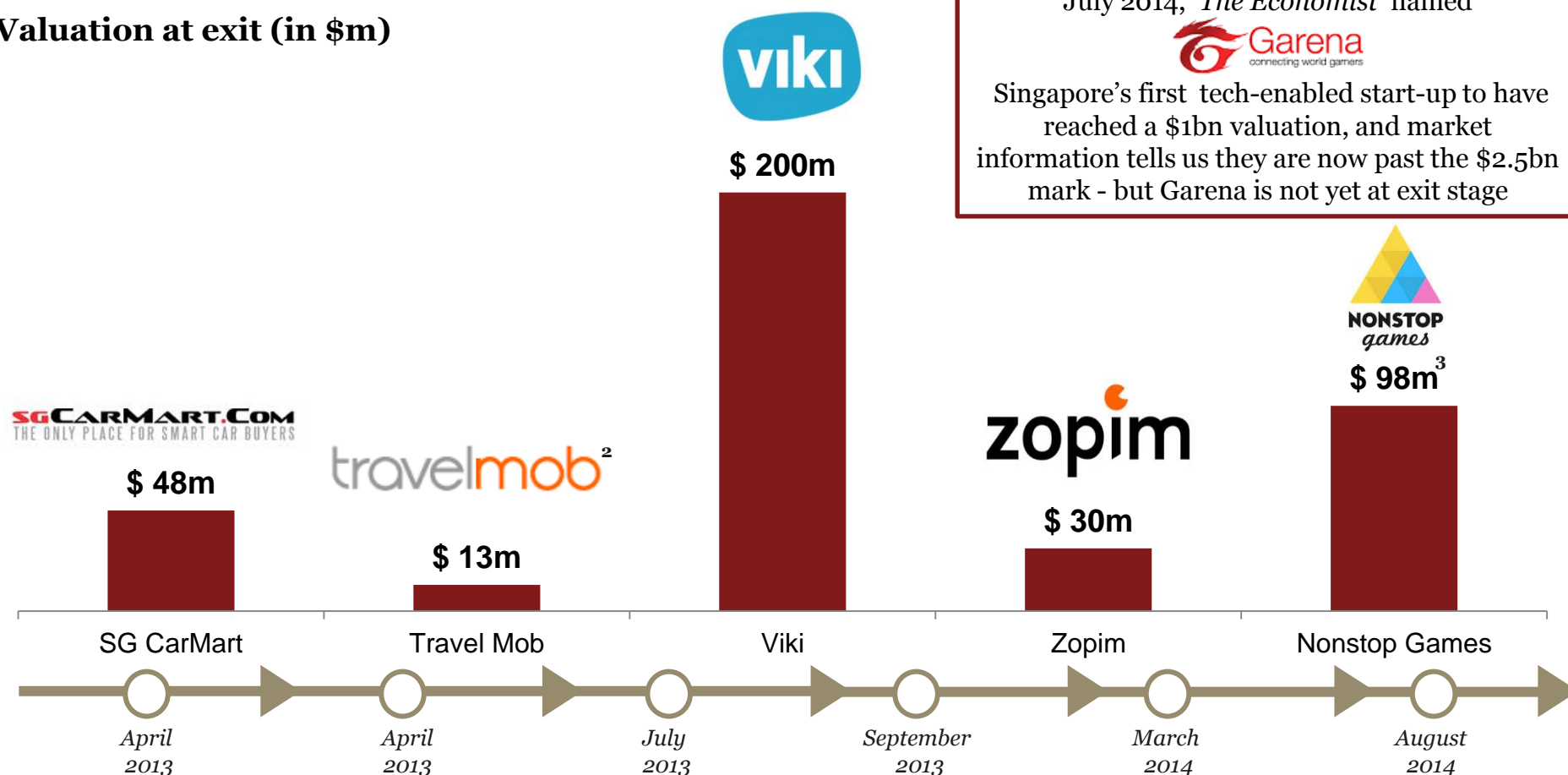
As there have been several notable start-up acquisitions, there seems to be a basis for future growth capital investments into Singaporean companies

Valuation at exit (in $m)

July 2014, '*The Economist*' named

Garena
connecting world gamers

Singapore's first tech-enabled start-up to have reached a $1bn valuation, and market information tells us they are now past the $2.5bn mark - but Garena is not yet at exit stage

$ 200m

$ 98m[3]

$ 48m

$ 13m

$ 30m

| SG CarMart | Travel Mob | Viki | Zopim | Nonstop Games |

April 2013 | *April 2013* | *July 2013* | *September 2013* | *March 2014* | *August 2014*

