



High-tech SME gap in Singapore

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Singapore, October 2010

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1. Executive summary

Project context:

The Singaporean government has named the high-tech industry as a strategic growth area and launched various programs to stimulate this sector. While this strategy was successful for MNCs and start-ups, there is only handful of successful high-tech SMEs in Singapore. The lack of high-tech SMEs is referred to as “the Gap”. The overarching project goal is to develop a set of insights and actionable recommendations for the Singaporean Investment Community, Government bodies and SME companies to make the latter more sustainable and make them achieve a large size faster.

Methodology / Approach:

The project is phase two of a larger three phased project. The current phase has the goal of a) identifying and profiling high-tech SMEs in Singapore, b) get a good understanding of the situation of SMEs and the underlying reasons for this Gap and c) to develop an initial set of recommendations how these can be overcome. To tackle the first part secondary research leveraging both public sources and private networks will be performed.

To achieve the second objective in-depth interviews with senior management of the identified SMEs will be conducted. The results of these interviews will be the foundation to develop the recommendations afterwards. To ensure a comprehensive approach in tackling parts 2 and 3 we will use a framework which consists of five areas of potential barriers: Market, Competition, Access to capital markets, Infrastructure/ Government support, and Company internal factors. Within these areas we will follow a set of hypothesis to guide our thinking.

Growth barriers for high-tech SMEs:

During the project we have identified 11 high-tech SMEs and conducted interviews with 7 of them. Interviews were conducted with either the owner or senior management from Business Development or Strategy. Our discussions show that interviewees perceive and can clearly outline perceived barriers for growth of high-tech SMEs, these include:

- a small domestic market with equally small, but highly different end consumer markets in the region; generally high price-sensitivity in B2B business in SE Asia
- a limited availability of growth capital and restrictive bank lending usually involving personal guarantees
- a focus by the government on creation of high-tech start-ups, not sustained growth of those companies

Recommendations:

Recommendations are based on work shop of the project team and mainly reflect experiences from Europe and South East Asia. In our point of view both the Singaporean government but also the business community needs to act. Key measures to overcome the barriers for growth include:

- for high-tech SMEs to create an industry organization in order to generate increased awareness and organize more impactful initiatives
- for the government and the business community to attract more and especially more sophisticated VC presence in order to ease growth financing

- for the government to rethink the role of GLCs, as those currently tend to squeeze out local competition rather than to conduct outward facing business expansion

2. Project context

2.1 Background

Singapore is increasingly transforming from a manufacturing to a services and high technology hub. In this context the Singaporean government has named the high-tech industry as a strategic growth area. While MNCs have for some time been offered attractive conditions for establishing their regional headquarters in Singapore, more recently also the start-up scene has received more support. Various programs, such as Spring Singapore, have been initiated to stimulate this sector.

While this strategy was by and large successful with respect to MNCs and start-ups, a “gap” exists for medium enterprises (defined as having a turnover of S\$5 to S\$80 million and less than 200 employees). The term “gap” refers to the fact that medium sized enterprises within the high-tech sector take in a much smaller role in the overall economy in Singapore than in other developed markets, such as Germany or South Korea. Neither in terms of total revenue nor in terms of employment do medium-sized high-tech companies in Singapore compare to their peers in other countries.

The overarching goal of the project is to develop a set of insights and actionable recommendations for the Singaporean investment community, government bodies and medium-sized companies to help the latter grow in a sustainable fashion. The project is broken down into three phases. The first phase was aimed at verifying the existence of the gap. The current and second phase aims at uncovering and understanding the reasons behind the gap’s existence. At the same time first hypotheses regarding its underlying fundamentals should be generated and potential solutions outlined. The third phase will try to explain why these barriers developed and will further investigate recommendations.

2.2 Results from earlier phase and resulting scope for phase two

The initial phase of the project was aimed at verifying the existence of the gap. The project found the following evidence supporting this hypothesis:

- a) The high-tech sector in Singapore is dominated by large companies with more than 200 employees, representing 72% of revenue generated in the sector
- b) In other sectors in Singapore medium-sized enterprises play a more important role, e.g. in wholesale, retail trade, and real estate
- c) Singaporean companies tend to go public relatively “early”, i.e. with a relatively modest market capitalization

Based on the results of the first study the focus of the second phase was three fold:

1. Identify and profile all relevant medium-sized high-tech enterprises supported with evidence from a set of relevant interviews
2. Develop a set of hypotheses on why the gap exists
3. Derive an initial set of recommendations for overcoming these barriers

This task will be tackled with a two pronged approach of secondary market research to identify and profile high-tech SMEs, as well as primary research in form of in-depth interviews with senior management or owners of high-tech SMEs to uncover reasons for the existence of "the gap". The report is structured in three parts following the logic of the three objectives mentioned above.

3. Part I: Identification and profiling of high-tech MEs

3.1 Secondary research to identify high-tech MEs

To focus our work we needed to properly define "Singaporean high-tech MEs". The following three key components had been chosen and appropriate criteria along those dimensions had been chosen:

"Medium Enterprise (ME)" defined as: (Definition based on previous study to ensure comparability)

- Sales Revenues > 5MSGD/Yr, <80MSGD/Yr
- Number employees > 10 employees, < 200 employees

"Singaporean" defined as:

- Incorporated in Singapore
- Business started in Singapore – by either nationals or non-nationals
- Head-quarters and key operations in Singapore, manufacturing can be abroad

"High Tech" definition relates to the significant portion of budget dedicated by the company to R&D, IP and intangible assets. Typical industries would include IT & internet, life sciences and pharma, green tech and telecommunications. We explicitly excluded commodity (i.e. low margin) manufacturing as well as distribution and retail.

To ensure a holistic search and identify the maximum number of Singaporean High Tech ME including privately held ones, we used different sources:

CapitalIQ

CapitalIQ is a leading database which has information about companies worldwide as well as macroeconomic and industry data. CapitalIQ is a web-based application which requires a subscription and is available through the INSEAD's library. All companies in the database can be accessed by their name but also using a filtering process called "screening". This is conducted choosing a set of criteria based on 2000 predefined ones in CapitalIQ.

For our purpose, we have limited the criteria to the following:

- Geography: the company has its headquarter in Singapore
- Number of employee: between 10 and 200
- Annual sales: between 5 and 80 MSGD.

We did not use a criterion on the industry as "high-tech" is not a pre-defined sector.

Once a group of potential candidates was identified, we double-checked the company using the internet (e.g. corporate website) to include or discard them for our purpose.

Issues:

- CapitalIQ is exhaustive with respect to public companies but does not automatically follow private ones.
- Data for public companies is reliable but data from private ones can be incomplete.

SME500

DP Information Group is an advisory bureau which originally provided credit information for Singaporean SMEs. Nowadays it is a specialist on Singaporean SMEs, publishing surveys, market insights and a ranking of Singaporean SMEs: "SME500".

SME500 is available each year for 175 SGD and is also available online at the National Public Library of Singapore after a free registration to the library.

We have filtered the 500 SMEs with the systematic criteria described above and applied the same discretionary method to include or discard each company as a High-tech SME.

Issue:

- Only companies with the highest turnover are included in this database.
- Private companies must publish their result in order to appear in the listing

LinkedIn

LinkedIn is the world's largest business oriented social network with a substantial user base also in Singapore. LinkedIn has a search function which allows finding companies by filtering by region, number of employees and industry. We then made further research on these companies as in the previous steps.

Network

We used our personal network to include more candidates in the research.

3.2 Profiling data for SME fact sheet

For each company, we recorded the following information: Turnover, number of employees, family owned/private/public company, contact details, website, year of creation, description of business.

The identified companies fulfilling the "Singaporean High Tech ME" are listed in Appendix 1 with above information.

