

# TOWARDS A SUSTAINABLE FUTURE

Delivering positive economic,  
environmental and social impact

Edited by  
Foo Maw Der  
Koh Cheng Boon  
Madeline Pua

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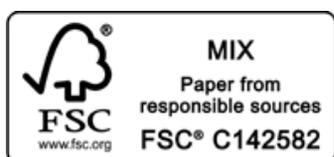
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# Foreword

**A**s Dean of Nanyang Business School, I am pleased that the Asian Business Case Centre (ABCC) has published this special edition of Multimedia Cases on Sustainability. With sustainability increasingly an imperative for all, this endeavour is a timely one given that organisations today are expected to do good and do well in this area. Businesses, education and managers need to reflect on this new reality and move to value creation that includes economic and social value, while also taking into account the protection of our environment.

As the world shifts towards greater emphasis on sustainability, there are both significant risks and opportunities for businesses. As a business school in a leading technological university, we are well placed to facilitate learning about the business, scientific, technological, and social aspects of sustainability, as well as contribute to thought leadership at the intersections of these fields. Our goal is to cultivate leaders and managers who can incorporate sustainable development when crafting strategy and driving implementation. This requires broader multi-stakeholder thinking, wider collaborations, interdisciplinarity, and capability for sustainable innovation.

I am therefore delighted to know that the authors of these case studies come from diverse backgrounds, and have looked at sustainability issues from different lenses. This reflects the reality that sustainability is multi-sided, spans across many disciplines, and encompasses the involvement of individuals, organizations and entire societies.

These case studies are compelling stories of how sustainability can and should be woven into the DNA of businesses and organisations. More than that, they provide excellent learning opportunities and insights, highlight the various considerations from key stakeholders' perspectives, and elucidate the tensions between business viability and sustainability. They are effective tools that allow learners to connect the dots between theories and real-world situations and are meant to spark further discussion and debate on how we can work together to solve sustainability issues facing businesses and organisations in an informed and considered manner.

I am confident that this case study multimedia book will serve as a good learning resource for educators, students, managers, leaders, entrepreneurs, environmental activists, and government agencies to adopt a multi-disciplinary and systems thinking approach to finding solutions to the challenges faced in sustainable development. They will certainly be a helpful resource for the executive, masters and undergraduate sustainability programmes at the Nanyang Business School.

These case studies remind me that we can all expand our reach and make a difference, contributing in our own way, to this sustainable development journey. I look forward to the many lively discussions and the fostering of innovative ideas and actions in support of sustainability that this book will catalyse.

**Christina Soh**

Dean

Nanyang Business School

Nanyang Technological University, Singapore

# Preface

**S**ustainability is a key issue that organisations and institutions around the world grapple with. In the United Nations Climate Change Conference in November 2021 (COP26), numerous countries signed on to reduce fossil fuel usage and our carbon footprint through placing limits on coal use and implementing legislation against deforestation. Crowds clamoured for the world to move towards environmentally responsible behaviours, as evidenced by public demonstrations that took place during the COP meetings, and for governments to enact laws to mandate sustainable practices across the board. Underlying these pressures was a growing consciousness that going green was simply the right thing for organisations and institutions to do, as production and consumption today should safeguard the rights of future generations to live equally good and healthy lives.

Beyond climate change, sustainability comes in various forms. In 2015, the United Nations developed 17 Sustainable Development Goals (UNSDGs) to serve as a “shared blueprint for peace and prosperity for people and the planet”. These goals include ending poverty, improving human well-being, furthering access to clean water and sanitation, encouraging responsible consumption and production, taking climate action, and building sustainable cities and communities. These UNSDGs dovetail with Singapore’s Green Plan 2030, which outlines five pillars of sustainability to establish a City of Green Possibilities. This multi-ministry effort spurs Singapore towards becoming a City in Nature (a green, liveable city), through an Energy Reset (promoting clean energy and greater energy efficiency to

reduce our national carbon footprint), developing a Green Economy (to harness sustainability as a competitive advantage) and building a Resilient Future together (through climate action and improved food security) to achieve a Sustainable Living environment for the current and future generations.

In alignment with Singapore's Green Plan 2030, Nanyang Technological University (NTU) launched a 15-year Sustainability Manifesto in October 2021. Some of its targets include attaining 100% Green Mark Platinum certification for eligible buildings, reducing energy usage, launching new sustainability education programmes, and supporting the UN SDGs. Nanyang Business School (NBS), which the Asian Business Case Centre is part of, has initiated activities and programmes to promote sustainability and established the NBS Annual Business Conference with sustainability as its inaugural theme in 2022.

In tandem with this, ABCC has produced a multimedia casebook comprising a series of eight cases that explore various perspectives of sustainability as well as organisations and institutions at the forefront of this field. We aim to spark discussion on how doing well and doing good can be – and are – complementary, and to highlight the triple bottom line of economic viability, social impact and environmental sustainability as a primary metric to steer organisations and institutions toward a sustainable future. As with most case studies by major publishers such as Harvard Publishing, Ivey Publishing, and INSEAD, these cases are thought-provoking but should not be used as research materials. Introductory videos that provide a flavour of some of these selected cases can be viewed at the Asian Business Case Centre's YouTube channel (<https://bit.ly/3C1gxtB>; QR code can be found at the end of this Preface), and a complimentary copy of

this casebook can be downloaded from Asian Business Case Centre's website (<https://www.ntu.edu.sg/asiacase>; QR code can be found at the end of this Preface).

## Overview

This casebook features three cases covering social enterprises, one case covering a small- to medium-sized enterprise (SME), one case covering a government-linked hospital, and one case covering a government-sponsored research centre. Following that, we investigate Singapore's national-level efforts to mitigate rising sea levels. Finally, we included a fascinating story of how Sircilla, a town in India plagued with high suicide rates in its community of textile weavers, established ways to assist its weavers and mitigate the problem.

Our first three stories follow social enterprises Foreword Coffee, SimplyGood, and Wateroam. Social enterprises, also known as the “third sector” (with the first and second sectors being for-profit companies and governments respectively), have grown in scope in Singapore with the establishment of the Singapore Centre for Social Enterprises (“raiSE”) in 2015. raiSE is a sector developer for aspiring social entrepreneurs, social enterprises and other individuals and organisations keen to contribute to the sector's growth.

Foreword Coffee, founded in 2017, empowers people with disabilities and special needs through work opportunities at cafés across Singapore. This social enterprise sources its coffee beans directly from small-holder coffee farms in Asia, providing farmers with fair trade prices. Foreword Coffee collaborates with government agencies and other third sector organisations to circumvent resource constraints in its operations and continually provide its stakeholders with sustainable value propositions.

SimplyGood turns fruit waste into innovative household cleaning products that forgo the use of plastic bottles. The case traces how SimplyGood accomplished this by creating dehydrated cleaning tablets using only non-toxic plant-based ingredients, serving up food for thought on how companies can resolve environmental issues by rethinking their business model and product offering. Moving forward, SimplyGood is exploring ways to apply their dehydration method to other types of cleaning agents as well as to expand its sales geographically.

The third journey is that of Wateroam. Founded in 2014 by three undergraduates, Wateroam develops portable water filtration systems for those below the bottom of the pyramid, and deploys its water filtration systems to remote villages and disaster-stricken areas across Southeast Asia through non-governmental organisations (NGOs). In this case, we find the three co-founders reflecting on their *raison d'être* and brainstorming strategies to position the enterprise to cater to Covid-stricken communities as well as post-pandemic markets.

Our first feature beyond social enterprises centres around Ya Kun Kaya Toast, a Singaporean café franchise selling traditional breakfast food and beverages such as Nanyang coffee (or “kopi”, a traditionally roasted coffee commonly enjoyed in Singapore and West Malaysia), soft-boiled eggs, and toast spread with kaya (coconut jam) and butter. The case provides an excellent example of how a firm successfully balances its triple bottom line of economic, social, and environmental sustainability while proactively finding ways to do more on various fronts including fair trade sourcing and reducing the environmental impact of its operations.

Next, we tell the story of National University Hospital (NUH), a major government-linked hospital, and how it tackles the challenges it faces in providing quality healthcare to an aging population by retaining and developing its health care professionals. Its change management journey provides guideposts for organisations to grow their human capital – a key pillar of any organisation – in a sustainable and effective manner.

Our sixth case covers the Future Ready Food Safety Hub (FRESH), a government-sponsored research centre that commercialises novel foods such as cultured meat. The Covid-19 pandemic has amplified the need for countries to be more self-reliant in food cultivation to mitigate any supply chain disruptions. As such, FRESH finds itself at a key decision point. Given its new circumstances in a post-pandemic world, how should it structure its ownership and operations to best suit its goals? In its current form, FRESH receives government funds and does not have to worry too much about the financial bottom line; yet, a corporate structure would give it more operational flexibility. This case underlines the challenges and opportunities for public-private cooperation to achieve sustainability goals.

Sustainability is not the purview of individuals or even organisations alone; tackling such issues requires the cooperation of a whole nation. “Race and Rise Against the Tide” highlights challenges common to many countries: rising temperatures and the corresponding rise in sea levels. Analysing Singapore’s societal systems-level approach to climate action, our case-writers reveal the interplay of various stakeholders including the government, companies and society at large, and the importance of coordination and cooperation in protecting what little useable space the island nation has for economic development, environmental conservation, and high-quality living.

The final story goes beyond the shores of Singapore, to India, the second most populous country in the world – in particular, the town of Sircilla, which at one point faced high suicide rates in its community of textile weavers. Low quality cloth produced by the weavers returned poor margins, while upgrading their machines required hefty loans, resulting in a persistent debt trap that exerted heavy financial and emotional burdens. How did the town solve the problem, when every possible measure seemed to lead to more questions than answers? This case serves as a reminder that human flourishing, or the reduction of human suffering, is a vital component of sustainability, and only a multi-pronged approach might produce a meaningful and lasting impact.

Although most of the case studies in this casebook are set in Singapore, the principles underscored remain applicable far beyond this Little Red Dot. The challenges of social enterprises' dual mission of doing good while staying financially viable; of established companies' efforts to groom and retain human capital; and of governments' coordinated efforts to build a bright future for all, are universal. We hope this series spurs discussion, debate, and ultimately thoughtful action to co-create sustainable living. As these cases illustrate, and the UN Sustainable Development Goals (which Singapore's Green Plan 2030 and NTU's Sustainability Manifesto are ascribed to) indicate, there are many different ways to contribute to this shared ideal.

While we have assembled this set of eight cases as a casebook, each case and its accompanying teaching notes may be purchased individually through the Asian Business Case Centre (ABCC) by emailing [asiacasecentre@ntu.edu.sg](mailto:asiacasecentre@ntu.edu.sg). They may also be purchased through the world's foremost case distributors, Harvard Publishing and Ivey Publishing.

We end this preface by acknowledging the many individuals whose contributions were instrumental in assembling this set of stories to share with the world. First and foremost, we wish to thank Hazel Chan and Jessie Tay of Nanyang Business School, who have supported us tirelessly in this journey. Next, our vault of esteemed case authors: Angeline Cuifang Lim, Benjamin Smith, Boey Yew Tung, Catherine Koh, Colin Lim, Gayathiri D/O Sivaraj, Heleena Panicker, Krishna Bhaskar, Lim Beng Chong, Lim Boon Chong, Sarah Cheah, Sharon Ng, Stephen Chua Chong Wei, Tania Nagpaul, Vivek Choudhary, and Winson Ang. To Ronald Hee, whose broad perspectives and deep knowledge of the interconnected world have shaped several cases. To our student assistants, for their excellent research on the subjects covered. To Natalia Tan, Teo Su Fern and Sharon Yap, for copyediting the cases with flair and polish. Last but not least, to Phoon Kok Hwa of Candid Creation Publishing, for his patient and comprehensive guidance on the publishing process.

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# Foreword Coffee: Marrying Passion and Mission

*Angeline Cuifang Lim, Maw Der Foo and Heleena Panicker*

**O**n the evening of 13th August 2021, as the cruise ship was pulling away from the Marina Bay Cruise Centre, Lim Wei Jie stood on the top deck of the ship with the wind blowing in his face, reflecting on Foreword Coffee's journey over the last four years. Foreword Coffee was a social enterprise in Singapore with a vision to empower persons with disabilities and special needs through employment opportunities.<sup>1</sup> Specifically, Foreword Coffee hired persons with disabilities and special needs to work in their cafés, provided customised on-the-job training for these employees, and actively found ways to develop these employees. Since its establishment in 2017, Foreword Coffee had expanded from a hole-in-the wall café at one of the residential colleges in the National University of Singapore (NUS) to five cafés in different parts of Singapore<sup>2</sup>; the number of employees had also grown from one to 21 and it continued to grow as Foreword Coffee planned for the opening of another two outlets in Q4 of 2021.

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1 Foreword Coffee. (2021). About Us. <https://forewordcoffee.com/pages/about-us>

2 Foreword Coffee. (2021). Contact Us. <https://forewordcoffee.com/pages/contact-us>

As the co-founder of Foreword Coffee, Wei Jie had been tirelessly working towards shaping and materialising his vision since the idea first popped into his head. He was beginning to feel worn out by the increased operational demands brought on by rapid expansion as well as the uncertainty that the COVID-19 pandemic had brought to the food and beverage (F&B) and retail sectors. While his journey as a social entrepreneur had generally been smooth sailing, he was uncertain about how the future would be going forward. First, with the pandemic causing many F&B and retail stores to shutter, how sustainable was it for Foreword Coffee to continue operating the way it always had? What other avenues of growth should Foreword Coffee seek? Second, he realised that despite growing in size, he and his co-founder were still heavily involved in the operational aspects of the business, leaving little time for more strategic roles. Finally, as fellow social entrepreneurs had started stepping down or had plans to do so, this got him thinking about who would succeed him and his co-founder when they eventually stepped down. As these questions swirled around in his mind, the ship sounded its foghorn one last time as it left the city state behind and headed towards international waters, beginning Wei Jie's long overdue vacation.

## **PLANTING THE “SEEDS” FOR FOREWORD COFFEE**

The idea for Foreword Coffee started when Lim Wei Jie was an undergraduate student at the National University of Singapore (NUS). As a freshman interested in working with marginalised communities, he joined the NUS Chua Thian Poh Community Leadership Programme (CTPCLP), an extracurricular programme that exposed students to community issues through workshops, talks, and collaborations with community organisations. There, he learnt about social entrepreneurship and how businesses could be a means of influencing the lives of others and not just about personal profits. Intrigued, he took a module on Social Entrepreneurship to further his understanding of the subject and subsequently interned at Skillseed, a social enterprise where he learnt the ropes of running a social enterprise from its founder.

In 2016, as a third-year undergraduate, Wei Jie participated in the Student Exchange Programme (SEP) where he spent a semester studying in Amsterdam, the Netherlands. There, he fell in love with European coffee culture, as he observed how coffee consumption did not just revolve around the beverage, but the social interactions among people of all ages who visited the cafés. There were families who were catching up over weekends with kids in tow, friends and co-workers connecting over a cup of coffee, and strangers who were just there to watch life go by. These cafés served Western-style specialty coffee. The showmanship and coffee knowledge shared by the baristas left a strong impression on Wei Jie. Fascinated by the deep appreciation for coffee and intrigued by the café culture, he set out to learn more.

While in NUS, Wei Jie was also part of the College of Alice and Peter Tan (CAPT) – a residential programme<sup>3</sup> for undergraduates that focused on community engagement. After learning of his interest in coffee, one of his professors who had spent some time volunteering in Yunnan, China recommended that he visit Yunnan to learn more about coffee from the coffee planters. He heeded this advice and went to a coffee plantation in Yunnan to experience coffee at its origins – planting, sowing, and preparing coffee seeds alongside the coffee farmers. There, he learnt that many coffee farmers earned a meagre profit for all the hard work put in, as coffee traders profited the most from the sale and export of coffee. That experience also exposed him to specialty coffee from Asia – which was less commonly served in cafés in Singapore.

## A HOLE-IN-THE-WALL CAFÉ

With his passion for coffee and his desire to improve the lives of those in marginalised communities, Wei Jie decided to merge those ideas and he pitched the concept of setting up a social enterprise café that hired persons with disabilities (specifically those with autism) to NUS in his final year as an undergraduate. However, his proposal was rejected as he had no experience as a social entrepreneur and was still a student. Refusing to give up, he decided to use that time to learn more about coffee. He set up a student interest group within CAPT and obtained funds from the college for the students participating in the group to learn about coffee. Through this group, he reached out to coffee roasters and café owners to teach the students in the group about coffee. He also café-hopped and spoke to owners, learning more about both coffee and managing a café from them.

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3 A residential programme in NUS was one in which the students who were part of the programme lived on campus in designated housing, attended modules that were curated specifically for that programme, and engaged in extra-curricular activities as part of the programme. Each programme had a theme and modules and extra-curricular activities revolved around that theme.

After a year, he decided to pitch the café idea again to NUS. This time round, instead of pitching the café as a student initiative, he pitched it as a business venture and highlighted an empty space at CAPT which could be used for this purpose. He succeeded with this new pitch, so an agreement was made, and a contract was signed. Foreword Coffee was established in April 2017 with Wei Jie and his friend as co-founders and directors.

Often referred to as a hole-in-the-wall café for the small space it occupied at CAPT, Foreword Coffee began operations in August 2017 with a sum of S\$20,000 from the co-founders and a training grant from SG Enable<sup>4</sup> that could be used to train and hire persons with disabilities. Being associated with SG Enable gave them the opportunity to showcase their business and recruit persons with disabilities. This was how they hired their first employee, who was deaf. When Foreword Coffee first started, Wei Jie had wanted to focus on persons with special needs. However, after working with his deaf employee, he realised that it was easy to include people who are deaf in the company as he could communicate easily with them by writing on paper and learning simple sign language. Incidentally, Wei Jie happened to be learning sign language at that time, so it became a symbiotic relationship where he taught his deaf employee how to make coffee and his employee taught him how to sign. This experience became a strategy for Foreword Coffee as they started to hire more deaf employees when they expanded. In spite of being deaf, they are capable of handling many of the tasks, and thus most of them were given the opportunity to manage outlets.

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4 SG Enable was a government agency focused on enabling persons with disabilities. See SG Enable. (2015). About Us. <https://www.sgenable.sg/pages/content.aspx?path=/about-us>

His second employee was a person with autism who had found Wei Jie through the media. The three of them became the initial team at Foreword Coffee, along with some of Wei Jie's friends who would stand in for him when he needed to be away from the café to attend to other matters. As his friends had their own full-time jobs, they could only pitch in to help occasionally.

His first co-founder was a student on government scholarship when he co-founded Foreword Coffee. As part of the scholarship requirements, he had to join the government in full-time employment upon the completion of his studies. Hence, he left Foreword Coffee in February 2018 to fulfil his scholarship commitments. It was also during this time that Wei Jie met his second co-founder, Nadi Chan, through the NUS Overseas Colleges (NOC) alumni network.<sup>5</sup> Nadi was interested in learning more about F&B and was inspired by Foreword Coffee's vision of empowering persons with disabilities. As he was still a student then, Nadi joined Foreword Coffee as an intern in February 2018 and juggled both his academic commitments while contributing to the café. It was only in January 2019 that Nadi officially became co-founder and director at Foreword Coffee.

During this initial phase, there was a lot of trial and error. Wei Jie started with developing his supply chain – figuring out where and whom to order from, managing costs, and tweaking his recipes. He also hosted students from special education schools for their attachments. This allowed him to learn more about working with employees who have special needs and how to tailor training for each one of them. The learning curve was steep, and he was confronted with so many challenges that he started questioning if the pursuit of

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5 The NOC programme was an entrepreneurship development programme in which students were given the entrepreneurial experience that they needed to develop their own start-ups. The programme provided training, mentoring, as well as access to an international network of entrepreneurs and alumni. See NUS Enterprise. (2021). Why NOC? National University of Singapore. <https://enterprise.nus.edu.sg/education-programmes/nus-overseas-colleges/why-noc/>

this vision would result in mental health issues for himself. However, he concluded that he truly enjoyed what he was doing and decided to persist in his ideals.

## MOVING OUT AND GROWING UP

### Growth and Visibility

The big break for Foreword Coffee came shortly after they launched in NUS. There was a news article with a short feature about them in December 2017 that created greater visibility for Foreword Coffee, especially among government agencies.

Shortly after, in March 2018, they were awarded the VentureForGood (Youth) Grant by the Singapore Centre for Social Enterprise (raiSE).<sup>6</sup> This grant was open to all new and existing Singapore-based social enterprises that were registered or had the intention of registering under the Companies Act or Co-operative Societies Act, and provided employment opportunities, education, skills development, basic human needs, economic tools and services, health care/ social care products and services, or products and services aimed at improving mental health and well-being of a group of intended beneficiaries, or engaged in capacity building for organisations in the social sector.<sup>7</sup> The grant provided up to 80% of the total projected capital expenditure and first year operating expenditure, capped at S\$20,000.<sup>8</sup> Foreword Coffee was awarded a sum of S\$30,000 to open an outlet at Civil Service College Singapore (CSC) – a college for government employees in Singapore. CSC was the chosen site as they

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6 raiSE was an organisation set up in 2015 by various government agencies to develop the social enterprise sector in Singapore. See raiSE Singapore. (2020). About raiSE. Singapore Centre For Social Enterprise. <https://www.raise.sg/about/about-menu/about-us.html>

7 raiSE Singapore. (2020). Venture for Good Youth. Singapore Centre For Social Enterprise. <https://www.raise.sg/ventureforgood-youth.html>

8 *ibid.*

had reached out to Foreword Coffee to ask if they wanted to open a café there to serve their staff and the civil servants who attended courses there.

Two months later, Foreword Coffee obtained another grant of S\$25,000 under the Lotus-NUS Fund. The Lotus-NUS Fund was a collaboration between the Lotus Life Foundation and NUS Enterprise<sup>9</sup> that provided social impact-driven start-ups founded by NUS-affiliated Singaporeans with seed funding of S\$25,000<sup>10</sup> to grow their ventures beyond ideation or prototyping, so that they could attract further funding to scale and sustain their venture.<sup>11</sup> In Foreword Coffee's case, the requirement was simply to grow their social impact, test their ideas and provide employment to persons with disabilities. (See **Exhibit 2** for a list of funding obtained by Foreword Coffee.)

These grants accelerated Foreword Coffee's expansion as it provided them with seed money to set up outlets outside of NUS. This was in line with Wei Jie's plan to run the CAPT outlet for a year before venturing outside of NUS. While the CAPT outlet provided Wei Jie the opportunity to test his idea of a social enterprise café staffed by persons with disabilities, the clientele was mainly staff and students working and residing in the residential colleges in University Town – the part of the NUS campus that CAPT was located, and the revenue obtained was insufficient for Wei Jie to pay his employees sustainable salaries. It was thus imperative for them to move to another location with greater demand for their products and services. The CAPT outlet was closed in May 2018 as semester break began and the number of

9 NUS Enterprise was a unit within NUS that "actively promotes entrepreneurship and cultivates global mind-sets and talents through the synergies of experiential entrepreneurial education, active industry partnerships for technology and commercialisation, holistic entrepreneurship support and catalytic entrepreneurship outreach." See Lotus Life Foundation. (2021). Lotus-NUS Fund. <https://www.lotuslifefoundation.sg/our-works/lotus-nus-fund/>

10 NUS Enterprise. (2020, February 12). Announcing the 5 Lotus-NUS recipients of 2019. NUS Enterprise. <https://nusenterprise.medium.com/announcing-the-5-lotus-nus-recipients-of-2019-c1e8df0ee0e3>

11 Lotus Life Foundation. (2021). Lotus-NUS Fund. <https://www.lotuslifefoundation.sg/our-works/lotus-nus-fund/>

customers fell significantly.

Foreword Coffee opened its first outlet outside of NUS at CSC in July 2018. This was soon followed by the opening of its second outlet in October 2018 at the Ng Teng Fong Centre for Healthcare Innovation (CHI) – a newly built healthcare training and innovation hub located next to one of the oldest and most centrally-located hospitals in Singapore.<sup>12</sup> These outlets catered mainly to employees and visitors of those buildings and public visibility of Foreword Coffee was still low. It was only until June 2019 when the Temasek Shophouse outlet with a downtown location was opened that the public had greater access to Foreword Coffee and public visibility and recognition of Foreword Coffee grew. Located in a refurbished state-owned heritage building on Singapore’s busiest shopping street, the Temasek Shophouse was set up as a social impact hub bringing together social entrepreneurs and other stakeholders interested in contributing towards the common good.<sup>13</sup> The Temasek Shophouse was established as part of the philanthropic efforts of Temasek Trust, housing the philanthropic arms of Temasek Holdings (a global investment company headquartered in Singapore)<sup>14</sup> – Temasek Trust, Temasek Foundation and the Stewardship Asia Centre<sup>15</sup> – the Commissioner of Charities under the Ministry of Culture, Community and Youth, and other social enterprises.

The building in which it was located also stood out with its biophilic design (a design that incorporated nature), including a Green Wall that housed 27 plant varieties with a microclimate cooling system that helped flora thrive in an urban space.<sup>16</sup> The opening

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12 Centre for Healthcare Innovation. (2017, December 4). Ng Teng Fong Centre for Healthcare Innovation. <https://www.chi.sg/our-facilities>

13 Temasek Shophouse. (2019). Temasek Shophouse. <https://www.temasekshophouse.org.sg/>

14 Temasek Shophouse. (2019). About Us. <https://www.temasek.com.sg/en/who-we-are/about-us>

15 Today. (2019, May 31). New Temasek Shophouse promotes social impact, sustainability on Singapore’s premier shopping strip.

16 Today. (2019, May 31). New Temasek Shophouse promotes social impact, sustainability on Singapore’s premier shopping strip.

of such an iconic space generated a lot of buzz in the media, with political figures mentioning it in their speeches.<sup>17</sup> The media coverage of Temasek Shophouse also constantly featured Foreword Coffee<sup>18</sup> and that contributed to significantly greater visibility for the social enterprise, and this in turn resulted in a greater social media presence as social media influencers and bloggers started featuring them.<sup>19,20,21</sup>

Since the establishment of Foreword Coffee, the journey was rather smooth sailing as Wei Jie had a clear focus from the beginning and was willing to make good use of all opportunities that came his way. Foreword Coffee also had a lot of support from government agencies, schools, corporations, and individuals who believed in his vision of empowering persons with disabilities. However, when COVID-19 hit Singapore and the rest of the world, many F&B and retail businesses were affected, and Foreword Coffee was no exception. One of Foreword Coffee's objectives was to create a space for greater interaction between persons with disabilities and the mainstream public and thus, persons with disabilities were put in frontline roles such as cashiering. A tabletop setting was also created so that customers could view the brewing process and the service crew was encouraged to share the brewing method with customers.<sup>22</sup> With the various dine-in restrictions imposed due to the pandemic, Foreword Coffee had to shut many of its outlets temporarily and turn to developing an online presence.

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- 17 Speech by Senior Minister Tharman Shanmugaratnam at the Official Launch of the Temasek Shophouse on 3 June 2019.  
 18 Today. (2019, May 31). New Temasek Shophouse promotes social impact, sustainability on Singapore's premier shopping strip.; The Business Times. (2019, June 1). Temasek's philanthropy arm sets up Asia-focused private equity fund for impact investing. Fiona Lam.; The Straits Times. (2019, June 1). A hub to help groups create social impact. Rahimah Rashith.; The Straits Times. (2019, June 4). New hub for social enterprises aim to spur ideas on sustainability. Rei Kurohi.; Temasek. (2019, December 2). Foreword Coffee: An inclusive café that develops potential. <https://www.temasek.com.sg/en/news-and-views/stories/sustainability/generational-investing/foreword-coffee-an-inclusive-cafe-that-develops-potential>  
 19 Vulcan Post. (2020, August 18). Coffee With A Conscience: This S'pore Café Chain Hires And Trains The Disabled As Baristas. Sheila Chiang. <https://vulcanpost.com/709643/foreword-coffee-roasters-singapore/>  
 20 Wonderwall. (2019, September 30). Empowering The Differently-Abled Through Coffee. Farhan Shafie. <https://www.wonderwall.sg/workplay/empowering-the-differently-abled-through-coffee/>  
 21 The Ordinary Patrons. (2019, June 18). Foreword Coffee at Temasek Shophouse. <https://ordinarypatrons.com/2019/06/18/foreword-coffee-at-temasek-shophouse/>  
 22 ChannelNewsAsia. (2017, December 27). Good businesses: Meet the entrepreneurs who want to make Singapore a better place.

With the support of various government grants given out to businesses during this period, Foreword Coffee was able to sustain the livelihoods of its employees, revamp its website and expand on e-commerce. To survive, they set up an online retail store on Shopee and signed up with three of the biggest food delivery platforms in Singapore – Grabfood, foodpanda, and Deliveroo. They also quickly developed new products such as bottled coffee that could be ordered online and delivered while still retaining the quality of the taste. These efforts paid off as they saw online sales increase tenfold during that time.

As the pandemic wore on and the situation in Singapore and around the world slowly settled into a new normal, Foreword Coffee opened a fourth outlet in February 2021 at Canberra Plaza, and a fifth outlet in August 2021 at NUS Yong Siew Toh Conservatory of Music. Most of these outlets were opened under no-rent or low-rent conditions, and this helped Foreword Coffee sustain its operations.

