

CLEAN AND GREEN TECHNOLOGIES

PROSPECTS FOR SMEs IN SINGAPORE



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Abstract

There is a growing recognition that the development of a strong and dynamic private sector is crucial to a long-term economic growth of an economy. In Singapore, the small-and-medium enterprises (SMEs) are increasingly playing a central role in the achievement of a sustainable industry development. However, majority of the SMEs in Singapore, unlike their counterparts worldwide, have not yet given enough attention to the impact of climate change, and they seem to be in no hurry to implement innovations and technologies to meet the requirements of a green economy. This paper thus seeks to discuss the SMEs' potential and promise of going green through certain perspectives. Essentially, it concludes that indeed going green has many benefits, key of which is not seeing red at the bottom-line of the SMEs.

The recent economic slowdown following the global financial crisis, coupled with the apparent impact of global warming and climate change are compelling the big and small businesses to rethink and revise their commercial strategies to improve their business competitiveness and survival. There seems an urgent need for the adoption and implementation of clean and green technologies and related initiatives. However, the majority of small and medium enterprises (SMEs) in Singapore have not yet given enough attention to this issue, unless they are an energy intensive venture or wish to present a clean and green image.

This paper seeks to discuss the SMEs' potential and promise of going clean and green through the following enquiry:

- Do SMEs in Singapore view climate change as a relevant business concern? How do they respond to the challenges of an increasingly clean and green economy? And
- Are SMEs viewing climate change as a driver of new business opportunities? Is there a case for smaller businesses to go clean and green, even at a higher operating cost?

¹Tan, Puay Eng (2010). "Small & Medium Enterprise (SME): Definition & Characteristics in Singapore", <http://rpe.nl.sg/Business/d3b88771-b4cb-48b8-b011-71158-c8f9dec.aspx>

Essentially, this paper looks to conclude that indeed going clean and green have many benefits, key of which is not seeing red at the bottom-line of the SMEs.

The SMEs in Singapore

SMEs are considered the engine of growth in most economies by virtue of their sheer number and significant economic and social contributions. SMEs are the backbone of the industrial and manufacturing sectors in many successful Asian economies, such as China, Japan, Republic of Korea, and Taiwan province of China. They are responsible for driving innovation and competition in many sectors.

In Singapore, SMEs are defined in terms of their net fixed assets investment (FAI) and the number of employees: Manufacturing enterprises with net FAI of S\$15 million and below; Non-manufacturing enterprises with no bigger than 200 employees.¹

By and large, SMEs in Singapore are founded, owned and operated by individual entrepreneurs, often without much support from public and/or non-public resources. As such, they, rather than the larger corporations, encapsulate the essence and enduring character of the market economic system. SMEs constitute 99% of all enterprises in Singapore, employ six out of every ten workers, and

contribute almost 50% to national GDP.²

Such figures can be regarded as on the high side, particularly taking into account Singapore's traditional reliance on foreign multi-national corporations (MNCs) for much of her economic growth. The dependence on MNCs for foreign direct investment (FDI) has resulted in the perception that SMEs in Singapore are not as vibrant as that of comparable economies such as Hong Kong and Taiwan province of China. Singapore's economy, however, requires a buoyant SME sector to maintain her competitiveness. This means that SME development is an essential policy going forward.

In the last twenty years, the number of SMEs in Singapore has grown appreciably, thanks largely to the effort of the government which has been vigorous in promoting SMEs, via a multi-agency network and chain of financial institutions. SPRING Singapore is the enterprise development agency for growing innovative companies and fostering a competitive SME sector.

Starting with the SME Master Plan in 1986, numerous initiatives and programmes had since been implemented by the SPRING Singapore (as well

as its antecedent agencies) to assist and strengthen the SME sector in Singapore. SPRING Singapore works with partners to help enterprises in financing, capabilities and management development, technology and innovation, and access to markets. As the national standards and accreditation body, SPRING Singapore also develops and promotes internationally-recognised standards and quality assurance to enhance competitiveness and facilitate trade.³

Do SMEs in Singapore view climate change as a relevant business concern? How do they respond to the challenges of an increasingly clean and green economy?

SMEs in Singapore, like their counterparts around the world, are confronted, more often than not, with challenges typically uncommon to the larger companies and MNCs, in particular, when it comes to competing for resources, like manpower, capital and funding. Many SMEs face difficulties, for example, in the collection of payment, which then leads to tight cash flows, and which then becomes an impediment in expanding the businesses as well as in enhancing the technical capacities of the enterprises.