Summary of findings

Company Name	Public	Primary Industry	Created in	Total Revenue	# of employees	Website
Addvalue Technologies Ltd.	Yes	IT Consulting and Other Services	1994	8.6	70	www.addvaluetechnology.com
Algosys Limited	No	Application Software	2008	18.2	-	www.tradelabs.net
Amplus Communication Ltd.	No	Mfg - Electrical / Electronics	1999	25.8	100	www.amplus.com.sg
InfoWave Pte Ltd.	No	Communication Equipment	2002	7.5	35	www.infowave.sg
nex-G Systems Pte Ltd.	No	Communications Equipment	2004	-	-	nex-g.com
Ntegrator International Ltd.	Yes	Communications Equipment	1999	39.8	-	www.ntegrator.com
Pixelmetrix Corporation Ltd.	No	Communications Equipment	1999	-	-	www.pixelmetrix.com
QT Technology Ltd.	No	Mfg - Electrical / Electronics	2002	31.2	62	qttech.com.sg
Smartflex Holdings Ltd.	Yes	Semiconductors	2003	18.1	113	www.smartflex.com.sg
Stratech Systems Ltd.	Yes	Systems Software	1989	9.9	173	www.stratechsystems.com
Unified Communications	Yes	Communications Equipment	1998	13.5	195	www.unifiedcomms.com/

This identification process pointed several key elements about Singaporean high-tech SMEs. First, we don't have many candidates for our study and therefore we confirm the existence of a "GAP". Second, the data we gathered during this research showed us that these companies will not go to a MNCs stage anytime soon unless with an inorganic growth process such as an M&A. The highest annual sales number (around 30 MSGD for QT technology) is still 60% below the large company's threshold of 80 MSGD. Finally, the identification process (i.e. focusing on the Singaporean SMEs criteria before filtering on the high-tech profile) displayed a very small number of high-tech SMEs over the total number of SMEs: around 2%. A similar study in Europe¹ shows a proportion around 4%. For the city-state of Singapore, which promotes education excellence and business success, having so few high tech companies can be seen as an obstacle for its long-term economic aspirations, assuming that this sector is important for the growth of the developed economies.

4. Part II: Reasons for the Gap of high-tech MEs

4.1 In-depth interviews to identify growth barriers

After identifying the companies we approached these and scheduled interviews with either the owner or senior management from the Business Development or Strategy department. Due to the complexity of the topic we believe that these were the most appropriate interviewees, with sufficient experience and insights. Furthermore we expanded our interviewee base to also include investors and government bodies to assure a holistic coverage of the topic. In total we conducted 7 interviews (3 face-to-face, 4 by phone). Average duration of the interview, supported by an interview guideline - was about 0.5-1h.

4.2 Guiding hypotheses based on framework

To ensure a structured but holistic approach in identifying the barriers interviews were structured into five blocks, each with an overarching question:

- A) Market – How do high-tech MEs deal with a limited domestic market?
- B) Competitive landscape – How "tough" is the Singaporean high-tech market?
- C) Access to Capital Markets – Are MEs constraint by insufficient funding?
- D) Infrastructure / Government Support – How efficient is the government in supporting MEs to become self-sustaining and achieve a large size quickly?

¹ Study made across 19 European countries, *High Tech SMEs in Europe*, EC, 2002

E) Company specifics – How well are Singaporean MEs run, what could they do better, and what are their major operational challenges?

The full interview summaries can be found in appendix 2.

4.3 Interview results

Overall there is no one single reason for the existence of “the gap” for Singaporean high-tech SMEs. It is instead a combination of factors of which the three most important ones are:

A. Market and competition: B2C businesses in particular suffer from Singapore’s limited market size. In addition, other geographically close consumer markets to differ considerably in terms of consumer behavior. Since B2B customers are more homogenous this issue is less grave for B2B companies. Singaporean businesses often see themselves at an advantage vis-à-vis a US- or European-based competitor when doing business in this region, although in some industries the Asian markets are still short in significance when compared to the West. B2B businesses also suffer from effectively having no home market in Singapore as important government contracts are de facto reserved to incumbent government linked companies (GLCs).

B. Access to capital markets: High-tech SMEs in Singapore lack funds to finance growth. Having historically clients from manufacturing the banking sector in Singapore is not sophisticated enough to accommodate their needs (e.g. requires heavy assets as collaterals): additionally private equity markets (VC, growth capital) are underdeveloped and cannot compensate the difficult access to debt.

C. Infrastructure / Government Support: The government support and infrastructure is tailored to the needs of start-ups and hence can not fulfill the needs of later stage high-tech SMEs. The government failed so far to attract high-caliber VC/ PE funds.

When analyzing each of the interview blocks in more detail additional reasons emerge:

A) Market and competition

Our interviews show that B2C businesses and B2B businesses in the high-tech sector face different challenges when it comes to market and competition.

B2C businesses suffer from limited market size

B2C companies set up in Singapore and initially catering to Singaporean demand are quickly confronted with the relatively small size of the end consumer market in the country of about 5 million people. In order to grow further and reach a medium size, these companies would then have to expand internationally. Other than e.g. small European nations such as Belgium, Luxemburg, or Finland however, Singaporean companies don’t find end consumer markets similar to Singapore close by. The economic prosperity of Malaysia, Thailand, Vietnam, Indonesia, and the Philippines simply does not compare to that of Singapore. Thus within the region high-tech companies find their addressable markets often confined to the urban centers of Kuala Lumpur, Bangkok, Ho-Chi-Minh City, Hanoi, Jakarta, and Manila. However each of these markets is again relatively small in size by itself and presents Singaporean businesses with a wide variety of challenges in terms of localization, different legal structures, and in parts less political stability. More promising

end consumer markets such as India and China in turn are both geographically and culturally distant.

“The moment you cross the border either northwards or southwards, you have a completely different market.”

B2B businesses see South-East Asia as their hinterland – depending on industry

B2B businesses recognize that their proximity to South-East Asian markets often translates into an advantage in particular vis-à-vis competitors from the US and Europe. Thanks to their better understanding of general and business culture in the region they find themselves in the position to create a sustainable hinterland for their products and services. One example is the increased cost-consciousness for non-tangible products such as software or services. While Western companies often complain about low margins, the regional players better understand to price those elements into their tangible product offerings.

“We know better how to do business here [than our competitors from the US and Europe].”

This assessment however depends on the industry, not in all cases the relevant market is sufficiently developed neither South-East Asia nor even in the whole of Asia. In cases where the core markets until today lie in North America and Europe, Singapore-based B2B businesses naturally see themselves at a disadvantage in market access. Where markets are not sufficiently developed and customer sophistication is lower, small and medium-sized businesses also find it more difficult to generate sufficient trust in their prospective buyers in the region and tend to lose out against more established MNCs despite being more innovative. Decision makers in buyer companies often find it safer to close deals with the larger players in the market to a much bigger extent than in the more developed markets.

“We are far away from our core markets in the US and in Europe. The Asian high-tech markets are less sophisticated and much more cost conscious. Furthermore Asians like to work with big companies [...].”

The Singaporean market is virtually closed for B2B mid-sized companies

Although in the B2B space Singapore probably has less weight as a sales market, it could in theory still be an important source for first customers. However, government contracts are virtually exclusively granted to established government linked companies (GLCs) or their spin-offs. Reasons quoted include a complicated tender system designed to curb corruption and a general risk-aversion of government officials involved in the deals. Singaporean B2B companies thus have to target other geographies right from the start, which presents a considerable hurdle.

B) Access to Capital Markets

Our interviews show that high-tech SMEs in Singapore suffer from insufficient possibilities to fund growth. This obstacle has several underlying and linked causes:

High-tech cannot take on debt as they do not have assets to collateralize

Since high-tech companies are focused on people and IP they often do not have many valuable assets on the balance sheet which could serve as collateral. Unlike in many Western developed economies Singaporean banks are still focused on more asset heavy industries and require collaterals which high-tech SMEs cannot provide.

"If I ask my bank for debt they either want to have machines as collaterals or a significant amount of cash – a small high-tech company I do not have either."

Missing collaterals have to be substituted by unlimited guarantees

Since collaterals are missing banks instead demand unlimited guarantees by the owners of the company, consequently they are hesitant to take on debt and leverage companies to a "healthy" level. This not only results in slower growth but also less investment in R&D as owners are more risk averse and try to avoid debt to finance innovative but risky projects. If personal guarantees are not provided the banks demand a combination of a strong management team and cash on the balance sheet, so e.g. in order to get S\$1.5 million the company needs to pay in S\$750.000 first.

"Banks in Singapore offer you money when you have cash and don't really need them."