### **Inclusive Hiring**

Since Foreword Coffee began its operations, it had practised inclusive hiring. In fact, they mainly hired employees with disabilities and trained them to take on various tasks within the cafés. As of September 2021, Foreword Coffee had a total of 23 employees including Wei Jie and Nadi. The rest of the employees comprised of a full-time marketing and a full-time business development staff, four full-time supervisors who oversaw the various outlets, and the remaining employees were full-time and part-time baristas and service crew (see **Exhibit 3**). Besides Wei Jie, Nadi and the two full-time backend administrative staff, the rest of the staff were differently-abled. This was intentional as Wei Jie wanted to hire as many persons with disabilities as they could afford in order to give them the opportunity to develop into empowered members of society. Wei Jie and Nadi

also wanted to allow more people to have the opportunities to learn from and interact with as many persons with disabilities as possible, so they were not contented with just having one outlet and set their sights on growing Foreword Coffee.

In working towards their goal, there were a number of challenges encountered. First, Wei Jie and Nadi had to learn how to work with each employee differently. With some deaf employees<sup>23</sup>, they had to learn to communicate through sign language or writing, and with employees who were on the autism spectrum or had special needs, it was imperative to learn their individual quirks and strengths in order to properly train and guide them. In some cases, parents, case workers or job coaches were on hand to help guide the employees as well.

Second, employees had to learn to communicate with and work with each other. Because of the inclusive environment that Wei Jie and Nadi created, the team was accepting of each other's shortcomings and humbly learnt from each other. Third, because the employees were unable to learn complex tasks within a short time, a lot of thought had to be put into designing the work environment and training. To patiently train and guide employees on-the-job, Wei Jie carved out four work stations and split complex tasks into smaller steps. He also created customised visual aids such as recipes and steps for processes and pasted them at the various stations so that employees could refer to them as they performed their tasks. To further cater to the needs of its employees, Foreword Coffee also purchased equipment that enabled employees to perform their tasks more easily. For example, a coffee tamping machine was purchased to help employees tamp the coffee (a process that seems easy to do but in reality, was not). An Eversys machine was also procured for the

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23 Some of these employees had hearing aids and were able to hear what others said.

Canberra outlet to automate much of the coffee-making process – this helped to facilitate the coffee-making process for new baristas.<sup>24</sup> Interestingly, while the technology helped to facilitate work for new baristas, the more experienced baristas stopped using these equipment once they learnt how to perform the tasks manually. These equipment were then moved to outlets with newer baristas for them to use. The innovations made in Foreword Coffee’s work processes, work arrangements and equipment set-up to facilitate the work of its differently-abled employees were featured in a job redesign guide produced by SG Enable and the Ministry of Manpower<sup>25</sup> to advocate for more inclusive hiring among employers in Singapore. The guide was launched at Foreword Coffee’s outlet at Temasek Shophouse<sup>26</sup>, drawing even greater attention to the good work that Foreword Coffee was doing.

## Sustainability

Besides inclusive hiring, Foreword Coffee was also known for their efforts in sustainability. Having attended a module on environmental sustainability and seeing a video in which plastic waste was piling up and affecting the natural environment around us, Wei Jie became more conscious about issues of sustainability and strove to include sustainability in his life as much as possible. Sustainability was one of the key aspects of Foreword Coffee right from the time it began operations, and Foreword Coffee’s participation in the sustainability movement contributed to its visibility with a number of media mentions.<sup>27,28,29</sup>

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24 Medium. (2021, February 16). Barista automation for social inclusion (Foreword's 4th Coffee Outlet). Foreword Coffee Roasters. <https://forewordcoffeeco.medium.com/barista-automation-for-social-inclusion-forewords-4th-coffee-outlet-69415cdf8507>

25 SG Enable. (2019, January 3). Job redesign guide for inclusive employers. [https://s3-ap-southeast-1.amazonaws.com/sgenableprod/wp-content/uploads/2019/08/20020718/SGE\\_JobRedesignGuide.pdf](https://s3-ap-southeast-1.amazonaws.com/sgenableprod/wp-content/uploads/2019/08/20020718/SGE_JobRedesignGuide.pdf)

26 The Straits Times. (17 June 2019). Job redesign guide launched to help firms be more inclusive. Sue-Ann Tan.

27 Temasek. (2019, December 2). Foreword Coffee: An Inclusive Café that Develops Potential. <https://www.temasek.com.sg/en/news-and-views/stories/sustainability/generational-investing/foreword-coffee-an-inclusive-cafe-that-develops-potential>

28 The Sustainability Project. (2018, February 18). Foreword Coffee - coffee with a conscience. Jo. <https://thesustainabilityproject.life/blog/2018/02/18/foreword-coffee-coffee-conscience/>

29 Clean & Green Singapore. (2020, November 5). Wei Jie's story. <https://www.cgs.gov.sg/what-we-do/keepsgclean/environmentandus/beinspired/wei-jie-s-story>

Foreword Coffee's model of sustainability hinged on three pillars – People, Coffee, and the Environment:

### **People**

Foreword Coffee aimed to present an inclusive workplace, which recognised every individual's ability to contribute meaningfully.<sup>30</sup> They wanted to provide opportunities to, and primarily hire, persons with disabilities. To provide sustainable employment, income must cover training, personal holistic development, and people development.

### **Coffee**

As their primary product, coffee was integral to the enterprise. They valued the importance of traceability and transparency in their coffee supply chain, ensuring that the product was ethically sourced.<sup>31</sup> Foreword Coffee imported directly from producers such that costs, which might otherwise go to middlemen, were reduced and the money went directly to producers. They also roasted their beans in-house and carried products such as brew bags and coffee capsules. In a further effort to support a more equitable value chain, since January 2021, Foreword Coffee pledged 5% of sales revenue derived from their coffee brew bags to community development projects in coffee growing regions in Asia.<sup>32</sup>

### **Environment**

Foreword Coffee actively worked to cut down waste and attempted to nudge customers towards being more conscious of their consumption.<sup>33</sup> As part of the Bring Your Own (BYO) movement,

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30 Foreword Coffee. (2020). Impact Report 2020. [https://cdn.shopify.com/s/files/1/0472/1950/7364/files/Foreword\\_Impact\\_Report\\_2020\\_compressed.pdf?v=1618799083](https://cdn.shopify.com/s/files/1/0472/1950/7364/files/Foreword_Impact_Report_2020_compressed.pdf?v=1618799083)

31 *ibid.*

32 Foreword Coffee. (N.D.) Sustainability. <https://forewordcoffee.com/pages/sustainability>

33 Foreword Coffee. (2020). Impact Report 2020. [https://cdn.shopify.com/s/files/1/0472/1950/7364/files/Foreword\\_Impact\\_Report\\_2020\\_compressed.pdf?v=1618799083](https://cdn.shopify.com/s/files/1/0472/1950/7364/files/Foreword_Impact_Report_2020_compressed.pdf?v=1618799083)

they provided a 10% discount to customers who brought their own cups rather than opted for single-use cups or utensils. Additionally, these single-use items were made from renewable resources and FSC-certified paper. Packaging for their products was also made with eco-friendly materials. Some of Foreword Coffee's other initiatives towards environmental sustainability were the Return & Reuse Initiative, Reduced Packaging Initiative, and Reused Packaging Initiative.<sup>34</sup>

**Exhibit 4** shows Foreword Coffee's Sustainability Model and how its three sustainability pillars aligned with the United Nations' Sustainability Development Goals.

## LOOKING AHEAD

Having experienced a rather smooth sailing and rapid growth journey thus far, Wei Jie was then confronted with a number of challenges as he continued to chart the path forward for Foreword Coffee.

The first challenge was the issue of sustainability. The pandemic had signalled to Wei Jie that the business cannot be operated as usual, as many F&B and retail stores in Singapore had shuttered, including local institutions that had been around for decades. The lost heritage was something that the nation mourned, but more importantly for Wei Jie, it was the livelihoods of his employees that mattered the most to him. Without Foreword Coffee, would they be able to find other employment that could accommodate their needs and empower them to live out their potential? Even if they could find employment, how inclusive would the environment be?

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34 Foreword Coffee. (2020) Sustainability. <https://forewordcoffee.com/pages/sustainability>

In Singapore, as of 3<sup>rd</sup> November 2020, there were approximately 9,000 persons with disabilities who were employed and more than 5,000 companies employing persons with disabilities.<sup>35</sup> This suggested that on average, each company employed 1-2 persons with disabilities. In Foreword Coffee, employees with disabilities made up more than 80% of their staff strength, and that had made a huge difference in allowing their employees with disabilities to learn to be comfortable with themselves and in providing them with a safe space to develop their potential. Given the need to protect their livelihoods, what other avenues for growth were available for Foreword Coffee? What avenues could weather potential crises such as the pandemic, without needing the support of the government?

A second challenge that Wei Jie faced was operational in nature. For the longest time, Nadi and Wei Jie had divided the core work between them – with Nadi spending more time on finance and operations, and Wei Jie spending more time on HR and marketing. They had mostly relied on temporary interns to support and sustain marketing efforts, and to help with various tasks. However, at the end of the day, they had to be constantly kept abreast of what the interns were doing because eventually, the work fell back on them once the intern left. It was only in 2020 that they hired two full-time staff to take over the marketing and business development roles which helped to alleviate some of the workload. However, what Wei Jie had realised was that the training of employees was not an easy task to delegate to the outlet managers as they could not deliver the training in the way that Wei Jie had developed it. He was constantly required to pick up the slack for many operational matters and that diverted his time and attention away from the strategic and external-facing aspects of the business.

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35 Ministry of Social and Family Development. (2020, November 3). Number of persons with disabilities (PWDs) who are currently employed. Seah Kian Peng. [https://www.msf.gov.sg/media-room/Pages/Number-of-persons-with-disabilities-\(PWDs\)-who-are-currently-employed.aspx](https://www.msf.gov.sg/media-room/Pages/Number-of-persons-with-disabilities-(PWDs)-who-are-currently-employed.aspx)

Last but not least was the challenge of succession planning. A number of his fellow social entrepreneurs had stepped down or had plans to do so, and one of them actually spent eight years developing his successor before he stepped down from the leadership role. This triggered the thought in him to start looking for someone he could slowly develop over the years to take over from him and Nadi when they were ready to step down from their current leadership roles. For Wei Jie, his heart was with his employees on the ground and that to him was the perfect role for him in the future when a new leader with perhaps more managerial or leadership experience and who was able to honour his vision could take over the reins of Foreword Coffee.

## **ACKNOWLEDGEMENTS**

We would like to thank Wei Jie and Nadi for so openly sharing with us their journey at Foreword Coffee over the years and to Koh Wee Ling for her support in conducting and transcribing the initial interview with Wei Jie.

**EXHIBIT 1: TIMELINE OF KEY EVENTS**

Month/Year	Milestone
April 2017	• Foreword Coffee was incorporated by Lim Wei Jie and his first co-founder with a sum of S\$20,000
August 2017	• First Foreword Coffee outlet opened at NUS College of Alice and Peter Tan (CAPT)
August 2017	• Awarded a grant from SG Enable to train and hire persons with disabilities
December 2017	• First news article with short feature on Foreword Coffee by ChannelNewsAsia – this brought greater visibility to Foreword Coffee and resulted in many opportunities
February 2018	• First co-founder left because of a scholarship bond
February 2018	• Current co-founder and director, Nadi Chan, first joined as an intern
March 2018	• Awarded the youth Venture for Good Grant under the Singapore Centre for Social Enterprise (raiSE)
May 2018	• Awarded the Lotus-NUS Fund by NUS Enterprise
May 2018	• Foreword Coffee moved out of NUS
July 2018	• Launch of Civil Service College (CSC) outlet (caters mainly to CSC staff; outsiders can only do takeaways)
October 2018	• Launch of Ng Teng Fong Centre for Healthcare Innovation (CHI) outlet (only opened to Tan Tock Seng Hospital staff after Singapore raised its risk assessment to DORSCON Orange thereby restricting public entry into the CHI building which was located next to Tan Tock Seng Hospital <sup>36</sup> )
January 2019	• Nadi officially joined as co-founder and director
June 2019	• Launch of Temasek Shophouse (TSH) outlet (first outlet open to public)
April 2020	• Launch of new website
June 2020	• Launch of online store on Shopee
October 2020	• Launch of online delivery through three main platforms – GrabFood, FoodPanda, and Deliveroo
February 2021	• Launch of Canberra Plaza outlet (with Eversys Coffee Machine to make operations easier for differently abled staff) <sup>37</sup>
August 2021	• Launch of NUS Yong Siew Toh Conservatory of Music outlet

Source: Created by authors.

36 The Disease Outbreak Response System Condition (DORSCON) was a color-coded framework that showed the current disease condition in Singapore. The assessment of risk took into account: (1) the current disease situation overseas, (2) transmissibility of the disease, (3) likelihood of the disease arriving in Singapore, and (4) its impact on Singapore's community. See MCI - Gov.SG. (2020, February 6). What do the different DORSCON levels mean. <https://www.gov.sg/article/what-do-the-different-dorscon-levels-mean>

37 Medium. (2021, February 16). Barista automation for social inclusion (Foreword's 4th Coffee Outlet). Foreword Coffee Roasters. <https://forewordcoffeeco.medium.com/barista-automation-for-social-inclusion-forewords-4th-coffee-outlet-69415cdf8507>

**EXHIBIT 2: FUNDING**

Grant/Fund Obtained	Funding Year/Period	Funding Amount	Fund Usage
Youth Venture for Good Grant under the Singapore Centre for Social Enterprise (raiSE)	March 2018	\$30,000	Used for Capital Expenditure, and working capital in opening the Civil Service Outlet
Grants via NUS Enterprise, under the Lotus-NUS Fund	May 2018	\$25,000	Capital expenditure for outlet at Tan Tock Seng Hospital/Centre for Healthcare Innovation and working capital for hiring
Open Door Programme Training Grant under WSG's Adapt and Grow initiative	2019	Undisclosed	Launch of a 40-hour Barista Confidence Training Programme aimed at equipping persons with disabilities with the knowledge and skills to work in a café serving specialty coffee <sup>38</sup>
Digital Resilience Bonus (DRB)	April 2020 – July 2021	\$2,500 each for Category 1 and Category 2	Adoption of technology to improve their processes (Category 1) and built an online shopfront or e-commerce platform (Category 2) <sup>39</sup>
Productivity Solutions Grant (PSG)	2020	Undisclosed	Launch of new website by adopting an e-commerce development package <sup>40</sup>
Sponsorship from Temasek Foundation and DBS	December 2020	Undisclosed	Made and distributed bottled coffee for healthcare workers across all 20 polyclinics and Tan Tock Seng Hospital <sup>41</sup>
Job Support Scheme (JSS)	April 2020 –current	10% to 75% of salaries	Continued to pay regular salaries to all full-time employees, and partial salaries to part-time employees despite reduced working hours <sup>42,43</sup>

Source: Created by authors.

38 Human Resources Online. (2019, December 3). PWD Day: How Foreword Coffee, MBS, Uniqlo, and more are building inclusive work environments for the differently-abled. Jerene Ang. <https://www.humanresourcesonline.net/pwd-day-how-foreword-coffee-mbs-uniqlo-and-more-are-building-inclusive-work-environments-for-the-differently-abled>

39 Infocom Media Development Authority. (n.d.). Digital Resilience Bonus for the Food Services and Retail Sectors. <https://www.imda.gov.sg/-/media/Imda/Files/About/Media-Releases/2020/Annex-D-Digital-Resilience-Bonus.pdf?la=en&ld=SDSGSGDirect>

40 The Straits Times. (2020, June 5). Over 5,000 jobs in the pipeline for digital sector: Iswaran. Hariz Baharudin. <https://www.straitstimes.com/politics/over-5000-jobs-in-the-pipeline-for-digital-sector-iswaran>

41 Native. (2020, December 3). Coping With COVID-19: First-Hand Accounts From the Owners of Foreword Coffee Roasters and Bloom Artisan Café. Xiao Shyan Tan. <https://www.wegonative.com/article/4136/coping-with-covid-19-accounts-from-business-owners-of-foreword-coffee-roasters-and-bloom-artisan-cafe>

42 Vulcan Post. (2020, August 18). Coffee With A Conscience: This S'pore Café Chain Hires And Trains The Disabled As Baristas. Sheila Chiang. <https://vulcanpost.com/709643/foreword-coffee-roasters-singapore/>

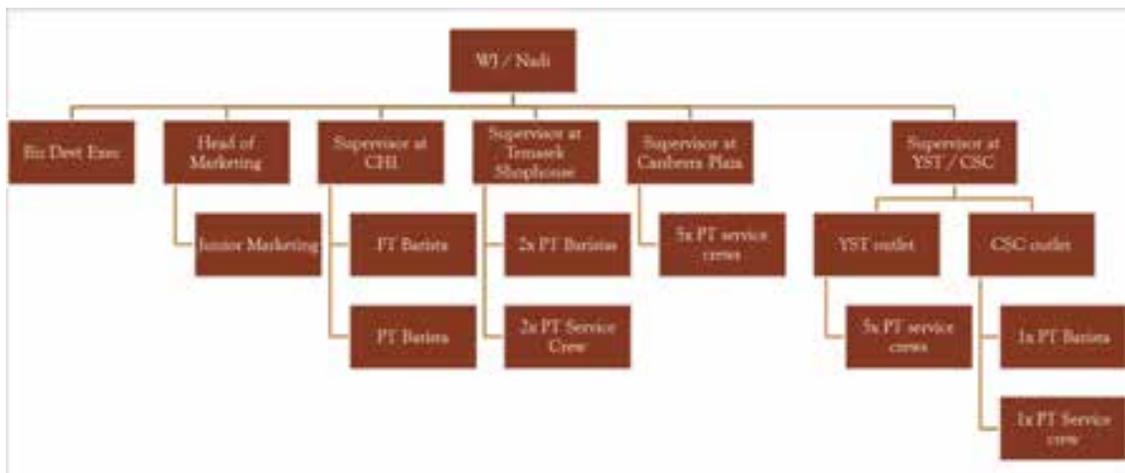
43 Native. (2020, December 3). Coping With COVID-19: First-Hand Accounts From the Owners of Foreword Coffee Roasters and Bloom Artisan Café. Xiao Shyan Tan. <https://www.wegonative.com/article/4136/coping-with-covid-19-accounts-from-business-owners-of-foreword-coffee-roasters-and-bloom-artisan-cafe>

Exhibit 2: Funding

Grant/Fund Obtained	Funding Year/Period	Funding Amount	Fund Usage
Special Employment Credit (SEC)	2017 – 2020	16% of a disabled employee’s monthly income, up to \$240 per month, per employee <sup>44, 45</sup>	Used to offset the wages of employees
Enabling Employment Credit (EEC)	2021 – current	20% of a disabled employee’s monthly income, capped at \$400 per month, per employee <sup>46</sup>	Used to offset the wages of employees

Source: Created by authors.

### EXHIBIT 3: ORGANISATION CHART



Source: Foreword Coffee

44 Special Employment Credit. (2021, October 13). General. <https://www.sec.gov.sg/faq/general/>  
 45 Special Employment Credit. (2021, October 13). Useful information for employers. <https://www.sec.gov.sg/faq/usefulinformationforemployers/>  
 46 Ministry of Manpower. (n.d.). Factsheet on Enabling Employment Credit. <https://www.mom.gov.sg/-/media/mom/documents/budget2020/factsheet-enabling-employment-credit.pdf>

**EXHIBIT 4: SUSTAINABILITY MODEL****Our Sustainability Pillars**

Source: Foreword Coffee. (2020). Impact Report 2020.  
[https://cdn.shopify.com/s/files/1/0472/1950/7364/files/Foreword\\_Impact\\_Report\\_2020\\_compressed.pdf?v=1618799083](https://cdn.shopify.com/s/files/1/0472/1950/7364/files/Foreword_Impact_Report_2020_compressed.pdf?v=1618799083)



# SimplyGood: From a Mission to Rescue Waste to a Passion for Reducing Single-Use Plastics

*Tania Nagpaul and Koh Cheng Boon*

On a rainy morning in August 2021, Jeremy Lee looked out the window of his office on the sixth storey of Social Collider<sup>1</sup>, a co-working space for social impact-oriented organisations in Singapore, and reflected on his entrepreneurship journey. He thought fondly of 2017, the year that he and his business partner Clewyn Puah set out to launch their own business as first-time entrepreneurs and third year undergraduate students in Singapore.

Inspired by the idea of waste valorisation<sup>2</sup>, the duo set up a social enterprise named UglyGood. At UglyGood, they turned fruit waste collected from various fruit juice outlets in Singapore into useable products such as cleaning agents, essential oils, and animal feed.

Since then, UglyGood had been acquired by another Small and Mid-Size Enterprise (SME), and Jeremy founded SimplyGood, a

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1 Social Collider is a collaborative, co-working, and co-innovation community for impact organisations in Singapore. Source: Social Collider. (N. D.). About us. Retrieved from <https://www.socialcollider.co/#section-about>

2 Waste valorisation is the process of reusing, recycling or composting waste materials and converting them into more useful products including materials, chemicals, fuels or other sources of energy. Source: American Institute of Chemical Engineers. (N. D.). Waste valorization. Retrieved from <https://www.aiche.org/topics/energy/waste-valorization>

sustainable consumer homecare and cleaning spin-off from his maiden venture.

The journey had been no less than a rollercoaster ride. Yet, the duo persevered and saw their endeavour to completion. As a social enterprise, profit was just as important as social and environmental impact – success was measured using the concept of the triple bottom line.<sup>3</sup> What were some of the challenges SimplyGood faced? How did Jeremy apply the triple bottom line to his businesses? What were Jeremy's motivating factors/drivers in staying the course?

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3 Miller, K. (2020, December 8). The triple bottom line: What it is & why it's important. Harvard Business School Online Business Insights Blog. Retrieved from <https://online.hbs.edu/blog/post/what-is-the-triple-bottom-line>

## THE VOYAGE

### Early Days of the Voyage

In 2017, two intrepid young entrepreneurs, Jeremy Lee and Clewyn Puah, decided to start a social enterprise called UglyGood. Being acutely aware of the magnitude of environmental degradation and its related impacts, the pair was intent on realising their entrepreneurial ambitions to solve environmental issues. They received funding from the Development Bank of Singapore (DBS) Foundation Social Enterprise Grant<sup>4</sup> as seed capital to help them get the business up and running.

Jeremy explains,

“We were keen to explore how could we use business as a force for good. Instead of relying on government-based interventions, we thought that it was a really beautiful match if we could create a product on sustainable lines.”

Initially, they entered into a collaboration with Singapore Wildlife Reserves and developed a collection and distribution network in which fruit waste was collected from the juicing industry and sent to the Singapore Zoo as animal feed.

In 2018, UglyGood won the Create4Good Challenge<sup>5</sup> and received an award of SGD 50,000 (approximately USD 37,056, based on the average exchange rate in 2018). Within their first one and half years, they built the capability to process ten tonnes of fruit waste per year

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4 DBS Bank. (2018, May 18). Safeguarding Asia's future: Innovations that create new uses for unwanted items, waste products (part 1). Retrieved from <https://www.dbs.com/innovation/dbs-innovates/safeguarding-asia-s-future-innovations-that-create-new-uses-for-unwanted-items-waste-products-part-1.html>

5 Singapore University of Technology and Design. (2018). Student achievements 2018. Retrieved from <https://www.sutd.edu.sg/About/Accolades/Student-Accolades/2018>

into liquid-based natural cleaning detergents. The business was working well as a B2B outfit.

Inspired by models of waste valorisation where waste is converted into value, they decided to diversify their product line. The founders had little to no educational background in chemical sciences – Jeremy was an information systems and analytics major, while Clewyn studied accountancy and finance. As such, the duo sought help from different research institutions such as Temasek Polytechnic, Agency for Science, Technology and Research (A\*Star), Singapore Polytechnic and National University of Singapore.

The initial stages of setting up UglyGood was arduous, and the founders had to experiment with several formulations for their cleaning agents and essential oils (see **Exhibit 1** for the UglyGood product line) before hitting upon one that balanced safety, effectiveness, ease of mass manufacture and consumer usage, and the triple bottom line. Entry into the home cleaning industry was not easy, but Jeremy's conviction in the merits of waste valorisation was apparent. *“Turning trash into treasure was really the core of our business,”* he said.

Just as the business was starting to stabilise, several consumers began pointing out that UglyGood products were not as environmentally friendly as they had expected. The product packaging – that is, the plastic bottles that contained their cleaning agents – were creating more plastic waste and adding to the plastic waste conundrum in Singapore. In 2020, the total amount of plastic waste generated was estimated at 868,000 tonnes, out of which only 4% was recycled.<sup>6</sup> According to a recent study, Singapore uses at least

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6 Ministry of Sustainability and the Environment. (2021, August 17). Launch of the Plastics Recycling Association of Singapore – Ms Grace Fu [Speech]. Retrieved from <https://www.mse.gov.sg/resource-room/category/2021-08-17-speech-at-the-launch-of-pras>

1.76 billion plastic items a year, or almost one item per person per day.<sup>7,8</sup>

In other words, if the 1.3 million bottles used in Singapore in one day were lined up one after the other, they could cover a stretch of 294.3 kilometres – about the length of 5,886 Olympic-size swimming pools.

The carbon footprint resulting from using these plastic bottles was far greater than the sustainability benefit of rescuing fruit waste. Manufacturing one pound of PET (polyethene terephthalate) plastic can produce up to three pounds of carbon dioxide. Processing plastic resins and transportation also contributed to the carbon footprint of plastic bottles in a major way. Estimates show that one 500 millilitre (0.53 quarts) plastic bottle of water has a total carbon footprint equal to 82.8 grams (about 3 ounces) of carbon dioxide.<sup>9</sup>

The team knew they had a problem. According to Jeremy,

“We hit a dilemma...we are trying our best to make use of food waste, but incidentally, we are also creating more waste. Listening to the consumers was a big bet but it paid off! It was an awakening of sorts, a humbling experience.”

Jeremy and his team realised the need to address this issue. There were not going to take this consumer push lightly. All production was halted, and the team went back to the drawing board.

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7 Hong, J. (2018, July 31). Singapore goes through 1.76 billion plastic items a year, recycles less than 20%. The Straits Times. Retrieved from <https://www.straitstimes.com/singapore/singapore-goes-through-167-billion-plastic-items-a-year-recycles-less-than-20-per-cent-of>

8 National Environment Agency. (2020). Waste statistics and overall recycling. Retrieved from <https://www.nea.gov.sg/our-services/waste-management/waste-statistics-and-overall-recycling>

9 Blue, M. L. (2018, June 11). What is the carbon footprint of a plastic bottle?. Retrieved from <https://sciencing.com/carbon-footprint-plastic-bottle-12307187.html>

## The Culmination of the Voyage

For any business, taking a pause from operations takes its toll on earnings (and thus a business's survivability as well as its ability to reinvest and expand) and is thus no mean feat, especially for a startup. Jeremy said that it was a "*painful decision*", but that it was necessary for the team to head back to the drawing board to realign with the fundamental purpose of their business.

If the main problem of their cleaning agents was the use of plastic bottles, the essential question was: why were they needed in the first place? Liquid products were typically stored in bottles, jars, or airtight refill packs, and their cleaning agent needed water for the enzymes to work, as well as a container that would not be digested or dissolved by its contents.

Jeremy and Clewyn pored over the formulation of their cleaning agent, rethinking the most fundamental aspects of their product. That is when their eureka moment struck. The duo noticed that about 96% of their product was water, with only 4% being the active agent, and realised that they could dehydrate the active cleaning agent and sell it as a dissolvable tablet.

This paved the way for a peek into consumers' perceptions and receptivity to a product like this. The home cleaning market was dominated by chemical-based household cleaning agents and sleek products that promised customers high-quality cleaning solutions. In such a consumer climate, launching a product that cost more than the usual cleaning detergent and reduced consumer ease of use (since customers had to dissolve the tablets first) was a long shot, but well worth trying. It required consumers to reassess their habits and preferences in favour of a product that would be a little more pricey

and involved an additional step before it could fulfil its primary function, but a lot more environmentally friendly.

After one year of research and development, and listening to their customers, the team developed a way of producing sustainable and environmentally friendly household cleaning tablets. Unlike their previous products, these tablets were not made solely from fruit waste. Instead, they were manufactured by compressing all-natural plant-based dry ingredients together.

Each ingredient was carefully chosen to serve a specific function in the final product. For instance, citric acid extracted from orange peels was used to ensure an optimal pH balance in the cleaning solution. Furthermore, the team used sodium carbonate and bicarbonate, which were used for controlling fungal growth and softening water, that was naturally derived from minerals. Formulated to dissolve fully in water, the cleaning tablets were 300 times smaller and 200 times lighter than traditional liquid-based cleaning agents (see **Exhibit 2** for the SimplyGood product line).

With the formulation in place, the team could now begin prototyping. A pilot test was launched to gauge potential customers' responses to this new idea. Both quantitative (voting) and qualitative comments were garnered in order to improve on the product and identify the best options. The team invested one year (January 2020 to December 2020) to pilot their dehydrated plant-based cleaning agent under the name "SimplyGood".