Facing ordeals and competition are therefore nothing unusual to the SMEs. While a number may succumb, many continue to survive, and some are even ahead of their competitors – a case of 'big challenges are big opportunities'. High performance and sustained capacity building are thus vital driving factors for success. Yet, more often than not, SMEs in Singapore are unable to improvise and grow successfully because the management lacks strategic and organizational know-how and they lack access to markets, technical information and money for R&D or innovation.

In this regard, key business areas that require SMEs to address include, among others, structural re-

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forms, effective management, value-added products and processes, quality control, customers' satisfaction, and technological innovation. Of these, the last factor is deemed to be the most cost-incurring, but also the most likely to garner manifold gains.

To date, not many SMEs in Singapore see climate change as a relevant business concern and thus, do not possess any clean and green strategy at present. This could boil down to three reasons:

- These SMEs have 'other fishes to fry';
- There has been no demand imposed by their clients to undertake strategic moves and follow-ups to go clean and green; and
- Going clean and green is seen like adopting technological innovation to achieve corporate social responsibility (CSR), and this is a costly affair.

Such attitudes were substantiated and aligned with the findings of the SME Development Survey Report 2009⁴, wherein it was revealed that the three broad perspectives that vexed SMEs in Singapore are: (a) sales-related; (b) finance-related; and (c) other operating issues, such as uncertain economic environment and availability of manpower.

With environmental awareness growing by the day, even the most adamant SME owners, business leaders and managers in Singapore cannot deny that climate change is indeed

²Ibid

³SPRING Singapore: The Standards, Productivity and Innovation Board is a statutory board under the Ministry of Trade and Industry (MTI) of Singapore. The agency helps to nurture a pro-business environment, facilitates the growth of industries and enhance innovation and enterprise capabilities of SMEs for better access to markets and business opportunities. As the national standards and conformance body, SPRING Singapore also 'helps to lower technical barriers to trade, provide quality assurance for products and services and promote industry use of Singapore and international standards'. SPRING Singapore's website is <http://www.spring.gov.sg/Pages/Homepage.aspx>.

⁴DP Information Group (2009). "SME Development Survey Report 2009: Singapore's SMEs brace for global economic recovery".

Climate change poses a genuine threat to the SMEs, taking into consideration that these smaller enterprises are, by and large, less well-equipped and do not possess the pertinent financial muscles and technology know-how, compared to the MNCs.

a very real concern for their businesses. In 2006, the Stern Review on the Economics of Climate Change, a 700-page report released for the British government by Mr Nicholas Stern, a former Chief Economist at the World Bank, and the current chair of the Grantham Research Institute on Climate Change and the Environment at the London School of Economics, discussed the effect of global warming on the world economy. The Review's main conclusion is that the benefits of strong, early action on climate change considerably outweigh the costs. It proposes that 1% of global gross domestic product (GDP) per annum is required to be invested in order to avoid the worst effects of climate change, and that failure to do so could risk global GDP being up to 20% lower than it otherwise might be. Tackling climate change is the pro-growth strategy for the longer term.

Enterprises can thus no longer ignore the need for a commitment to balancing social, environmental and financial performances. More critically, climate change poses a genuine threat to the SMEs, taking into consideration that these smaller enterprises are, by and large, less well-equipped and do not possess the pertinent financial muscles and technology know-how, compared

to the MNCs, in fulfilling the requirements of a clean and green economy.

However, the situation is not totally beyond correction. There are SMEs in Singapore which are inclined to the concept of strengthening its technological know-how to enhance their operations. Based on the SME Development Survey Report 2009, to date, 64% of SMEs in Singapore have taken actions to strengthen their in-house technology innovation capabilities, with the 'Hiring of staff with required knowledge/expertise' and 'Sending staff for appropriate training courses' being the two top actions taken. While such a high number of SMEs recognising the importance of technology innovation is encouraging, the reality is that ability to attract skilled staff and the resources available for these SMEs to send staff for training are often inadequate.⁵

The survey data also highlighted the advantages of technological adoption in ensuring continual growth among the SMEs. Of those polled, 79% in the "Accelerating Growth" category and 64% in the "Moderate Growth" category had taken action to strengthen their technological capability.⁶ In fact, 82% of the SMEs reported having material impact from technological adoption, with "Increased Productivity" (50%), "Product/Services Innovation" (41%) and "Cost Efficiency" (36%) being the top 3 benefits.⁷

There was a separate report that in the year 2008, 80% of the SMEs in Singapore that adopted technology innovation saw improvement in actual turnover or profit.⁸

In face of the current emphasis in Singapore on improvement in productivity and cost efficiency as a strategy for the future and the focus on R&D, it is possible that more SMEs in Singapore will be motivated to implement appropriate practices to compete in a clean and green economy. Public opinion indicates that consumers will be increasingly supportive of businesses with clean and green products or services.