IPOs are the preferred way to overcome owners' unlimited guarantees

Confronted with this environment interviewees explained that the preferred way to overcome this risk of personal guarantees is to make the company go public. By changing the legal status of the company through an IPO the personal exposure is limited to the equity in the company so that personal property will not be at risk in case of bankruptcy.

Unlike in the US and Europe, Singapore does not have a mature VC/ PE scene

As explained above the debt market is not capable of satisfying financial needs of high-tech SMEs in Singapore. Unfortunately, the resulting financing need is currently not being filled by institutional players from the Private Equity sector (VC, growth capital, Business Angels), which makes this challenge even more grave. The government tries to fill this gap with programs like SPRING and SMART, but only with limited success and applicability for later stage companies. On top of that many Singaporean VCs are related to big Singaporean banks like OCBC and DBS, so that they are also hesitant to provide funds.

"High-tech in Singapore only got into the focus in 2003, so there just was not enough time for a considerable VC/PE scene to develop for this sector."

C) Infrastructure / Government Support

Our interviews show that the Singaporean government is highly successful in creating a vibrant start-up community, but its support mechanisms do not fulfill the needs of later stage Singaporean high-tech companies. This has several underlying and linked causes:

Government support is tailored to the needs of start-ups

Our interviews confirmed that Singapore is an ideal location to start-up a company. First the Singaporean administration is highly efficient and hence it is easy and cheap to start a company. Second, the different government agencies such as EDB, Spring etc. provide subsidies and incentives for start-ups. Third, Singapore provides easy access to top talent although local talent often prefers to work for MNCs, but within 48h one can get a work permit for foreign top talent.

“When we set-up our company, we evaluated different locations. As a start-up to need three things: market access, top talent and capital. In Singapore we had all of them.”

Government lacks experience to select high-potentials and nurture them

The Singaporean government provides assistance to its SMEs and really strives for making a difference. However our interviewees believe that the government money is “dumb money”. The government subsidies are small compared to the needs of the later stage SMEs and untargeted as the government lacks the ability to distinguish between winners and losers. Moreover the government lacks the experience and know-how to challenge the SME management, to coach them and to provide them with high-caliber contacts around the world.

“As SMEs are looking for Series A/B, they are looking not only for money. They are looking for (1) knowledge/ coaching, (2) network/ connections and (3) money. A government can not provide the first two as this is outside of their area of expertise.”

Government failed to attract high-caliber VC/PE funds

Our interviewees believe that the government should not try to substitute the missing VC/PE community as the government is not likely to put up the required amounts and to bear the associated risks. Overall they believe that the direct government support is close to its full potential and could (and should) not be expanded with reasonable effort. However, most of them wished that the government would shift its focus to create infrastructure and boundary conditions which attract some of the high-caliber VC/PE firms.

“I do not know a single high-caliber VC/PE fund with a focus on high-tech SMEs here in the region. That’s too risky for them; they are more interested in making money quick.”

Export support is of insufficient quality

Especially high-tech companies that have to compete abroad due to the limited size of the Singaporean market feel that the government is not providing adequate export support (IE – International Enterprise). SMEs often need organizations like chambers of commerce abroad to get a foothold in the market, gather initial market information and generally a partner who helps them orientate themselves. Our interviewees stated that overall IE has weak connections to the business communities abroad, insufficient resources and poor local footprint.

“I think that Singaporean export supporting organizations are not a big help, they do not have sufficient resources, lack local contacts and thus cannot be helpful.”

D) Miscellaneous

Managers of start-ups and medium size companies in the high-tech sector raised several other issues impacting their businesses:

Social stigma and cost of living prevents start-ups from hiring talents:

In Singapore the social pressure to “succeed” is high. Success is often defined as material success by the surrounding family: the capacity to live in a condominium, buy a car, travel abroad, etc. This pressure tends to push talents toward MNCs that offer stable jobs and high salaries. Additionally in Singapore the cost of living is extremely high, this creates difficulties for start-ups to hire talents for low salaries and to keep the ones they need for their R&D.

“Social pressure requires to have an own flat, not a rented one, and car; this is only financeable with a decent salary.”

“Singapore is highly prestige driven society and hence the local top talent prefers to work for the prestigious SMEs.”

A*Star Program and SPRING help small and medium high-tech companies in funding R&D

The A*Star program enables start-up and medium size companies to benefit through partnerships from a pool of high level PhDs and teachers working on their research projects. For companies drawing on A* Star support mitigates the difficulties of recruiting young talents and enables them to directly benefit from university research findings. Some successful high tech SMEs are heavily using these resources. Similarly R&D co-funding via the SPRING program was repeatedly quoted as important government support also by mid-sized high-tech companies

“Psychologically, we've always been a trading country, and, in many ways, we still are. We just trade different things now. We used to be a marketplace of goods. And, now, we are a marketplace of ideas.”²

² International venture capital: Singapore, www.altassets.com,

Singaporean SME management methods don't display real specificities:

No real specificities have been found in Singapore in term of management of high-tech SMEs. Most owners have been educated in top universities. Families of owners do not seem to have any specific influence on the conduct of the businesses and owners seem fully in control of their businesses.

Singapore does not educate real engineers:

Interviewees mentioned that Singaporean educated engineers are not the right talent. Most of them study engineering as this is pushed by the government and entry requirements are low – however, after a couple of years many people change their profession away from engineering. At this high-tech SMEs often need "true" engineers willing to stick to their field and develop further.

“We hardly ever hire Singaporean engineers as they are not hands-on enough for us, after a couple of years they switch to, for example, real estate – we need dedicated engineers who want to work in this field for years.”

5. Part III: Initial recommendations

Based on our primary and secondary market research, we derived an initial set of recommendations. To be specific and actionable we structured these along the players: Singaporean high-tech SMEs, Government bodies and VC/PE funds. It is important to bear in mind that these have been derived based on a limited number of data points.

A) Singaporean high-tech SMEs

Form an overarching body representing the interests of high-tech SMEs:

The challenge of a limited B2B market size could be overcome if a fair competition between GLCs and SMEs existed. To increase the impact of influencing efforts SMEs should try to form an overarching organization which will represent the interests of high-tech SMEs towards the government. This organization should actively try to lobby in favor of fair and innovation-friendly tender processes for government projects.

Moreover this organization could organize career fairs and information events on the high-tech SMEs in universities, which could at least make people aware of career opportunities beyond MNCs and GLCs.

Raise awareness on challenges of high-tech SMEs:

The challenges encountered during the first two phases of the project as well as statements by interviewees indicate that the SME sector and its potential impact on the Singaporean economy is largely unknown. SMEs should also use the organization mentioned above to support a research initiative (e.g. with NUS, SMU or INSEAD) to substantiate the potential importance vis-à-vis the status quo of (high-tech) SMEs to spark discussions and raise awareness about the specific challenges they face. The current study could serve as a foundation for this but would have to be repeated on a more comprehensive level. Once a discussion has started it will be easier to find open ears at the government.

Create platforms of knowledge exchange and mentors for SMEs:

Together with the government SMEs (or the representing organization) should try to establish a platform for knowledge exchange between high-tech SMEs. This could feature regular workshops about the experiences of doing business in various countries in the region or exchange on good management practice. A second platform should aim to link advisors, i.e. very experienced and successful representatives from other SMEs, MNCs and GLCs, to SMEs that are looking for more than just "dumb" money.

Cross-national business development in the high-tech SME sector

In order to overcome the current obstacles in growing B2B high-tech businesses in particular with respect to Singaporean buyers, SMEs could go one step further from just hiring engineering talent in the region and actively co-found ventures with partners from e.g. Thailand, Malaysia, Indonesia, etc. Such ventures could then find themselves supported by a larger combined "home" market to start off.

B) GovernmentIntroduce fairer and more innovation-friendly tender procedures for government projects:

To compensate for the limited size of the domestic B2B market the government should introduce fairer tenders for government projects and e.g. relax some of the bureaucratic hurdles for smaller bidders. Additionally it should introduce an incentive scheme that will compensate for the "uncertainty penalty" SMEs are facing when bidding against GLCs.