The change of name was necessitated by the fact that the tablet's formulation did not use fruit waste as its primary raw material. Rather, the dehydrated tablets required a new manufacturing process using other plant-based ingredients (mentioned above). SimplyGood was

birthed with the goal of producing a plant-based cleaning agent and that did not require plastic bottles as packaging. The team's overwhelming success saw SimplyGood becoming a separate entity in January 2021, after just one year of pilot testing.

SimplyGood's unique selling proposition rested on encouraging the consumer to be a part of the solution rather than a contributor to the problem of plastic waste in Singapore. Apart from supporting a worthy cause, consumers felt good about investing in their family's safety and well-being in the short and long term.

It is not difficult to see why it succeeded. Jeremy said,

“We were just adding 96% of [the liquid cleaning agent] with ionised water, which people already have at home. And then, let's look at the plastic bottle. Why are we purchasing more plastic bottles when they could just reuse whatever they bought previously? Because normally everybody has a bottle at home.”

By appealing to the consumers' eco-conscience to reduce plastic waste, SimplyGood not only eliminated the plastic bottle wastage generated but also made their consumers feel “simply good” for contributing to environmental protection. The new formula also enabled supply chain innovation.<sup>10</sup> Shipping three 500ml bottles of cleaning liquid cost S\$7.50. A pack of three tablets, however, only cost S\$1.50 – very substantial savings of 80%!

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10 Skillicorn, N. (2016, March). What is innovation? 15 experts share their innovation definition. Idea to Value. Retrieved from <https://www.ideatovalue.com/inno/nickskillicorn/2016/03/innovation-15-experts-share-innovation-definition/>

## THE JOURNEY CONTINUES

Reflecting on the journey so far and the development and frequent redevelopment of their business model, Jeremy said,

“The stages of assumption and hypothesis testing in a business model require a lot of trial-and-error, and SimplyGood faced big setbacks almost every six months during its initial stages.”

### The Business Model

Simply put, a business model is a plan of how a business makes money. The first step in establishing a business model is to understand what the business wants to offer its customer.

The fundamental business purpose of SimplyGood and UglyGood have remained the same since the early days of Jeremy and Clewyn’s entrepreneurship journey. In both projects, Jeremy saw a business opportunity that helped to resolve existing environmental issues.

Both ventures targeted a similar customer segment: consumers who were interested in using non-toxic, environmentally friendly cleaning agents. However, the duo had to review their business model multiple times before attaining success. They had to be nimble and flexible rather than rigidly attached to their initial ideas. For instance, UglyGood’s move from B2B food waste redistribution to retail of household cleaners and essential oils came about as early as the first year of its operation. In the process, its revenue model changed completely.

Then, due to consumer pressure, the team moved away from salvaging fruit waste to mitigating plastic waste generation. The formulation of the dehydrated tablets meant yet another shift in revenue model. The

tablets were costlier to produce than the liquid detergents, which were made out of fruit waste. Hence, the team had to work out their pricing in such a way that consumers would be willing to pay the premium associated with using the plant-based, lighter and more space efficient tablets.

The presence of competitors and heavy advertising in the home cleaning industry made it more challenging for SimplyGood to differentiate themselves and stand out, especially because they were a small startup. They knew they had to take a step back to think about their next direction. This meant that the business was not likely to survive if it limited itself to this market. Jeremy said,

“In the early days of UglyGood, one of the biggest challenges was that we were targeting the corporate B2B market such as facilities management in buildings and other businesses trying to use such solutions, but they do not really care about the value proposition we offered; of being eco-friendly and safe. So we corrected ourselves and figured that the consumer market will be more receptive to our product offerings.”

Furthermore, there were many organisations who were interested in the idea of waste valorisation and wanted to simply offload their trash onto UglyGood, making use of the fruit waste collection logistics system created by UglyGood. They were not willing to share the cost of waste collection or contribute to the process of transforming it into useable products.

To establish a profitable business, Jeremy and team had to be able to offer something that could cater to their customers' needs. To achieve this, they took in consumer feedback to identify gaps in their business model. Surprisingly, their largest revenue stream came

from a product that they launched as a response to Covid-19: their food grade hand sanitisers!

“The food grade sanitiser was our humanitarian response to the pandemic. It had to be liquid based and therefore stored in bottles. The response to the sanitisers grew into something that we did not expect it to be. Therefore, what we did was that we mandated that all our sanitisers should come in 1-litre and 5-litre refillable formats.”

The team placed sanitiser refill stations at a few boutiques such as The Social Space<sup>11</sup>, where customers could refill their sanitiser bottles.

## The Team

The SimplyGood team comprised five members including Jeremy. The startup's sales and marketing were (at the point of writing) managed by individuals with 11 and 30 years of experience in their respective functions. The Chief of Marketing was supported by a marketing specialist as well as an operations and marketing executive. SimplyGood's Chief of Formulations was an engineer with over 20 years of experience as a formulation scientist. The team worked tirelessly alongside Jeremy to run SimplyGood efficiently and help it scale new heights.

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11 The Social Space is a socially conscious multi-concept store, featuring a Tea Bar & Café, a fair-trade retail area and a nail salon, all promoting a greater awareness for sustainability, an appreciation for providence, and more accessible conscious living. Source: The Social Space. (N. D.). The Social Space. Retrieved from <https://www.thesocialspace.co/>

## Motivators

“It might sound cliché, but I live by the Nike motto - Just do it! There’s a great deal of self-learning that keeps me excited and revitalised. If there were no problems, it meant that you’re not doing enough.”

The perseverance required to stay motivated as a social entrepreneur came from various sources. For Jeremy, knowing that he had taken the road less travelled to achieve a higher purpose helped to keep the momentum going.

The team was committed to achieving the triple bottom line – that is, keeping their focus on profits while staying equally pledged to people and the planet. Within just one year of its pilot product launch, SimplyGood saved more than 15,326 plastic bottles and provided job opportunities for more than 20 adults with cerebral palsy through inclusive hiring. They continued to maintain a contract with Cerebral Palsy Alliance Singapore such that every two months, when SimplyGood restocked its inventory, beneficiaries from the Alliance were recruited to help with the packaging process.

Furthermore, the team was aligned with the push for environmental sustainability on national (Singapore Green Plan 2030) and international platforms (United Nations Sustainable Development Goals, or UN SDGs for short). The mainstream household cleaning industry was known to be environmentally destructive due to the strong chemicals that were used to make cleaning detergents and the pollutive and sometimes excessive packaging used to market the products. SimplyGood heeded a direct call to mitigate both these impacts: their cleaning tablets were made of plant-based ingredients, and they had completely abandoned

the use of plastic bottles for storing traditional liquid-based cleaning detergents.

Recognition of their efforts by corporations and the media provided the extra push to continually stand firm on their path. In 2020, Jeremy and the team pitched their idea to the Overseas Chinese Banking Corporation Bank (OCBC Bank) and were one of the five recipients of the #OCBCCares Environment Fund in 2020.<sup>12</sup> The fund was mostly used for the improvement of the formula for their dehydrated cleaning products, which they had originally adapted from housewives' home recipes. Jeremy emphasised,

“It’s my vision to show that sustainable businesses are the way to go in the future. To build the company from day one on these grounds is a very fulfilling experience for me.”

Support from family and friends was also crucial. Hailing from a business-oriented family, Jeremy’s parents could relate to his ambition to start a new business. Friends and mentors acted as sounding boards for ideas so that Jeremy did not find himself in an echo chamber where he only heard his views reflected back at him. Jeremy recounted,

“My family was very supportive of me doing business, but they did not understand the emphasis on sustainability. However, they allowed me to follow my dreams and had my back throughout.”

The ethos of the triple bottom line has remained strong for Jeremy and instilled pride in the SimplyGood team. Economic viability (profit), environmental sustainability (planet) and social impact

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12 OCBC Bank. (N. D.). OCBCCares Environment. Retrieved from <https://www.ocbc.com/group/sustainability/ocbccares-environment>

(people) were SimplyGood's three pillars, and a source of continual motivation for the team.

## Impact Measurement

“Measuring impact is really tough, and this is something that we're trying to master along the way. While we can calculate the number of bottles saved based on the sales of the tablets, knowing our net positive or net negative carbon footprint has not been easy. We have not mastered it yet and trying to follow the industry frameworks shared and used by partners.”

While SimplyGood has struggled to measure its social and environmental impact as precisely as they would like, its founder emphasised the importance of developing metrics that represent “real measured” impact rather than superficial feel-good indices without much quantitative data backing them. At the point of writing, the team is working hard to develop a net carbon emission metric to assess SimplyGood's impact.

## THE CHALLENGES AHEAD

Despite the initial success of SimplyGood, Jeremy was cognisant of the challenges that he and his team were likely to encounter going forward. These included making tough choices about particular areas of focus to spend time and money on. Jeremy explained,

“As is typical for every startup, one of the biggest challenges is being tight on budget so we really need to focus on what we want to do. As a startup, the team is small, and there are several initiatives we want to do, but we need to focus on a selected few due to resource constraints.”

Other challenges revolved around talent attraction, retention, and growing the capabilities of the team to respond to changes in an ever-evolving business world in adaptable and efficient ways.

“Talent attraction and growing the team efficiently is not easy.”

“Despite coming from a B2B background, we have now transformed into an e-commerce based company. This makes the market and growth segment, that is, how we can scale our product and acquire more customers, very important, and we have seen an increase in our marketing and customer acquisition costs.”

When asked about what's exciting and what's in store for the next five years, Jeremy responded,

“We're really trying to revolutionise and reimagine the home care industry, so we will offer as many options as we can to dehydrate all forms of cleaning products to put them into a template. In the next quarter, we're pushing for a hand soap variant with the same concept: dissolve the tablet and it's ready for use.”

SimplyGood's product diversification plans over the next twelve to eighteen months included laundry tablets, dishwashing tablets and/or floor cleaners. Their product development would be based on ongoing consumer demand research.

While operations in Singapore have somewhat stabilised, Jeremy reckoned that expanding outside of Singapore would be their next milestone in the coming years. There was little doubt that breaking into the hard-to-crack markets of developing nations in Southeast Asia was far from easy, and the team was committed to circumventing

the barriers that they might encounter in such markets. Reduction in production and shipping costs to serve customers from developing countries was a challenge that SimplyGood was prepared to confront in the near future.

Still looking out of the glass door into the wide-open space from his office, as if seeing far into the future, Jeremy remarked,

“I have miles to go before I sleep. Better get to work!”

## EXHIBIT 1: UGLYGOOD'S PRODUCT LINE



Source: SimplyGood

## EXHIBIT 2: SIMPLYGOOD'S PRODUCT LINE



Source: *SimplyGood*

# Wateroam: Social Enterprise in Singapore

*Koh Cheng Boon and Foo Maw Der*

In 2014, three young men met at the HydroPreneur Programme<sup>1</sup>, an industry-oriented entrepreneurship programme organised by the Public Utilities Board (PUB) – Singapore’s national water agency – to accelerate commercialisation of technologies and foster a new generation of water entrepreneurs. This event kickstarted the journey of Wateroam, a social enterprise founded by David Pong (“David”), Wateroam’s Chief Executive Officer (CEO), Lim Chong Tee (“Lim”), Wateroam’s Chief Marketing Officer (CMO), and Vincent Loka (“Loka”), Wateroam’s Chief Technical Officer (CTO). David graduated from the National University of Singapore (NUS) with a Business degree, while Lim and Loka graduated from NUS with degrees in Environmental Engineering.

Wateroam is a social enterprise that develops water filtration systems for rural and disaster-hit areas. Since 2014, Wateroam has deployed its water filtration systems to more than 30,000 people in remote

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<sup>1</sup> The HydroPreneur Programme (HPP) was established to impart business skills and water industry knowledge to aspiring entrepreneurs. Source: Singapore International Water Week. (2017). 2016 blue paper. Retrieved from <https://www.siww.com.sg/qqi/slot/u143/2021/Landing%20Page/SIWW%202018/Programmes/Water%20Leaders%20Summit/siww-2016-blue-paper.pdf>

villages and disaster-stricken areas across Southeast Asia through Non-Governmental Organisations (NGOs)<sup>2</sup>.

2021 was a challenging year for Wateroam, and the seventh year of its operation. As its three co-founders perused a 2020 World Economic Forum report that identified Singapore as one of the five most promising start-up hubs to watch outside of Silicon Valley<sup>3</sup>, they reflected on their journey and the road ahead. What additional tools and frameworks would they need to navigate changing social and economic conditions worldwide? How should they position Wateroam to succeed in Covid-stricken communities as well as post-pandemic markets?

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2 Gilchrist, K. (2018, April 22). How burnout drove an entrepreneur to help 30,000 people in Southeast Asia. CNBC. Retrieved from <https://www.cnbc.com/2018/04/22/wateroam-southeast-asia-clean-water-entrepreneur-driven-by-burnout.html>

3 Yoon, S. (2020, October 8). 5 start-up hubs to watch – Beyond Silicon Valley. World Economic Forum. Retrieved from <https://www.weforum.org/agenda/2020/10/5-start-up-hubs-to-watch-and-we-don-t-mean-silicon-valley/>

## GENESIS OF WATEROAM

Wateroam is a Singapore-based, award-winning social enterprise that develops water filtration systems for rural and disaster-hit areas. It was established in 2014 by David Pong, Lim Chong Tee, and Vincent Loka<sup>4</sup>. To date, Wateroam's water filtration systems have been deployed to people in Cambodia, Indonesia, Nepal, Pakistan, Malaysia, Myanmar, and Vanuatu. Wateroam has gained global recognition for providing clean drinking water to more than 30,000 people in remote villages and disaster areas across Southeast Asia<sup>5</sup>. Their efforts have earned plaudits from the United Nations, which, in 2016, named Loka a Young Leader for Sustainable Development Goals.

What sparked the genesis of this social enterprise?

## YOUNG ENTREPRENEURS IN SOCIAL ENTERPRISE

### First Spark: Changing Lives, One Drop at a Time

During the HydroPreneur Programme, the three co-founders realised that there was an urgent global need for potable water and decided to put academic knowledge into action.

It was never their intention to become a business. "We just wanted to come up with practical and pragmatic solutions to change people's lives. That's how we got ourselves into this, and we haven't looked back since," Lim recounted<sup>6</sup>.

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4 Yap, C. (2020). This Singapore social enterprise brought clean water to more than 88,000 people. CNA. Retrieved from <https://cنالuxury.channelnewsasia.com/people/singapore-social-enterprise-wateroam-12665822>

5 Gilchrist, K. (2018, April 22). How burnout drove an entrepreneur to help 30,000 people in Southeast Asia. CNBC. Retrieved from <https://www.cnbc.com/2018/04/22/wateroam-southeast-asia-clean-water-entrepreneur-driven-by-burnout.html>

6 Saunders, A. (2019, June 7). Wateroam: Singapore's clean water start-up. Hive Life. Retrieved from <https://hivelife.com/wateroam/>

## WATEROAM'S CO-FOUNDERS LIM CHONG TEE, VINCENT LOKA AND DAVID PONG



Source: Wateroam

### **Situational Analysis: The Global Water Crisis**

According to the World Health Organization, 785 million people lack access to basic drinking water, and two billion people use a drinking water source contaminated with faeces<sup>7</sup>. To facilitate global cooperation in tackling this issue, the UN has declared universal access to clean water and sanitation as one of the Sustainable Development Goals for 2030. **Table 1** contains more facts and figures related to the global water crisis.

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7 World Health Organization (2019, June 14). Drinking-water. Retrieved from <https://www.who.int/news-room/fact-sheets/detail/drinking-water>

**TABLE 1. FAST FACTS: THE GLOBAL WATER CRISIS<sup>8</sup>****Fast Facts: Global Water Crisis**

- 785 million people lack access to clean water: that's one in 10 people on the planet.
- Women and girls spend an estimated 200 million hours hauling water every day.
- The average woman in rural Africa walks 6 kilometres every day to haul 40 pounds of water.
- Every day, more than 800 children under 5 die from diarrhoea caused by contaminated water, poor sanitation, and unsafe hygiene practices.
- One of the United Nations' Sustainable Development Goals is to provide universal access to clean water and sanitation by 2030.

Source: Reid, K. (2021, April 16). *Global water crisis: Facts, FAQs, and how to help*. Retrieved from <https://www.worldvision.org/clean-water-news-stories/global-water-crisis-facts#facts>

The United Nations has projected that by the year 2050, there could be about 4.5 billion people affected by a water crisis. Apart from increased domestic and industrial water use, an increase in population leads to greater demand for food and, in turn, water to irrigate crops<sup>9</sup>. This may result in a water crisis in which there is not enough water to go around<sup>10</sup>.

## Macro-Environment: Securing the Region's Water Future

A report by the Asia Society Leadership Group on Water Security in Asia indicates that three out of four people around the world are likely to face water scarcity problems by 2050. Asia, where half of the

8 Reid, K. (2021, April 16). *Global water crisis: Facts, FAQs, and how to help*. Retrieved from <https://www.worldvision.org/clean-water-news-stories/global-water-crisis-facts#facts>

9 Baer, A. (1996, June). Not enough water to go around?. *International Social Science Journal*, 2(148), 277–292.

10 United Nations Development Programme. (2006, January 1). *Human development report 2006: Beyond scarcity – Power, poverty and the global water crisis*. Palgrave Macmillan.

world's population resides, has less freshwater (3,920 cubic meters per person per year) than any other continent excluding Antarctica<sup>11</sup>. Asia's growing population (see **Table 2**) and soaring urbanisation rates (See **Figure 1**) compound the urgency of sustainable water development in the region.

Furthermore, climate change may lead to cascading effects ranging from impaired food production, the loss of livelihood security, large-scale migration within and across borders, and increased economic and geopolitical tension and instability.

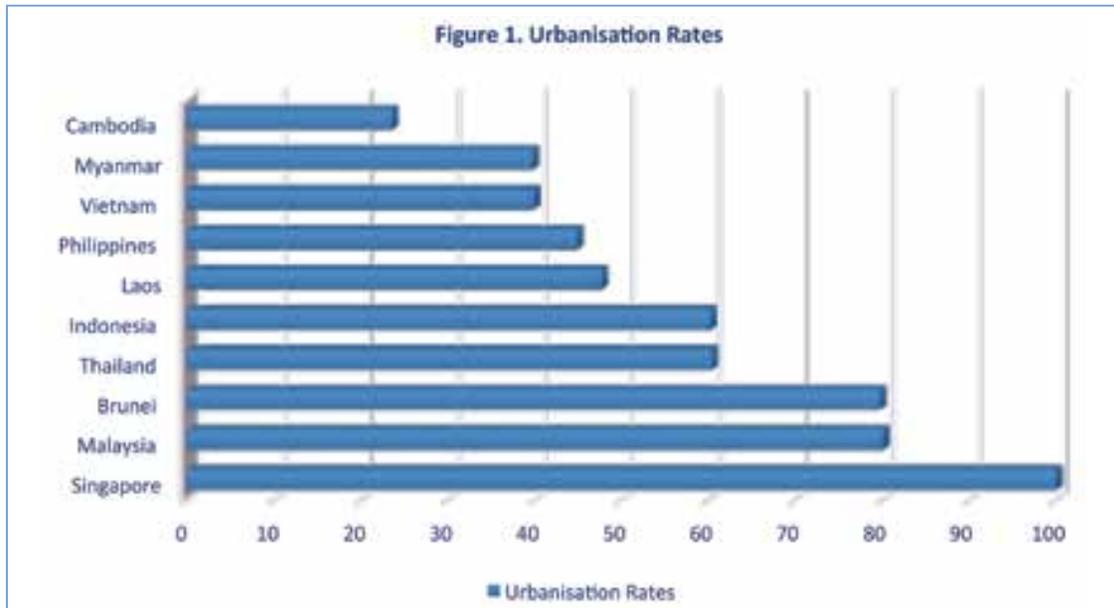
**TABLE 2. POPULATION GROWTH PROJECTIONS WORLDWIDE<sup>12</sup>**

Region	Population in 2020	% of the Total	Population in 2050	% of the Total	Population In 2100	% of the Total
Asia	4.6	59	5.3	55	4.7	43
Africa	1.3	17	2.5	26	4.3	39
Other	1.9	24	1.9	20	1.9	17
World	7.8	100	9.7	100	10.9	100

Source: United Nations Department of Economic and Social Affairs Population Dynamics. (2019). World population prospects 2019. Retrieved from <https://population.un.org/wpp/Download/Standard/Population/>

11 Asia Society. (2009, April). Asia's next challenge: Securing the region's water future. Retrieved from <https://asiasociety.org/asias-next-challenge-securing-regions-water-future-0>

12 United Nations Department of Economic and Social Affairs Population Dynamics. (2019). World population prospects 2019. Retrieved from <https://population.un.org/wpp/Download/Standard/Population/>

**FIGURE 1: URBANISATION RATES ACROSS SOUTHEAST ASIA<sup>13</sup>**

Source: <https://www.statista.com/statistics/1011533/apac-forecasted-urbanization-rate-by-country/>

Population growth is a fundamental driver of natural resource stress. An increasing population puts strain on ecological systems that provide water for drinking, agriculture, and other life-sustaining services. Unsustainable commercial, industrial and agricultural practices, scaled up in an attempt to cater to the growth in demand, may lead to a rapid increase in pollution, resource consumption, and land degradation.

In addition, demographic changes, including higher-consumption lifestyles - particularly in South Asia and China - and rising life expectancies across the region underscore the urgent need to plan for increasing demands on water resources.

Massive urbanisation in Asia is set to present a new set of water management challenges in the coming decades. By 2015, the percentage of the global population living in Asian megacities (those

13 Krungsri Research. "Forecasted urbanization rate in the ASEAN region in 2025, by country." Chart. February 20, 2019. Statista. Accessed August 11, 2021. <https://www.statista.com/statistics/1011533/apac-forecasted-urbanization-rate-by-country/>

with populations of 10 million or more) and large cities (those with populations of 5 to 10 million) is expected to grow to 4.7% and 3.7% respectively. Asian urban centres with populations of 500,000 or less will constitute a staggering 27% of the global population by 2015, posing even bigger challenges than megacities.

As the Asian Water Development Outlook warns, unless greater attention is focused on resolving the water problems of small urban centres, these areas are likely to become “major water and wastewater black holes of the future”<sup>14</sup>.

### **Planning: Vision and Current Reality**

The vision of solving global thirst is aligned with the needs of the world. This dream might have looked daunting and idealistic at the time Wateroam was founded. However, providing clean and drinkable water had all the feel-good elements of altruism and the spirit of innovation<sup>15</sup>. This created the spark for the three social entrepreneurs to take a leap of faith and venture into this uncharted territory.

“As a hardware company, we face hard challenges. Manufacturing set-up and raw materials costs are high and skilled manufacturing is hard to come by. It took time before we found the right mentors and advisers to help us come up with better and more innovative solutions. With most of us coming straight out of university, we knew that there were a rather large variety of functional areas that we didn’t have a lot of experience in. These include specialised skillsets which may not have been taught in school, such as investment fundraising, manufacturing, product development,

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14 Asian Development Bank and Asia-Pacific Water Forum. (2020, December). Asian water development outlook 2020: Advancing water security across Asia and the Pacific. Retrieved from <https://www.adb.org/sites/default/files/publication/663931/awdo-2020.pdf>

15 Yap, C. (2020). This Singapore social enterprise brought clean water to more than 88,000 people. CNA. Retrieved from <https://cna.luxury.channelnewsasia.com/people/singapore-social-enterprise-wateroam-12665822>

legal and patents, setting up and managing distributor networks, managing sales channels, etc. We were thankful that there were many advisers who helped us wholeheartedly along the way. They've become our friends, our sounding board, and some of our greatest cheerleaders.”<sup>16</sup>

– Lim Chong Tee, Chief Marketing Officer of Wateroam

As David, CEO of Wateroam, put it, “If you find a purpose and a problem out there in a world that is so critical to solving and you also have the passion for solving it, then just go for it. You may not have the skillset or know-how to do everything, but somehow the world will help you along the way to figure out those things.”<sup>17</sup>

Professor Ng How Yong, a renowned authority in membrane and water technologies at NUS, was the mentor of Loka and Pooi Ching Kwek (one of Wateroam's advisers)<sup>18</sup>. His technical expertise and mentorship sped up Wateroam's product design process. Prof Ng's strong network also opened doors for the three co-founders.

The Wateroam team had a remarkable run during the programme and won the Rising Hydropreneur Star award at the Singapore International Water Week in 2014 on the strength of their prototype and proposed business model.

## ALTERNATIVE GOALS AND PLANS

While the three co-founders realised that there was an urgent global need for clean drinking water, they were also aware of the importance

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16 Imagine H2O. (2019, July 31). Getting cheap, simple, clean water into the hands of those who need it most - Wateroam's unit for disaster response. Retrieved from <https://medium.com/imagineh2o/founder-profiles-2019-lim-chong-tee-co-founder-cmo-wateroam-dd4475dbbf85>

17 What does it take to be an entrepreneur?. (2019, December 6). Today. Retrieved from <https://www.todayonline.com/commentary/what-does-it-take-be-entrepreneur>

18 Pooi was a research engineer at NUS who was working towards his Masters degree in Environmental Science and Engineering and conducting research on desalination.

of prioritizing and maximizing their efforts. As the Chinese proverb goes, “water at a distance cannot put out the fire nearby”. Hence, they decided to target their products at communities in need that were close to their home country of Singapore, such as Cambodia, Myanmar and Laos.

In 2014, the trio decided to put their products to the test, pooling their savings – around 10,000 Singapore dollars – and visiting two small towns near Phnom Penh, Cambodia and Bintan, Indonesia.

“As a social enterprise, we need to be a for-profit business, but at the same time, we’re supposed to make a tangible social impact on the ground. So, we struggled a lot at the start. In fact, there were offers from distributors who wanted to help us retail our product and technology to the military and to the hiking market. They’d tell us to forget about all that we were trying to do and focus on something that is very high end. But then we realised that if we designed for the military right at the start, our heart and mindset would be very different. We would very much be geared towards that market, and it would never be affordable enough for the base-of-pyramid markets, which we were much more passionate about.”<sup>19</sup>

– David Pong, CEO of Wateroam

Lim shared that he had noticed a surge in natural disasters that may be attributed to climate change. Rapid, light and simple water solutions were a basic need for disaster-struck areas, presenting opportunities for Wateroam to get involved. For Loka, the triple bottom line of social, environmental and financial goals was the driving force. He

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19 What does it take to be an entrepreneur? (2019, December 6). Today. Retrieved from <https://www.todayonline.com/commentary/what-does-it-take-be-entrepreneur>

said, “Beyond profit-making, I appreciate how business can be used as a force to do good.”

### **First Mission: Action and Evaluation**

The company’s first mission in mid-2014 was to deploy their portable water filtration system prototype in Bintan, Indonesia. On the road, the team discovered one major flaw of their prototype (see **Figure 2**), which was a bulky luggage-sized machine weighing 40 kilograms. It was too heavy for most, and was especially challenging to transport across rough terrain in disaster-struck areas. In fact, carrying the pack left one team member in need of slipped disk surgery.

**FIGURE 2: WATEROAM’S FIRST PORTABLE WATER FILTRATION SYSTEM PROTOTYPE**



*Source: Wateroam*

Following this experience, they returned to the drawing board to rethink the design of the water filtration system. After repeated trials and rounds of product development, the team eventually came up with a final prototype in 2015. This new lightweight water filtration pump weighed 3.5 kilograms and could be attached to a central

water source, which in turn could supply clean water to a village of 100 people for up to two years. This version of the pump retailed at \$399, which worked out to be around \$2 per person per year for such a village<sup>20</sup>. This lightweight design set Wateroam apart from other water filtration solutions and helped it win favour with their target communities, NGOs and corporate supporters.

With insights gathered from the field testing and a more thorough understanding of rural conditions and lifestyles, the team developed a 450-gram prototype that was somewhat similar in design to the hospital drip bag. The prototype comprised a medical-grade plastic bag that could hold up to 10 litres of water and produce 6 to 9 litres of filtered water in an hour. Before using it for the first time, a ceramic filtration membrane had to be manually placed onto the base of the bag. The ceramic filtration membrane was selected for its robustness and its ability to remove bacteria from the water. This prototype was named “Fieldtrate Lite” (see **Figure 3**).

**FIGURE 3: FIELDTRATE LITE**



Source: Wateroam

20 Gilchrist, K. (2018, April 22). How burnout drove an entrepreneur to help 30,000 people in Southeast Asia. CNBC. Retrieved from <https://www.cnbc.com/2018/04/22/wateroam-southeast-asia-clean-water-entrepreneur-driven-by-burnout.html>

Wateroam also developed a compact and ergonomically-friendly filtration system named “Fieldtrate Plus” (see **Figure 4**). Weighing 10 kilograms lighter than its predecessor, it could produce 500 litres of filtered water in an hour using the ceramic filtration membrane and the force of gravity.

**FIGURE 4: FIELDTRATE PLUS**



Source: Wateroam

To gain greater insight into customer needs in different cultures and situations, Wateroam signed a Memorandum of Understanding with World Vision Malaysia, the Malaysian arm of an international NGO, in 2015. This MOU allowed Wateroam to have its products field-tested in rural communities where World Vision Malaysia ran its development programmes. The field testing provided good insights into the cultural habits, lifestyles, and challenges of the communities – critical inputs for the Wateroam team to improve their products.