Note: [1]Based on a non-exhaustive database of 'key' start-up acquisitions in Singapore, based on news articles and press release on the relevant acquisitions
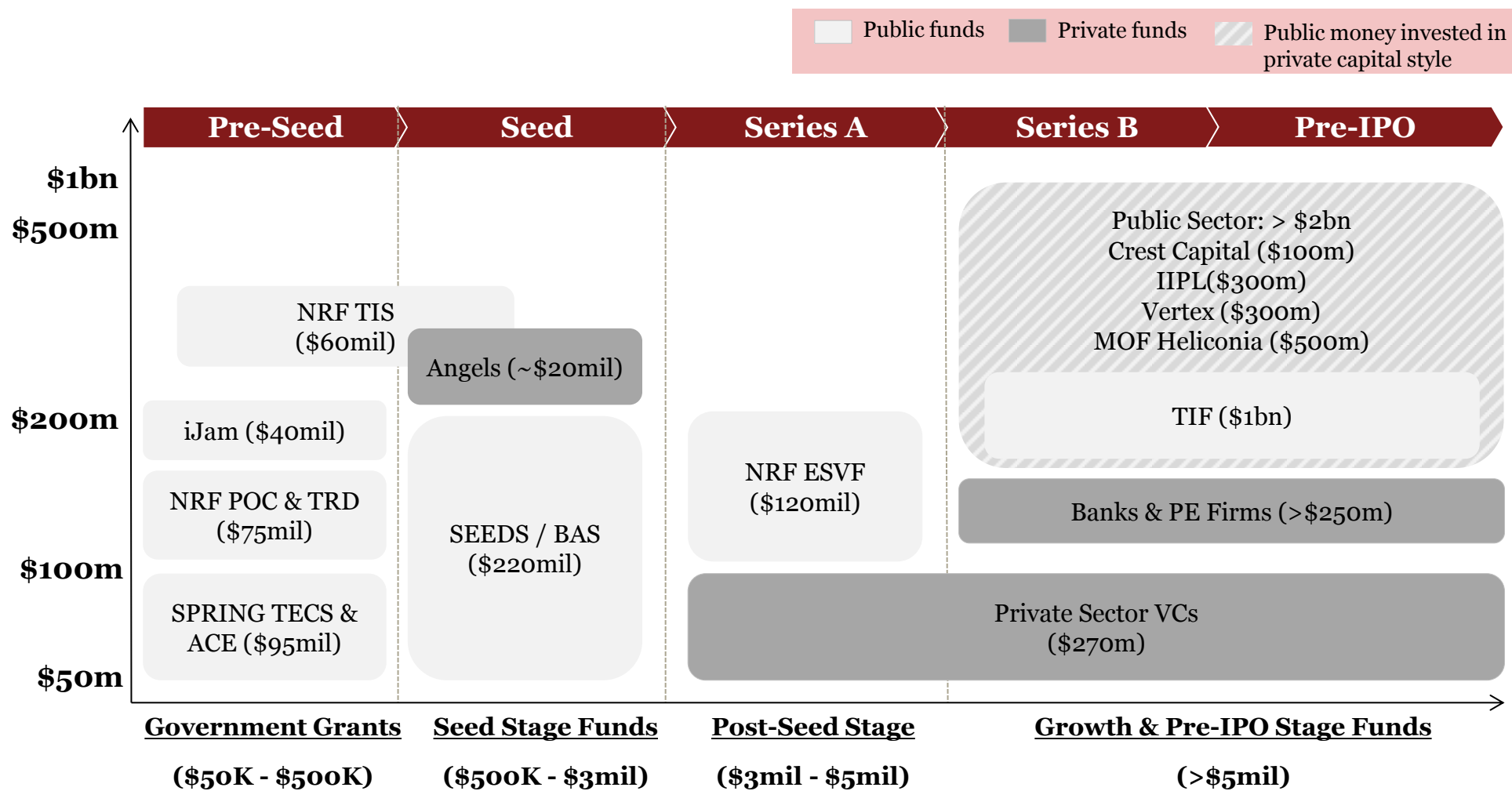[2]Dealvalue based on market rumour
[3]Maximum potential deal value based on potential future milestone payments
Source: TechinAsia, PwC Analysis
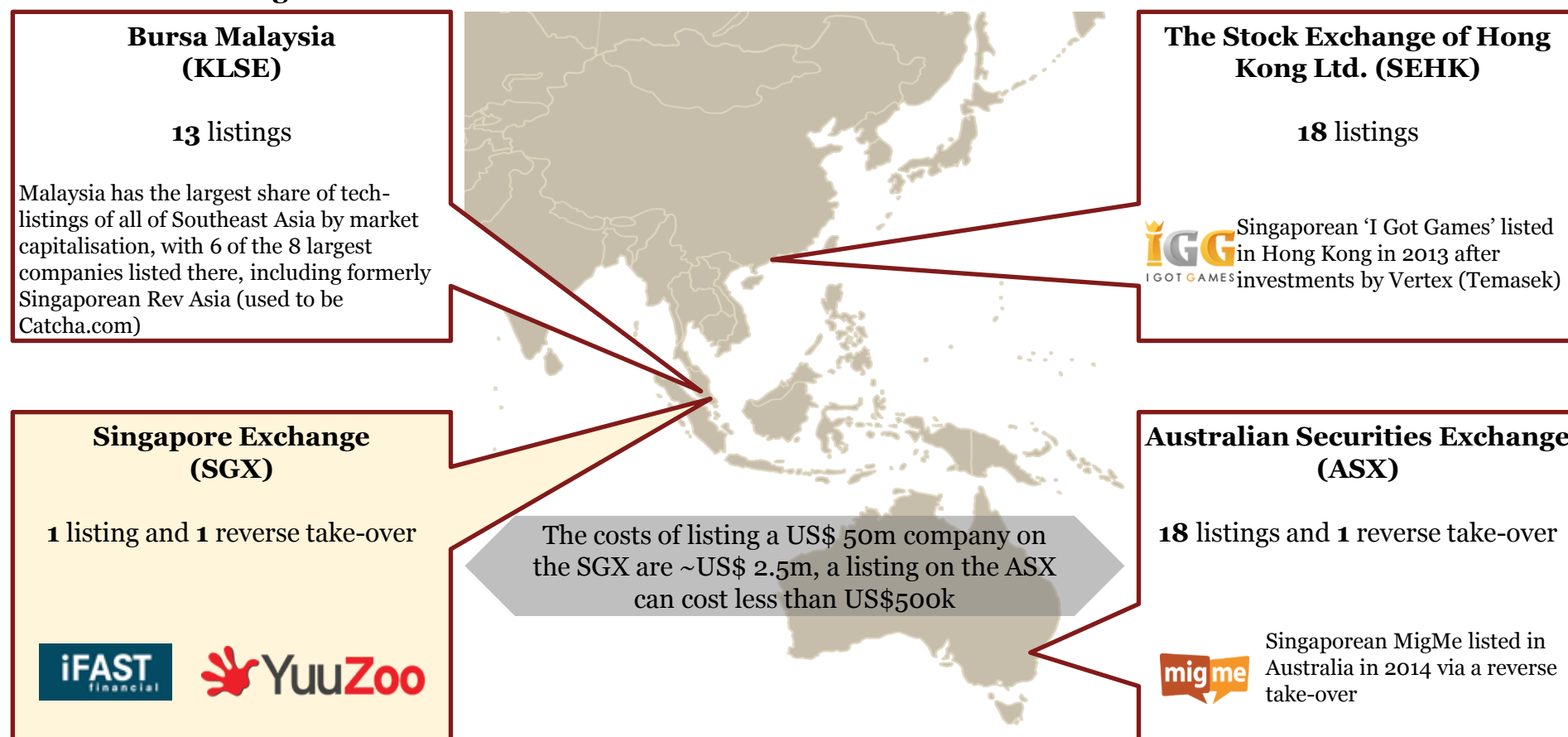
Ecosystem recommendation 1:

Where today's available capital is focused primarily on early stage support, a business case could be made for directing more (public) capital towards start-ups' growth stages

| | Public funds | Private funds | Public money invested in private capital style |

| Pre-Seed | Seed | Series A | Series B | Pre-IPO |

$1bn

$500m

NRF TIS ($60mil)

Angels (~$20mil)

Public Sector: > $2bn
Crest Capital ($100m)
IIPL($300m)
Vertex ($300m)
MOF Heliconia ($500m)

$200m

iJam ($40mil)

TIF ($1bn)

NRF POC & TRD ($75mil)

NRF ESVF ($120mil)

Banks & PE Firms (>$250m)

$100m

SEEDS / BAS ($220mil)

SPRING TECS & ACE ($95mil)

Private Sector VCs ($270m)

$50m

| **Government Grants** | **Seed Stage Funds** | **Post-Seed Stage** | **Growth & Pre-IPO Stage Funds** |
| **($50K - $500K)** | **($500K - $3mil)** | **($3mil - $5mil)** | **(>$5mil)** |

Source: ACE, Meng's Map of the money, PwC Analysis

Ecosystem recommendation 2:
With only two tech listings on the SGX since 2010, it seems it could be made more attractive to go for a (local) IPO

Tech-enabled listings in selected countries since 2010[1]

Bursa Malaysia (KLSE)

13 listings

Malaysia has the largest share of tech-listings of all of Southeast Asia by market capitalisation, with 6 of the 8 largest companies listed there, including formerly Singaporean Rev Asia (used to be Catcha.com)

The Stock Exchange of Hong Kong Ltd. (SEHK)

18 listings

Singaporean 'I Got Games' listed in Hong Kong in 2013 after investments by Vertex (Temasek)

Singapore Exchange (SGX)

1 listing and **1** reverse take-over

The costs of listing a US$ 50m company on the SGX are ~US$ 2.5m, a listing on the ASX can cost less than US$500k

Australian Securities Exchange (ASX)

18 listings and **1** reverse take-over

Singaporean MigMe listed in Australia in 2014 via a reverse take-over

Note: [1] Based on sample of 50 initial listings in information technology and 2 reverse take-overs (Yoozoo and MigMe)
Source: CapitalIQ, national stock exchanges, Drew Napier, PwC Analysis

3.4 Market environment

Contents │ At a glance │ Introducing the ecosystem │ Economic contribution │ **Key drivers and challenges** │ Appendices

Market environment

With a small domestic market, start-ups are unlikely to become billion-dollar companies by operating solely in the Singapore market. Hence, 'going regional' is essential. Due to Singapore's strategic location, local tech-enabled start-ups are well-poised to target opportunities in Southeast Asia and Asia.

Singapore has a solid market environment that serves as an attractive hub for tech-enabled start-up establishment. While there are challenges surrounding overseas expansion, there have been several successes within the local tech-enabled start-up ecosystem to serve as inspiration and case studies for budding start-ups.

Mentors often come from more senior companies and from companies that have gone through a successful exit. A venture capitalist stated that with increased circulation of capital from future exits, more mentors will become available to support the tech-enabled start-up ecosystem – and that the ecosystem should be given the time to develop itself to reach that point.

Overall, Singapore offers many benefits to tech-enabled start-ups

Primary benefits of Singapore for tech start-ups

Ease of doing business	*Strong infrastructure*	*Attractive tax incentives*	*Strong Community*	*IP protection*	*Opportunity to use as testing lab*
• Easiest country to do business in (World Bank's 2014 "Doing Business" Report) • Efficient, transparent and non-corrupt administration	• High internet, mobile and smartphone penetration • High-quality transport and communications infrastructure • Well connected to global cities	• Financial subsidies, government-backed financing schemes, business incubator schemes, and tax incentives for start-ups • Corporate tax is low and tax laws are business-friendly	• Availability of mentors and other stakeholders (e.g. accelerators/incubators) • Strong community support for new entrepreneurs with frequent events / meet-ups • Presence of start-up hubs such as Block 71, 73	• Strong IP protection laws – Ranked as the best country in the world for protection of intellectual property • Strong legal environment	• Being a small and highly connected population within a confined environment, Singapore is attractive for conducting pilot runs of innovative start-up ideas