Re-evaluate the policy of GLCs:

Currently GLCs enjoy a privileged role in connection with government projects; we assume that the concept of GLCs is a first step to build "National Champions" which can then compete abroad – similar to the policy in France. It seems, however, that GLCs are rarely outward-oriented and do not compete well in foreign markets. Instead they enjoy a domestic quasi-monopoly which does not foster innovativeness within a particular sector. In this context we believe that the concept of GLCs should be reevaluated – often ground breaking innovations come from within the SME segment rather than larger corporations. In the longer term Singapore could improve its overall prospects of being a business hub if it has a specialized, strong and healthy SME sector rather than larger GLCs which are not competitive enough to beat MNCs and only hinder the growth of SMEs.

Invest more in export support for Singaporean SMEs:

Given the fact that SMEs in particular need a knowledgeable partner when going abroad, a strong network of chambers of commerce abroad can serve as a catalyst for SME growth. To achieve this it seems that the Singapore government will have to commit additional resources to enlarge the local footprint. By having considerable resources on the ground in the respective countries an effective export support will be much easier, due to a stronger network, more local knowledge etc.

Expand export credit guarantees (ECG):

Although with the ECICS an export credit guarantee agency exists since 1976, it should be evaluated whether it has the same importance as the very successful "Hermes Bürgschaften" in Germany. In 2009 Hermes Bürgschaften covered ~22.4 billion Euro (~2.3% of total exports) and is one of the most successful ECG programs world wide.

Especially for SMEs doing business with developing nations in South East Asia such ECGs could be very important.

Reallocate some seed funds to growth capital investments:

Government attributes seed funds to a variety of start-ups. However, successful start-ups in need of funds find it harder to get funds at a later stage. Thus, their small size does not make them attractive yet for the VCs but in the meantime they don't qualify anymore for the governmental seed funds. By allocating part of seed funds to growth capital funds, government would enable promising start-ups to further develop and reach the critical size needed to attract institutional investors.

Salary Top-Up for PhDs

Government could provide complementary salaries to PhD students working for high-tech start-ups. This would enable high-tech start-ups to become more competitive on the job market and recruit the resources needed for their R&D.

Monitor investments through a public investment board

Government should act as a real investor (ex: a VC) expecting return from its investment. This would help owners of start-ups to focus on their business profitability by asking them to report their financial results to a public investment board, report on progress made and discuss critical decisions. The public investment board would group researchers with expertise in high-tech, successful entrepreneurs, financial experts, persons with strong operational experience locally and abroad. They will in turn provide advices and contacts to the owner.

C) VC/ PE funds

Bring non-financial expertise

VC/PE firms should realize that Singaporean high-tech entrepreneurship history is fairly young compared to the history of Silicon Valley for example. We can assume that this result in a lack of mentorship for Singaporean ventures and these firms need strategic advices on how to nurture their growth.

Invest in Singaporean firms

Viewed from the surface, all the reputable PE/VC institutions have an office in Singapore but on the other hand, entrepreneurs complain not having enough PE/VC focus. Indeed, a research shows that less than 1/10 of the total VC funds managed from Singapore are invested in Singaporean firms³. These firms should asses the potential growth of Singaporean High-Tech ventures, given the fact that Singapore could be the perfect launching pad for such ventures given the quality of its infrastructure.

³ *Making IT: the rise of Asia in high tech*. Rowen, Gong, Hancock, Miller, Stanford press

6. Conclusion and next steps

Throughout the study, we confirmed that very few high-tech start-ups reached the level of medium size company in Singapore. Only 11 companies were indeed identified as high tech ME in Singapore.

After interview with the main medium size companies, we concluded that the main reasons restraining growth of the high tech start-ups in Singapore were mainly:

- the small size of the Singapore market and the difficulty to expand their sales abroad
- the difficulty to access capital for growth and loans
- the focus from government on the creation rather than the growth of start-ups
- the difficulty to hire and retain qualified staff

Finally, from this analysis, we drew several initial recommendations for the start-ups and government bodies to increase the number of start-ups reaching the size of medium size company.

To complete this research, further study would be required on the recommendations and the current government support. For such a study, we would first recommend making a complete review of the various governmental bodies and schemes that are supporting the start-ups. This will give a complete picture of current landscape for support. Then, start-up owners and government bodies should be interviewed to get their point of view and recommendations in order to pinpoint the areas for improvements. Finally, according to the feedbacks received, more refined recommendations should be drawn with clear actionable plans.

Leads for future interviews:

- Dr Wong Poh Kam, Dr. Wong is currently Associate Professor, Business School and Director, Entrepreneurship Centre, National University of Singapore. He currently serves on the board of directors/advisory board of several high tech start-ups in Singapore, Malaysia and Silicon Valley, and chairs the NUS Venture Support Fund Steering Committee. He has done academic research regarding the Singaporean High-Tech ecosystem.
- DP Information Group who provide advisory services for Singaporean SMEs.

Appendix 1: Fact sheets of Singaporean high-tech SMEs

Addvalue Technologies Ltd.

COMPANY PROFILE

Industry
Information Technology

Type of business
IT Consulting and Other Services

Incorporation
1994

Headquarter
28 Tai Seng Street No 06- 02 Singapore 534106 www.addvaluetech.com

Business description
Addvalue Technologies Ltd. designs, develops, and distributes telecommunication equipment and related products in Europe, North America, and Asia. Its satellite communication product offerings include Skipper 150 FleetBroadband used to talk, send, and receive text messages and emails from small and mid-sized commercial marine, fishing, and leisure vessels. The company also designs and develops location-based applications, such as tracking, monitoring, remote telemetry, and navigation products using GPS/GSM/GPRS technologies. In addition, it offers engineering services comprising SCADA, telemetry, data logger with or without backend connectivity, tracking with GSM only, interface for taxi operation, interface for other sensors with connectivity, tracking with Satcom and/or with GSM, and monitoring using hand phones. It serves customers in the communications, information technology, and electronics industries.

Key figures	
Ticker: SGX A31	FY09/10
Turnover MS\$	17.2
Total assets MS\$	49.4
Employees	70

International footprint & subsidiaries
Worldwide

Key personnel
<ul style="list-style-type: none">• Chan, Kum Lok Founder, Chairman and CEO• Chow, Choi Fun CFO• Tan, Khai Pang CTO

Algosys Limited

COMPANY PROFILE

Industry
Information technology

Type of business
Financial services software

Incorporation
2008

Headquarter
1, Changi North Street Singapore 498789 www.tradelabs.net

Business description
<p>Algosys Limited engages in the research and development of automated trading algorithms for the futures markets worldwide. The company involves in selling software, proprietary trading using the algorithms, managing trading floors under total trading outsourcing for high net worth individuals, and leasing algorithms for small trading accounts. As of March 31, 2009, it had eight trading algorithms and had approximately 1,600 subscribers base. Algosys Limited was formerly known as TradeLabs PLC and changed its name in July 2010. The company was founded in 2008 and is based in Singapore.</p>

Key figures	
	FY09/10
Turnover MS\$	12.7
Total assets MS\$	46.4
Employees	n/a

International footprint & subsidiaries
Worldwide

Key personnel
<ul style="list-style-type: none">• Goel, Niraj Chairman• Abraham, Binu Executive Director• Hocken, Claire Head of Investor Relations• Cheema, Kamaljeet Singh Sales Director of India and Director

Amplus communication Pte Ltd.

COMPANY PROFILE

Industry
Communications Equipment Application Software

Type of business
Design and manufacturing of electronic components

Incorporation
1999

Headquarter
19A Serangoon North Avenue 5 Singapore 554859 www.amplus.com.sg

Business description
Amplus Communication Pte Ltd. designs and manufactures RF, microwave, and millimeter-wave communication products. It offers VSAT and oscillator products; and logic, mixed signal, power circuits, and mechanicals parts. The company also provides offshore network products include internal communication systems, public address and general alarm systems, PABX, local area network etc... Further, the company provides navigation and communication systems include autopilots, radar/plotter/sounder, GPS/plotters, auto direction finders, sonar radars, ECDIS, navigational safety, gyrocompass, weather fax receivers, receivers, antennas, mobile satellites, intercommunication, other related equipment Furthermore, it offers ODM design, OEM manufacturing, engineering, and fixed and mobile satellite services. The company offers its products for airport operators, air traffic control customers, defense customers, hotels, shipyards, and ship owners.