To respond to client feedback and address some of the limitations of Fieldtrate Lite and Fieldtrate Plus, Wateroam’s Chief Technology Officer, Loka, developed two more prototypes called “ROAMfilter

Plus” and “ROAMfilter Ultra” (see **Figure 5**). ROAMfilter Plus weighed 2.5 kg and was capable of producing over 200 litres of filtered water in an hour. ROAMfilter Ultra weighed 45 kg (including accessories) and could produce 1,500 litres of filtered water in an hour.

**FIGURE 5: ROAMFILTER PLUS AND ROAMFILTER ULTRA**



Source: Wateroam

### **Goal and Plan Selection: Competitive Environment and Sustainable Business Plan**

According to Wateroam’s CEO David Pong, “There are other water filtration companies out there, but ours is the fastest and the lightest. A lot of other solutions are designed for industrial use. Ours is designed for smaller locations and disaster relief.”<sup>21</sup>

All companies are affected by low barriers to entry; social enterprises with fledgling technology are even more so. Patent applications are time- and resource-consuming, and products can be easily replicated or improved upon further (by companies or their competitors) in the

21 Gilchrist, K. (2018, April 22). How burnout drove an entrepreneur to help 30,000 people in Southeast Asia. CNBC. Retrieved from <https://www.cnbc.com/2018/04/22/wateroam-southeast-asia-clean-water-entrepreneur-driven-by-burnout.html>

time it takes to secure intellectual property rights. **Table 3** summarises some of the players in the water filtration market.

**TABLE 3: WATEROAM AND ITS COMPETITORS**

Brands	Price (USD)	Weight	Filtration System	Effectiveness
Wateroam ROAMfilter Plus	\$399	2.5 kg	Pore size 0.02 µm hollow fibre membrane filter.	Manual flow rate: 200 L/h Gravity-fed/ electric flow rate: 400 L/h
iSpring RCC7AK 6-stage Superb Taste High-Capacity Reverse Osmosis Water Filter System <sup>22</sup>	\$439	9.07 kg	Reverse Osmosis (RO) water filtration system.	Not available
HydroBlu Go Flow Gravity Bag with Versa Flow Water Filter <sup>23</sup>	\$45.95	0.28 kg	Pore size 0.1 µm Versa inline filter.	45.4 L/h
SkyHydrant <sup>24</sup>	\$3,000	12 kg	Pore size 0.04 µm polyvinylidene fluoride (PVdF) membrane.	400 L/h
Villagepump 500 Standard <sup>25</sup>	\$8,400	80 kg	0.05 mm mesh filter and capillary ultrafiltration membranes (with automatic backwash).	500 L/h

## Implementation: Ecological and Business Sustainability

Wateroam stays true to its vision to “build a world without prolonged thirst”. Their primary mission is producing and developing water filtration systems for those who do not have convenient access to clean water. The company is essentially managed by the three co-founders, with downstream integration from product assembly and marketing to after-sales services. This forward integration

22 iSpring. (N.D.). iSpring RCC7AK 6-stage superb taste high capacity under sink reverse osmosis drinking water filter system with alkaline remineralization-natural pH, white [E-commerce listing]. Retrieved from <https://www.amazon.sg/iSpring-RCC7AK-Capacity-Drinking-Remineralization-Natural/dp/B005LJ8EXU>

23 HydroBlu. (N.D.). Go Flow water gravity bag with Versa Flow water filter [E-commerce listing]. Retrieved from <https://hydroblu.com/go-flow-water-gravity-bag-with-versa-flow-water/>

24 SkyJuice. (N.D.). SkyHydrant™ water filtration systems. Retrieved from <https://skyjuice.org.au/skyhydrant/>

25 Villagepump. (N.D.). Villagepump 500 Standard. Retrieved from <https://www.villagepump.org/villagepump-500>

process reduces costs, improves efficiency from design to production and product improvement, and ensures protection of proprietary information.

At the outset, Wateroam had limited capital. Unlike other businesses, the return on investment was not expected to be high, and most of the time, their end users could not afford the products themselves.

As such, Wateroam chose to partner with Non-Government Organisations (NGOs) to distribute their products to their target segments, who were more likely to accept products distributed by a credible sponsor. Through their fieldwork and track record working the ground in these communities, NGOs have earned the trust and goodwill of the end users. Furthermore, NGOs tend to have better access to funding, and are thus more able to purchase these products on end users' behalf and train end users to operate them.

Since its inception, Wateroam has worked with more than 50 non-profit entities. Most of them are NGOs and government agencies with the cultural awareness required to convince locals to adopt a new water filtration system. Among its beneficiaries are Rohingya refugees and victims of the 2018 Lombok earthquake.

As a social enterprise, Wateroam's performance is measured by the triple bottom line of financial, social and environmental impact. The company's stakeholders are of utmost priority in their value creation and goal setting process.

As of April 2018, Wateroam has brought clean water to more than 30,000 people in 14 countries across Southeast Asia. Within the next five years, the team hopes to help 30 million people in the region.

As more units are sold and used by more communities, Wateroam's social impact and financial performance improves too, as does its ability to develop greener products and services that increase health and environmental awareness in its target communities<sup>26</sup>.

Lim joined this venture with a personal mission to improve the well-being of those who are deprived of basic needs such as clean water. To him, the joy of seeing communities collecting buckets of clean water together was his key motivator. While such statements can easily be dismissed as being too idealistic and altruistic, Wateroam has shown that social enterprises are able to achieve these goals without ignoring the (financial) bottom line. In 2016, the company broke even, and the three co-founders and their four staff members were able to start taking a salary as revenues had grown sufficiently.

## **CORPORATE-LEVEL STRATEGY**

Wateroam was established with a clear vision: to "Change People's Lives, One Drop at a Time". It pursues a corporate-level Focus strategy in a niche market segment with high growth potential. To keep pace with emerging needs worldwide, Wateroam is currently focusing on leveraging digital technology to offer their clients better remote analytics of their water filtration system's performance. This comprises sensors that can monitor and provide data on the quality of water produced.

## **BUSINESS-LEVEL STRATEGY**

At the business level, Wateroam has pursued a hybrid strategy of product differentiation and low-cost production to keep their

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26 Wateroam. (N.D.). Impact stories. Retrieved from <https://www.wateroam.com/impact-stories>

offerings affordable for their clients. The ROAMfilter Plus and Ultra pumps primarily operate using a proprietary hollow fibre membrane, which has a pore size of  $0.02 \mu\text{m}$  - 25 times smaller than that of traditional ceramic filtration membrane. Studies have shown that bacteria are effectively filtered out with a pore size of at most  $0.22 \mu\text{m}$ <sup>27</sup>. The ROAMfilter Plus pump retails at \$399. This translates to \$2 per person per year for a village of 100 people<sup>28</sup>. Table 3 provides an overview of the costs of some filtration systems in the market.

## FUNCTIONAL-LEVEL STRATEGY

One of Wateroam's biggest challenges is the limited buying power of their end users. Instead of focusing on how to get disaster-stricken countries or low-income communities to take the initiative to provide clean water to villagers, Wateroam has adopted an innovative approach. It collaborates with NGOs, organisations and sponsors with corporate social responsibility programmes to bring its water filtration systems to its target communities. This collaboration is maximised with corporate marketing strategies that can increase mindshare in clients and wider audiences.

## DOLLARS AND SENSE

Wateroam has earned several awards and accolades for its work. In 2016, the company was awarded a 100,000 Singapore dollar (about \$75,900) social entrepreneurship grant from DBS, Southeast Asia's largest bank. Wateroam's work was also recognised by the United Nations when co-founder Vincent Loka was named a Young Leader for Sustainable Development Goals.

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27 MSR. (2021, July 1). Hollow fiber membrane filters: Advantages in backpacking water filters. Retrieved from <https://www.msrgear.com/blog/hollow-fiber-membrane-advantages-backpacking-water-filters/>

28 Gilchrist, K. (2018, April 22). How burnout drove an entrepreneur to help 30,000 people in Southeast Asia. CNBC. Retrieved from <https://www.cnbc.com/2018/04/22/wateroam-southeast-asia-clean-water-entrepreneur-driven-by-burnout.html>

Apart from these, Wateroam is a beneficiary of Startup SG, an initiative that was launched in 2017 to unify various aspects of government support schemes for ecosystem stakeholders, including startup founders, investors, incubators and accelerators. The Startup SG Founder programme assists aspiring entrepreneurs in venture building, mentorship and startup capital support. Accredited mentor partners identify qualifying applicants based on the uniqueness of their business concept, the feasibility of the business model, the strength of the management team, and the potential market value of the business.

In 2018, Wateroam managed to obtain S\$600,000 in seed funding to embark on a new phase of growth. What additional tools and frameworks would the three co-founders need to navigate changing social and economic conditions worldwide? How should they position Wateroam to succeed in post-pandemic markets?



# At the Nexus of the Triple Bottom Line: Ya Kun Kaya Toast

*Boey Yew Tung, Sharon Ng, Winson Ang, and Lim Boon Chong*

**Y**a Kun Kaya Toast' (Ya Kun<sup>1</sup>) was a popular and well-loved local coffee chain - a household name in Singapore and Asia. Faced with changing consumer preferences and strident competition in the marketplace, it had always needed to constantly reinvent itself.<sup>2</sup>

The business was founded in 1944 by Mr Loi Ah Koon. It started as a single coffee stall and had remained with the Loi family since then. Its operations only started expanding in 2001<sup>3</sup>, and it became a chain café with its menu offering centred on *kopi*<sup>4</sup> (coffee), *kaya* (coconut jam) toasts and soft-boiled eggs. A series of astute business decisions over the years saw Ya Kun grow from strength to strength.

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1 Ya Kun Kaya Toast will be referred to as Ya Kun from this point on in the case document.

2 Koh, W. (2015). *The Top Toast: Ya Kun and the Singapore Breakfast Tradition* (second edition), Cengage Learning Asia Pte Ltd.

3 Zhang, J. (15 May 2021). The pressures of being 3rd gen of a big family business. *The Mothership*.

4 *Kopi*: Local style coffee. Typically made with Robusta beans roasted with corn, sugar, or margarine, but recipe could vary with some adding barley as well. *Kopi* was brewed with a muslin 'sock-like' filter called *kopi-sock*. Skill in 'pulling' the brew through the *kopi-sock*, coffee powder to water ratio and temperature of brewing water, all determined quality of the *kopi*. *Kopi* could be served neat, or in multiple permutations of the brewed *kopi* (in various dilutions), condensed milk, evaporated milk, sugar, and ice.

On 9<sup>th</sup> August 2021, 77 years after the founding of Ya Kun, the United Nations released its IPCC<sup>5</sup> Sixth Assessment Report. It revealed that climate change had accelerated to the point of potentially breaching the key warming threshold in the following decade<sup>6</sup> and sounded the clarion call for climate change across the world. Consumer awareness of sustainability issues was also increasing, especially amongst the younger generation. The WEF Youth Recovery Plan<sup>7</sup> report found that they wanted action on climate change and were concerned with wealth inequality, job security and flexibility, culture, and social impact.<sup>8</sup>

Concurrently, much dialogue and efforts had been initiated globally to address the 2030 Agenda for Sustainable Development that was adopted by all United Nations Member States in 2015. The 17 United Nations Sustainable Development Goals (SDGs) recognised that ending poverty and other deprivations must proceed in tandem with strategies to improve health, education, inequality reduction, and economic growth; while simultaneously addressing climate change and preservation of oceans and forests.<sup>9</sup>

Globally, sustainability had become increasingly important for all industries and markets. Businesses were confronted with both challenges and opportunities from sustainability-related developments and emerging trends. Consequently, enterprises would need to develop and imbue sustainability capabilities into their

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5 The Intergovernmental Panel on Climate Change (IPCC) Working Group 1 (WG1) was the top climate science body of the United Nations. It published an extensive report on the climate approximately every eight years. The latest report was prepared by 234 authors from 66 nations and comprised three parts: [a] Summary for Policy makers (SPM), 39pages; [b] Technical Summary (TS), 150 pages; and [c] Full Report, 1,300pages. <https://www.ipcc.ch/report/ar6/wg1/>

6 Fogarty, D., Tan, A. (09 August 2021). Climate change is speeding up, key warming threshold set to be breached by 2030s: IPCC report. *The Straits Times*.

7 The Youth Recovery Plan report was developed by the Davos Lab initiative of the World Economic Forum (WEF). The report was based on a survey of 187 countries that involved 19,000 people and 344 dialogue sessions with two million people in attendance.

8 Nelson, D. (13 August 2021). Clarion call from youth for a better world: WEF report. *The Straits Times*.

9 United Nations website. The 17 Goals. (Accessed 30 September 2021). [sdgs.un.org](https://sdgs.un.org).

businesses in order to retain their competitive advantage, maintain sustainable value creation, and address stakeholders' concerns.

As a small and medium enterprise (SME), how should Ya Kun balance its Triple Bottom Line to navigate the sustainability challenges facing its industry and secure a sustainable future for the company?

## THE TRIPLE BOTTOM LINE

The originator of the Triple Bottom Line<sup>10</sup> (TBL) concept, John Elkington, intended it to be a three-dimensional framework for “businesses to track and manage economic (not just financial), social, and environmental value added – or destroyed.”<sup>11</sup>

For its TBL, Ya Kun had clearly demonstrated strengths in two of the three dimensions – Economic and Social. The company’s practice had aligned with these two dimensions, even before these ideas were publicly mooted in 1994. Ya Kun grew steadily over the years. Its revenue more than doubled for a decade before taking a hit due to the Covid-19 pandemic and dipped to SGD\$20.9 million in 2020 (see **Exhibit 1**). Increasingly, consumers were also expecting businesses to demonstrate their commitment to environmental sustainability. Evidently, this was a call for action for food and beverage companies like Ya Kun to also address the environmental dimension of the TBL.

### TRIPLE BOTTOM LINE #1: P IS FOR PROFIT (ECONOMIC)

For its part, Ya Kun operated a successful business for almost eight decades and provided employment opportunities in the process. The company created wealth for itself, its suppliers, and the community with its corporate taxes directly contributing to Singapore’s nation-building efforts.

10 ‘Triple Bottom Line’ (aka TBL) was coined by author and entrepreneur, John Elkington in 1994 as a sustainability framework that examined a company’s social, environmental, and economic impact. [i] People (aka Social) – positive and negative impact an organisation had on its most important stakeholders, including employees, communities and any other persons affected by the organizations. [ii] Planet (aka Environment) – positive and negative impact an organisation had on its natural environment, including its contribution or replenishment/reduction of carbon footprint, pollution, usage of natural resources, etc. [iii] Profit (aka Economic) – the positive and negative impact an organisation had on local, national, and international economy, including creating employment, paying taxes, wealth creation, etc. (Elkington, J. 25 June 2018. 25 Years Ago I Coined The Phrase “Triple Bottom Line”. Here’s Why It’s Time To Rethink It. *Harvard Business Review*.)

11 Elkington, John. (25 June 2018). 25 Years Ago I Coined the Phrase Triple Bottom Line: Here’s Why It’s Time to Rethink It. *Sustainable Business Practices, Harvard Business Review*.

Looking beyond financial gains, the Sustainable Development Goal (SDG8) promoted “inclusive and sustainable economic growth, employment and decent work for all”<sup>12</sup> with the belief that sustained and inclusive economic growth could drive progress, create decent jobs for all and improve living standards. As the world grappled with the Covid-19 pandemic, the International Labour Organisation (ILO) reported a massive impact on employment worldwide. Global working hours were estimated to shrink by 14% in the second quarter of 2020 alone – this was equivalent to approximately 400 million full-time workers doing a 48-hour work week. In Singapore, the unemployment rate for non-PMETs<sup>13</sup> grew by 6.4% in 2020.<sup>14</sup>

In Ya Kun’s home base (Singapore), the Singapore Green Plan 2030 included a Green Economy pillar that sought to leverage on the competitive advantage and resilience that sustainability practices can provide to enterprises to grow the economy. The objective being “[s]ustainability as the [n]ew [e]ngine for jobs and growth”<sup>15</sup> As part of this pillar, the Sustainable Enterprise Programme was launched on 1<sup>st</sup> October 2021 with SGD\$180 million set aside to support Singapore’s businesses on sustainability initiatives and to capture the associated opportunities.<sup>16</sup> Green standards and accreditation programmes were also being developed by Enterprise Singapore<sup>17</sup> in collaboration with Singapore Standards Council and Singapore Accreditation Council for various industries, including sustainable food production to support the Green Economy pillar.<sup>18</sup> In addition, to future-proof local industry and enterprise competitiveness, the Ministry of Trade

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12 Sustainable Development Goal 8 – Decent Work and Economic Growth. (n.d.). <http://www.un.org/sustainabledevelopment>. *United Nations Sustainable Development Goals*.

13 PMET - Professionals, Managers, Executives and Technicians

14 Labour Force in Singapore 2020: Impact of COVID-19 on the Labour Market Report. *Manpower Research & Statistics Department, Ministry of Manpower, Singapore*.

15 Singapore Green Plan 2030. (n.d.). [www.GreenPlan.gov.sg](http://www.GreenPlan.gov.sg)

16 Tan, Dylan. (01 October 2021). ESG launches Enterprise Sustainability Programme to help companies go green. *The Business Times*.

17 Enterprise Singapore was the government agency championing enterprise development to support the growth of Singapore as a hub for global trading and start-ups. It was also the national standards and accreditation body. Its parent agency was the Ministry of Trade and Industry, Singapore.

18 Tang, See Kit. (01 October 2021). New SGD\$180 million scheme to help at least 6,000 Singapore firms tap green economy opportunities. *Channel News Asia*.

and Industry (MTI) had also developed 23 Industry Transformation Maps (ITMs).<sup>19</sup> The ITM for Food Services comprised four pillars – Jobs & Skills, Productivity, Innovation and Internationalisation (see **Exhibit 2**).

### **Brewing Up a Successful Business Formula**

Any coffee stall that could lay claim to moving 1,176,000 slices of its famous toasts, 735,000 soft-boiled eggs and 1,190,000 cups of its beverages, and 1,000 tonnes of its famous *kaya* every month, was undoubtedly a very popular coffee stall and a successful business. That was in 2013 when Ya Kun had 40 outlets in Singapore and more than 40 outlets across 10 countries.<sup>20</sup> Since then, Ya Kun had expanded its operations (circa 2021) to 11 countries outside Singapore with 71 local outlets and 57 overseas outlets.<sup>21</sup> All overseas stores were franchised with the exception of outlets in Hong Kong. Outlets in Singapore were approximately 50% franchisee-operated and 50% owner-operated.<sup>22</sup>

Recognising that franchising was one of the fastest ways to grow<sup>23</sup>, Ya Kun adopted this model to expand locally and overseas. Fortuitously, local expansion benefitted from the tailwinds of the nascent yet novel dining trend of “food streets within malls” in the early 2000s.<sup>24</sup> However, the decision to sell franchises also underscored the need to consolidate and protect its brand reputation with a strong trademark portfolio and good legal support to avoid intellectual property litigations. This fitted well into the Internationalisation pillar of the ITM for Food Services.

19 Enterprise Singapore. (Webpage accessed 08 October 2021). <https://www.enterprisesg.gov.sg/about-us/overview>

20 Ya Kun Kaya Toast Youtube video. (18 February 2013). <https://www.youtube.com/watch?v=0CYNKTM3x2A>. *YaKunKayaToast*.

21 Ya Kun Kaya Toast Coffeestall since 1944. (Accessed 09 August 2021). <http://yakun.com/find-us/local/>. *Yakun.com*

22 Loi, J. (13 September 2019). Traditional to Trendy: Ya Kun’s Journey of Internationalisation and Branding (A Talk by Jeshar Loi). <https://www.youtube.com/watch?v=cuDSeGXLvO4>. *Eye on Asia, NLB*.

23 Barraclough, E. (Feb 2018). A toast to Ya Kun’s IP-driven success. *World Intellectual Property Organization, WIPO Magazine*.

24 Lee, J. (18 April 2021). Lessons on Leadership: Ya Kun experienced a boom when it was a family-run business but driving the business to greater heights today requires expertise from outside and the willingness to let go. *The Mothership*.

Barrier to entry in the local café market was low. Copycats could readily replicate Ya Kun's café business model without the need for large sums of capital. Therefore, it was necessary to protect the brand. The name '*Ya Kun Kaya Toast and Coffeestall since 1994*' was created to deter rivals who wanted to ride on Ya Kun's "reputational coattails" and also to communicate Ya Kun's brand heritage<sup>16</sup> and create customer appeal.

Additional steps included registered trademarks for 'Ya Kun toast,' 'Ya Kun' word mark, '亞坤' (Chinese characters for Ya Kun), 'Ya Kun Toastwich,' copyright designs for enjoy-at-home ground coffee, and *kaya* merchandise. The processes for coffee roasting and brewing, and *kaya* recipe were protected as trade secrets.<sup>25</sup> Trademark-protected posters were used to evoke a sense of nostalgia in Ya Kun outlets. These posters and all materials and manuals used in its franchise system were also protected through copyright.<sup>26</sup>

In terms of market development, Ya Kun had also ventured into other food and beverage businesses that complemented or had adjacencies to their core business of Ya Kun cafés. This included East Japan Railway Co.'s 'Honey's Bar' operated via a joint venture (JRE Ya Kun Food Service Pte. Ltd.)<sup>27</sup>; and a master franchise for 'Beard Papa' cream puffs in Singapore that was secured in 2015.<sup>28</sup>

Along with its business successes, Ya Kun had maintained constant surveillance on competition. Jeshier Loi, Ya Kun's Director of Branding and Market Development, summed up the state of competition aptly, "In the earlier days, we faced a lot of competition, even in the form of straight-up copycats who took our concept wholesale and just

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25 Barraclough, E. (Feb 2018). A toast to Ya Kun's IP-driven success. *World Intellectual Property Organization, WIPO Magazine*.

26 From a Lone Stall to International Success. (Accessed 13 August 2021). *World Intellectual Property Organization, WIPO Magazine*. <https://www.wipo.int/ipadvantage/en/details.jsp?id=2573>

27 Kyodo News. (18 April 2021). JR East opens 1st overseas Honey Bar's juice stand in Singapore. *Nippon.com*.

28 Ya Kun acquires Beard Papa Master Franchise in Singapore. (15 April 2015). <http://yakun.com/whats-new>. *Yakun.com*.

changed the colours. In recent years, competition has come from food delivery services and the entrance of Korean and Japanese brands. This has pushed rentals up and also thinned out the manpower that is available. So, we have spent a lot of energy on our branding, focusing on what Ya Kun is known for.”<sup>29</sup>

### **Moving with the Times**

Ya Kun adopted technology on a need-to basis. Technology adoption happened mostly in the backend such as inventory management, human resource, and accounting systems. At the frontend, technology was applied more subtly to avoid disrupting its heritage brand image. These could be workflow or layouts to increase operational efficiency at the outlets<sup>30</sup>, and were generally “invisible” to the customers. Obviously, *kopi* continued to be hand-brewed using a “sock-filter” that made ten cups each time.<sup>31</sup>

For its loyalty programme, Ya Kun went digital with their Cherish app. This helped reduce manpower utilisation through improved productivity for transactions and payments. On the other side of technology adoption was employee acceptance. Clear communications and training were important. Jesher pointed out to never “underestimate your own employees when it comes to accepting change”. Even though Ya Kun’s frontline staff were generally in the older age bracket, they were able to effectively adapt to the Cherish app.<sup>32</sup>

Adopting online marketing via its company website and social media accounts allowed Ya Kun to significantly expand its customer reach. However, it also became vulnerable to trolling and

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29 Singapore Business Federation. (13 May 2019). Ya Kun: Transforming for the digital age. *BiZQ*.

30 *ibid.*

31 Barraclough, E. (Feb 2018). A toast to Ya Kun’s IP-driven success. *World Intellectual Property Organization, WIPO Magazine*.

32 Singapore Business Federation. (13 May 2019). Ya Kun: Transforming for the digital age. *BiZQ*.

fake news. Vigilance was necessary to protect its brand image and customer relationship.

Ultimately, Ya Kun viewed affordability and accessibility<sup>33</sup> as the determinants for adopting any new technology.

### What's on the Menu?

Ya Kun had three different outlet concepts: Ya Kun kiosks which provided a limited menu for takeaways only; traditional Ya Kun Kaya Toast cafés which usually had compact wooden tables and stools; Ya Kun Family Cafés which had a full menu with a resident chef.<sup>34</sup> Its core product was the breakfast trio of *kopi*, *kaya* toast and soft-boiled eggs – a simple yet ample source of sustenance packed with a boost of caffeine (*kopi*), energy (*kaya* toast) and protein (eggs).<sup>35</sup>

Its menu expanded around this core and was organised into sub-categories: Traditional Favourites, Beverages, Value Set Meal, All Day Sides, Asian Signatures and Asian Style Sandwiches (aka Toastwich). Its famous *kaya* was also retailed in bottles at the outlets. Produced exclusively in its Singapore factory, it carried HACCP<sup>36</sup> certification as a mark of quality assurance and halal certification for its Muslim clientele.<sup>37</sup>

Nevertheless, Ya Kun was not averse to introducing more innovative items for special occasions or otherwise. Examples included collaborating with Glico to produce Kaya Toast and Kopi O flavoured Pocky Biscuit Sticks at the 2019 Singapore Food Festival<sup>38</sup>,

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33 *ibid.*

34 Loi, J. (13 September 2019). Traditional to Trendy: Ya Kun's Journey of Internationalisation and Branding (A Talk by Jeshier Loi). <https://www.youtube.com/watch?v=cuDSeGXLvO4>. *Eye on Asia*, NLB.

35 Lee, J. (18 April 2021). Lessons on Leadership: Ya Kun experienced a boom when it was a family-run business but driving the business to greater heights today requires expertise from outside and the willingness to let go. *The Mothership*.

36 Hazard Analysis and Critical Control Points (HACCP) certification was an international standard defining the requirements for effective control of food safety.

37 Ya Kun Kaya Toast Coffeestall since 1944. (Accessed 11 August 2021). <http://yakun.com/menu/asian-style-sandwiches> *Yakun.com*

38 Ezaki Glico Co., Ltd. (12Jul2019). 'Iconic Singaporean Breakfast remixed with Pocky X Ya Kun Kaya Toast'. [glico.com.sg](http://glico.com.sg).

D24 Durian Kaya Rainbow Steamed Bread and Gula Melaka D24 Pandan Swiss Roll to celebrate Singapore's 56<sup>th</sup> National Day<sup>39</sup>, Smoked BBQ Ciabatta, Roasted Sesame Ciabatta and Hae Bee Hiam Ciabatta<sup>40</sup>, and Prawn Mayo Croffle, Kaya Butter and Tuna Mayo Croffle.<sup>41</sup>

## TRIPLE BOTTOM LINE #2: P IS FOR PEOPLE (SOCIAL)

### Preserving Heritage to Build a Business

Cuisine unique to a community was considered an intangible cultural heritage. UNESCO recognised intangible cultural heritage as traditions or living expressions that were inherited and transmitted through subsequent generations and included food amongst others. Cultural heritage was considered important as a mainspring of cultural diversity and a guarantee of sustainable development.<sup>42</sup>

Brand heritage was key to Ya Kun's positioning strategy.<sup>43</sup> Ya Kun was conferred the SPBA<sup>44</sup> - Heritage Brand award in 2005.<sup>45</sup> As a heritage brand, it had to demonstrate its ability to stay true to its heritage and origins, whilst continually innovating and transforming in order to stay relevant and competitive.<sup>46</sup>

39 Ya Kun Kaya Toast Facebook. (Accessed 09 August 2021). <https://www.facebook.com/yakunkayatoastsg/>. @yakunkayatoastsg.

40 *ibid.*

41 *ibid.*

42 UNESCO. (n.d.). Intangible Cultural Heritage and Sustainable Development. *ich.unesco.org*.

43 Lee, J. (18 April 2021). Lessons on Leadership: Ya Kun experienced a boom when it was a family-run business but driving the business to greater heights today requires expertise from outside and the willingness to let go. *The Mothership*.

44 SPBA – Singapore Prestige Brand Award was inaugurated in 2002 by the Association of Small & Medium Enterprises (ASME) and Lianhe Zaobao of Singapore to recognise and honour Singapore brands developed and managed effectively through strong and innovative branding initiatives. The award categories included Promising Brands, Established Brands, Heritage Brands and Special Merit.

45 Ya Kun Kaya Toast Coffeestall since 1944. (Accessed 12 August 2021). <http://yakun.com/in-the-news/awards>. *Yakun.com*.