"From the perspective of starting and running your own business, the ease of doing it in Singapore and the support of the entire eco-system around is just above and beyond any other country in Southeast Asia."
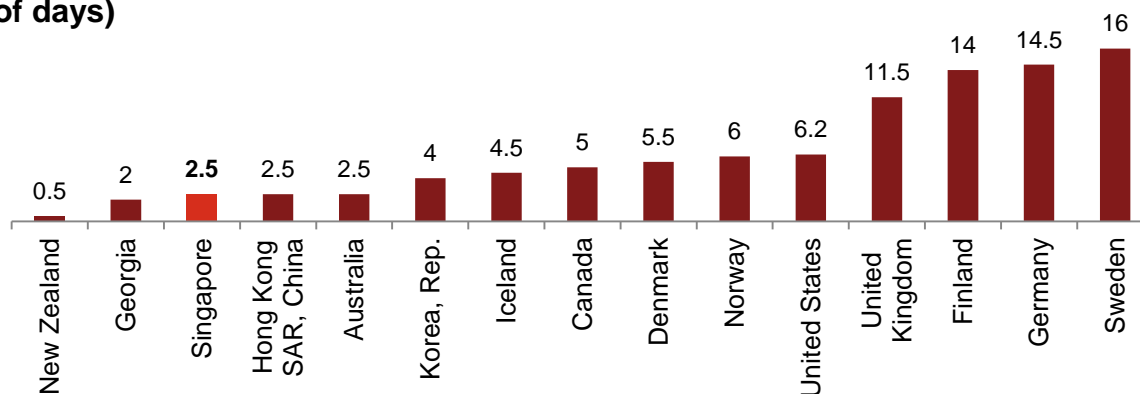
- Alexis Horowitz-Burdick, Founder of Luxola, TechinAsia

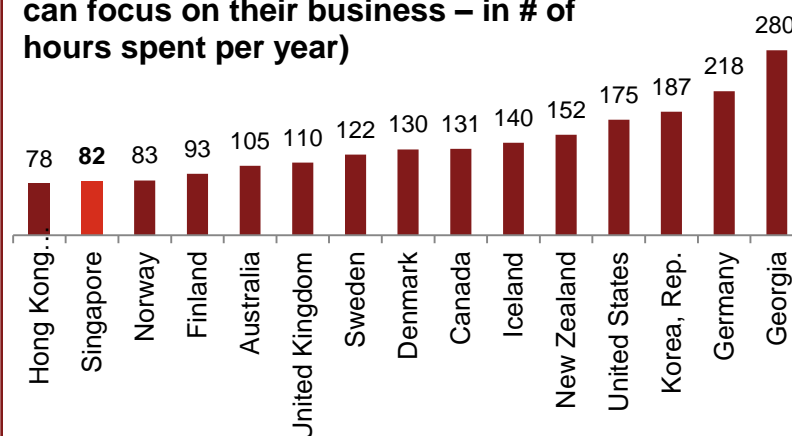# *The ease of doing business has been one of the main 'pull' factors for most foreign start-up entrepreneurs*

2014 World Bank ranking "Ease of doing business"

Rank	Country
1	**Singapore**
2	New Zealand
3	Hong Kong SAR, China
4	Denmark
5	Korea, Republic of
6	Norway
7	United States
8	Finland
9	United Kingdom
10	Australia
11	Iceland
12	Sweden
13	Germany
14	Georgia
15	Canada

Starting a Business (# of days)

Country	Days
New Zealand	0.5
Georgia	2
Singapore	2.5
Hong Kong SAR, China	2.5
Australia	2.5
Korea, Rep.	4
Iceland	4.5
Canada	5
Denmark	5.5
Norway	6
United States	6.2
United Kingdom	11.5
Finland	14
Germany	14.5
Sweden	16

Ease of paying taxes (so entrepreneurs can focus on their business – in # of hours spent per year)

Country	Hours
Hong Kong...	78
Singapore	82
Norway	83
Finland	93
Australia	105
United Kingdom	110
Sweden	122
Denmark	130
Canada	131
Iceland	140
New Zealand	152
United States	175
Korea, Rep.	187
Germany	218
Georgia	280

"As a foreigner, I was drawn to Singapore because of how easy it was to set up a company, get funding and such. Even [the process of] paying my [start-up's] taxes was a lot simpler than back home."

- Entrepreneur

Source: World Bank 2014 "Doing Business" Report, PwC Interviews

A >$1bn company will have to operate more regionally, and internationalisation is always hard

The Singapore domestic market is relatively small...	**...and overseas expansion is challenging...**	**...but Singapore can be a great hub for Southeast Asia**

- Expansion is difficult from both a product and operational perspective
- Southeast Asia is not 'one market' but requires a country-by-country approach

- Singapore is well-placed geographically and economically
- The country's free trade agreements make it easier to target international markets

"Singapore's population is only 5 million. If we want to grow big, we have to look abroad and expand."
- Entrepreneur

"Tastes and preferences are so different that we would have to incur significant cost to tweak our product …The market dynamics , purchasing power, infrastructure are all challenges for us."
- Entrepreneur

"Southeast Asia has approx. 600m people and is the fastest growing region globally. Our businesses should tap on that market potential by expanding regionally."
- Entrepreneur

"…The most important of Singapore's economic realities [is] the country's tiny size. That means Singapore must cater to global standards and markets or doom its businesses to irrelevance."
- Technology Review

"Scaling our operations is difficult as well. Different countries have different accounting treatments, and coordinating the back-end to ensure our financial information is accurate and compliance is a nightmare."
- Entrepreneur

The ASEAN 2015 integration should also benefit Singapore's position as a business hub, by making it easier for Singapore's tech-enabled start-ups to seize international opportunities

Source: PwC Interviews

Several Singapore tech-enabled start-ups have already successfully internationalised their businesses starting from Singapore

Examples – not exhaustive

- Publisher of three of Asia's largest parenting sites – theAsianparent.com, pregnant.sg and kidlander.sg – reaching out to over 1.3 million Asian parents
- Operates in Singapore, Malaysia, Thailand, the Philippines and Indonesia
- Looking to expand into India and Vietnam in the next 18 months