Are SMEs viewing climate change as a driver of new business opportunities? Is there a case for smaller businesses to go green, even if it means higher operating cost?

There can be no doubt that climate change, as intimidating as it may sound, does offer the prospect of numerous new business opportunities.

At the same time, the prime issue facing businesses in Singapore is the direct and indirect impact of new legislative schemes that may be passed by the government. Ultimately, these businesses, including the SMEs, will have to adapt to the new regime or risk exposure to higher operating costs. Businesses which adapt early would find the cost of changing operating practices wholly condensed, compared with acting later. This presents a range of opportunities for the SMEs, in particular, those which are innovative and see the immediate benefits of adopting climate-friendly policies.

For example, if and when the government acts to impose a levy to improve energy efficiency, SMEs which have significant energy input component would face greater exposure to the pricing impact. If their cost increases are not matched by their competitors, it is certain that the operations of these SMEs would be severely affected because there will be flow-on obligations. Conventional energy and utility costs, for example, fossil fuel and power generation are set to escalate – a reality in a carbon-constrained economy, and this would accrue to the smaller businesses. The cost of compliance will be accordingly passed down the business chain, affecting everyone in the process. All businesses will then be affected by such regulatory measures in response to climate change.

An alternative camp-of-thought is, given the breadth and diversity within the hundreds and thousands of SMEs across Singapore, it is impossible to say whether climate change factors would indeed drive costs up. While

⁵Ibid.

⁶Ibid.

⁷Ibid.

⁸Chew, Yew Nah (2009). "Gearing up for the upturn through innovation", *The Business Times*, April 14, 2009, pp 17.

it is true that there would be ever-increasing rise in costs for inputs like fossil fuels, there may well be cost savings when new technologies are made available on a wider basis. These technologies can significantly reduce energy bills and manpower costs, and yield greater savings in the long run.

It is also true that there may be a rise in costs due to regulatory burdens but equally, the government is likely to incentivise the smaller businesses to reduce their carbon footprint and implement best practice models. The most crucial factor is that there are industry grants available to the SMEs to assist in, for instance, purchasing energy-efficient processes equipment, as well as the necessary building attributes. SMEs should therefore study these avenues if they are contemplating any capital expenditure.

Whatever the perspective, one thing is certain, that is, the resolution going forward is unquestionably to be more efficient, and the only way costs will fall will be for businesses to take steps to be more energy efficient and to practise conservation as energy price climbs with expectations. One practical way for SMEs to achieve energy efficiency and conservation is definitely through the adoption of clean and green technologies.

Until recently, using clean and green technologies was something only bigger businesses, normally the MNCs could afford. Recycling technologies and other clean and green innovations were simply too costly and price prohibitive for the SMEs. However, with the elevation of the clean and green movement, inventive products and new production techniques have made it achievable and cost-effective for SMEs and micro-enterprises, to engage in going clean and green process, as illustrated in the following two examples of Singapore SMEs. This

explicates why incorporating social and environmental consideration into the mainstream business strategy is a mounting commercial pattern.⁹

In practice, many larger companies and corporations have already begun to assess, through usage of technologies, on how they can reduce their energy consumption as a means of reducing their overall costs of doing business. It is expected that more SMEs would likewise follow suit sooner or later, even

if it means that the initial investment in the clean and green technologies may see the business incurring additional costs in the near term.

One reason why SMEs should be adopting the clean and green strategy, is that there is a rising awareness in their customers as well as the end-consumers on the impact that products have on the environment. As a result, these clients have begun and are more likely to purchase products, which

Going green for a bigger and better yield

Agro Genesis, a local agribusiness start-up, received technical and funding support through SPRING Singapore's Technology Enterprise Commercialisation Scheme (TECS), to take a concept from lab-to-market by using nanotechnology and field-testing on an environment-friendly fertiliser that substantially increases crop yield.