46 SPBA website. (Accessed 30 September 2021). [spba.com.sg](http://spba.com.sg).

By virtue of being a Heritage Brand, it had also helped preserve a piece of Singapore's traditional cuisine - an intangible cultural heritage<sup>47</sup>. The quintessential local breakfast staple of *kopi*, *kaya* toast and eggs (Ya Kun's Set A) had become ubiquitous among Singaporeans and connected one with a sense of Singaporean history. 'Set A' was Ya Kun's headline menu offering and retailed at a relatively wallet-friendly price of SGD\$4.80.<sup>48</sup> These three items had always been associated with Ya Kun from its early days. In an interview with the media, Jeshu explained that Ya Kun's value proposition was founded and sustained by staying true to its heritage of '*kopi*, *kaya* toast and eggs' from the start. The company had no intention to change this approach, nor chase after trends or be edgy.<sup>49</sup> Jeshu reiterated that "[their] approach [was] to grow strategically and not rush [their] expansion. Going forward, the idea [was] to anchor [themselves] to grow in the markets [they were] already in."<sup>50</sup>

Having ran the business for almost eight decades, Ya Kun knew the importance of the "human element" for a heritage coffee chain. Jeshu explained that "[t]oasting the bread, roasting the coffee beans, and brewing *kopi* [were] all processes still done by hand because people like[d] that human element." Hence, Ya Kun chose to eschew automation despite its potential to increase productivity in their cafés.<sup>51</sup> Even though acknowledging that maintaining this heritage came at a cost, it was important for Ya Kun to continue doing so.<sup>52</sup>

And so, while artisanal coffee brewed with a range of fancy methods such as pour-overs, vacuum, and espresso machines were all the

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47 Unesco defined intangible cultural heritage as an important factor in maintaining cultural diversity in the face of growing globalisation. <https://ich.unesco.org/en/what-is-intangible-heritage-00003>

48 How Well Does a Ya Kun Employee with 13 Years of Experience Know their Products | Legit Old. (15 April 2021). <https://www.youtube.com/watch?v=AVEFjkn8dU>. *MothershipSG*.

49 Lee, J. (18 April 2021). Lessons on Leadership: Ya Kun experienced a boom when it was a family-run business but driving the business to greater heights today requires expertise from outside and the willingness to let go. *The Mothership*.

50 Singapore Business Federation. (13 May 2019). Ya Kun: Transforming for the digital age. *BiZQ*.

51 Lee, J. (18 April 2021). Lessons on Leadership: Ya Kun experienced a boom when it was a family-run business but driving the business to greater heights today requires expertise from outside and the willingness to let go. *The Mothership*.

52 Singapore Business Federation. (13 May 2019). Ya Kun: Transforming for the digital age. *BiZQ*.

rage in cafés, the humble and ubiquitous *kopi*, with its wallet-friendly proposition for a caffeine fix and varied permutations of preparation styles<sup>53</sup> soldiered on.

## Business Continuity

Ya Kun acknowledged that a family-ran business risked inherent biasness that could hinder objectivity when making business decisions. Recognising the benefits that professionals with appropriate skillsets and talents could offer, professionals were employed to join Ya Kun’s senior management and worked together with the family members. Toshiya Tanaka, who had more than 20 years of food and beverage industry experience was brought in as the CEO.<sup>54</sup>

Adrin Loi, son of Ya Kun’s founder, sat at the top of the organisational structure<sup>55</sup> as the Executive Chairman. Adrin’s son, Jeshar Loi, headed the Branding and Business Development department. Jeshar was also responsible for the sustainable expansion of the business, including “the look and feel of outlets and other brand touch points.”<sup>56</sup>

In line with the principles of SDG8, Ya Kun had always strived to maintain a decent work environment for its employees. It was careful to hire people who can integrate well and improve the culture in the company. All new employees, including management staff, had to spend two weeks working at a Ya Kun outlet to gain a frontline perspective of the business.<sup>57</sup>

53 Goh, K. (22 May 2016). Get your kopi kick at inaugural Singapore Coffee Festival. *The Straits Times*.

54 Lee, J. (18 April 2021). Lessons on Leadership: Ya Kun experienced a boom when it was a family-run business but driving the business to greater heights today requires expertise from outside and the willingness to let go. *The Mothership*.

55 Koh, W. (2015). *The Top Toast: Ya Kun and the Singapore Breakfast Tradition* (second edition), Cengage Learning Asia Pte Ltd.

56 Singapore Business Federation. (13 May 2019). Ya Kun: Transforming for the digital age. *BiZQ*.

57 Lee, J. (18 April 2021). Lessons on Leadership: Ya Kun experienced a boom when it was a family-run business but driving the business to greater heights today requires expertise from outside and the willingness to let go. *The Mothership*.

Knowing the long hours and labour-intensive nature of the business, especially at the storefronts, the company recognised that working in a ‘*kopi* and toast’ café might not be an appealing career choice. Being a somewhat “traditional” local café chain, attracting talents to replace attrition of management staff was also challenging. As a third-generation member of the owner’s family, Jeshier Loi expressed that he was unsure if the fourth generation of Loies’ would be willing to “pick up the mantle.”<sup>58</sup>

### A Black Swan Event

The global impact of Covid-19 pandemic was extensive. Cafés and bars worldwide suffered a contraction of 37% from 2019 (USD\$468.2 billion) to 2020 (USD\$295.4 billion).<sup>59</sup>

The Singapore market was similarly affected. Safety management measures to control community transmission of the virus, including restricted or complete ban of dining-in and work-from-home arrangements, meant that chain cafés like Ya Kun were deprived of a significant portion of clientele - office workers in their downtown outlets.<sup>60</sup> During Singapore’s “Circuit Breaker”<sup>61</sup> between April and June in 2020, foodservice outlets could only offer takeaway or food delivery as dining-in was banned. This shifted foodservice sales online, peaking at a high of 47.5% in May 2020, and again in June 2021<sup>62</sup> (see **Exhibit 3**).

Total receipts for Singapore cafés and bars fell 33% to SGD\$1.62 billion in 2020 from SGD\$2.42 billion the previous year. This was

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58 *ibid.*

59 Passport database. (Accessed 12 Aug 2021). <https://www.portal.euromonitor.com/remotexs.ntu.edu.sg/portal/magazine/homemain>. *Passport* (by Euromonitor International).

60 Passport: Cafes/Bars in Singapore (February 2021, *Euromonitor International*).

61 Circuit breaker: ‘Soft’ lockdown to break unlinked community transmission of the virus. Only essential services were opened. Everyone was expected to stay at home. Schools went online. Workers telecommuted from home. All eateries, including hawker centres and coffeeshops could only offer takeaways as dining-in was banned. Retail shops were closed except those selling essential items, such as provision shops, supermarkets, and pharmacies.

62 Dining-in was banned during the circuit-breaker period in 2020, and twice in 2021 (16May to 13Jun, and 22Jul to 10Aug) when the country entered Phase2 (heightened alert).

mirrored in chain cafés which dipped 25% (SGD\$486.1 million in 2019 to SGD\$366.4 million in 2020).<sup>63</sup> (see **Exhibit 4**) Barring any trajectory change in the pandemic, market analysts were expecting a cautious and gradual recovery at a CAGR<sup>64</sup> of 11%<sup>65,66</sup> with the industry recovering beyond pre-Covid levels in 2023 (SGD\$2,457 million)<sup>67</sup> hopefully aided by the continued easing of dine-in restrictions and recovery of international travel and tourism<sup>68</sup> (see **Exhibit 5**).

By 8<sup>th</sup> October 2021, 83% of Singapore's population had been fully vaccinated<sup>69</sup> against the Covid-19 virus, and 85% had received at least one dose.<sup>70</sup> The Singapore government had begun its transition to regard Covid-19 as endemic whilst cautiously opened up the economy.<sup>71</sup> It adopted a vaccination-differentiated approach for community safe management measures and border control measures.<sup>72</sup>

Meanwhile, foodservice outlets had also begun to adapt to the new normal.<sup>73</sup> Seating capacity was reduced to adhere to safe distancing measures, contactless ordering and payment was introduced to reduce risks for consumers and staff, and promotions were held for dine-in during non-peak hours (to shift consumer demand and manage capacity). Consume-at-home menu choices (e.g., frozen dishes that only needed re-heating before consumption) were introduced and expanded. Similar to other foodservice operators, Ya

63 Singapore Consumer Foodservice Market Size (2006 to 2025), *Passport* (by Euromonitor International).

64 CAGR: Compounded annual growth rate

65 At constant 2020 prices.

66 Singapore Consumer Foodservice Market Size (2006 to 2025), *Passport* (by Euromonitor International).

67 Passport database. (Accessed 12 Aug 2021). <https://www.portal.euromonitor.com/remotexs.ntu.edu.sg/portal/magazine/homemain>. *Passport* (by Euromonitor International).

68 Singapore Consumer Foodservice Market Size (2006 to 2025), *Passport* (by Euromonitor International).

69 Fully vaccinated = received two doses of COVID-19 vaccines.

70 Adeline, Stephani. Pazos, Rebecca. (08 October 2021). Tracking Singapore's Covid-19 vaccination progress. *The Straits Times*.

71 (26 July 2021). COVID-19 task force chairs deliver ministerial statements on Government's response to pandemic. <https://www.channelnewsasia.com/singapore/covid-19-task-force-chairs-statements-parliament-phase-2-2064561>. CNA

72 Preparing for our transition towards Covid resilience. (06 August 2021). <https://www.moh.gov.sg/news-highlights/details/preparing-for-our-transition-towards-covid-resilience>. Ministry of Health Singapore.

73 Passport: Consumer Foodservice in Singapore (February 2021, Euromonitor International).

Kun also joined online food delivery platforms. In the medium term, the prevalence and popularity of online delivery platforms were likely to shape new menu item development and even new outlet locations for foodservice operators.<sup>74</sup>

### **Positive Social Impact – A Force for Good**

As expressed in SDG8, “decent work mean[t] opportunities for everyone to get work that [was] productive and deliver[ed] a fair income, security in the workplace and social protection for families, better prospects for personal development and social integration.”<sup>75</sup>

For its Social bottom line, Ya Kun had provided employment opportunities for its employees for almost eight decades, and subsequently, economic benefits for its franchisees. Since the Covid-19 pandemic first hit, the company had remained emphatic in prioritising livelihoods and jobs ahead of other considerations. Almost all of Ya Kun’s outlets continued operating during the Covid-19 pandemic, and the company was able to keep its staff of more than 300 workers employed.<sup>76</sup> It deployed a two-step approach of pay adjustment across the company, and expeditious alteration of business operations to keep storefronts running. Ya Kun promised its employees that “everyone [would] be able to bring home a monthly paycheck, and no one [would] be furloughed or retrenched. Everyone took a pay cut to protect the entire team. From board members to frontline staff, [they were] all in this together and sacrifices [had] to be made.”<sup>77</sup>

Solidarity and trust were core to Ya Kun’s company culture and required “frequent communication, particularly in a remote working

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74 *ibid.*

75 Sustainable Development Goal 8 – Decent Work and Economic Growth. (n.d.). <http://www.un.org/sustainabledevelopment>. *United Nations Sustainable Development Goals*.

76 Tee, K. (8 September 2020). How Jeshier Loi is taking the family’s Ya Kun Kaya Toast business to the next level. *The Peak*.

77 Stewardship Asia. (Undated). We are in this together: The Stewardship mindset guiding Yakun through Covid-19. <https://www.stewardshipasia.com.sg/knowledge/publications/we-are-together-stewardship-mindset-guiding-ya-kun-through-covid-19>. *stewardshipasia.com*.

environment, to ensure alignment, clarity of instructions, and to avoid conflicts that could impede the speed of change and handicap business productivity. And so, in times of crisis, Ya Kun was able to walk the talk.” Nonetheless, the company acknowledged that the industry would continue to face headwinds beyond the government’s support scheme.<sup>78</sup>

During the pandemic, the company also embarked on several initiatives to support those whose livelihoods were adversely affected. Amongst these was the ‘Gift a *Kaya* Toast Set’ initiative where families affected by the pandemic were gifted with *kaya* toast sets. Within a few weeks, more than 1,300 sets were gifted to children and youths through the company and its customers.<sup>79</sup> The company also offered kitchen space to charitable initiatives and supplied cooked food to migrant workers.<sup>80</sup> In order to champion the spirit of doing good and acknowledge the contributions made by frontliners to the community, it launched ‘Fuel a Frontliner’ (in conjunction with Together, SingaporeCares), whereby any frontliner could be gifted with a cup of Ya Kun’s *kopi*/tea through Ya Kun’s Cherish app.<sup>81</sup> The company also collaborated with local charity, ‘Ray of Hope’, to introduce a ‘Shoebox project’ campaign in December 2020 that allowed the public to donate shoeboxes containing presents for children from families affected by pay cuts and retrenchments. The inaugural campaign collected 500 shoeboxes of gifts.<sup>82</sup> Ya Kun was making positive social impact.

A YouGov survey in 2020<sup>83</sup> found that the majority (79%) of consumers were more likely to purchase from brands with a strong social conscience. Younger consumers (aged 18 to 24) were more

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78 *ibid.*

79 *ibid.*

80 Tee, K. (8 September 2020). How Jeshar Loi is taking the family’s Ya Kun Kaya Toast business to the next level. *The Peak*.

81 Ya Kun Kaya Toast Facebook. (Accessed 09 August 2021). <https://www.facebook.com/yakunkayatoastsg/>. @yakunkayatoastsg.

82 Yap, G. (18 December 2020). Shoebox Projects sees over 500 donations of gifts for needy kids. *The New Paper*.

83 Ho, K. (03 July 2020). Singaporeans prefer “socially responsible” brands during pandemic. YouGov.

likely to strongly agree with this sentiment than those older (aged 55 and above) - 31% versus 14% respectively.

Another YouGov survey in 2018<sup>84</sup> reported that a vast majority (88%) of consumers thought businesses had a responsibility to do social good, alluding to the importance of Corporate Social Responsibility (CSR). 56% felt businesses were responsible for ensuring that their supply chain did not harm the environment<sup>85</sup>. In response to the question “What makes a brand a good corporate citizen?”, 73% indicated “genuine care of its customers”, 55% indicated “promoting and practising environment sustainability”, 54% indicated “services outside of the norm”, 47% indicated “philanthropy”, 45% indicated “ensuring equality amongst employees”, while only 20% indicated “high performances in sales and profits”. In addition, 59% indicated that they were more likely to purchase from a brand with a strong COVID-19 response or focus.

As the Covid-19 pandemic continued to exact its toll on the economy and society, could Ya Kun continue to fulfil its Social bottom line through providing decent work opportunities and impactful social initiatives without unduly compromising its own economic sustainability?

## **TRIPLE BOTTOM LINE #3: P IS FOR PLANET (ENVIRONMENT)**

### **The “Green” Consumer**

The emergence of green consumerism was well supported by studies and reports. Across the world to the Asia Pacific region, and to Ya

84 YouGov staff. (04 January 2018). 56% of Singaporeans believe businesses have a responsibility to prevent environmental damage. YouGov.

85 However, this fell to just 46% among business owners and those who work in senior management (including CEOs), suggesting a gulf of opinion between those at the helm of Singaporean brands and the wider public.

Kun's home base (Singapore), consumers were calling for greener actions from businesses. One global report found that "sustainability" was at the top of consumers' mind, both in terms of production and consumption, tying in with the objectives of SDG12. Consumers were inclined to play their part for the environment and were willing to express this with their spending.<sup>86</sup>

Sustainability Development Goal 12 – Responsible Consumption and Production (SDG12) was borne out of a concern that "economic and social progress over the last century ha[d] been accompanied by environmental degradation that [was] endangering the very systems on which our future development and very survival depend[ed] on."<sup>87</sup> A report found that looking beyond the pandemic, 90% of food and beverage professionals surveyed worldwide perceived sustainability as being very or extremely important to improve the resilience of their businesses (see **Exhibit 6**). On the global front, 65% of consumers were worried about climate change, and younger generations were becoming increasingly concerned with this issue.<sup>88</sup>

Cafés that did not take environmental issues seriously risked losing customers for whom living a greener lifestyle was a core aspect of their identity.<sup>89</sup> A separate independent study corroborated the above when it found that there were positive correlations between sustainable restaurant practices and customer loyalty that resulted in high(er) restaurant revisit intentions.<sup>90</sup>

A decade-long research on more than 150,000 millennials<sup>91</sup> by the Case Foundation found that three of their ten defining traits<sup>92</sup> were

86 Nguyen, H. (29 April 2021). Global: Consumer willingness to pay for environmentally friendly products. *YouGov*.

87 Sustainable Development Goal 12 – Responsible Consumption and Production. (n.d.). <http://www.un.org/sustainabledevelopment>. *United Nations Sustainable Development Goals*.

88 Euromonitor International Lifestyles Survey, 2020. *Passport (by Euromonitor International)*.

89 Coffee Shops in the "New Normal". January 2021. *Passport (by Euromonitor International)*.

90 Hyung, CM. Kim, MJ. (June 2020). Can sustainable restaurant practices enhance customer loyalty? The roles of value theory and environmental concerns. *Journal of Hospitality and Tourism Management*. <https://doi.org/10.1016/j.jhtm.2020.03.004>

91 Dimock, M. (17 January 2019). Defining generations - Where Millennials end and Generation Z begins. *Pew Research Center*.

92 Economy, P. (27 July 2019). A New Study of 150,000 Millennials Reveals They Have 10 Surprising Things in Common. *Inc.com*.

that they cared about social issues, exhibited social good in small acts performed daily, and had a consistent preference for cause engagement with peers. At 80 million strong, this was a societal force, comprising the largest segment of the global workforce. Businesses would be ignoring this consumer group's powerful influence at their own peril. Singapore had just under a million millennials (22% of total population) in 2020.<sup>93</sup>

Responses were also largely affirmative for a YouGov survey<sup>94</sup> that polled the Asia Pacific (AP) region on the question, "Businesses had a responsibility to ensure their supply chain did not harm the environment." The Philippines polled the highest (63%), followed by Singapore (56%), with the average at 50% for the region. Even the lowest polled country, Thailand, returned with a significant 42% who agreed with the survey question.

A survey<sup>95</sup> conducted by the authors showed sentiments similar to those reported above. Regardless of whether they visited cafés or not, respondents were largely aligned in their responses. The survey results showed that more than 80% intended to practise responsible consumption, 62% felt that a green premium was acceptable for environmentally friendly products, and more than 50% factored in the environmental friendliness of a company in their purchase decisions. The survey also further presented that more than 83% felt that environmentally friendly products were necessary and more than 93% felt that companies had a social responsibility to direct customers towards less environmentally harmful consumption. In addition, 58% factored in the CSR of a company in their purchasing decision.

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93 Population and Population Structure: 1950-2020. *Department of Statistics Singapore*.

94 YouGov staff. (04 January 2018). 56% of Singaporeans believe businesses have a responsibility to prevent environmental damage. *YouGov*.

95 Survey sample of approximately 400 people across all age groups in Singapore.

## Green Gap and Waste Generation

However, despite the above evidence, there was a discrepancy that could potentially impede advancement of green consumerism. This would be the green gap.<sup>96</sup> It was a phenomenon whereby consumers, despite having expressed concerns for the environment and their intent to adopt more environmentally friendly behaviors, do not universally act on it. Only a few acted on their intentions.<sup>97,98</sup>

It would be worth noting that food loss and wastage contributed to unsustainable production and consumption as well. Approximately 1.3 billion tonnes (US\$1 trillion) of food, equivalent to about one third of all food produced globally, ended up in rubbish bins due to spoilage.<sup>99</sup> Closing the green gap would contribute to more sustainable consumption.

Notwithstanding the green gap, foodservice businesses had chosen to respond to the potential of a changing tide towards green consumerism and reduce their climate impact. Recognising increased concerns and awareness of food production sustainability, and the rise in demand for plant-based menu (i.e., 'greener') alternatives, several restaurants in Singapore introduced dishes prepared with Impossible Meat<sup>100</sup> into its menu.<sup>101</sup> In 2018, Starbucks stopped the use of all plastic lids with straws to reduce waste generation and achieved an estimated reduction of 2.72 tonnes in paper and plastic materials used every year.<sup>102</sup>

96 Mahoney, S. (11 April 2011). Study: Green Gap is Bigger Than Ever. *Marketing Daily*. <https://www.mediapost.com/publications/article/148938/study-green-gap-is-bigger-than-ever.html>

97 Wang, J., Shen, M., & Chu, M. (2021). Why is green consumption easier said than done? Exploring the green consumption attitude-intention gap in China with behavioral reasoning theory. *Cleaner and Responsible Consumption*. <https://doi.org/10.1016/j.clrc.2021.100015>

98 ElHaffar, G., Durif, F., & Dube, L. (2020). Towards closing the attitude-intention-behavior gap in green consumption: A narrative review of the literature and an overview of future research directions. *Journal of Cleaner Production*. <https://doi.org/10.1016/j.jclepro.2020.122556>

99 Sustainable Development Goal 12 – Responsible Consumption and Production. (n.d.). <http://www.un.org/sustainabledevelopment>. *United Nations Sustainable Development Goals*.

100 Made by the company, Impossible Foods, the various ingredients of Impossible Meat were derived from plants and the product tasted similar to beef while being suitable for vegans and vegetarians.

101 Passport: Cafes/Bars in Singapore (February 2021, *Euromonitor International*).

102 Starbucks. (25 September 2021). Reusable cups, meatless options and ethically-sourced coffee: How you can help save the planet with Starbucks. *The Straits Times*.

The Singapore government also had a goal to cut waste and consumption through the Sustainable Living pillar of Singapore Green Plan 2030 with a target to reduce waste to landfill per capita per day by 20% by 2026 and 30% by 2030.<sup>103</sup>

For its Environment bottom line, Ya Kun was not seen to be publicly active. Although, it did support the ‘Make Every Drop Count!’ 2019 campaign by the Singapore Public Utilities Board’s (PUB) to raise awareness on the importance of water conservation.<sup>104</sup>

To retard environmental degradation that endangered the very systems that support future development survival, SDG12 advocated for responsible consumption and production behaviour through a better understanding of environmental and social impacts of products and services. On its part, businesses such as Ya Kun, could endeavour to “identify hot-spots within [its] value chain where interventions [had] the greatest potential to improve the environmental and social impact”, and ultimately lead to more sustainable lifestyles, reducing impacts and improving well-being.<sup>105</sup>

## STANDING AT THE NEXUS OF THE TRIPLE BOTTOM LINE

The United Nations’ IPCC Sixth Assessment Report stated in no uncertain terms that climate change was widespread, rapid and intensifying.<sup>106</sup> It went on to say that “[i]t is unequivocal that human influence [had] warmed the atmosphere, ocean and land,”<sup>107</sup> and “[t]he scale of recent changes across the climate system as a whole

103 Singapore Green Plan 2030. (n.d.). [www.GreenPlan.gov.sg](http://www.GreenPlan.gov.sg)

104 Ya Kun facebook page. (21 August 2021). <https://www.facebook.com/yakunkayatoastsg/posts/make-every-drop-count-as-part-of-the-public-utilities-boards-pub-refreshed-campa/2764997833524500/>. *Ya Kun Kaya Toast facebook account*.

105 Sustainable Development Goal 12 – Responsible Consumption and Production. (n.d.). <http://www.un.org/sustainabledevelopment>. *United Nations Sustainable Development Goals*.

106 Fogarty, D., Tan, A. (09 August 2021). Climate change is speeding up, key warming threshold set to be breached by 2030s: IPCC report. *The Straits Times*.

107 Working Group 1. (9 August 2021). IPCC Sixth Assessment Report: Headline Statements from the Summary for Policymakers. *International Panel on Climate Change, United Nations*.

and the present state of many aspects of the climate systems [was] unprecedented over many centuries to many thousands of years.”<sup>108</sup>

The world was not letting up on the race to mitigate climate change. Barely three months after the IPCC Sixth Assessment Report was released, the Conference of Parties 26 (COP26) [would] take place in Glasgow in November 2021. 20,000 delegates, including non-governmental organisations (NGOs) and inter-governmental organisations (IGOs), as well as 120 heads of state from 197 member states of the United Nations would attend to review and discuss a climate change agenda that would include the countries’ Nationally Determined Contributions (NDCs). The NDCs documented each country’s intended climate change actions based on a legal framework that was created in COP15 (aka Paris Agreement).<sup>109</sup> The IPCC Sixth Assessment Report would undoubtedly be heavily referenced.

Standing at the nexus of the Triple Bottom Line, Ya Kun had clearly demonstrated strengths in two out of the three dimensions. How should the company balance its TBL to navigate the sustainability challenges facing its industry and secure a sustainable future for ‘Ya Kun Kaya Toast’?

## SUPPLEMENTARY MATERIALS

- Ng, Sharon. Interview by Jaime Ho. “The green consumer paradox: Can we walk the talk on sustainability?” *The Climate Conversations - S2, EP 48*. Channel News Asia. 10 Sep 2021. <https://www.channelnewsasia.com/listen/climate-conversations/green-consumer-paradox-can-we-walk-talk-sustainability-ep-48-2168541>

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108 Fogarty, D., Tan, A. (09 August 2021). Climate change is speeding up, key warming threshold set to be breached by 2030s: IPCC report. *The Straits Times*.

109 UN Climate Change Conference 2021. GLASGOW COP26. (Accessed 08 October 2021). <https://ukcop26.org/>

### EXHIBIT 1: BRANDSHARE SALES (ACTUALS, SGD MILLION) IN CAFÉS/BARS: FOODSERVICE VALUE 2015-2020

Brand Name	2015	2016	2017	2018	2019	2020
Starbucks	79.7	90	95.8	100.1	106	85.5
The Coffee Bean & Tea Leaf	58.3	69.1	66.3	67.8	70.4	55.3
Toast Box	30.2	28.7	29.8	28.2	29.1	23.7
<b>Ya Kun Kaya Toast</b>	<b>18.2</b>	<b>19.7</b>	<b>22.6</b>	<b>26.3</b>	<b>28.3</b>	<b>20.9</b>
McCafé	28.3	27.3	26.7	24.5	23.8	20.1
Harry's Bar	23.5	26	26.6	25.4	25.8	16.1
The Coffee Connoisseur	25.7	22.5	18.2	18.3	14.8	10.6
Killiney Kopitiam	7.2	8.6	10	9.1	11	6.5
Dunkin' Donuts	4.9	6.5	6.8	6.2	6.7	4.6
Spinelli	5	5.2	5.3	4.9	4.5	2.2
O' Coffee Club	7	3.6	5.2	5.7	6.7	2.1
Bakerzin	8.1	9.3	6	7.3	6.1	1.1
Trung Nguyen Coffee	0.5	0.5	0.5	0.5	0.5	0.3
Caffè Ritazza	1	1	1	-	-	-
Dôme	5.5	4.2	2.2	0.5	-	-
Gloria Jean's Coffees	-	-	-	-	-	-
Pacific Coffee	2.6	3.4	-	-	-	-
San Francisco Coffee Co	-	-	-	-	-	-
Others (Chained)	90.9	111.2	132.6	146.7	152.4	117.4
Others (Independent)	1815.9	1854.5	1878.6	1900.6	1930.9	1255.5
Total	2212.4	2291.3	2334.2	2372.1	2417	1621.9
(SGD million)						

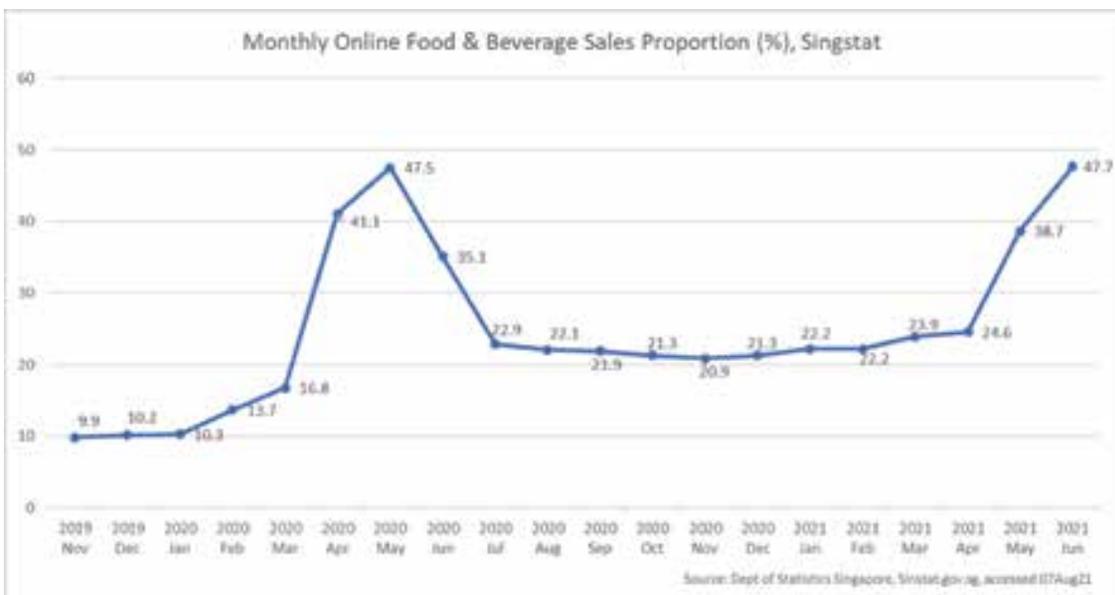
Source: Cafés/Bars in Singapore. Euromonitor International.

## EXHIBIT 2: FOOD SERVICES INDUSTRY TRANSFORMATION MAP



Source: The Future Economy Council. Ministry of trade and Industry, Singapore. (Webpage accessed 08 October 2021).