- Sells more than 130,000 fashion and beauty products from 500 international brands
- Active in Singapore, Indonesia, Malaysia, the Philippines, Thailand, Vietnam, Hong Kong, and Brunei

- Launched over 10 games on its platform, Garena+
- Owns a flagship chat app called BeeTalk, which has amassed over 10 million users in 4 months
- Expanded successfully into regional markets like Thailand, Indonesia and the Philippines

Source: TechinAsia, e27

As the Luxola example shows, start-ups can use Singapore as a hub to go on a step-by-step expansion towards successful internationalisation

Luxŏla

1. Assess the market for the product

- Demand and market space for cosmetics products was huge in Southeast Asia
- Lack of trusted e-commerce partners for big labels to work with

5. Adapt to different customer needs

- Localised marketing was key
- On-the-ground teams help to create and execute ideas that will best resonate with locals

4. Identify market entry focus

- For Luxola, it was customer acquisition before building on-the-ground capability
- Understanding your resource constraints helps to narrow your focus

"We have done it [market entry strategy] piece-by-piece... [And it] has allowed us to try many different logistics partners...while avoiding the cost of warehousing in every market"

3. Understand country-specific issues

- Understand the country-specific challenges
- Look for similarities and key differences
- Create efficiency by solving an issue in one country & utilising the "best practice" in others

"Payment options are a pain in Indonesia...rather than try to roll out every localised payment option for every country at the same time, we prioritised Indonesia...[Now], it's taking us a fraction of the time because we understand the process"
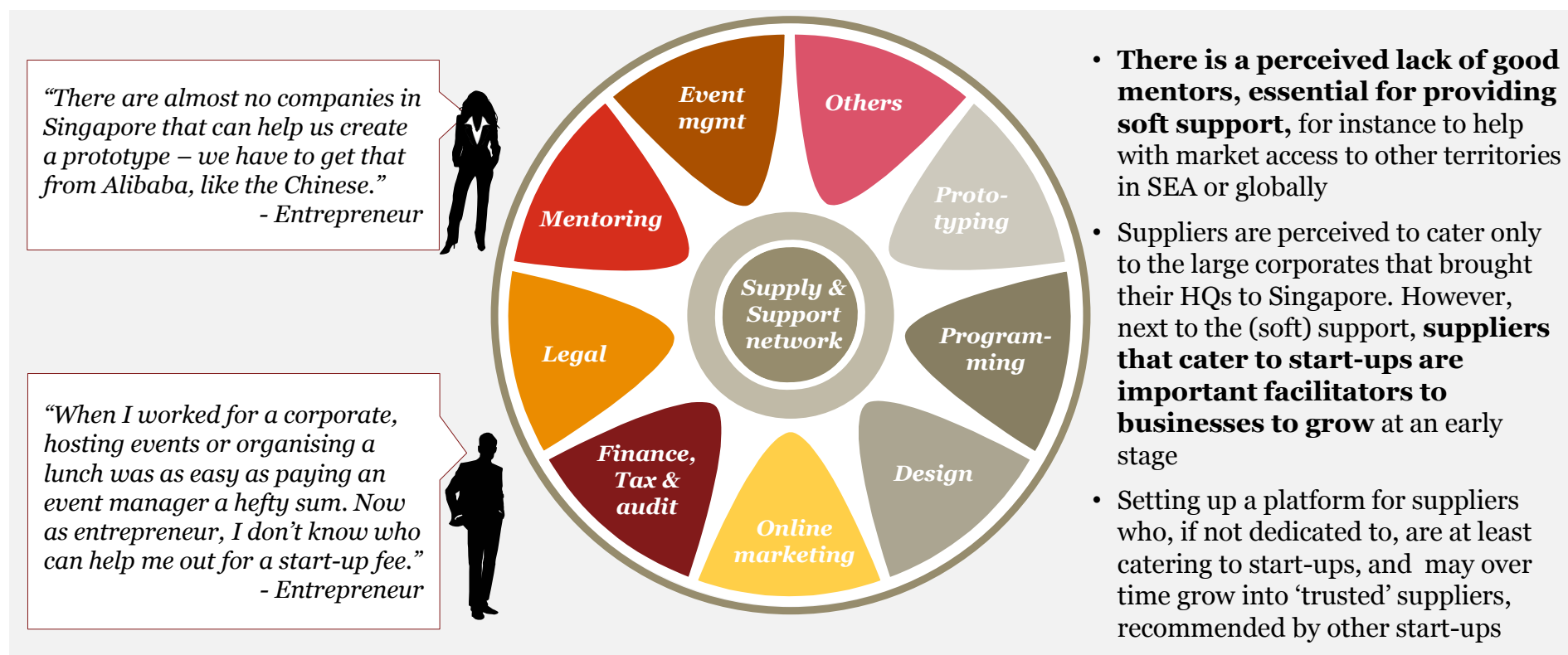
2. Evaluate the business' readiness

- Define the business model before expanding to other markets
- Example: inventory management, product mix, customer acquisition

"We learned a lot in the nine months we were purely in Singapore before we pushed out to other countries. Had we launched in all countries from the get go, we would have made some VERY costly mistakes"

Source: PwC Analysis

Ecosystem recommendation:
Many entrepreneurs feel a need for stronger support, for example in the form of good mentors and prototyping

"There are almost no companies in Singapore that can help us create a prototype – we have to get that from Alibaba, like the Chinese."
                                                    - Entrepreneur

"When I worked for a corporate, hosting events or organising a lunch was as easy as paying an event manager a hefty sum. Now as entrepreneur, I don't know who can help me out for a start-up fee."
                                                    - Entrepreneur

- **There is a perceived lack of good mentors, essential for providing soft support,** for instance to help with market access to other territories in SEA or globally

- Suppliers are perceived to cater only to the large corporates that brought their HQs to Singapore. However, next to the (soft) support, **suppliers that cater to start-ups are important facilitators to businesses to grow** at an early stage