International footprint & subsidiaries
Worldwide

Key figures	
	FY09/10
Turnover MS\$	17.7
Total assets MS\$	19
Employees	100

Key personnel
<ul style="list-style-type: none">• Wee-Piak, Chan Founding Member, CEO• Eng-Poh, Pang Founding Member and Vice President of Technology• Koh, Leon Founding Member, Senior Vice President of Business Development and General Manager• Lie, Benny Founding Member and Senior Vice President of Marketing• Teng-Lye, Mark Lim Founding Member and VP of Engineering

Infowave Pte Ltd.

COMPANY PROFILE

Industry
Communications Equipment

Type of business
Design and manufacturing of electronic components

Incorporation
2002

Headquarter
600 Sin Ming Avenue Singapore 575733 www.infowave.sg

Business description
Headquartered in Singapore, InfoWave is a leading infocomm technology (ICT) group providing communications engineering, telecommunications, applications, consulting, and outsourcing services to the region's leading transport, logistics, public safety, homeland security, and defense organizations. We work closely with customers to help them become high-performance businesses and governments. Founded in 2002, InfoWave's core capabilities lie in the design and development of a wide range of telematics and wireless equipments; implementation and management of integrated real-time track-and-trace, supply chain management, corporate performance management, and intelligent surveillance solutions. In addition, we provide security consulting and telecommunications services.

Key figures	
	2007
Turnover MS\$	7.5
Total assets MS\$	n/a
Employees	35

International footprint & subsidiaries
Worldwide

Key personnel
<ul style="list-style-type: none">n/a

nex-G Systems Pte Ltd.

COMPANY PROFILE

Industry	Type of business	Incorporation	Headquarter								
Wireless Telecommunications	Wireless equipment manufacturer	2004	25 Kallang Avenue #07-05 Singapore 339416 http://nex-g.com								
Business description			Key figures								
<p>nex-G is a global wireless network solution provider with a focused mission to build and enable high throughput wireless transmission technologies in Multi-service, multi-radio, multi-RF for Wi-Fi and WiMAX.</p> <p>With a solid team of dedicated and experienced design engineers in RF and networking, and integrated manufacturing and distribution facilities, nex-G is able to focus on developing and delivering an extensive range of broadband wireless solutions, enabling carrier class, mission-critical broadband wireless networks. nex-G provides carriers, service providers, and enterprises the opportunity to grow their markets and enhance their service offerings.</p>			<table border="1"><thead><tr><th></th><th>FY09/10</th></tr></thead><tbody><tr><td>Turnover MS\$</td><td>n/a</td></tr><tr><td>Total assets MS\$</td><td>n/a</td></tr><tr><td>Employees</td><td>n/a</td></tr></tbody></table>		FY09/10	Turnover MS\$	n/a	Total assets MS\$	n/a	Employees	n/a
	FY09/10										
Turnover MS\$	n/a										
Total assets MS\$	n/a										
Employees	n/a										
International footprint & subsidiaries			Key personnel								
ASEAN			<ul style="list-style-type: none">• Ronnie Persad (CEO/Founder)• Glenn S. West (CTO)• Alistair Henderson (VP Product Development)								

Ntegrator International Ltd.

COMPANY PROFILE

Industry
Communications Equipment

Type of business
Service provider

Incorporation
1999

Headquarter
4 Leng Kee Road No 06-03/02 Singapore 159088

Business description
<p>Ntegrator International Ltd., an investment holding company, provides information technology and telecommunication solutions in Singapore, Myanmar, Vietnam, and internationally. It involves in the design, installation, implementation, and integration of data, video, fiber optics, and wireless and cellular network infrastructure, as well as voice communication systems. The company also engages in the sale of voice, video, and data communication equipment and networks, as well as offers project management services for network infrastructure. In addition, it provides maintenance and support services that include 24/7 call centre hotline, hardware and software repair, online CRM system, on site support, and remote modem dial-in services. The company primarily serves banking and financial institutions, defense and government ministries, and telecommunication companies.</p>

Key figures	
Ticker: SGX 5HC	FY09/10
Turnover MS\$	37.1
Total assets MS\$	15.2
Employees	51-100

International footprint & subsidiaries
Singapore, Vietnam, Thailand, Myanmar, Cambodia

Key personnel
<ul style="list-style-type: none">• Chen Tien Lap (chairman)• Chang Joo Whut (CEO)• Han Meng Siew (COO)• Chan Kit Sw (CFO)

Pixelmetrix Corporation Pte Ltd.

COMPANY PROFILE

Industry
Communications Equipment

Type of business
Design, manufacturing and servicing of digital devices

Incorporation
1999

Headquarter
31 Kaki Bukit Road 3 07-03 Techlink Singapore 417818 www.pixelmetrix.com

Business description
Pixelmetrix Corporation Pte. Ltd. engages in the design and production of management and telemetry systems for digital broadcasters. Its products include DVStation, a multi-port and multi-layer monitoring solution for digital video networking; DVStation Pod, a one-port that connects to a laptop via standard Ethernet; DVStation-Remote, which is a one-port monitor system for RF, ATM, and MPEG signals; and DVStation-IP3, a monitoring engine for IPTV, cable, satellite, and terrestrial providers utilizing IP to transport and deliver video. The company provides its equipment and network intelligence systems for the management and monitoring of digital cable, IPTV networks, content providers, terrestrial transmission, satellite operators, and network equipment manufacturers.

International footprint & subsidiaries
Worldwide

Key figures	
	FY09/10
Turnover MS\$	n/a
Total assets MS\$	n/a
Employees	n/a

Key personnel
<ul style="list-style-type: none">Wilson, Danny Founder, Chief Executive Officer and President

Industry
Semiconductors

Type of business
Semiconductor supplier and services

Incorporation
2002

Headquarter
Blk 203, #06-51, Woodlands Ave 9 Woodlands Spectrum II Singapore 738956 http://qttech.com.sg

Business description
<p>QT is highly committed in providing high quality products, equipment services, and semiconductor solutions at an affordable cost. Most of our customers are mainly from international firms who are stringent in their process and equipment requirement.</p> <p>QT Solutech is a division of QT Technology Group starting the Factory Automation & Software business, System Maintenance and has expanded to EPI & RTP Equipments, Solar, Slurry Recycling System, Chemical Supply System and Security & Surveillance system in response to the global market demands.</p>

Key figures	
	FY09/10
Turnover MS\$	31
Total assets MS\$	37
Employees	62

International footprint & subsidiaries
Malaysia, Germany, South Korea

Key personnel
<ul style="list-style-type: none"> Charlie Yoon (CEO) Dennis Ng (COO)

Smartflex Holdings Ltd.

COMPANY PROFILE

Industry
Semiconductors

Type of business
Semiconductor supplier and services

Incorporation
2003

Headquarter
No 20 Tampines St 92 Singapore 528875
www.smartflex.com.sg

Business description
Smartflex Holdings Ltd., an investment holding company, provides integrated circuit (IC) module assembly and testing services for contact and dual interface smart cards, which are used in the banking and finance, pay TV, telecommunications, and transportation industries. It provides IC assembly and testing services for contact smart cards and dual interface smart cards; and performs IC assembly for both 6-contact and 8-contact smart cards, which are used in the telecommunications industry and industries requiring higher security smart cards, such as the banking and financial services and the pay TV industries. The company's smart card IC modules are used by customers in China, India, Europe, and southeast Asia as SIM cards in GSM phones to identify a subscriber on a GSM mobile phone network, as RUIM cards in CDMA phones to identify a subscriber on a CDMA mobile phone network, as banking cards for secured payment and identification purposes, and as pay TV cards.

International footprint & subsidiaries
Worldwide

Key figures	
Ticker: SGX 5RE	FY09/10
Turnover MS\$	31.2
Total assets MS\$	13.2
Employees	113

Key personnel
<ul style="list-style-type: none"> • Tan, Tong Guan Co-Founder and Executive Chairman • Ng, Eric Co-Founder, CEO • Yeo, Choon Tat Financial Controller • Koh, Ee Koon Company Secretary • Lee, Seng Suan Company Secretary • Pang, Sze Yong Sales Director

Stratech Systems Ltd.