The research idea arose because the firm noted that chemical fertilisers usually require dissolving the substance in water before it is added to farmland and that leads to wastage as most of the nutrients get filtered away through soil. Only 1% of nutrients in chemical fertilisers are absorbed by crops, while the remaining 99% 'get lost in the process'. In their latest test, up to 10kg of Miracle Sweet (the innovation and value-added product) can replace up to 100kg of common fertiliser used for a hectare of land. This product reduces wastage and hence costs, as it can be applied directly to the seeds prior to planting. Hence, vast farms would benefit immensely from such a coating method.

Another positive 'green' factor was that unlike conventional fertilisers - which are typically composed of nitrogen, phosphorus and potassium, Miracle Sweet comprised natural elements. It was developed using micro suspension technology, a process developed by the firm that breaks down nutrient and mineral particles further into 'micro-size'. This way, plants can uptake the minerals faster and more easily. Miracle Sweet has been tested on crops such as rice, corn, soya bean, sweet potato and tapioca in fields and greenhouses. As Miracle Sweet is an insoluble phosphate and calcium liquid, the product is an environment-friendly alternative to chemical fertilisers.

Agro Genesis plans to roll out the product in 2010-2011 once final field tests are completed. Recognising that size does matter in the agriculture business, it wants to work with the right distributors and partners to make the product big. Revenue mainly from product sales and consultancy fees at the firm had grown consistently by about 20-30% over the last five years. The firm's innovative work earned it a \$500,000 grant from SPRING Singapore under the TECS in 2008. Funding support from the scheme has helped the firm set up a 600 sq. m. farm for product testing, and a control lab. Both facilities, where the 15 research staff members work, are helping to accelerate product development.

⁹Ewing, Tejas (2010). "Corporate responsibility as core strategy", unpublished.

Source: "SME Spotlight: Going green tech for a bigger, better yield", *The Straits Times*, March 24, 2010 (http://www.straitstimes.com/SME%2BSpotlight/SME%2BHighlights/Story/STISStory_505982.html)

Taking green idea into uncharted waters

Just like Agro Genesis, another Singapore SME, SIF Technologies, took their concept from lab-to-market with help from SPRING Singapore's Start-up Enterprise Development Scheme (SEEDS).

The key product and service offered by the Singapore's environmental engineering firm is the marketing of a chemical-free water treatment system. When it first started in 2004, the business was not well received because the green movement in Singapore was still in its infancy, and with chemical use dominating the water treatment industry, many were not easily convinced by the firm's innovation. It was only after the company launched and offered a 'money-back guarantee' to anyone who installed the system, did the business kick-start. At the end of 2004, SPRING Singapore approved a \$300,000 funding under the SEEDS programme to help the firm get going. Things started to turn around after that.

The firm had developed the water treatment system called DPA, named after the dispersion algorithm, which uses a form of technology called hydroactivation to increase dissolved oxygen in water by breaking down its molecular clustering. When water is oxygenated, the nitrifying bacteria, or good bacteria, can break down waste in the water, allowing it to be treated and reused. DPA is 'green' as it treats water without using chemicals and does not require electricity to function. Industry sectors such as agriculture, oil and gas, pharmaceuticals as well as hospitality have embraced this system. The DPA system costs about \$15,000. It enables customers, such as big farms, to be self-sustaining by recycling water, so farmers need not worry about scarcity and wastage.

Over the last few years, DPA has recycled an estimated 500 million litres of water, which easily translates into a cost saving of several hundred thousand dollars in water bills. The company's track record has helped to bring in several investors, including angel investors. SIF also recently signed several major contracts in Singapore, including one to supply DPA in Singapore's first eco-precinct, Treelodge@Punggol.

Knowing that a common hurdle new innovations face is the lack of evidence to support what might appear to be extravagant claims, the company set about documenting laboratory reports and trial results from pilot studies and sought third-party scientists to verify the findings. The process helped SIF differentiate itself from its competitors. It also kept testimonials from satisfied customers. Such feedback is helpful not only in keeping track of progress but in identifying new business ventures as well. That new venture turned out to be aquaculture, which did not initially feature in the company's business plan.

There is now a possibility that SIF could be acquired by a listed environmental engineering company, within the next one year. When this happens, it would enable the firm to take a 'quantum leap' and 'play the big boys' game'. The firm employs six people at the moment.