## EXHIBIT 3: MONTHLY ONLINE FOOD & BEVERAGE SALES PROPORTION (%)



Source: Department of Statistics, Singapore.

#### EXHIBIT 4: SALES IN CAFÉS/BARS: FOODSERVICE VALUE 2015-2020

Year	2015	2016	2017	2018	2019	2020
Cafés (total)	2,212.40	2,291.30	2,334.20	2,372.10	2,417.00	1,621.90
Chain	396.6	436.8	455.6	471.5	486.1	366.4
Independent	1,815.90	1,854.50	1,878.60	1,900.60	1,930.90	1,255.50
(SGD million)						

Source: Cafés/Bars in Singapore. Euromonitor International.

#### EXHIBIT 5: FORECAST SALES IN CAFÉS/BARS: FOODSERVICE VALUE 2021-2025

Year	2021	2022	2023	2024	2025
Cafés (total)	1,996.50	2,271.60	2,456.90	2,593.20	2,672.30
Chain	432.9	475.2	507.1	534.5	559.2
Independent	1,563.60	1,796.30	1,949.80	2,058.70	2,113.10
(SGD million)					

Source: Cafés/Bars in Singapore. Euromonitor International.

#### EXHIBIT 6: IMPORTANCE OF SUSTAINABILITY FOR BUSINESS RESILIENCE



Source: International Voice of the Industry survey 2020. Responses fielded globally.



# Enhancing Patient Care by Transforming the Work Environment for Front-Liners at the National University Hospital (NUH)

*Lim Beng Chong and Catherine Koh*

Singapore, a young yet developed nation, had a rapidly ageing population as well as a growing shortage of nurses. As a major public healthcare provider, it was imperative for the National University Hospital (NUH) to attract and retain an adequate number of nursing staff<sup>1</sup> to meet the mounting demand in healthcare services and to take on the hospital's plans for service expansion.

The LUV-ing Nurses Movement was introduced in 2013 with the strategic intent of creating an energising and engaging practice environment in which nurses would stay and grow with NUH. "LUV", an acronym for "Listen, Understand, and Value", encouraged nursing staff to provide the best "LUV-ing" care to patients.

To gain a better understanding of the challenges faced by its nursing staff, large-scale surveys and focus group interviews involving nursing staff at all levels were conducted between June to September

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<sup>1</sup> Nursing professionals in public hospitals in Singapore typically begin their careers as Enrolled Nurses or Staff Nurses (if they have a Diploma or Degree in Nursing). The term "nurses" usually refers to ground-level staff nurses and enrolled nurses at all levels of seniority whose primary role is to care for patients directly. Thereafter, they may pursue different career tracks: that of nurse managers, nurse educators, nurse clinicians, and nurse researchers, whose job scope may or may not include directly caring for patients. Source: Ministry of Health. (N. D.). Nursing careers. Retrieved from <https://www.moh.gov.sg/hpp/nurses/career-practices/CareerNPracticesDetails/nursing-careers#career>

2013. Subsequent analysis of the data revealed significant issues in leadership, human resource, organisational structure and work processes. The team found that improvements were needed pertaining to the role of nurse managers, human resource (HR) policies and practices, continuing education and professional development, leadership development, structural impediments to service provision, and collaborative partnerships with doctors.

Armed with these findings, several workgroups were established under the guidance of a dedicated LUV-ing Nursing Taskforce (“the taskforce”) to examine the issues in detail and provide recommendations to the hospital management. Since then, with full management support, interventions were developed and implemented to improve the professional practice environment in NUH.

Apart from the lower turnover rate among nurses and improved engagement scores (based on a survey carried out in 2017), the hospital also experienced improvements in Patient Experience survey scores and nurse-sensitive quality care indicators. These provided further confirmation that the transformation effort had indeed helped to turn the situation around in NUH.

“We are losing a lot of good people; something has to be done now!”

– Associate Professor Joe Sim, CEO of NUH from 2009 to 2016

## EMERGING CHALLENGES

In 2010, the Singapore healthcare system faced unprecedented challenges.

Its healthcare sector had always been lauded as one of the best in the world, as evidenced by the long-life expectancy and low hospital-related mortality rate of Singaporeans. However, broader changes in Singapore's demographic seemed to suggest that the road ahead would be a little more rocky than rosy.

The percentage of the population aged 65 and above was expected to double from 10.5% in 2013 to 20% by 2030<sup>2</sup>, and an ageing population was expected to impose significant demands on healthcare services. Specifically, the number of persons aged 60 and above with dementia was approximately 82,000 in 2018. This number was expected to increase to 152,000 by 2030.<sup>3</sup> The Ministry of Health also projected a greater number of Singaporeans living with chronic conditions. A report by the National Healthcare Group highlighted that the number of people living with diabetes was expected to balloon from 450,000 in 2019 to one million in 2050, if left unchecked.<sup>4</sup>

At the same time, Singapore faced a shortage of nurses. Nurse attrition had always been an area of concern due to factors such as low status of the profession, perceived inadequate remuneration, demanding shift rotations, and limited career mobility. Apart from that, Singapore had a dwindling population of young adults – the nation's total fertility rate in 2020 was a mere 1.10, which was far below the replacement rate of 2.1.<sup>5</sup> As such, the number of people

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2 Committee on Ageing Issues, Singapore. (2006, February 3). *Report on the ageing population*. Retrieved from [https://www.msf.gov.sg/publications/Documents/CAL\\_report.pdf](https://www.msf.gov.sg/publications/Documents/CAL_report.pdf)

3 Ministry of Health Singapore. (N. D.). *Let's talk about Vascular Dementia*. Retrieved from <https://www.healthhub.sg/programmes/74/understanding-dementia>

4 National Healthcare Group. (2019). *The three waves*. In *River of life: NHG's perspectives on population health*. Retrieved from <https://corp.nhg.com.sg/ROL/Pages/RiverOfLife.aspx>

5 Department of Statistics Singapore. (2021). *Understanding age-specific fertility rate & total fertility rate*. Retrieved from <https://www.singstat.gov.sg/modules/infographics/total-fertility-rate>

pursuing Nursing qualifications, choosing Nursing as a career, and staying in the field was declining. This was a worrying trend given a projected uptick in healthcare demand in the coming years.

NUH, a member of the National University Health System, was a public hospital with over 50 medical, surgical, and dental departments offering an extensive suite of specialist care to the public. Established in 1985, it served more than a million patients annually (at the time of writing). Despite being one of the most established and respectable hospitals in Singapore, NUH was confronted with the same nursing shortages that other hospitals faced.

In 2011, NUH's upward trend in nursing staff turnover hit a three-year high of 11.7%. The majority of those who had left were between 21 to 30 years of age (this group represented 60% of its overall turnover) and/or had served in NUH for two years or less (this group represented 53% of overall turnover). While the Singapore government had rolled out initiatives to attract more people to Nursing as a profession, these were not enough to cater to the growing demand for healthcare services.

Formal staff feedback channels such as the 2011 Employee Engagement Survey (EES) and exit interviews revealed several areas of concern. These included incivility at the workplace as well as issues related to communication, career advancement, supervision, job satisfaction, remuneration, and workload. There was an urgent need to identify specific areas for improvement while leveraging NUH's strengths to enhance the engagement and effectiveness of the nursing fraternity and improve the retention rate of nursing staff.

In recognition of the ongoing challenges, the CEO of NUH, Associate Professor Joe Sim, saw the need for change and was determined to take

action. After preliminary discussions with key nursing leaders, it was clear that NUH would have to revamp itself to improve the working environment for nurses as well as opportunities for them to advance their career and develop their skills further. It was also important to foster a greater sense of pride and purpose in the profession.

On October 2012, a taskforce was established to address these challenges and transform NUH into an organisation where nursing staff enjoyed their work and wanted to stay. This taskforce, co-led by Dr Catherine Koh<sup>6</sup>, Deputy Director of Nursing, and Mr Jim Gu, Director of the National Cancer Institute, Singapore, comprised NUH staff from different departments and staff levels. To augment the taskforce, external consultants were engaged as advisors. As this would be a multiyear transformation effort, Dr Catherine Koh was appointed to lead this change and to see it through as the future Chief Nurse.

To unify current and future initiatives and create greater staff awareness of the management's efforts to improve the working culture for nursing staff, the LUV-ing Nurses Movement was officially announced.

The Movement served two purposes. First, it aimed to enhance the recognition of nurses' dedication to providing the best LUV-ing care to patients. Second, it sent a message to the nursing staff that they were valued members of the organisation and that the hospital management wanted to listen to them and understand their challenges.

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6 Dr Catherine Koh obtained her Doctorate in Nursing Practice from the University of Colorado, Denver in the United States in 2010. Source: Koh, C. (2015, July 31). Need a doctor? Just get the nurse. *The Straits Times*. Retrieved from <https://www.asiaone.com/health/need-doctor-just-get-nurse>

## UNDERSTANDING THE CURRENT SITUATION

“We are committed to building] an energising work environment where nurses can develop and grow with us, and where nurses can give the best care to our patients.”

– Associate Professor Joe Sim, CEO of NUH from 2009 to 2016

From the outset, Joe knew that it was important to “build an energising work environment where nurses can develop and grow with [NUH], and where nurses can give the best care to our patients.” With this overarching goal, the taskforce developed an inhouse diagnostic survey to gain an in-depth understanding of the challenges faced by NUH’s nursing staff. These factors spanned different levels of analysis at the individual, ward/department, and hospital level (see **Table 1** for more details). Individual-level factors included job satisfaction, relationships, job demands, and work stress. Ward/department-level factors primarily pertained to leadership issues and social dynamics among colleagues. Finally, organisational factors consisted of purpose, reputation, values, and culture.

Numerous discussions were held among the taskforce members, key personnel in NUH HR, and representatives from the Nursing Division to ensure the relevance and validity of the scope of the survey to the context of NUH.

**TABLE 1: THE CONCEPTUAL FRAMEWORK DEVELOPED FOR THE SURVEY**

Organisational Level	
a. Shared purpose b. Perceived organisational image c. Perceived job image d. Supportive and caring employer e. Alignment in values f. Diversity and inclusion g. Being fair and transparent h. Learning organisation i. Espoused values and enacted values j. Organisational citizenship behaviour	
Ward Level	
<u>Managers</u> a. Leadership style b. Diversity skills c. Superior support d. Developing others	<u>Colleagues</u> a. Helping norms b. Cooperation norms c. Civility d. Commitment e. Competence f. Cultural inclusion norms g. Learning h. Psychological safety i. Developing others j. Counterproductive work behaviour
Individual Level	
<u>Roles and responsibilities</u> a. Job satisfaction b. Relationship with superiors, physicians, and colleagues c. Ability to give quality care d. Empowerment e. Recognition and rewards f. Job demands g. Role-related stress	<u>Job growth</u> a. Personal development b. Career progression/development c. Performance management and feedback d. Psychological contract <sup>7</sup>

Source: NUH

The survey was pilot tested on a small sample of nurses to determine its clarity and effectiveness. Based on the taskforce’s findings from the pilot test, further refinements were made. Thereafter, the final version of the survey was rolled out hospital wide.

7 The term 'psychological contract' refers to individuals’ expectations, beliefs, ambitions and obligations, as perceived by the employer and the worker. It differs from a legal contract of employment, which offers a limited reality of the employment relationship. The legal contract refers to an agreement, usually written and signed, about the mutual formal obligations of the employer and the worker. The psychological contract, on the other hand, describes how the parties themselves understand their relationship, their own views of commitment and what they can expect to receive in return. Source: Chartered Institute of Personnel and Development. (2021, February 4). The psychological contract. Retrieved from <https://www.cipd.co.uk/knowledge/fundamentals/relations/employees/psychological-factsheet>

Nursing staff were encouraged to participate in the survey through various ways.

First, the CEO wrote a personal note to explain the purpose of the survey and the importance of participation (see **Exhibit 1**).

Second, a video was produced to create awareness of the LUV-ing Nurses Movement among the nursing staff.

Third, the survey duration was set at three weeks to ensure that those who were on leave or away for official duties were given ample time to participate.

Fourth, the survey was conducted onsite, with multiple sessions planned per day, to minimise any inconvenience for the nursing staff.

Finally, the survey was designed to be anonymous to allay concerns that some staff had about being candid.

The survey was conducted between 24 June to 12 July 2013 by an external survey vendor. A response rate of 84% was achieved, comprising 2,382 nurses (L1), 195 nursing managers (L2), and 15 nursing directors (L3). The respondents represented nine healthcare disciplines and 51 wards/departments.

## **FINDINGS FROM THE SURVEYS AND FOCUS GROUP DISCUSSION**

The survey data were analysed by the taskforce members and several key insights were uncovered. First, staff engagement was positively correlated with intention to remain. Second, most of the issues

affecting nurses' decision to leave were individual-level factors. These key factors are summarised in **Table 2**.

While standardised surveys with a large number of respondents allowed the taskforce to establish broad trends and patterns, they failed to capture contextual information pertaining to specific groups and individuals. To better understand nurses' reasons for dissatisfaction and intentions to leave, 30 focus group discussions involving 215 nurses were conducted from 19 to 30 August 2013. To allay concerns of confidentiality, the focus group discussions were facilitated by external consultants.

Insights from these sessions provided further clarifications to the survey findings. For example, on the issue of fairness, one major problem raised was the inconsistency of criteria for Nursing degree programme sponsorships. There was no system to ensure consistency in selecting staff for external courses, and the criteria varied among the nursing managers. One nurse remarked, "One of my colleagues was denied the Advanced Diploma and she was told that it was because she worked at NUH for only two years while another colleague [who had worked at NUH for] two years was sent for the course."

**TABLE 2: SUMMARY OF THE SURVEY FINDINGS**

Organisational Level
a. Lack of support and care b. Lack of fairness and transparency
Ward Level
a. Managers lack diversity skills b. Managers are not supportive
Individual Level
a. Violation of psychological contract b. Low job satisfaction c. Lack of empowerment d. High workload e. Lack of recognition and rewards

Source: NUH

Another issue highlighted was the lack of opportunities for career progression. Many nursing staff expressed that there was an overemphasis on academic qualifications and a lack of regard for work experience. There was also a dearth of opportunities for those who did not meet the education enrolment requirements for the sponsorship awards, which were limited in number. As a result, senior nurses often moved to other hospitals once their contract ended.

Participants also pointed out that their salaries and promotion were lower at NUH compared to other public healthcare institutions – *this might be a misperception as compensation /benefits and career progression were harmonized across these institutions by the Ministry of Health*. For example, several nursing staff believed that at other hospitals, a promotion from the starting job grade to the next level would be automatically granted after a year of work experience, but at NUH, it would take at least two years. In addition, many expressed the view that while the promotion supposedly “depends on performance”, it “really depends on the sister (nurse manager).”

Apart from the above, participants shared that there were limited opportunities for professional development at NUH, and fewer nurses from NUH were sponsored for Advanced Diploma specialised Nursing programmes compared with nurses from other healthcare institutions. One nurse related her experience of going for her Advanced Diploma only to find that she was the only nurse from NUH in a class of 80, with the rest coming from other healthcare institutions.

Many nurses commented that other hospitals proactively sent their nurses for courses to support their career progression, but this was not the case in NUH. One nurse said, “In NUH, they give excuses why the nurses cannot attend the relevant courses or get promoted. It is

embarrassing when our counterparts in other hospitals question why we are not yet promoted when they [have already been] promoted. We also work hard and deserve the just rewards.”

## DEVELOPING THE CHANGE PLAN

With a better understanding of the challenges faced by the nurses, the taskforce – with support from the hospital management – established five workgroups to develop solutions for the issues identified.

1. **HR workgroup.** This workgroup, which comprised nursing staff representatives from all levels and HR representatives, focused on developing HR guidelines and standardising HR practices among units to address inconsistent and inequitable HR practices. Their scope included overtime compensation, training leave, annual leave allocation/public holiday work schedules, protection of personal time, (deleted “inequitable pay structure”) and transfer requests.

2. **Manpower planning workgroup.** This workgroup comprising nursing staff representatives from all levels, HR representatives, and the Nursing Administration Manpower team focused on reviewing manpower planning and staff allocation practices. Their focus issues included TrendCare<sup>8</sup> not being reflective of the workload, erratic shift patterns or double shifts, and high workload undermining nurses’ quality of care, and optimising the existing electronic staffing systems.

3. **“Blue Octopus” workgroup.** This workgroup comprising nursing staff representatives from all levels and HR representatives was established to review and streamline the roles and workload of nurse

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8 TrendCare is a workforce planning and workload management system that provides dynamic data for clinicians, department managers, hospital executives and high-level healthcare planners. Source: TrendCare. (N. D.) *TrendCare*. Retrieved from <https://www.trendcare.com.au/>

managers. Nurse managers were the “sandwiched” class of nursing staff: they had a multitude of administrative tasks, audits, projects, and deliverables, but no “protected” clinical and administrative time<sup>9</sup>. Nursing managers also expressed feeling a lack of empowerment as they had to go through many layers of approval for decision-making, which slowed work processes.

#### **4. Continuing Education and Leadership Development workgroup.**

This workgroup comprising nursing staff representatives from all levels, HR representatives whose job focus was professional development, and the Nursing Education team was tasked to address challenges posed by inadequate communication and standardisation of professional development opportunities and sponsorship eligibility. The survey and focus group interviews revealed that nursing leaders in general were not supportive, not able to provide clear direction, not change-focused and lacked the skills to develop others. Therefore, it was proposed that a leadership training roadmap was needed to develop the leadership capabilities of nursing staff at all levels. In addition, a Professional Development Self-Assessment Tool, based on a learning and development framework, was developed to facilitate identification of staff learning gaps and formulation of individual development plans. This development plan was to be discussed during annual performance management sessions to capture staff training activities (e.g., courses, conferences, workshops, and seminars), job rotation, stretch assignments, and mentorship.

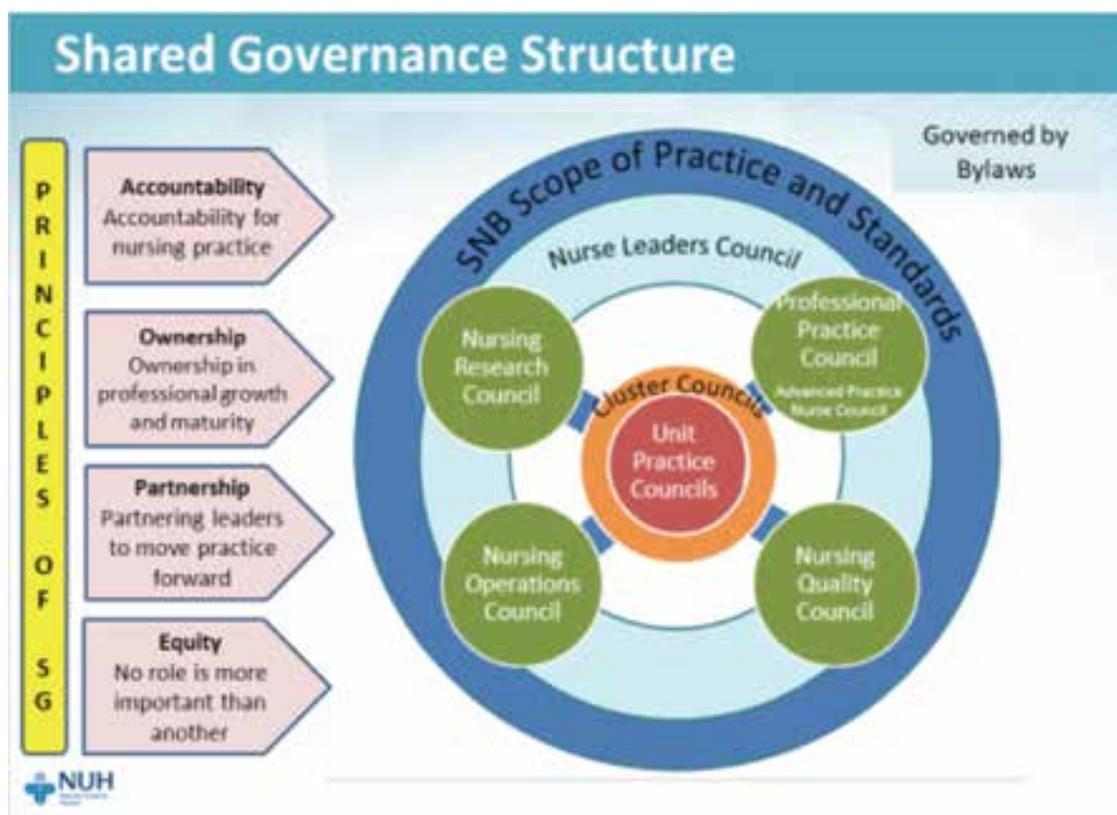
**5. Shared Governance workgroup.** This workgroup comprising nursing staff representatives from all levels to set up a shared governance structure among nursing staff hospital-wide to enhance

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9 “Protected time” refers to time dedicated to certain activities only.

shared decision-making and leadership at all levels. The shared governance structure included the Nurse Leaders Council, Nursing Operations Council, Nursing Practice Council, Nursing Quality Council, and Nursing Research Council. These department-level Councils would be equitably comprised of nurses from Unit Practice Councils; members of the latter were to be elected by nursing staff. Shared governance processes would ensure fair representation of the views of all nursing staff, particularly in determining nursing practices and standards of patient care as well as evaluating, deciding, and implementing changes that would impact the practice environment for nurses. This would mitigate the prevalent hierarchical and “silence is golden” culture, which many nurses had expressed frustration with.

**FIGURE 1: SHARED GOVERNANCE STRUCTURE OF NUH NURSING STAFF**



Source: NUH

In addition to forming dedicated workgroups to develop solutions for specific challenges, other recommendations were made to resolve several broader issues. For example, *collaborative partnership* was proposed to enhance understanding and collaboration between nurses and doctors, by setting up communication platforms within each unit. Finally, hospital-wide programmes would be implemented to improve the overall NUH work environment and culture, namely the *workplace anti-aggression programme*, *cultural diversity appreciation programme*, and the *hospital visitors control plan programme*.

## IMPLEMENTING THE CHANGE PLAN

“Engaging and empowering nurses to be part of the change process is critical to its success.”

– Joann Pang, Chief Nurse at NUH.

Nurse Pang, Dr Catherine Koh’s successor, Chief Nurse of NUH in January 2021.

From her experience in change management, Dr Catherine Koh, the leader of the LUV-ing Nurses Movement at NUH, was aware that change initiatives often fail unless attention is given to the anxieties and concerns of people affected by the proposed changes. Furthermore, she understood the need for support from senior management for any change effort to succeed. Dr Koh and her taskforce took the following steps to ensure that those affected by the proposed change understood its intent and how they could contribute to the change process.

## **Communication and Staff Engagement**

Given the importance of communication and staff engagement in change implementation, the taskforce formulated an elaborate plan to communicate the change effectively.

First, the survey and focus group findings and recommendations were shared with the hospital's senior management and senior nursing leaders to gather their inputs and support for the proposed plans.

Second, more than 20 engagement sessions with middle management in the nursing staff (i.e., Nurse Managers, Nurse Clinicians, and Nurse Educators) were facilitated personally by Dr Koh. She shared the findings and recommendations, listened to their perspectives, and garnered their support and commitment in transforming the nursing work environment.

Third, to secure buy-in from the nursing staff, the taskforce constantly communicated with staff to keep them updated on the LUV-ing Nurses Movement. The LUV-ing Nurses workgroups regularly provided updates via emails and flyers around the wards, through nursing staff forums, and during ward roll calls as well as hospital events such as Nurses' Day celebrations and CEO townhalls.

Finally, to further engage the staff, a song writing competition was organised to create awareness and interest in the ongoing changes as well as to publicise the LUV culture that the taskforce was working to inculcate in the staff. This idea had originated from one of the nursing staff, and was a prime example of showing support through listening and implementing suggestions from the ground.

As this transformation was a multiyear effort, it was critical for senior nursing staff leaders to maintain constant engagement with members of the various LUV workgroups, to keep everyone focused on the vision and purpose of the planned changes.

### **Winning Support from Key Stakeholders**

**Senior Management.** Support from the senior management of the hospital, especially the CEO, Assoc. Prof. Joe Sim, was paramount to the LUV-ing Nurses Movement, as resources and expertise from the HR, HR Development, and Corporate Communications departments were needed to support the implementation of the cultural transformation.

One of the challenges the taskforce faced was engaging nursing staff who did not report directly to the Nursing department, such as nurses in the Diagnostic Imaging department and the specialist outpatient clinics. However, with the senior management on board, support could be drummed up among the managers of these areas. This helped to facilitate their nurses' participation in surveys, focus groups, and workgroup engagements.

**Doctors.** To facilitate the integration of the LUV-ing Nurses Movement with the doctors at NUH, three influential senior doctors were co-opted into the steering committee to provide inputs and insights to the findings and recommendations from the doctors' perspectives.

**Middle-management nursing staff leaders.** Changing from a traditionally hierarchical and authoritative nursing/healthcare culture to one that was collaborative, encouraged staff participation, and actively listened to staff feedback required a major shift in the mindsets and behaviours of middle-level nursing staff leaders.

With the belief that “leadership starts with me”, senior nursing staff leaders were directly involved in facilitating the Shared Governance workshops to share the desired leadership behaviours and collective team values with all nursing staff. It was critical for senior nursing staff leaders to influence the middle management through role-modelling in their daily interactions and as advisors in Councils. This effort led to more middle managers in the nursing staff exhibiting these desired leadership behaviours to their staff. Over time, the behavioural changes became more evident. This was well-received by the staff.

**Emerging change champions.** The most significant cultural shifts happened in the wards as some nurses stepped up and emerged as leaders amongst their peers. As staff champions, these nurses took on the challenges and responsibilities as Chairs or Representatives in Unit Practice Councils and even Department Councils, to advocate for their colleagues, negotiate and make decisions on their behalf, as well as to role-model positive leadership behaviours.

### **Motivating Staff to Change and Supporting Them Through This Transformation**

The senior management of the hospital and members of the LUV-ing Nurses taskforce understood that people react to change differently: some may respond in a positive manner while others may exhibit pessimism or resistance, at least initially. This is understandable as major change is a stressful process for all individuals involved.

To support the transformation journey of the nursing staff at NUH, the taskforce maintained frequent and open communication to keep staff updated and organised events to showcase and celebrate successful examples of change – for instance, Nursing department

annual work plan workshops, Nurses' Day celebration events, and Nursing department year-end parties.

Showcasing and sharing ideas as well as best practices by nursing staff helped to sustain the motivation for change. In 2015, slightly more than a year after the implementation of the LUV-ing Nurses Movement, the NUH Employee Climate Survey showed that the employee engagement score had improved significantly from 2011. In fact, the 2015 score exceeded Willis Towers Watson's<sup>10</sup> Singapore National Norm for employee engagement.<sup>11</sup> The improvements were seen across all categories compared to the 2011 Employee Climate Survey.

As someone who had worked her way through the ranks of the nursing staff, Dr Catherine Koh understood that the "battle will be won in the middle" – the middle-level nursing managers were a key stakeholder in the cultural transformation effort, as the primary interface between senior managers and ground-level staff.

Furthermore, nursing managers were the group most affected by the proposed changes from the LUV-ing Nurses Movement, as they ultimately were held accountable for their unit and its performance. Yet, transiting to their new work roles would require them to juggle two modes: that of leaders who make decisions that directly impact the ground-level staff, and that of facilitators who keep an open mind to ideas from the staff and are willing to take risks as they transform their workplace culture together.

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10 Willis Towers Watson is a multinational risk management, insurance brokerage and advisory company established in 1828. Source: Willis Towers Watson. (N. D.) *About us*. Retrieved from <https://www.willistowerswatson.com/en-US/About-Us/overview>

11 Cultural, economic, and labour market factors, among others, can have a strong influence on survey results. Such factors can be accounted for by using Country National Norms as benchmarks to better understand an organisation's employee engagement. Source: Zuckerman, A. (2019, July 15). *Survey best practice: What's in a norm?*. Retrieved from <https://www.willistowerswatson.com/en-SG/Insights/2019/07/survey-best-practice-whats-in-a-norm>

As such, constant reassurance was needed from senior nurse leaders and Dr Catherine Koh to encourage middle management to listen with an open mind instead of turning down comments and requests immediately, and to let staff try out their ideas and solutions. This would require senior nursing leaders to play their part by moving away from a “blaming culture” when a mistake or error occurs. “As long as it doesn’t hurt our patients, let them try,” Dr Koh urged the senior nursing managers.

To facilitate the cultural change at the NUH Nursing department, new skill sets were identified and plans were put in place to equip nursing managers and nurses with the requisite skills to initiate the new work behaviours. For example, additional training was provided to nursing managers to nurture their facilitation, leadership, role-modelling, coaching, mentorship, conflict management, and stress management skills. At the same time, ground-level nursing staff were given training to build their competencies in assertiveness, decision-making, negotiation and conflict resolution, team building and collaboration, time management, leading and participating in meetings, and collegiality. Emergent leaders among the staff were identified and empowered to lead or champion proposed changes in their work area.

Members of the taskforce noticed that there was little pushback from other departments and colleagues (e.g., doctors) during the LUV-ing Nurses Movement journey. Many welcomed the change and were glad to see nurses stepping up and voicing their opinions more. The positive response from colleagues at the hospital further enhanced nurses’ confidence, which in turn reinforced their newly acquired work behaviours.