- Setting up a platform for suppliers who, if not dedicated to, are at least catering to start-ups, and may over time grow into 'trusted' suppliers, recommended by other start-ups

Source: PwC interviews

Government regulation

At present, the Singapore government is driving initiatives on several fronts to promote tech entrepreneurship and growth in the ecosystem.
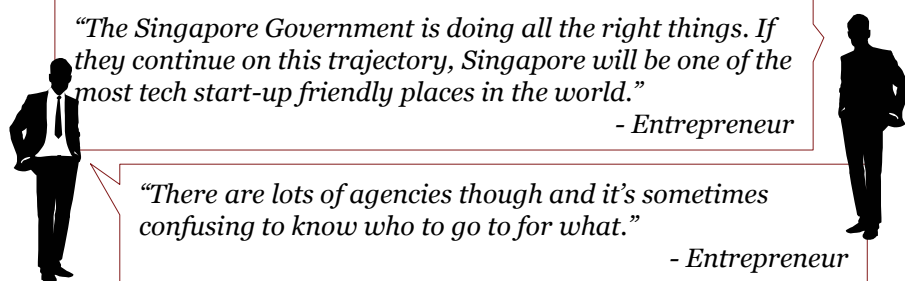
As the tech-enabled start-up ecosystem evolves, there is still unlocked potential for the government to accelerate growth in the ecosystem, such as facilitating international regulatory and approval processes as well as serving as a role model for the consumption of start-up goods and services.

Effectiveness of early stage funding could be assessed, with the key priority now shifting more towards growth funding and scaling up.

Singapore can learn and potentially cherry-pick from what governments are focussing on in more mature ecosystems like the ones in Israel / Tel Aviv and in the UK / London. Tel Aviv has broken down a 'Start-up City' vision into very actionable working plans, and in the UK industry is now calling for more support on growth stage financing. The Appendix of this report includes examples of activities there (p61-62).

The Singapore government is driving a number of initiatives, which are highly appreciated by the ecosystem

SPRING singapore Enabling Enterprise
- Responsible for helping SMEs grow and build trust in products and services
- Work with partners to help SMEs with technology and innovation, among others

ace action community for entrepreneurship
- Organisation by entrepreneurs and civil servants to seed and nurture start-ups
- Provide funding, networking and mentorship for start-ups to grow

ie Singapore INTERNATIONAL ENTERPRISE SINGAPORE
- Responsible for helping Singapore companies gain entry into new markets
- Supports their efforts to bring business to new markets

ENTERPRISEONE Serving Singapore's Business Community
- Multi-agency initiative managed by SPRING
- One-stop site for enterprises looking to start, sustain and grow their business

iDA INFOCOMM DEVELOPMENT AUTHORITY OF SINGAPORE
- Develops information technology and telecommunications within Singapore
- Actively supports growth of innovative technology companies and start-ups

EDB singapore
- Responsible for planning and executing Singapore's business strategies for growth
- Helps businesses drive innovation

MINISTRY OF MANPOWER
- Oversees the manpower needs for the Singapore economy
- Introduced the "Entrepass" for foreign entrepreneurs to start their business

Agency for Science, Technology and Research SINGAPORE CREATING AN INNOVATION ECONOMY
- Responsible for fostering world-class scientific research and talent
- Provides intellectual, human and industrial capital to partners in industry

"The Singapore Government is doing all the right things. If they continue on this trajectory, Singapore will be one of the most tech start-up friendly places in the world."
- Entrepreneur

"There are lots of agencies though and it's sometimes confusing to know who to go to for what."
- Entrepreneur

Sample of Government institutions' achievements
- Organisation of 50+ Blue Sky Exchanges between entrepreneurs and professionals
- SME Securitisation Loan by DBS Bank, which raised $100 million for 400 companies
- 150+ sessions of ACE Speakers Circuit, reaching out to more than 60,000 youths

Source: SPRING Singapore, PwC Interviews

Tech-enabled start-ups can either enhance or stifle start-ups

| **Most entrepreneurs are in consensus that local public policies are business-friendly…** | **…but when it comes to disruptive technologies, current public policies may need to evolve** |

The Singapore government has helped in the development of the crypto-currency industry…

Example: Crypto-currency industry

- Singapore's strides in crypto-currency can partly be attributed to the Monetary Authority of Singapore's (MAS) clear-cut regulation of virtual currency intermediaries operating within its jurisdiction

- The Association of Crypto-Currency Enterprises and Start-ups Singapore was formed to represent such businesses locally

Source: TechinAsia, Singapore Business Review, PwC Analysis

…but some industry-specific regulations may still need to be amended in the future to further enhance growth of start-ups, for instance around the sharing economy

Example: Sharing economy

- Currently, there is a lot of attention on the sharing economy

- The government is taking an active approach at looking into regulations across various industries to decide upon what will be allowed within current regulatory frameworks, where laws may have to evolve and where laws will remain in place to potentially protect a current market space, as is happening in countries like Germany and the US around taxi transportation

Ecosystem recommendation:
Many entrepreneurs would welcome simpler public procurement procedures to make it easier for start-ups to sell to the public sector

| **The government has the capacity to directly contribute to the growth of local start-ups through its procurement...** | **...and could also achieve great impact by serving as a role model for SMEs, GCCs and MNCs** |

- Already 80% of all Government tenders (for contracts valued >$70k) were awarded to SMEs, accounting for about 50% of total contract value awarded

- The Ministry of Finance (MOF) recognizes that more can be done to help smaller companies take on larger projects, particularly in the IT and Telecommunication sector to nurture Singapore's tech start-ups

Tech-enabled start-ups are more innovative and are well-positioned to serve the needs of other local companies...