COMPANY PROFILE

Industry
Information Technology

Type of business
Systems Software

Incorporation
1989

Headquarter
2 International Business Park No 06-20/35 Tower 2 The Strategy Singapore 609930 www.stratechsystems.com

Business description
Stratech Systems Limited engages in the design, development, integration, implementation, maintenance, and project management of information technology and advanced technology systems. It delivers real-time systems in the areas of intelligent vision, intelligent transport systems, and e-systems. Its intelligent transport systems consist of intelligent Border Crossing System; SmartFleet, an intelligent fleet management system; SmartTranz, a real-time public transport travel information system; Parkvasive, a pervasive solution for the intelligent parking management and secure vehicle/driver access control; and Electronic Toll Collection and Electronic Road Pricing Systems. The company's e-Systems products include Dynamic Pricing and Secure Payment, an online certificate of entitlement auction and payment engine; SmartCare, an online medical/healthcare claims/payment processing and proration system; SmartReports, an integrated knowledge management system for parliament and court reporting; Facilities Management and Disaster Recovery solutions. It serves various industries, such as aerospace and defense, financial services, government, healthcare, homeland security, and transportation.

International footprint & subsidiaries
Worldwide

Key figures	
Ticker: SGX S73	FY09/10
Turnover MS\$	35
Total assets MS\$	13.9
Employees	173

Key personnel
<ul style="list-style-type: none"> • Chew, Khien Meow Founder, Executive Chairman and CEO • Lim, Soon Hock Deputy Chairman, • Chua, Ah Leng President and COO • Sng, Hiang Hoe Director of Finance • Chew Khien Mien, Kennedy Technology Strategist

Unified Communications Holding

COMPANY PROFILE

Industry
Mobile Telecommunications

Type of business
Services and software for MNOs

Incorporation
1998

Headquarter
168, Jalan Bukit Merah, Connection One, Tower 3, #04-08A, Singapore 150168 http://www.unifiedcomms.com

Business description
Unified Communications Holdings Limited, an investment holding company, engages in software and technology solution businesses. It offers various solutions that each addresses a specific business optimization problem for mobile telecommunications service provider. The company delivers various bolt-on optimization solutions, including mobile value-added-services (VAS) that address approximately 300 million subscribers in 18 countries. It provides various application products, such as basic VAS applications, roaming VAS applications, and service analytics and service lifecycle management applications; and business support and analytics platform; mobile marketing and advertising applications; and premium VAS applications.

International footprint & subsidiaries
South East Asia, South Asia, Middle East, Africa

Key figures	
Ticker: SGX U18	FY09/10
Turnover MS\$	18.3
Total assets MS\$	12.8
Employees	195

Key personnel
<ul style="list-style-type: none">• Wong Tze Leng (Executive Chairman and Exec. Director)• Anton Syazi Ahmad Sebi (CEO and Executive Director)• Ho Ting Sai (Business Dev.)

Appendix 2: Standardized interview minutes

Interview number:	1
Interviewee & position:	Titus Yong, Owner/Founder
Company:	Ingenio

Key takeaways:

Market:

B2C difficult to develop from Singapore market as it is difficult to go abroad – even in the region (limited size, difficult to expand abroad as language/culture/regulation/living style/wealth is different)

For Singaporean founders in high-tech, it can be easier to start a company in the US than in Singapore (better financing, bigger market size, staff available, cheaper cost of living,...)

General inflexibility with respect to innovation in Singaporean businesses makes it difficult to excite them for new technology

Competitive landscape:

The large number of GLC (government linked companies) may sometimes prevent private Singaporean companies from developing as they are systematically favored and have strong financial backing; this is particularly true for the more dynamic subsidiaries of GLCs

Access to Capital Markets:

Lack of growth financing in SGP (VCs mostly located in HK as they target Chinese market, VC with low risk appetite)

Low level of debts contracted by start-ups as owners have to sign unlimited guarantees on these debts; limits financing resources and increases risks taken by owners

IPO at early stage often as a means to remove owners' unlimited guarantees

Infrastructure & Government Support

Funding from government only at 1st stage, not at 2nd stage – however funding not necessarily a government function

Early stage funding from government introduces lack of accountability (no close monitoring of government investments due to “spray and pray” approach, no expertise, ...)

Government could improve environment for VCs to attract more of them to Singapore

Company-internal & Management

Family interference in business matters not an issue (no “clan-like” management structures) – comparable to US and Western European structures

High cost of living in SGP makes it difficult to find qualified staff able to work for low wages at early stages

The social stigma of failure: failure not regarded as “valuable learning experience” in Singapore, safer to work for MNCs than risking a failure with a start-up

Quotes:

“The moment you cross the border either northwards or southwards, you have a completely different market.”

“A hurdle rate of 30% or even 50% is difficult to achieve in a small market like Singapore.”

“There is no sizeable accumulation of personal wealth in Singapore. The country has only been founded in 1965.”

“KPIs for government officials are tied to founding start-ups, not preserving them. A huge number of start-ups receive funding, but very little oversight is available due to overstretched resources on the government side.”

“The high productivity in Singapore is bought with long hours; people in established companies are completely tied up in day-to-day work and are not open to investigate new ways of doing business.”

“Social pressure requires to have an own flat, not a rented one, and car; this is only financeable with a decent salary.”

Interview number:	2
Interviewee & position:	Cedric Gouliardon, COO
Company:	Pixelmetrix

Key takeaways:**Access to capital markets:**

Unlike in the US and Europe, Singapore does not have a mature VC/ PE scene
 High-tech SMEs in Singapore do not have access to high-end VCs
 Most VCs are related to the big Singaporean banks (e.g. OCBC, DBS)
 VCs want to make money fast, therefore IPO is considered as most promising exit
 VCs can not exit by selling to growth equity investors as SE Asian PE funds are not interested in SMEs

Leverage:

High-tech companies do not get bank debt as they do not have assets to collateralize
 Working capital is often financed with loans collateralized with real estate, e.g. company headquarter

Government support:

Government is highly successful in supporting start-ups, but it can not help small enterprises to grow
 Singapore is highly attractive for entrepreneurs: (1) easy and cheap to start own company, (2) government subsidies, (3) local talent pool and (4) easy to bring in foreign workers (takes less than 48h)
 Government should create infrastructure to attract high-end VC and PE funds

Market size:

In high-tech B2B markets Singapore is too far away from the biggest market the US and Europe.

	<u>Market size</u>	<u>Access to talent</u>	<u>Access to capital</u>
USA	✓✓✓	✓✓✓	✓✓✓
Europe	✓✓ (fragmented)	✓✓	✓✓
Asia/ Singapore	✓ (cost conscious)	✓✓	✓

Quotes:

“For growing a business you need access to big markets, to talent and to capital. In Singapore, we do not have a sophisticated VC scene.”

“We are far away from our core markets in the US and in Europe. The Asian high-tech markets are less sophisticated and much more cost conscious. Furthermore Asian like to work with big companies and they often buy products and service/ support.”

“IPOs at an early stage are common in Singapore as VCs do not have any other exit opportunities and they want to cash out quickly.”

“The government support is much appreciated, but does not help growing companies to the medium size segment. The government should also create infrastructure to attract VC/ PE funds.”