“I often remind other doctors to show some LUV to our nurses as they are at the heart of all that happens for the patient.”

– Dr Benjamin Leong, Senior Consultant in the Emergency Medicine Department at NUH

## THE NEW NORMAL

To ensure that any changes made would be a lasting cultural feature of the workplace, a number of initiatives were implemented. First, senior nursing staff leaders conducted ground sensing constantly when doing their rounds and spoke regularly with staff regarding the various change interventions to identify issues and challenges faced so that timely support could be rendered. Nursing staff were constantly reminded that “change needs to start with ‘me’”, and of the importance of patience and perseverance in “converting” one person at a time (using the analogy of “saving one starfish at a time”).

Second, the proposed changes were incorporated into the Nursing department’s overall work plan by connecting these plans to annual performance indicators for Nursing and translating them into individual performance plans for nursing staff leaders e.g., setting up of Unit Councils, and the introduction of staff retention rate and employee engagement survey scores as performance metrics.

Third, all changes and related resources were documented and shared on the Nursing intranet website dedicated to the LUV-ing Nurses Movement to allow easy access and retrieval of information and reference material. To ensure that new employees in the Nursing department were socialised to the new work culture, information regarding the LUV-ing Nurses Movement was incorporated into the orientation programmes for all new nursing staff.

In addition, the taskforce set in place continuing development and education programmes for staff leaders (e.g., Council Chairs and Co-Chairs) and nurse leaders to provide them with the relevant knowledge, skills and attitude or mindset to support and sustain the cultural transformation. A special course was also developed and implemented for newly promoted nurse managers to ensure consistency in HR practices and to reinforce leadership behaviours and building of Shared Governance culture within their units.

Finally, changes were made to the existing system and workflows to support the shift. For instance, annual performance management discussions began to entail the use of the newly created Professional Development Self-Assessment Tool to identify areas for development and development plans to close these gaps. The Shared Governance structure was assimilated into existing nursing management and governance structures and processes. This led to a major shift in the way decisions were to be made in the Nursing department, and the stakeholders who participated in that process. To tackle the issue of inconsistencies in communications and expectations, the Nursing department embarked on the paradigm of open sharing of information such as the clinical ladder which spelled out performance expectations and required professional development for nurses to progress to the next level.

## THE EFFORT PAID OFF

“NUH started the LUV-ing Nurses Movement in 2013. Based on your feedback, we put in place many initiatives to improve our nurses’ work environment over the past three years.”

– Associate Professor Eugene Liu, CEO of NUH from 2016 to 2021

Organisational change takes time and effort and backing from upper management is essential to sustaining the effort. Since his appointment as CEO of NUH in 2016, Associate Professor Eugene Liu continued to support the LUV-ing Nurses Movement initiated by his predecessor, Assoc. Prof. Joe Sim.

By 2017, almost all the proposed initiatives had been implemented (see **Exhibit 2**). Key implementations included nurturing nurse leaders through the Nurse Leaders Role Transition and Development Programme, allowing nurses to own their career growth with the Clinical Ladder and Professional Portfolio, and collaborative decision-making through Shared Governance.

To assess the effectiveness of the LUV-ing Nurses Movement, a diagnostic survey was conducted in October 2017 to ascertain the impact of the various initiatives to improve nurses' work environment over the past 3 years. Comparing nurses' perceptions in 2013 with those in 2017 (see **Exhibit 3**), there were improvements across multiple indicators.

At the hospital level, "espoused values versus enacted values" were higher in 2017 than in 2013, and the same trend was observed for diversity support as well as fairness and transparency. At the individual level, indicators for workload, structural empowerment, recognition and reward, job satisfaction, and the psychological contract were higher in 2017 compared to 2013. Indeed, nurses had higher job satisfaction, lower turnover intention, higher engagement at work, higher occupational commitment, and lower turnover rates in 2017 than in 2013.

However, organisational support at the hospital level was perceived to be lower in 2017 than in 2013. Members of the taskforce

recognised that while much has been achieved, there was more to be done.

Improved staff retention and an increased number of experienced nurses led to reduced churn and resources required to constantly on-board and train new staff. This resulted in a clinical practice environment with more stability, which further enhanced the quality of care for patients as evidenced by improvements in Patient Experience Scores as well as nurse-sensitive quality care indicators such as patient fall rate.

## **CONCLUSION**

As the population ages in Singapore and in other parts of the world, many healthcare systems are under constant or impending strain. The change management effort at NUH resulted in a nursing fraternity with greater employee engagement and service standards, which improved the hospital's ability to fulfil its mission for the public good. While much has been achieved with the LUV-ing Nurses Movement, there remains room for improvement and growth. After all, change is a journey, not a destination.

**EXHIBIT 1: NURSING DEPARTMENT SURVEY COMMUNICATION  
AND EMAIL FROM THEN-CEO JOE SIM**



**Do tell us what is on *Your Mind***  
Take part in this Nursing survey and let us know  
how we can work together to create a better work environment for you.

*Lu♥-ing Nurses Movement*

*Listen • Understand • Value*



## Message from CEO

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Our Dear Nursing Colleagues,

You matter to us...

We would like to build an energizing work environment where you can develop and grow with us, and where you can give the best LUV-ing care to our patients.

That is why we started this LUV-ing Nurses Movement!

We would LUV to:

**L**isten to your feedback through this survey

**U**nderstand your feedback through more in-depth focus group discussions

**V**alue your feedback by committing resources to develop and implement initiatives.

Please tell us what we are doing well and where we can work together with you to make your work and your work environment even better.

Your feedback is private and confidential. External consultants are conducting the survey and you have my assurance that no one in NUH will have access to individual responses.

*Let's work together to create a better work environment for all of us here in NUH.*

Yours Sincerely,

A handwritten signature in black ink that reads 'Joe Sim'. The signature is fluid and cursive, with the first name 'Joe' and last name 'Sim' clearly distinguishable.

Associate Professor Joe Sim  
CEO, NUH

# Lu♥-ing Nurses Movement

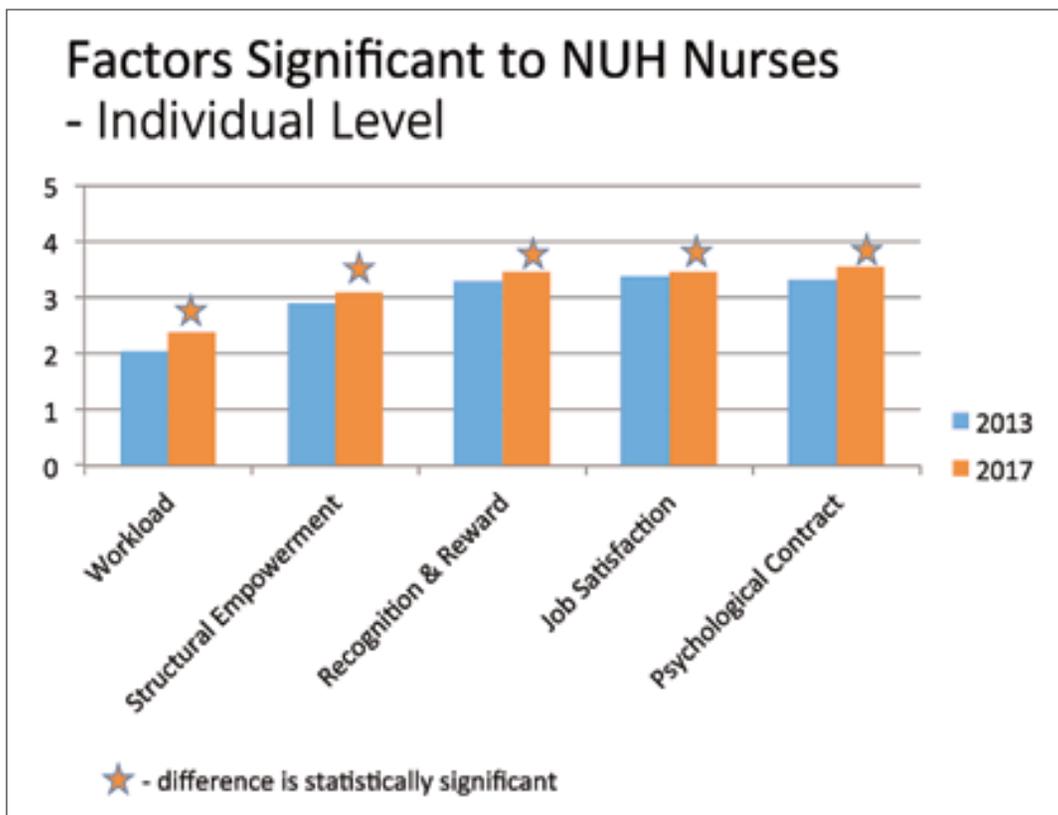
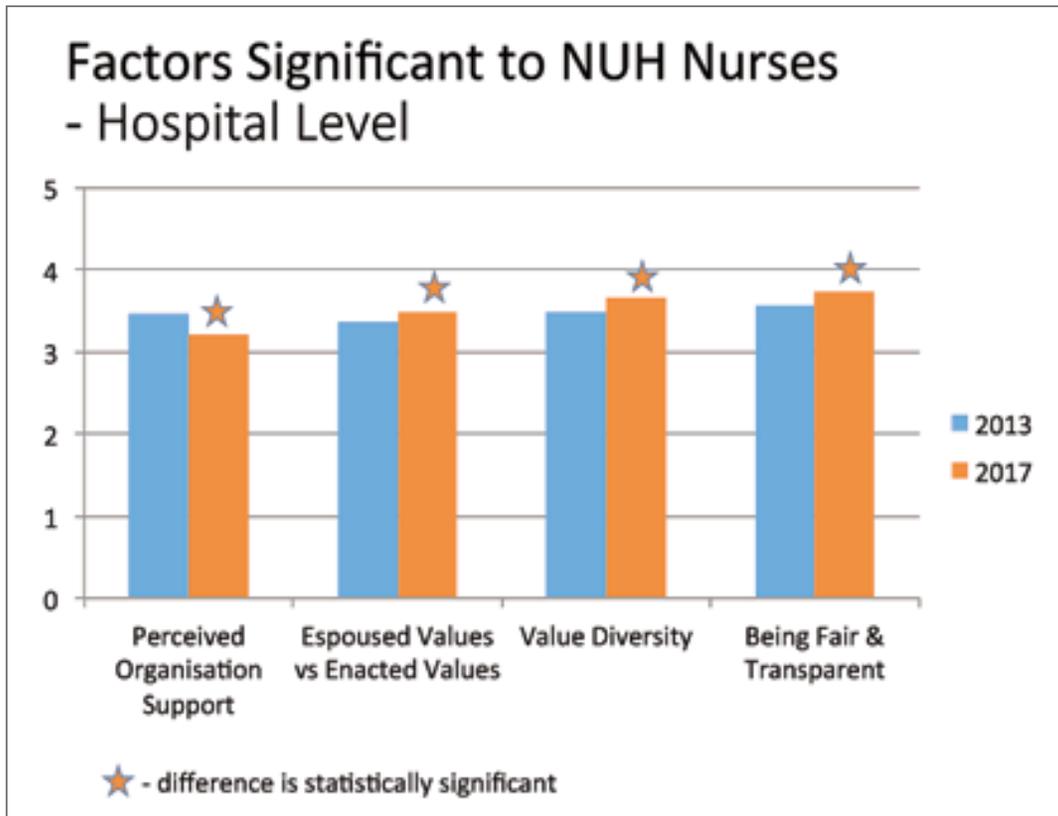
— Listen • Understand • Value —

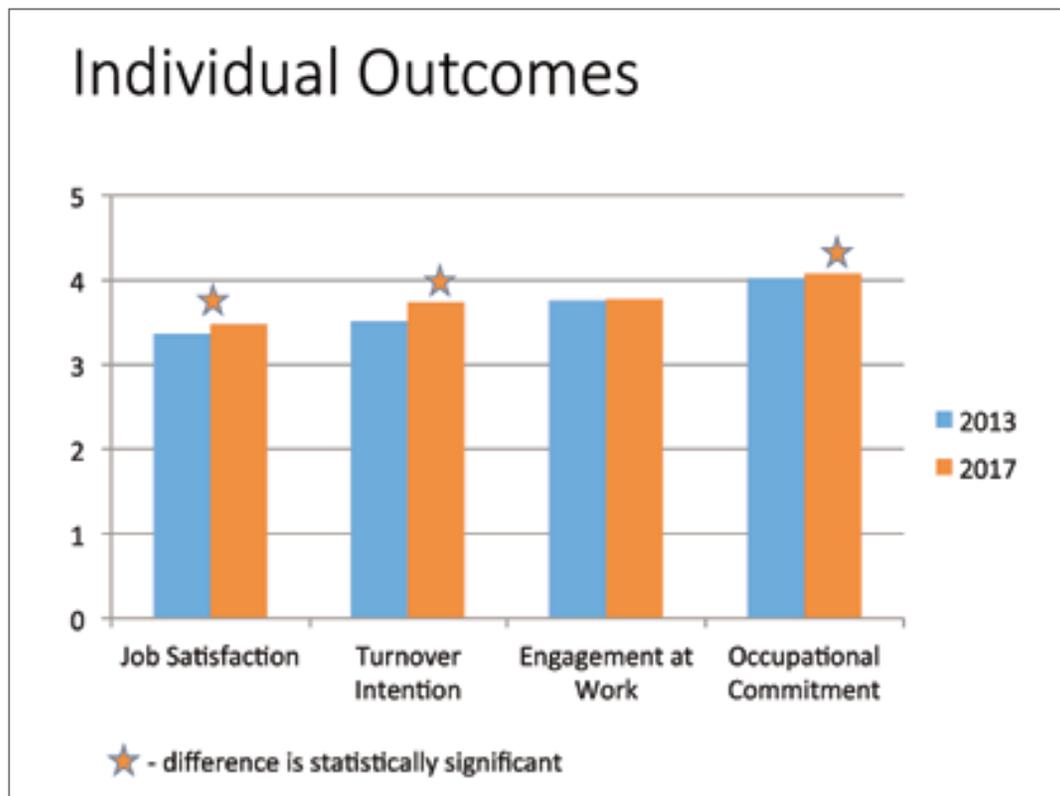
## EXHIBIT 2: PROPOSED INITIATIVES OF THE LUV-ING NURSES MOVEMENT



Source: NUH

**EXHIBIT 3: WORK ENVIRONMENT FACTORS AND OUTCOMES**





These findings, which were based on nurses' sentiments, affirm that the LUV-ing Nurses Movement has had a positive impact on employee engagement and satisfaction, and that NUH's Nursing department was progressing in a favourable direction. It is therefore prudent that NUH continues to focus on building and strengthening its culture of Shared Governance while developing leadership competencies in the nursing fraternity.

Source: NUH

# Race and Rise Against The Tide: Sustainable Development for Singapore

*Koh Cheng Boon and Stephen Chua Chong Wei*

Singapore's rapid economic growth over a mere 56 years was a testament to her foresight in economic development. While economic development was critical, the nation reached a point where it needed to balance the triple bottom line (TBL) of profit, people, and the planet.<sup>1</sup>

Rising sea levels, in particular, were one of the biggest environmental challenges that were closely intertwined with economic and social development. There were many possible ways that Singapore could adapt to manage this environmental challenge. The decisions and actions taken with immediacy would decide whether Singapore would be able to see the 100th anniversary of its independence in 2065. Projections by experts differed: some optimistically believed widely that rising sea levels would not be like in the movies, and that Singapore would have time to adapt.<sup>2</sup> Other experts predicted gloomy outcomes, from all polar ice melting and raising sea levels by

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1 In economics, the triple bottom line (TBL) maintains that companies should commit to focusing as much on social and environmental concerns as they do on profits. Source: Kenton, W. (2021, March 16). Triple bottom line (TBL). *Investopedia*. <https://www.investopedia.com/terms/t/triple-bottom-line.asp>

2 Hicks, R. (2019, September 30). How will low-lying Singapore's built environment survive rising seas? *Eco-Business*. <https://www.eco-business.com/news/how-will-low-lying-singapores-built-environment-survive-rising-seas/>

216 feet<sup>3</sup> to apocalyptic predictions of “an unmanageable problem”<sup>4</sup> As a tiny and low-lying island state, Singapore could not take rising sea levels for granted. Her very existence was threatened by the ocean swallowing her whole.

To address this complex issue, Singapore sought to blaze a new path that balanced the triple bottom line. Tensions between the three aspects in Singapore’s sustainability posed several challenges. The main question was, how should we manage the scenario of rising sea levels against the backdrop of multitudinous possibilities and uncertainties? What realities do you foresee for this little red dot by 2065?<sup>5</sup> How should this island nation manage its triple bottom line? What were the measures that Singapore needed to take to counter or adapt to the rising sea level, and how would you evaluate the impact of each measure adopted, and the nation’s strategy as a whole?

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3 National Geographic Society. (2013, September). What the world would look like if all the ice melted. *National Geographic*. <https://www.nationalgeographic.com/magazine/article/rising-seas-ice-melt-new-shoreline-maps>

4 Meyer, R. (2019, September 25). The oceans we know won’t survive climate change. *The Atlantic*. <https://www.theatlantic.com/science/archive/2019/09/ipcc-sea-level-rise-report/598765/>

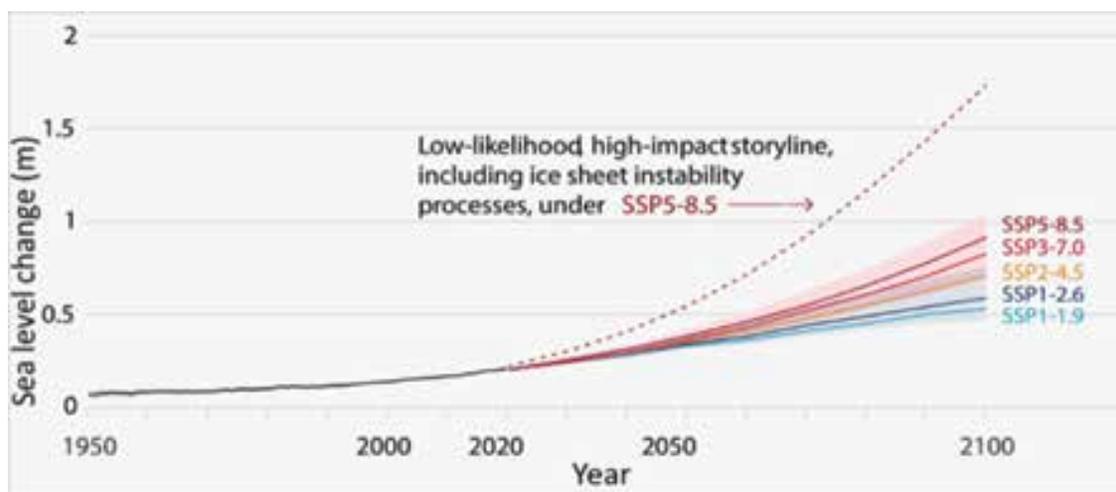
5 “Little red dot” is a nickname often used in the media, and in casual conversation, as a reference to Singapore. This term gained wide publicity when the third President of Indonesia, B. J. Habibie used it to refer to Singapore in what possibly appeared to be a disparaging manner.

## THE ELEPHANT IN THE ROOM

About 70% and 80% of the earth's surface and countries in the world respectively were surrounded by water. Globally, the number of people living below sea level<sup>6</sup> was projected to reach 470 to 760 million by the turn of the 22<sup>nd</sup> century.<sup>7</sup> About 627 million people around the world would have their houses submerged if global temperatures rose by 4°C (with the currently projected carbon emissions). The IPCC (Intergovernmental Panel on Climate Change) 6th Assessment Report (AR6) released on August 2021 predicted that changes in global temperature ranged from 1.4 to 4.4°C under different Shared Socioeconomic Pathways (SSPs).<sup>8</sup>

A 3°C temperature difference between the best (1.4°C) and worst (4.4°C) case scenarios may seem numerically insignificant. However, this may lead to a significant difference in predicted global sea levels by the end of the 21<sup>st</sup> century caused by rising temperatures, as illustrated in **Figure 1**, with the dashed line suggesting a worst-

**Figure 1: Sea-level Projections under Various SSP Scenarios**



Source: IPCC (Intergovernmental Panel on Climate Change) 6<sup>th</sup> Assessment Report (AR6)

6 This refers to the rising sea level due to current rates of glacier and ice sheet melt and warming waters. This would flood large parts of the world and cause catastrophic harm to coastal regions.

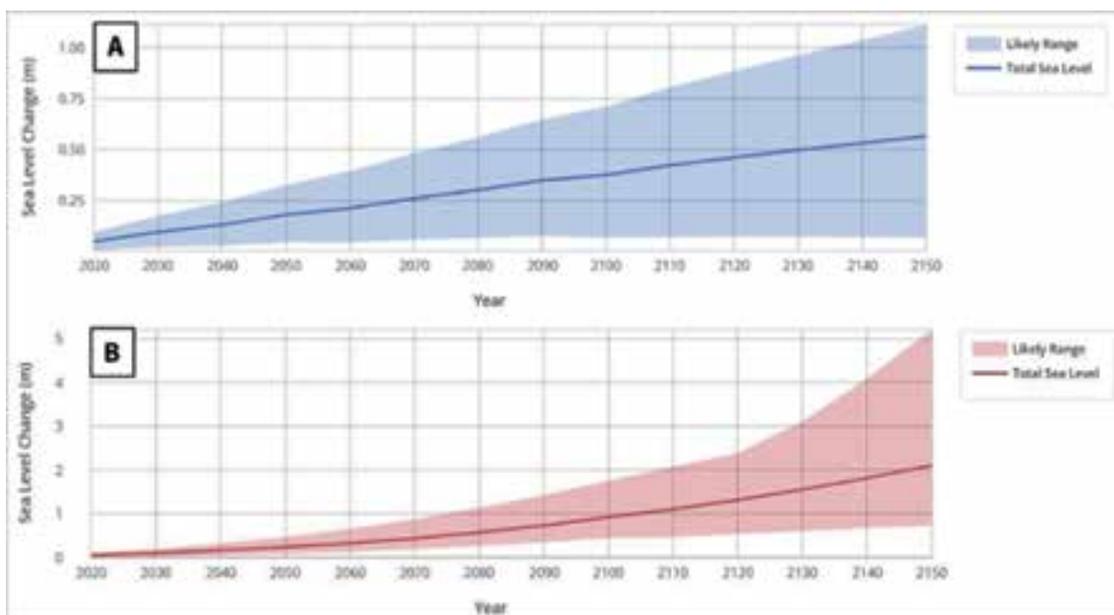
7 Strauss, B. H., Kulp, S. & Levermann, A. (2015, November). *Mapping choices: Carbon, climate, and rising seas, our global legacy*. Climate Central Research Report. <https://sealevel.climatecentral.org/uploads/research/Global-Mapping-Choices-Report.pdf>

8 Intergovernmental Panel on Climate Change. (2021). *Sixth assessment report*. <https://www.ipcc.ch/assessment-report/ar6/>

case scenario in which global carbon emissions continue to climb at uncontrolled rates.

The Singapore government has opted to plan for 1 metre of sea-level rise by the end of the century as reference for future mitigation and adaptation measures.<sup>9</sup> However, as scientists have known for some time, sea levels around the world are just not ‘level’ – contrary to what the name implies. Sea-level rise in regions located further from the poles of the Earth and nearer to the equator, such as Singapore, can be up to 30% higher than the global average.<sup>10</sup> The National Aeronautics and Space Administration (NASA) produced a sea-level projection tool which predicts the amount of sea-level rise in various parts of the world based on the latest data. Predictions for Singapore (see **Figure 2**) reveal that the city-state could be underestimating the

**Figure 2: Sea-level Projections for Singapore for Best (A) and Worst (B) Case Scenarios**



Source: Produced by NASA based on IPCC AR6 data<sup>11</sup>

- 9 Ministry of Sustainability and the Environment. (2021, August 31). *Virtual symposium - IPCC AR6 - What does it mean for Singapore - Ms Grace Fu* [speech]. <https://www.mse.gov.sg/resource-room/category/2021-08-31-opening-remarks-at-ipccar6-webinar/>
- 10 Commentary: As ice caps melt, Singapore a hot spot for sea-level rise. (2021, May 4). *Channel News Asia*. <https://www.channelnewsasia.com/commentary/rising-sea-levels-singapore-impact-equator-water-drawn-1338406>
- 11 NASA. (N.D.). *Sea level projection tool*. <https://sealevel.nasa.gov/ipcc-ar6-sea-level-projection-tool>

magnitude of sea-level rise. Instead of 1 metre, Singapore's sea level could increase anywhere between an extremely optimistic 0.2 metres to a worst-case scenario of 5 metres by 2150.

As a Small Island Developing State (SIDS), much of Singapore's built-up development is concentrated in a small area. High population density (that is expected to increase) puts Singapore in a position that is even more vulnerable to sea-level rise. Adding to the woes of small land size, most of Singapore's land lies only 15 metres above Singapore's Height Datum.<sup>12, 13, 14</sup>

To put this into perspective, a 5-metre rise would flood up to 30% of the country; the Central Business District (CBD) was particularly vulnerable as it lay less than 5 metres above sea level.<sup>15</sup> The adaptation and mitigation measures based on a margin of safety of 1 metre may thus place Singapore in an untenable future. Likewise, other important city centres such as Trafalgar Square in London, United Kingdom, would be submerged with a 4°C increase in global temperature.<sup>16</sup>

Whether it is the elephant in the room or a black swan event, there is nowhere to hide when sea-level rise is a possibility with debilitating consequences for Singapore. To address this complex issue with many known-knowns and unknown-unknowns, Singapore must create a new path for a sustainable development that balances the triple bottom line.

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12 Singapore's Height Datum is the mean sea level determined at Victoria Dock from 1935 to 1937. It is widely considered to be Singapore's "sea level". Source: Singapore Land Authority. (2015, July). *Height datum & height determination using GNSS in Singapore*. [https://fig.net/resources/proceedings/2015/2015\\_07\\_vrfp\\_comm5/5A\\_Khoo\\_Singapore\\_Height\\_Datum.pdf](https://fig.net/resources/proceedings/2015/2015_07_vrfp_comm5/5A_Khoo_Singapore_Height_Datum.pdf)

13 Hirschmann, R. (2021, January 29). *Singapore: Population density*. <https://www.statista.com/statistics/778525/singapore-population-density/>.

14 National Climate Change Secretariat. (N. D.). *Impact of climate change in Singapore*. <https://www.nccs.gov.sg/singapores-climate-action/impact-of-climate-change-in-singapore/#fn1>.

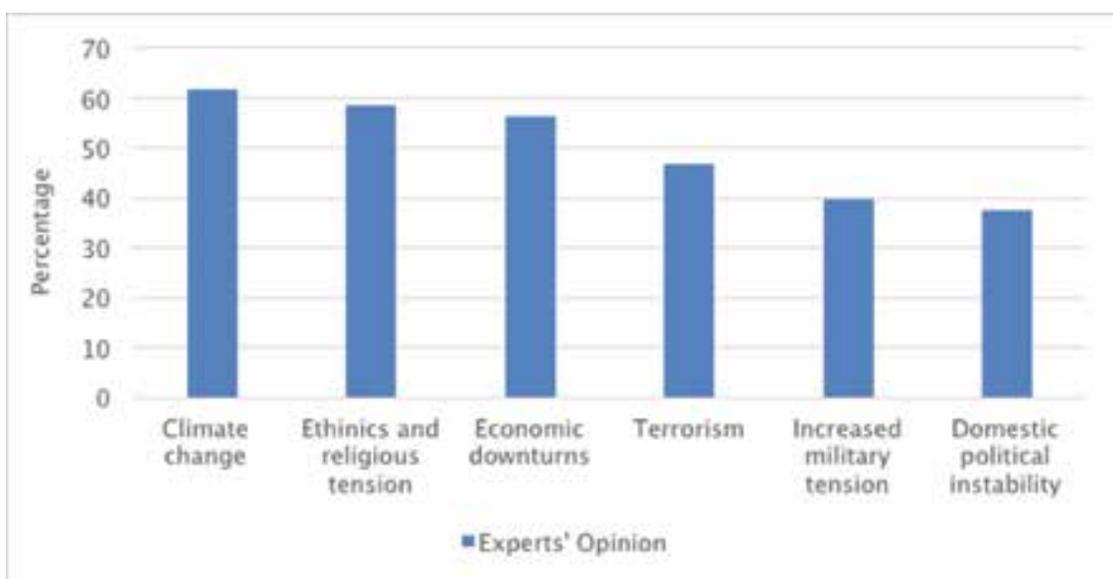
15 Hicks, R. (2019, September 30). How will low-lying Singapore's built environment survive rising seas?. *Eco-Business*. <https://www.eco-business.com/news/how-will-low-lying-singapores-built-environment-survive-rising-seas/>

16 Climate Central [climatecentral]. (2021, Oct 12). *Mapping choices: Global tour* [Video]. YouTube. <https://www.youtube.com/watch?v=ekhLHzxc92U>

## LIFE AND DEATH MINDSET FOR SINGAPORE

In an online survey on pressing security challenges facing Southeast Asia in 2019, climate change was ranked the highest by experts from Singapore, at 61.7% (see **Figure 3**).<sup>17</sup> A study conducted by Ipsos indicated that 86% of Singaporeans believed average temperatures in Singapore would increase.<sup>18</sup>

**Figure 3: Opinion of Experts on Southeast Asia on the Most Pressing Security Challenges Faced by the Region**



Source: Chart reproduced by authors based on data available in Statista

These concerns were not unfounded, and the Meteorological Service Singapore reported that the city had been warming twice as quickly as the world average over the past 60 years, with temperatures rising about 0.25°C per decade. It just had its hottest decade on record, and if global carbon emissions were to keep rising at the current rate, daily temperatures could reach highs of 35 to 37°C (95-99 Fahrenheit) by 2100.<sup>19</sup>

17 ISEAS. (2019, January 29). *Opinions of experts on Southeast Asia from Singapore on the pressing security challenges facing the region in 2019*. <https://www.statista.com/statistics/1052883/singapore-expert-opinions-security-challenges-sea/>

18 Ipsos. (2020, January 6). *Share of respondents who thought it likely that average global temperatures would increase in Singapore for 2020*. <https://www.statista.com/statistics/1090567/singapore-likelihood-increasing-average-global-temperatures/>

19 Ng, D. (2021, April 30). *Why Singapore is heating up twice as fast as the rest of the world*. CNA. <https://www.channelnewsasia.com/cnainsider/singapore-hot-weather-urban-heat-effect-temperature-humidity-906231>

Singapore's government was known for forward planning and planning for the worst. In 2020, the government announced that S\$100 billion would be allocated to protect the city-state against rising sea levels.<sup>20</sup> Prime Minister Lee Hsien Loong declared that “everything else must bend at the knee to safeguard the existence of [Singapore]”.<sup>21</sup>

## URBANISATION VS. ENVIRONMENTAL SUSTAINABILITY

While climate change and rising sea levels were indeed “life or death” issues, there was a need to balance economic, social, and environmental interests.<sup>22</sup> However, this balancing game needed to be managed with conflicting demands in terms of resource allocation, time and space.