- In 2013, the Ministry of Trade and Industry (MTI) highlighted the need for SMEs to restructure for business competitiveness and achieve quality growth.

- This involves SME investment in areas such as skills upgrading, new technologies and innovative processes

- SMEs are an important pillar of Singapore's economy, contributing more than 50% of economic output. Hence, they represent a large (untapped) market for tech-enabled start-ups in Singapore

"The government could do more to support start-ups by becoming a consumer of our products and services. For example, they could choose us over the incumbents for 'non-critical' missions."
                                                    - Entrepreneur

"Government support could send a signal to the market that start-ups are capable of delivering high quality goods and services as well."
                              - University researcher and entrepreneur

"To be honest, I don't think many start-ups are looking to target the government as consumers yet. We don't have the time or money to cope with their procurement processes. I think the corporates (SMEs, MNCs) in Singapore are better-placed to give us their business."
                                                    - Entrepreneur

Source: PwC Interviews, MTI press releases

Appendices

Definition of a tech-enabled start-up

> **For the purpose of this report, a tech-enabled start-up is a young, company that is primarily technology-driven**

The definition of a 'tech start-up' has not been established in academia, with large variances in the scope of firms to be included in its analysis.

For the purposes of this report, a tech-enabled start-up is deemed to possess the following characteristics:

- Technology is central to the product or service being provided

- Technology serves as an enabler for the production of innovative products or services, arising from the practical application of knowledge

- There is high leverage of the labour input to the product or service, allowing the business to scale rapidly where required – "designed for high growth"

- The product or service is a "disruptive innovation" where it helps to create a new market or a new supply chain network that disrupts an existing market

- The business has not been in operation for more than 8 years

This definition typically excludes companies that are heavily dependent on labour or capital inputs, but includes companies whose final product or service is not technology itself, but is technology dependent, such as Reebonz or RedMart. Hence, the team has used the term "tech-enabled start-up" to remind readers of this report that such businesses continue to fall within scope of this analysis.

This definition does not include biotech.
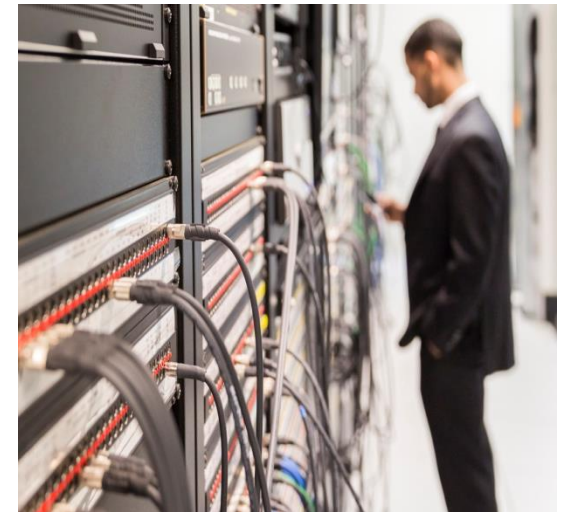
To calculate the potential impact of the ecosystem on Singapore, we developed data-driven formulas to calculate GDP and job output

In a given year, the...	equals	the outcome of :
Pool of potential founders	=	[Number of IT & Engineering graduates per year] × [Number of years during which graduate may become an entrepreneur] × [Interest in entrepreneurship as profession] × [1 +Population growth rate for Singaporeans[1]] ^ [t(x), for which x =number of years from now to specific year] + [Conversion rate of founders turned serial entrepreneurs after previous start-up failed] × [Number of start-ups failed in previous year]
Number of new start-ups	=	[Pool of potential founders in a given year] × [Conversion rate of potential founders to entrepreneurs] / [Average number of founders per start-up]
Total revenue of start-ups	=	([Estimated number of start-ups in Singapore today] × [Estimated distribution along maturity curve of start-ups in Singapore today] + [Number of start-ups in a given year] × [Estimated likelihood of survival for start-ups of certain age]) × [Projected revenue of start-ups distributed along maturity curve] + [Cumulative number of successful start-ups] × ([Revenue of successful start-ups] × [1 + growth rate of real GDP] ^ [t(x), for which x =number of years from now to specific year]
Contribution to GDP	=	[Estimated revenues of start-ups in a given year] × [Percentage of revenues estimated to contribute to value add] / [Singapore GDP in a given year]
Estimated number of jobs	=	[Estimated revenues of startpus in a given year] / [Estimated average productivity per employee in tech-enabled start-ups]

Note: [1] Population growth rate is taken for Singaporean nationals only – excluding PRs and foreigners
Source: PwC Analysis

Tel Aviv has a "Start-up City" vision, updated annually

Tel Aviv's Start-up City vision is broken down along three key 'anchors'...

... and has been made actionable

Fostering an innovative, digital and accessible environment

Tel Aviv will invest in creating a digital and accessible environment, provide platforms and spaces that facilitate innovation and R&D, and simplify bureaucratic procedures for start-up ventures in the city

- Collecting data and setting measurable targets
- City Wi-Fi
- Removing property tax barriers
- Municipal apps competition – TelAvivApp2U
- Transparency and accessibility

Unveiling the city's strengths and drawing foreign audiences

Tel Aviv will remove barriers to entering and doing business in Israel, make the city more accessible to foreign audiences, and support and encourage qualities that appeal to entrepreneurs, investors and hi-tech professionals from around the world

- Start-up Visa – work permits for employees of start-up companies
- The city's presence at global events and conferences
- Making the municipal environment more accessible to foreign audiences

Involving the city's residents in the Start-up City initiative

Tel Aviv is taking steps to instill the values of accessibility and partnership in all the Municipality's operations and services

- Open Start-up
- Municipal committees with public participation
- Social labs

Source: Tel Aviv Start-up City Vision, PwC Analysis

London / The UK is now aiming to go from start-up ecosystem to scale-up ecosystem, aiming to enter the next stage of maturity