Source: "SME Spotlight: Taking green idea into uncharted waters", *The Straits Times*, March 17, 2010 (http://www.straitstimes.com/SME%2Bspotlight/SME%2BHighlights/Story/STIStory_503123.html)

Businesses that adopt clean and green practices will gain a competitive edge by being ahead of the curve as and when emission-related laws are eventually tightened.

are classified as green products and purchase from firms, which engage in clean and green practices. The benefit of having these clients is that they tend to purchase products from businesses they can trust repeatedly and regularly. They are also likely to recommend and spread the word about businesses which have a reduced environmental footprint and which engage in clean and green practices and supply environment-friendly products.

More importantly, the end-consumers are willing to spend a little extra or, in some cases, a lot extra, in order to obtain these products and purchase from the clean and green businesses. This will ultimately compel the SMEs to examine how to deliver their products in a climate-friendly manner to their customers. It is justified to expect that this trend will be maintained and expanded in the foreseeable future.

Conclusion

Clean and green matters are staying on the agendas of businesses, stakeholders and regulators notwithstanding the recent economic downturn following the global financial crisis. The truth is that everyone benefits from a cleaner and greener business environment. The business case of going clean and green has never been stronger. Businesses that adopt clean and green practices will gain a competitive edge by being ahead of the curve as and when emission-related laws are eventually tightened.

By virtue of their smaller size, SMEs can be nimble in their responses, something the larger companies cannot do easily. Promoting innovation and

adoption of clean and green technologies would enhance the competitiveness of SMEs. SMEs that can find their niche and identify new and creative way of meeting market needs will be the ones that are well set to prosper when the economy turns buoyant again.

Clean and green technology does not have to be expensive. In fact, the opposite is true in that they give companies an opportunity to reduce costs. Ultimately, companies – each unique – should seek to balance their business and clean and green priorities. Through a diligent approach and a strategic perspective, such endeavours will help to avoid SMEs going into the red.

Forward-thinking SMEs in Singapore, like Agro Genesis and SIF Technologies, truly appreciate that environmental and business sustainability can go hand-in-hand. Clean and green programmes can optimise commercial bottom-lines through resource savings and provide financial benefits through greater operational efficiency. While indeed clean and green programmes may cost more at times, the cost of ignoring them will be higher.

⁵Ibid - Chew

Green careers

For a broader perspective, it must be remembered that a clean and green economy may translate into more green opportunities for enterprising and innovative SMEs setting up their own ventures and businesses. Around the world, more government agencies, venture capitalists, angel investors, banks and financial institutions, and even the non-governmental organisations (NGOs) will be ever-ready to provide technical and/or funding assistance to promising entrepreneurs and their small ventures that are directly involved in the environment-friendly businesses – either to jumpstart their small enterprises (to purchase specialised equipment), or to develop and execute their business ideas.

Singapore is no exception. The green movement in the country is moving in the right direction, through more intensive education and greater public awareness of the threat posed by climate change and global warming. The movement should eventually gain momentum. Singapore would benefit from many more green opportunities in the future. The younger generation of Singaporeans, in particular those with sufficient environmental engineering

training, could see increasing demand for their skills as entrepreneurs develop innovative ways to make technologies available to the general public.

The prestigious French graduate business school, INSEAD, ranked Singapore as Asia's most innovative economy and fifth in the world in its new Global Innovation Index.¹⁰ Singapore has also put in place a strong legal and regulatory framework to protect intellectual property. It is one of the easiest places to start a business. Therefore, it definitely makes sense for SMEs, and start-up enterprises to increase their competitiveness, both locally and overseas, by leveraging on the city-state's strong infrastructure to roll out unique and innovative clean and green products and services.

Many experts shared the view that the human race is now at the intersection of a new technological era when innovation would be required to solve the environmental problems we have and to curb the impact of global warming and climate change. Taking into account their increasing prominent role in the Singapore economy, it is certain that SMEs are integral to a successful national response to environmental protection and climate change. □

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WIPO launched on June 1, 2010, WIPO GOLD, a free, on-line global intellectual property (IP) reference resource that provides quick and easy access to a broad collection of searchable IP data and tools relating to, for example, technology, brands, designs, statistics, WIPO standards, IP classification systems and IP laws and treaties. WIPO GOLD is a free public resource which provides a one-stop gateway to WIPO's global collections of searchable IP data. It aims to facilitate universal access to IP information.

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