Interview number:	3
Interviewee & position:	Wee-Piak Chan, CEO / President
Company:	Amplus Communication

Key takeaways:

Market size / competition:

For many B2B companies no "domestic" market exists as GLCs get most government contracts, thus they have to compete abroad very early in their life stage
 Strategy of "national champions" not successful, as GLCs are focused on domestic market instead of expanding abroad
 GLCs are efficient in delivery but not innovative; they effectively buy technology from MNCs
 South East Asia is in a way the "hometurf" for Singaporean SMEs as they know how people conduct business in the region (vs. Western MNCs know less)
 Higher cost-consciousness in SE-Asia puts pressure on margins mostly for intangible products (e.g. software, services); prices for tangible goods not affected

Access to capital markets:

With a strong local background and relevant track record VC funding is available – interviewee was of the opinion that many pitches are of poor quality
 Debt and funding by banks (without personal guarantees) is available when company has cash and if management team has track record – but that is when you do not necessarily need it

Government support:

Export support (IE – International Enterprise) is poor as local footprint is too small and insights / connections to local business community are limited, here more is necessary
 Government should abandon the structural preference of GLCs and use transparent and fair tender offers for public orders
 R&D funding from SPRING is successful and frequently used

Human resources / talent:

High-tech SMEs cannot attract good local talent instead substitute with talent from region
 This has two reasons: a) GLCs and MNCs attract better talent from university due to brand and compensation b) many Singaporeans do not want to stick to engineering but switch careers after some years (high-tech SMEs often need "real engineers")
 There is a misallocation of educational resources, most people in Singapore study engineering as this is pushed by the government and entry requirements are low – however, after some time most people change their profession away from engineering
 If high-tech SMEs do attract good (management) talent, that often are lay-offs from larger firms
 Positive: flexible immigration regulations in Singapore allow sourcing foreign talent (e.g. India, Philippines)

Quotes:

"I have difficulties getting good talent from universities as GLCs get most of the "brain"."

"The small domestic market combined with poor export supports from the government makes it really difficult for companies to reach a critical size."

"With a strong track record and a good management team we did not have a problem getting VC funding."

"Banks in Singapore offer you money when you have cash and don't really need them."

Interview number:	4
Interviewee & position:	Varun Arora
Company:	Goto Camera

Key takeaways:

Access to capital markets:

Capital markets are only one aspect. If we are looking for series A/B, we will be looking not only for capital, but also for knowledge/ coaching and connections. In Singapore you can get money, but not the latter two

There is virtually no debt available to high-tech SMEs as they do not have assets to collateralize and as it often takes too long to scale up for the banks

Singapore and even SE Asia is just too small to generate the deal flow high caliber VC/PE firms require to settle in; a lot of internet/ businesses are just replications, there are only very few which are scalable and hence of interest to VC/PE

IPO is one of the only ways of raising money. But also most company founders try to cash out quicker than in other markets and hence prefer the IPO option

Government support:

Government is highly ambitious and clearly wants to make a difference. Their grants and subsidies are highly appreciate, but not enough to fulfill the needs of later stage companies

The government has not the capability of selecting the winners and hence distributes its subsidies untargeted to everyone

HR:

Local top talent prefers to work for large MNCs because of the money and prestige

It is very easy to bring in foreign talent and to them Singapore is an attractive location

Quotes:

"For a later stage fund raising we would even consider moving our headquarters to the US to be closer to the high-caliber VC/ PE firms".

"Owners want to quickly cash out and hence the actively seek the IPO at early stages."

"Singapore is highly prestige driven society and hence the local top talent prefers to work for the prestigious SMEs."

Interview number:	5
Interviewee & position:	Marcus Tan, Senior Manager, Investment & Spin-Off Mgmt. Division
Company:	A*Star – Exploit Technologies

Key takeaways:**Market:**

Small domestic market size more relevant for B2C-style companies; most interesting high-tech business developments target B2B

Competitive landscape:

Tender system for government contracts imposes substantial hurdles on small and medium-sized companies, thus often favoring GLCs

Access to Capital Markets:

High-tech growth financing (S\$2 to S\$10) internationally difficult to obtain

Hong Kong a more active VC hub, but focus on late stage funding with opportunity for IPO in 1 to 2 years; exit market for IPOs of Chinese companies, not necessarily high-tech

High-class VCs like Sequoia missing in Singapore, therefore less eagerness to take on VC

Infrastructure & Government Support

Lots of “unguided” R&D funding by the government in recent years; much stronger focus on commercial success to be expected in next 5-year plan (2011 to 2015)

Company-internal & Management

Singaporean job market attracts top talent into consulting, investment banking, and other business functions, even with an engineering education; leads to lack of engineers overall

Small and medium-sized businesses often have to resort to hiring foreign talent

Quotes:

“The tender system (for government contracts) has been established to prevent fraud, but it poses hurdles for small and medium companies.”

“In Hong Kong, VCs want to make a quick dollar by doing a late stage investment and pushing it to IPO within a year.”

“Students do not longer see a comfortable life as an engineer.”

Interview number:	6
Interviewee & position:	Managing director
Company:	High-tech ME Singapore

Key takeaways:**Market size / competition:**

Targeting Western market gives them price advantage. Production costs are relatively cheap in Singapore compare to the Western markets.

A “Made in Singapore” stamp is regarded highly in the international market.

Access to capital markets:

Singaporean SMEs typically have very low debt. For example, this company has debt level of less than 10%.

Singaporean SMEs go for IPO at a stage much earlier than their Western counterparts.

This seems to be highly driven by the aversion for high debt level, thus companies prefer to sell equity instead.

Government support:

Government provides good support for SMEs: funding, connection with customers, access to top talents from Singaporean Universities. IE, IDA, and Spring are examples of government bodies that support SMEs.

Human resources / talent:

SMEs cannot pay salary at the same level as large companies; however, some employees do prefer SMEs for the freedom to create and the sense that they could take part in setting the direction of the company.

Interview number:	7
Interviewee & position:	Pierre Hennes, Managing Partner
Company:	Extream Ventures (VC)

Key takeaways:

Access to capital markets:

Top-down approach of VC/PE firms:

- VC/PE relatively young asset class and hence driven by top-down approach, i.e. government companies going private and family business looking at expansion/ professionalism. Most of these companies are in traditional business
- High-tech investments in Singapore only since 2003
- There is a lot of liquidity in the market (Singapore) – for the start-ups/ early stage \$~300M for later stage \$150-200M

Singapore unattractive to high-caliber VCs as this market does not generate sufficient deal flows (high-caliber VCs with \$150M funds need a couple of 7 to 10M deals to invest money) and you can not combine Indonesia, Malaysia and Singapore into one region as these are completely different markets

IPOs are preferred option for founders as this is the ONLY way to get rid of all the personal guarantees and to cash-out to some extent

Government support:

Bottom-up approach/ ecosystem creation:

- Creating educational system/ research centers, e.g. INSEAD/ A*
- Incentivize investments in R&D
- Provide subsidies for start-ups
- Government of Singapore did great job in creating a vibrant start-up scene, but until you have a vibrant mid-size company scene it will take at least another 10 years

Entrepreneur culture:

Entrepreneurs in Singapore are generally inexperienced first-time entrepreneurs. There are only very few serial entrepreneurs

Historically entrepreneurs had no access to funding other than family & friends and as a result they were very focus on cash-flow generation. This means that they did everything which generated cash and hence were not very focused and had non-scalable business models

There are some entrepreneurs who only would like the money and not being bothered otherwise

There are not enough success stories of entrepreneurs around and the few are not well marketed, hence university graduates do not feel attracted to entrepreneurship or working in start-ups

High-tech SMEs:

The Singaporean market is too small for high-tech SMEs. In order to expand they need at least an upfront investment of \$500K per additional country. Therefore they have high cash requirements when they go abroad

Appendix 3: Interview guide

I) Introduction

Thank you very much for your time. We are a team of INSEAD students currently working on a project to aiming at explaining growth patterns of high-tech Small Medium Enterprises in Singapore. We have found your firm on XYZ and would like to talk to you about the development of your company, things that could help you grow and things which are obstacles for your growth. We envision taking approximately 0.5-1h of your time.

(Leveraged questions are highlighted in yellow to focus interviews)

II) Market

Overarching: How do they deal with a limited domestic market?

H: The limited size of the domestic market limits growth.

Q: How important is the domestic market for Singaporean high-tech SMEs? What is an approximate relative international turnover? Where do you see growth opportunities in Singapore, abroad – where exactly?

H: The int'l footprint is not strong enough and the way of doing int'l business not sophisticated.

Q: How do Singaporean high-tech SMEs generally operate internationally? Export, licensing, subsidiaries? What are advantages/ disadvantages of each approach?

H: Singaporean high-tech SMEs are active in the wrong/shrinking sectors

Q: Are Singaporean high-tech SMEs well positioned in the most attractive segment regarding market size/ growth and profitability?

H: SMEs are not focused enough but opportunistic.

Q: Do you feel that Singaporean high-tech SMEs are generally focussed enough on their core business or do they display opportunistic behaviour?