In a November 2014 industry-commissioned report called 'The Scale-Up Report on UK Economic Growth', Sherry Coutu provides 12 recommendations on how to get from start-ups to scale-ups

1 National data sets should be made available

2 Public organisations have to report on top 50 scale-ups in their region

3 50% of public funding for entrepreneurship should go to projects with impact on scale-ups

4 Make a Minister responsible for reversing the 'scale-up gap' by 2025 and create a scale-up report every year

5 Ensure the UK is in the Top 5 of the OECD PISA rankings for numeracy and literacy by 2025

6 Local Enterprise Partnerships and city / cluster / ecosystem leaders should promote the top 50 scale-ups in their area

7 A 'scale-up' visa should be made available to top scale-up companies to recruit staff within two weeks of applying

8 Local Enterprise Partnerships, universities and the private sector should cooperate on effective learning programmes

9 The government should draw attention to scale-up companies and their leaders as role models so they can find customers quicker

10 Make impact of 'cycle time' on rapidly growing companies a major consideration for regulators

11 Government and industry must ensure (and report on) progress in the finance-gap is maintained

12 Government and industry must ensure (and report on) progress in infrastructure areas is maintained

Source: The Scale-Up Report on UK Economic Growth', Sherry Coutu – November 2014

Example start-up acquisitions in Singapore (not exhaustive)

| No.	Start-up	Year of Acquisition	Acquirer	Local / Foreign Acquirer	Amount (US$m)	Industry	Industry Category
1	Nonstop Games	2014	King	Foreign	96	Games Developer	Entertainment
2	Zopim	2014	Zendesk	Foreign	30	Live customer support chat widget	Services
3	ERIIN	2014	Undisclosed	Foreign	Undisclosed	Online fashion store	E-commerce
4	Indiescapes	2014	BeMyGuest	Local	Undisclosed	Travel experience marketplace	E-commerce
5	SGE	2013	TechinAsia	Local	Undisclosed	Tech Blog	Entertainment
6	EK Media	2013	SingPost	Local	1.2	Cosmetic Sample e-commerce	E-commerce
7	Thoughtbuzz	2013	The New	Foreign	Undisclosed	Social Media Analytics	Analytics
8	Viki	2013	Rakuten	Foreign	200	Video content site with crowdsourced subtitles	Entertainment
9	YFind	2013	Ruckus Wireless	Foreign	Undisclosed	Indoor Positioning	Services
10	Techsailor	2013	The New	Foreign	Undisclosed	Social, location and mobile media services	Advertising
11	Travelmob	2013	HomeAway	Foreign	12.5	Vacation rentals site	E-commerce
12	Asian Food Channel	2013	Scripps Network	Foreign	66	Food and lifestyle broadcaster	Entertainment
13	DS3	2013	Gemalto	Foreign	Undisclosed	Internet banking security authentication server	Security
14	sgCarMart	2013	Singapore Press Holdings	Local	48M	Vehicle marketplace	E-commerce
15	Catcha Digital Asia	2013	Opt Inc	Foreign	Undisclosed	Online advertising network	Advertising
16	Gridblaze	2013	Undisclosed	Foreign	Undisclosed	Data storage service	Services
17	The Mobile Gamer	2012	Singtel	Local	1.5	Mobile gaming software distributor	Entertainment
18	HungryGoWhere	2012	Singtel	Local	9.4	Food portal	Services
19	Peekspy	2012	Stubhub	Foreign	Undisclosed	Convert venue visualisation	Services
20	AdMax Network	2012	Komii Media	Foreign	Undisclosed	Digital media network	Advertising
21	OrSiSo	2011	Singtel	Local	Undisclosed	Social media dashboard	Services
22	BigDeal.sg	2011	NTUC Link	Local	Undisclosed	Daily deals aggregator	E-commerce
23	Aktiv Digital	2011	Komii Media	Foreign	Undisclosed	Ad network platform	Advertising
24	JobsCentral Group	2011	Career Builder	Foreign	Undisclosed	Jobs search portal	Services
25	Brandtology	2011	Media Monitors	Foreign	Undisclosed	Online brand monitoring & BI	Analytics
26	Beeconomic	2010	Groupon	Foreign	Undisclosed	Daily deals aggregator	E-commerce
27	TransferTo	2010	Ingenico	Foreign	38	Mobile Payment Transfer Company	Services
28	TenCube	2010	McAfee	Foreign	11	Mobile security	Security
29	ShowNearby	2010	Global Yellow Pages	Foreign	3.5	Mobile directory app	Services
30	Shareinvestor.com	2008	Singapore Press Holdings	Local	12	Internet FS & tech company	Services
31	Soundbuzz	2008	Motorola	Foreign	27.7	Music downloads site	Entertainment
32	e-Cop	2007	Temasek Holdings	Local	Undisclosed	Information Security Technology & Services	Security
33	HardwareZone	2006	Singapore Press Holdings	Local	4.5	IT Media Company	Entertainment

Source: TechinAsia

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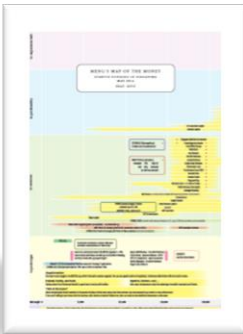
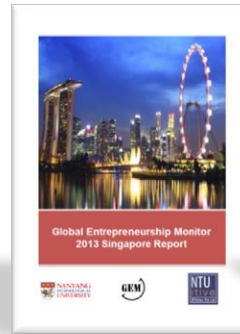Wong, Meng (2014) *Meng's Map of the Money*

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Singapore's tech-enabled start-up ecosystem
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April 2015
65

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