H: Singaporean SMEs do not respond quickly enough to market trends.

Q: Do Singaporean SMEs react quickly enough to market trends? Why/ Why not? What could they do to respond faster?

H: Singapore is better suited for B2B business model.

Q: Do you think that B2B or B2C business models are generally more successful amongst Singaporean high-tech companies.

III) Competitive landscape

Overarching: How tough is the Singaporean high-tech market?

H: Large MNCs are crowding out SMEs / result in high competition for SMEs

Q: Given the size of Singapore and the number of MNCs, what role do you think MNCs play in the competition? What about other SMEs, especially from foreign markets?

H: Competitive intensity is very high, hindering growth

Q: What are key player in the Singaporean high-tech space? Large multinationals or other SMEs? Where do they come from?

Q: What are their respective strength/ weaknesses? What do they compete on?

- | | | |
|---|-------------------------------------|---|
| <input type="checkbox"/> Higher quality | <input type="checkbox"/> Lower cost | <input type="checkbox"/> Better products (innovation) |
| <input type="checkbox"/> Service | <input type="checkbox"/> TBD | <input type="checkbox"/> TBD |

IV) Access to capital markets

Overarching: Are they constrained by insufficient funding?

H: Lack of capital is key obstacle to grow

Q: Is accessibility to capital markets an issue for Singaporean high-tech SMEs?

- | | | |
|------------------------------|-----------------------------------|-----------------------------|
| <input type="checkbox"/> Yes | <input type="checkbox"/> Not sure | <input type="checkbox"/> No |
|------------------------------|-----------------------------------|-----------------------------|

H: SMEs do not use PE / VC but rely on traditional financing

Q: What sources of funds do Singaporean high-tech SMEs generally use? What are the advantages/ disadvantages?

- | | | |
|--|---|-------------------------------------|
| <input type="checkbox"/> Family/ friends | <input type="checkbox"/> Business Angel | <input type="checkbox"/> VC/PE fund |
| <input type="checkbox"/> Long-term loan | <input type="checkbox"/> | <input type="checkbox"/> |

Q: Are Singaporean high-tech SMEs aware of alternative financing markets like VC / PE or government funds? Why don't you use them?

- | | | |
|----------------------------------|---|--|
| <input type="checkbox"/> Unaware | <input type="checkbox"/> Don't understand | <input type="checkbox"/> Too complex/ time consuming |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

H: SMEs are underleveraged

Q: Would Singaporean high-tech SMEs generally like to take on more debt?

Q: What could be done to increase the use of external sources?

H: The only way to get significant funding is an IPO

Q: How important are IPOs for Singaporean high-tech SMEs? What are advantages, disadvantages? Are they common among SMEs?

Fully agree

Not sure

Fully disagree

H: Singaporeans are ownership oriented and have problems with loss of control

Q: In Silicone Valley founders are frequently giving up a majority share in their company to get funds. We do not see that here, do you see that model to work here in Singapore?

V) Infrastructure/ Government support

Overarching: How efficient is the government in helping SMEs to become self-sustaining/ cash-flow positive?

H: There is a lack of institutionalized support for companies at a later stage?

Q: Recently we have seen a lot of start-up focused support from the government, e.g. incubators like SMART or the STAR program. Does such a support also exist for companies at a later stage, i.e. high-tech SMEs?

Yes

Not sure

No

Q: What is the attitude of the government concerning high-tech SMEs, i.e. does it care? What kind of programs are in place? Does it provide a platform for a business community to grow?

H: The regulatory environment does not favour SMEs but rather start-ups and MNCs

Q: Given the support we mentioned above, what do you think of the overall regulatory environment for high-tech SMEs in Singapore, e.g. depreciation rules, tax advantages, cheaper access to funds etc.? What are measures which work particularly well, which don't?

Lower taxes

Better depreciation

Support with legal matters

VI) Company specifics

Overarching: How well are Singaporean high-tech SMEs run? What could they do better?

Note: Ask "company specific" questions still from a general angle (i.e. do Singaporean high-tech SMEs generally)! - Most often interviewee will elaborate on his general view on the industry and then add, but we do XYZ. So you get both perspectives.

1) Finance

H: The level of professionalism concerning finance is very low

Q: Do Singaporean high-tech SMEs generally have a dedicated CFO? What is an average planning horizon? How does the financial planning process generally look like?

2) Strategy

H: SMEs do not have a clearly articulated strategy

Q: Do Singaporean high-tech SMEs have generally a well articulated strategy?

Agree Partially agree Partially disagree Disagree

H: The strategy development process is not very sophisticated

Q: How often do Singaporean high-tech SMEs review their strategy? How does the strategy generation process look like? Whom do they involve?

3) Management

H: Management consists of "family" rather than the right people

Q: What is the typical size of the management team of a high-tech SME? Do you usually find external managers or is it more in the control of the founder / family of the founder? What is the overall role of family in Singaporean high-tech SMEs?

H: Succession is an obstacle for the motivation to grow

Q: What is the usual succession pattern for Singaporean high-tech SMEs? In your point of view is this a major challenge or an emerging challenge?

4) Corporate governance

H: SMEs do not get sufficient senior guidance / lack thought partners

Q: In Western markets SMEs and start-ups use advisory and supervisory boards to provide guidance, expertise, mentorship and strategic advice. How is the situation in Singapore? Why are they used/not used?

Q: Who are the go-to people for the owner / CEO of a high-tech SME? Do forums exist where like minded individuals can meet and discuss challenges? Would this be desirable in Singapore?

5) R&D

H: SMEs are too inwardly focused to innovate

Q: Do Singaporean high-tech SMEs have R&D partnerships, e.g. other companies, universities, etc.? Why/ why not?

H: SMEs do not focus on innovation sufficiently

Q: (attention: very company-focussed question) What is a typical annual R&D budget in %? Do they generally have a dedicated R&D team or do employees spend a dedicated amount of their time on R&D?

6) HR

H: SMEs do not get the best talents / young talents

Q: What is the typical age span of the employees of Singaporean high-tech SMEs? Do they get sufficiently young top-talent? Why/ why not?

H: SMEs cannot retain good talents

Q: What are annual fluctuation among high-tech SMEs employees? Why do they leave? Where do they go (e.g. MNCs, VC, PE, ...)?

H: SMEs do not invest in their employees

Q: Do high-tech SMEs generally have formal trainings for their employees? Do they give them the opportunity to develop themselves externally, i.e. days off and payment of external trainings?

Q: How much do they invest in training and development of their employees?

H: Employees are not incentivized sufficiently

Q: How do they motivate their employees?

Yes Not sure No

Q: Do they have performance based remuneration in place? What is the variable part in %? What are the typical targets this is linked to? (e.g. individual, group, company performance)

Q: Can the overall compensation package generally match the compensation of MNCs/ finance jobs?

Yes

Not sure

No

7) Marketing & Sales

H: Sales Force Effectiveness is not a focus of Singaporean companies

Q: What is your view on the sophistication level of the sales force of high-tech SMEs, i.e. use of appropriate tools, trainings, correct incentivising?

H: Marketing is not a focus area or if it is, it focuses on the wrong channels (e.g. mass media)

Q: Is Marketing in the focus high-tech SMEs, or is it generally more product driven? Which media channels and vehicles are usually used for marketing purposes?

8) Competitive advantage / positioning

H: SMEs competitive advantage are not sustainable, i.e. focus on cost advantages rather than innovation

Q: Where do you see your competitive advantage? Cost, Quality, Customization, Innovation, customer service etc. (probably a question to tick boxes)

Higher quality Lower cost Better products (innovation)
 Service TBD TBD

Q: Do you think that these advantages are sustainable for the next 5 years?

Semi quantifiable questions:

a) Annual turnover of your company 2010 and 2005:

2005: _____ 2010: _____

b) Number of employees 2010 and 2005:

2005: _____ 2010: _____

c) Founding year: _____

d) Share of international turnover 2010 vs. 2005:

2005: _____ 2010: _____

e) Regions of the world do you do business with?

- Europe East Asia (Japan, China) Sout Asia (India)
 Latin America Sout America Australie, Oceania Africa/Middle East