### Economic Development

Rising sea levels presented a threat to Singapore's economy and international competitiveness as a trading hub. As a land-scarce nation with a size less than that of Beirut, Lebanon, and a population less than that of Nairobi, Kenya,<sup>23</sup> Singapore faced many challenges in maintaining a delicate balance between infrastructure development of housing, roads, support infrastructure, the survival of the island state, and sustaining economic growth.

Let us take one of the critical infrastructures in Singapore, Jurong Port, as an example. As demonstrated in **Figure 1**, there were large uncertainties in projecting sea-level rise. Any attempt to raise the

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20 Mokhtar, F. (2020, February 26). Singapore has a S\$100 billion plan to survive in a far hotter world than experts predicted. *Bloomberg*. <https://www.bloomberg.com/news/features/2020-02-25/singapore-has-a-100-billion-plan-for-adapting-to-climate-change>

21 *ibid.*

22 Purvis, B., Mao, Y., & Robinson, D. (2019). Three pillars of sustainability: In search of conceptual origins. *Sustainability Science*, 14(3), 681–95. <https://doi.org/10.1007/s11625-018-0627-5>

23 Demographia. (2021, June). *Demographia world urban areas 17<sup>th</sup> annual edition: 202106*. <http://www.demographia.com/db-worldua.pdf/>

port too high or too soon would cause millions of dollars to be wasted transporting cargo from ship to dock due to unnecessary height buffers. However, raising the port too little or too late might render the busy port that processes 40,000 vessels a year dangerous to use or even utterly unusable.<sup>24</sup>

The question that needed to be addressed for any measure taken was more often: when should this be done, and how? An architect involved in environmental policy in Singapore indicated that any measures planned could be carried out in phases, and ramps were always possible to use as stop-gap measures. Any changes made could have extensive effects on the entire port workflow, and an imprecise implementation timeline was bound to have serious ramifications for port operations.<sup>25</sup>

Furthermore, if the protection measures were not implemented as an integrated plan, tourist attractions such as Gardens by the Bay could become the “Gardens Beneath the Bay”.

As projected by Climate Central, two scenarios for sea-level rise in Singapore could mean that one-third of Singapore, including the central business district, would be submerged below sea level. The CBD and other key buildings (e.g., Singapore Sports Hub) sat on the Kallang River Basin, where large amounts of marine clay and sand could be found underneath the unconsolidated land reclamation fill.<sup>26</sup> Such soft sediments were prone to compaction and erosion, and thus posed great difficulty for construction in the area (e.g. Thomson-East Coast Mass Rapid Transit Line’s Marina Bay

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24 Hicks, R. (2019, September 30). How will low-lying Singapore’s built environment survive rising seas? *Eco-Business*. <https://www.eco-business.com/news/how-will-low-lying-singapores-built-environment-survive-rising-seas/>

25 *ibid.*

26 Chua, S., & Federico, S. (2020, July 21). *How Singapore’s geological past may save us from the rising seas*. Earth Observatory of Singapore. <https://earthobservatory.sg/blog/how-singapore%E2%80%99s-geological-past-may-save-us-rising-seas>

station).<sup>27</sup> This inevitably drove costs upward. Patchy pockets of subsurface sand posed additional risks of liquefaction (instability caused by ground movements). This risk was heightened by rising sea levels, thus adding more stress to coastal developments. One example is the Nicoll Highway collapse in 2004, where underestimated stress from surrounding sediments ultimately contributed to an engineering disaster that killed four people and injured three.<sup>28</sup>

At the projected rates of sea-level rise, it was also estimated that up to US\$2 billion worth of land in Singapore would disappear by 2100.<sup>29</sup> Land was a precious asset in Singapore, and urban planners for the island nation carefully considered ways to optimise land use. If land were to disappear into the sea, Singapore would lose its physical capital that could have been used for economic development.

In addition, Singapore's standing as an international trading hub would be hampered by the effects of climate change and rising sea levels. The melting of polar ice caps could open new routes for the shipping industry, such as the Northern Sea Route which bypassed Singapore;<sup>30</sup> this was expected to reduce travel time by up to 30% between Europe and Asia (see **Figure 4**)<sup>31</sup>, thereby threatening Singapore's competitiveness and relevance as a maritime hub.<sup>32</sup> If this new route became a reality, it might mean a reduction in the number of ships passing through Singapore's port, and thus, its revenue from port operations. As of the year 2019, the conventional

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27 Lim, A. (2018, June 25). LTA using ice walls for first time in MRT tunnelling of Thomson-East Coast Line. *The Straits Times*. <https://www.straitstimes.com/singapore/transport/lta-using-ice-walls-for-first-time-in-mrt-tunnelling>

28 Ahmad, N. (2017). Nicoll Highway collapse. *Singapore Infopedia*. [https://eresources.nlb.gov.sg/infopedia/articles/SIP\\_430\\_2004-12-17.html](https://eresources.nlb.gov.sg/infopedia/articles/SIP_430_2004-12-17.html)

29 Channel News Asia. (2020, March 31). *Carbon conundrum* [Video]. <https://www.channelnewsasia.com/watch/carbon-conundrum>

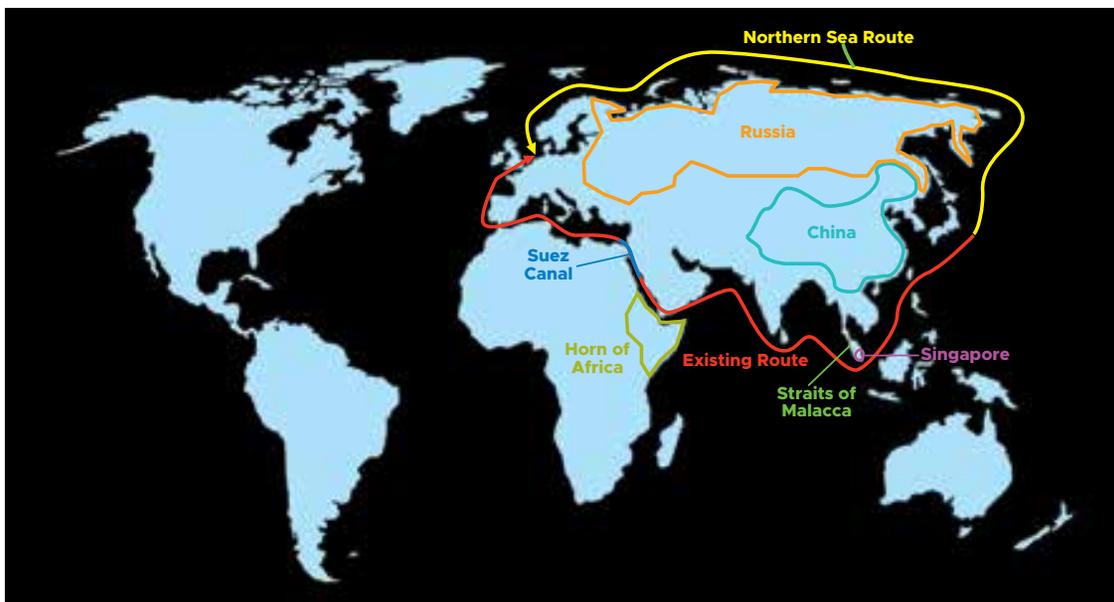
30 Liu, V. (2020, January 30). Singapore port must stay shipshape as year-round Arctic shortcut looms. *The Straits Times*. <https://www.straitstimes.com/singapore/singapore-port-must-stay-shipshape-as-year-round-arctic-shortcut-looms>

31 *ibid.*

32 Dushkova, D., Krasovskaya, T., & Evseev, A. (2017). *Environmental & human impact of the Northern Sea route & industrial development in Russia's arctic zone*. In Heininen, L., Exner-Pirot, H., & Plouffe, J. (Eds.), *Arctic yearbook*. Northern Research Forum. [https://arcticyearbook.com/images/yearbook/2017/Scholarly\\_Papers/15\\_Environmental\\_&\\_Human\\_Impact.pdf](https://arcticyearbook.com/images/yearbook/2017/Scholarly_Papers/15_Environmental_&_Human_Impact.pdf)

route passing through Singapore saw more than 18,880 ships and 1,031.2 million tonnes of cargo per year.<sup>33</sup> Singapore's port operator reported a net revenue of almost S\$4.2 billion in the 2020 financial year alone.<sup>34</sup>

**Figure 4: Northern Sea Route vs. Traditional Suez Canal-Malacca Strait route**



Source: Diagram drawn by the first author. Photo by Tima Miroshnichenko from Pexels.

## Social

The bottom line of social impact refers to how well a population can live, work, and play in a place without compromising the quality of the environment.<sup>35</sup> Urbanisation has highlighted the need for social sustainability due to the increased demand for utilities such as electricity and water.<sup>36</sup> Electricity is largely generated by burning fossil fuels - more people living in urban areas rely heavily on the electrical grid, which can contribute to high emissions of greenhouse gases.

33 Suez Canal. (N. D.). *Navigation statistics*. <https://www.suezcanal.gov.eg/English/Navigation/Pages/NavigationStatistics.aspx>

34 PSA International. (2021). *Financial report 2020*. <https://psaannualreport.com/wp-content/uploads/2021/05/PSA-Financial-Report-2020.pdf>

35 Shirazi, R. M., & Keivani, R. (2017, December 2). Critical reflections on the theory and practice of social sustainability in the built environment –A meta-analysis. *Local Environment*, 22(12), 1526–45. <https://doi.org/10.1080/13549839.2017.1379476>

36 Channel News Asia. (2020, March 31). *Carbon conundrum* [Video]. <https://www.channelnewsasia.com/watch/carbon-conundrum>

The 2013 Population White Paper's projection for Singapore to hit 6.9 million by 2030 portends more housing, infrastructure, and increased urbanisation in order to avoid "today's problem" of overcrowding and strain on infrastructure.<sup>37</sup> The white paper identified land earmarked for 700,000 new homes - complete with recreational areas and green spaces. While this was primarily an attempt by the government to ensure the realisation of adequate planning and infrastructure for a liveable city, it also heightened national awareness of the challenge of striking a balance between the myriad competing needs of Singapore's residents. Singapore's projected population density of 13,000 people per km<sup>2</sup> raised questions about how to achieve quality living standards (e.g., adequate greenery), a key measure of social sustainability, within its small land area.

Rising sea levels would also impact Singapore socially through increased coastal and inland flooding. Flash floods occurred from time to time in Singapore due to its high annual rainfall<sup>38</sup> and low-lying land. Extreme climate events were predicted to become more frequent as the world continued to warm. Such events were exacerbated through "compound flooding", in which other factors such as high tide levels, poor drainage, and storm surges coincided with high rainfall, ultimately leading to increased flood risks in urban areas. The number of flash floods had steadily been increasing over the years. As reported by Temasek Ecosperity, "in 2017, there were fourteen occurrences of flash floods, as compared to ten and six in 2016 and 2015 respectively".<sup>39</sup> At the same time, higher mean sea levels meant that during heavy rainfall, flash floods could become more severe, posing greater dangers to the safety of people and

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37 Adam, S. (2013, January 29). Singapore projects 6.9 million population as neighbours catch up. *Bloomberg*. <https://www.bloomberg.com/news/articles/2013-01-29/singapore-projects-6-9-million-population-as-neighbors-catch-up>

38 National Environment Agency. (2021, January 19). Singapore's climate 2020: A year of contrasts in weather. <https://www.nea.gov.sg/media/news/news/index/singapore's-climate-2020-a-year-of-contrasts-in-weather>

39 Temasek Foundation Ecosperity. (2019, January 21). *Climate change and rising sea levels: Mitigating and adapting to the looming threats*. <https://www.ecosperity.sg/en/ideas/climate-change-and-rising-sea-levels-mitigating-and-adapting-to-the-looming-threats.html>

transportation networks.<sup>40</sup> In mid-April 2021 and on 24 August 2021, flash floods in the Bukit Timah district, a populous residential area, led to flooded pedestrian walkways and main roads.<sup>41</sup> When transport infrastructures flood, traffic becomes much slower due to reduced visibility and navigability, significantly increasing the time spent on the road (for any given route) and reducing the productivity of people.

Singapore also experienced the effects of the Southeast and Northwest monsoon seasons. With climate change bringing about more extreme weather events, the effects of the monsoon season were likely to become more severe in the island nation. Stronger monsoon winds drove the wave heights at Singapore's coast,<sup>42</sup> encouraging coastal flooding. In the long run, the coastal areas of Singapore would no longer be suitable for living due to the safety concerns posed by greater mean wave heights.<sup>43</sup>

Finally, Singapore's small land area meant that creating new spaces for people to live, work and play would be difficult, thus posing greater challenges for its social resilience.<sup>44</sup>

## Environmental

The concept of sustainable development was centred around reconciling different dimensions of a country's progress with the environment that its people lived in.<sup>45</sup> During the National Day

40 Ministry of the Environment and Water Resources & Ministry of National Development. (2016). *Singapore's climate action plan: A climate-resilient Singapore, for a sustainable future*. <https://www.nccs.gov.sg/docs/default-source/publications/a-climate-resilient-singapore-for-a-sustainable-future.pdf>

41 Ng, M. (2021, April 21). Heavy rain triggers flooding across Singapore. *The Straits Times*. <https://www.straitstimes.com/singapore/environment/flooding-reported-across-singapore-on-saturday>

42 Cannaby, H., Palmer, M. D., Howard, T., Bricheno, L., Calvert, D., Krijnen, J., Wood, R., Tinker, J., Bunney, C., Harle, J., Saulter, A., O'Neill, C., Bellingham, C., & Lowe, J. (2016, May 2). Projected sea level rise and changes in extreme storm surge and wave events during the 21st century in the region of Singapore. *Ocean Science*, 12(3), 613–32. <https://doi.org/10.5194/os-12-613-2016>

43 Channel News Asia. (2020, March 31). *Carbon conundrum* [Video]. <https://www.channelnewsasia.com/watch/carbon-conundrum>

44 Temasek Foundation Ecosperity. (2019, January 21). *Climate change and rising sea levels: Mitigating and adapting to the looming threats*. <https://www.ecosperity.sg/en/ideas/climate-change-and-rising-sea-levels-mitigating-and-adapting-to-the-looming-threats.html>

45 Purvis, B., Mao, Y., & Robinson, D. (2019). Three pillars of sustainability: In search of conceptual origins. *Sustainability Science*, 14(3), 681–95. <https://doi.org/10.1007/s11625-018-0627-5>

Rally in 2019, Prime Minister Lee Hsien Loong said, “We should treat climate change defences like we treat the Singapore Armed Forces – with utmost seriousness... These are life and death matters. Everything else must bend at the knee to safeguard the existence of our island nation.”<sup>46</sup>

The environment was an indispensable aspect of sustainable development. Singapore needed to consider the existential benefits that the ecosystem held for people as well as the impacts of businesses and lifestyles on the quality of the environment.<sup>47</sup>

Rising sea levels had most definitely had an impact on the ecosystem in Singapore. Global sea levels had always been rising since the last Ice Age, and this was reflected by nature's own trail of footprints. Coral reef ecosystems were fragile environments that were altered easily by environmental changes.<sup>48</sup> As water levels continued to increase and oceans gradually became more acidic, these ecosystems were placed under threat.

A recent landmark paper published in the esteemed journal, *Science*, found that beyond the threshold of 6.1 mm/yr of sea level rise, mangroves were unable to keep up and either migrated landward or drowned. Global sea-level rise was already at 3.7 mm/yr. Given that Singapore experienced higher than the global average sea-level rise, and had little sediment supply due to intensive urbanisation, it seemed difficult for mangroves in Singapore to survive in the years to come.

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46 Prime Minister's Office. (2019). National Day Rally 2019. <https://www.pmo.gov.sg/Newsroom/National-Day-Rally-2019>

47 Brinkmann, R. (2020). *Environmental sustainability in a time of change*. Palgrave Macmillan, Cham. [https://doi.org/10.1007/978-3-030-28203-5\\_1](https://doi.org/10.1007/978-3-030-28203-5_1)

48 Mohan, M. (2019, September 14). Tides of change: As fish and coral disappear, Palau faces the economic realities of climate change. CNA. <https://www.channelnewsasia.com/news/sustainability/tides-of-change-as-fish-and-coral-disappear-palau-faces-the-11900216>

Below, we describe some engineering and natural defence strategies that Singapore had or planned to adopt to mitigate the sea-level rise. The challenges that Singapore faced should not be viewed in a silo; each solution may impact one aspect of Singapore while amplifying or hindering another aspect. Singapore would be more able to plan better for a sustainable future if it could recognise and appreciate these interdependencies. How did strategies to mitigate sea-level rise create tensions among the triple bottom line? How could solutions have internally complementary effects that resulted in benefits to the entire triple bottom line?

## ENGINEERING METHODS

Engineering methods focus on tackling the effects of rising sea levels by building the necessary “coastal defence measures”. These defensive measures were wide-ranging and could be compared to a build-up defensive approach. These included building sea walls, polders, new islands made from reclaimed land, and implementing and/or improving storm water management systems. New buildings were to be built four metres above mean sea level, and critical infrastructure was to be built at least another metre higher than that.<sup>49</sup>

Currently, about 70% of Singapore's coastlines featured hard engineering methods like sea walls and breakwaters (see **Figure 5**) in place. That said, sea walls had certain shortcomings. They simply deflected water to surrounding areas rather than mitigating sea-level rise, and they were prone to failure, which could lead to catastrophic consequences. They also posed a risk to marine life, which may come up against what used to be soft shorelines with devastating consequences.<sup>50</sup> The remaining 30% of Singapore's coastlines were

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49 Hicks, R. (2019, September 30). How will low-lying Singapore's built environment survive rising seas?. *Eco-Business*. <https://www.eco-business.com/news/how-will-low-lying-singapores-built-environment-survive-rising-seas/>

50 Ayanaputra, P., & Lohatepanont, K. (2019, September 2). Sinking cities. *Bangkok Post*. <https://www.bangkokpost.com/world/1740904/sinking-cities>

protected by nature defences.<sup>51</sup> These measures were planned based on a ten-year projection of sea-level rise.<sup>52</sup> By engineering its coastline, Singapore could reduce erosion arising from stronger waves and minimise the occurrences of coastal flooding. These defensive measures, such as sandbags (see **Figure 6**), mitigated against lateral loss of sand on beaches and made sandy coasts stable and safe for Singaporeans.

In addition, other “build-up” measures stipulated by the government included raising Nicoll Drive, a major highway, by up to one metre, starting in 2016, to protect the east coast of Singapore. Housing and commercial property developers such as City Development Limited raised the ground level by one metre, raised kerb heights in carparks and entrances, and installed flood gates for residential properties, offices, hotels, and shopping malls under their care.<sup>53</sup>

### **Figure 5: Breakwater at East Coast Park**



Source: Photo was taken by the first author

51 Tan, A., & Cheong, M. (2021, April 19). S'pore's coastal guardians against the rising sea. *The Straits Times*. <https://www.straitstimes.com/singapore/environment/spores-coastal-guardians-against-the-rising-sea>

52 Hicks, R. (2019, September 30). How will low-lying Singapore's built environment survive rising seas?. *Eco-Business*. <https://www.eco-business.com/news/how-will-low-lying-singapores-built-environment-survive-rising-seas>

53 *ibid.*

**Figure 6: Sandbags to Reduce Erosion at East Coast Park**

Source: Photo was taken by the first author

In 2008, the country opened the S\$226 million Marina Barrage (see **Figure 7**), which sealed off the Singapore River to create a reservoir and hold back the sea.<sup>54</sup> Nine crest gates (see **Figure 8**) and seven drain pumps (see **Figure 9**) were installed to manage the water level in the reservoir.

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54 Mokhtar, F. (2020, February 26). Singapore has a S\$100 billion plan to survive in a far hotter world than experts predicted. *Bloomberg*. <https://www.bloomberg.com/news/features/2020-02-25/singapore-has-a-100-billion-plan-for-adapting-to-climate-change>

**Figure 7: Marina Barrage**



Source: Photo was taken by the first author

**Figure 8: Nine Crest Gates**



Source: Photo was taken by the first author

**Figure 9: Seven Drain Pumps**

Source: Photo was taken by the first author

Land reclamation standards were revised to handle inland flooding. As early as 2011, new buildings and transport infrastructures had to be raised to a height of 4 metres from the original 3 metres.<sup>55</sup> For major infrastructure projects, such as Changi Airport's Terminal 5, the height above ground needed to be even higher, at 5.5 metres<sup>56</sup> or more above mean sea level.<sup>57</sup> This ensured that Singaporeans could still carry out their daily activities and reside safely in future even during a flood.

Drains and canals were important infrastructures that needed to be built at a system level. Singapore had spent billions on its drainage

55 ibMokhtar, F. (2020, February 26). Singapore has a S\$100 billion plan to survive in a far hotter world than experts predicted. *Bloomberg*. <https://www.bloomberg.com/news/features/2020-02-25/singapore-has-a-100-billion-plan-for-adapting-to-climate-change>

56 Zheng, Z. (2019, February 18). Govt to invest more to protect S'pore against climate change & rising sea levels. *Mothership*. <https://mothership.sg/2019/02/singapore-government-climate-change-budget/>

57 Ministry of the Environment and Water Resources & Ministry of National Development. (2016). *Singapore's climate action plan: A climate-resilient Singapore, for a sustainable future*. <https://www.nccs.gov.sg/docs/default-source/publications/a-climate-resilient-singapore-for-a-sustainable-future.pdf>

network since the 1960s. Thanks to Singapore's history with floods,<sup>58</sup> Singapore invested heavily in building and maintaining its drainage systems. In 2012, the Singapore government decided to expand the 3.2 kilometre long Bukit Timah First Diversion Canal to contain 30% more rainwater.<sup>59</sup> The project was completed in 2019 and cost the government a total of S\$300 million to complete.<sup>60</sup> The Public Utilities Board had also planned to raise the height of a 450m stretch along Dunearn Road, a road that ran through a major residential area that was prone to flooding, by November 2021.<sup>61</sup>

However, it was not possible to keep building and widening drains indefinitely to accommodate every extreme rainfall event due to land constraints and competing needs. Although rainwater holding capacity increases when canals and drains are expanded, it also affects transport infrastructures and reduces space available for other activities. When floods due to heavy rainfall occurred at Orchard Road in June 2010 and 2011, it greatly disrupted economic and social activities as Orchard Road was one of the largest shopping districts in Singapore. To overcome land scarcity, the idea of underground floodwater management was proposed. The Stamford Detention Tank (see **Figure 10**) and Stamford Diversion Canal (see **Figure 11**) cost S\$227 million to construct and have been operational since 2018.<sup>62</sup> Together, they helped to detain, delay, and divert storm runoff from Stamford Canal into the Singapore River to better protect Orchard Road against floods.

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58 Chan, F. K. S., Chua, C. J., Ziegler, A. D., Dabrowski, M., & Varis, O. (2018, June 20). Towards resilient flood risk management for Asian coastal cities: Lessons learned from Hong Kong and Singapore. *Journal of Cleaner Production*, 187, 576–589. <https://doi.org/10.1016/j.jclepro.2018.03.217>

59 Liu, V. (2019, September 14). \$300m upgrade of Bukit Timah Canal boosts flood security. *The Straits Times*. <https://www.straitstimes.com/singapore/300m-upgrade-of-bukit-timah-canal-boosts-flood-security>

60 Hicks, R. (2019, September 30). How will low-lying Singapore's built environment survive rising seas?. *Eco-Business*. <https://www.eco-business.com/news/how-will-low-lying-singapores-built-environment-survive-rising-seas/>

61 Lim, J., & Liew, I. (2021, August 28). PUB to raise 450m stretch of Dunearn Road to reduce risk of flash floods. *The Straits Times*. <https://www.straitstimes.com/singapore/environment/pub-to-raise-450m-stretch-of-flood-prone-dunearn-road-to-reduce-risk-of-flash>

62 Public Utilities Board. (2018, September 28). *Stamford Diversion Canal and Stamford Detention Tank go operational*. <https://www.pub.gov.sg/news/pressreleases/StamfordDiversionCanalandStamfordDetentionTank>

**Figure 10: Singapore's Climate Adaptation Measures Included the Stamford Detention Tank, Which Helped Prevent Flooding in its Prime Shopping District**



Source: Public Utilities Board

**Figure 11: Completed Tunnel of Stamford Diversion Canal**



Source: Public Utilities Board

## Nature's Defences<sup>63</sup>

Many existing buildings that lacked underground drainage would be flooded in the event of torrential rain during high tide season – a climate phenomenon is known as “rain bombs”. This phenomenon was expected to occur more frequently in a warming world, including Singapore.

“It's difficult to build detention tanks for existing buildings,” said Mr Tan Szue Hann, Managing Director of Miniwiz, a Taiwanese company that upcycles waste into construction and consumer products.<sup>64</sup> “So for older districts, you need storm drains that lead to district-level stormwater capture systems.”<sup>65</sup>

Without these barriers, Singapore's rivers and canals could be quickly overwhelmed by sudden and heavy downpours.

Rapid urbanisation had led to the loss of forest cover and hence the environment's natural ability to absorb water; only 0.5 % of Singapore's 70 km<sup>2</sup> land area was covered by primary forests, which were located around the country's water-critical reservoirs.

Though the country had spent billions on tree-planting to keep faith with the “garden city” vision of founding prime minister Lee Kuan Yew, much of the “sponge effect” of forests had given way to hard concrete. “The preservation of our remaining forests is crucial,” said Mr Tan from Miniwiz, stressing the need to maintain the natural balance of the water cycle. “Paving over forests removes the absorption power of trees.”

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63 Hicks, R. (2019, September 30). How will low-lying Singapore's built environment survive rising seas? *Eco-Business*. <https://www.eco-business.com/news/how-will-low-lying-singapores-built-environment-survive-rising-seas/>

64 Goh, J. (2019, March 8). 5 minutes with... Tan Szue Hann, Managing Director at MINIWIZ. *InDesignLive.SG*. <https://www.indesignlive.sg/people/5-minutes-tan-szue-hann-miniwiz>

65 Hicks, R. (2019, September 30). How will low-lying Singapore's built environment survive rising seas? *Eco-Business*. <https://www.eco-business.com/news/how-will-low-lying-singapores-built-environment-survive-rising-seas/>

Singapore's government saw the need to prepare for more frequent flooding in the long run due to rising sea levels. Although expanding concrete structures could help to manage flooding, it was important to consider the overall urban landscape in becoming a "City in Nature".<sup>66</sup> Instead of mitigating flood effects, another approach was to adapt to the floods as they occurred. One example was the naturalisation of the canal at Bishan-Ang Mo Kio Park, located in a popular and densely populated residential area, into a river floodplain (see **Figure 12**) that was meant to flood during heavy rainfall.<sup>67</sup> This bioengineering method not only slowed down the flow of water to Singapore's Kallang River mouth (thereby reducing flood risks), but it also attracted much wildlife back to the park.<sup>68</sup> The increase in flora and fauna greatly enhanced the green landscape in Singapore, and attracted more birdwatchers and people interested in nature to the area for leisure activities.

**Figure 12: Nature's Defence: Bishan-Ang Mo Kio Park Canal Flooding to Absorb Torrential Rain**



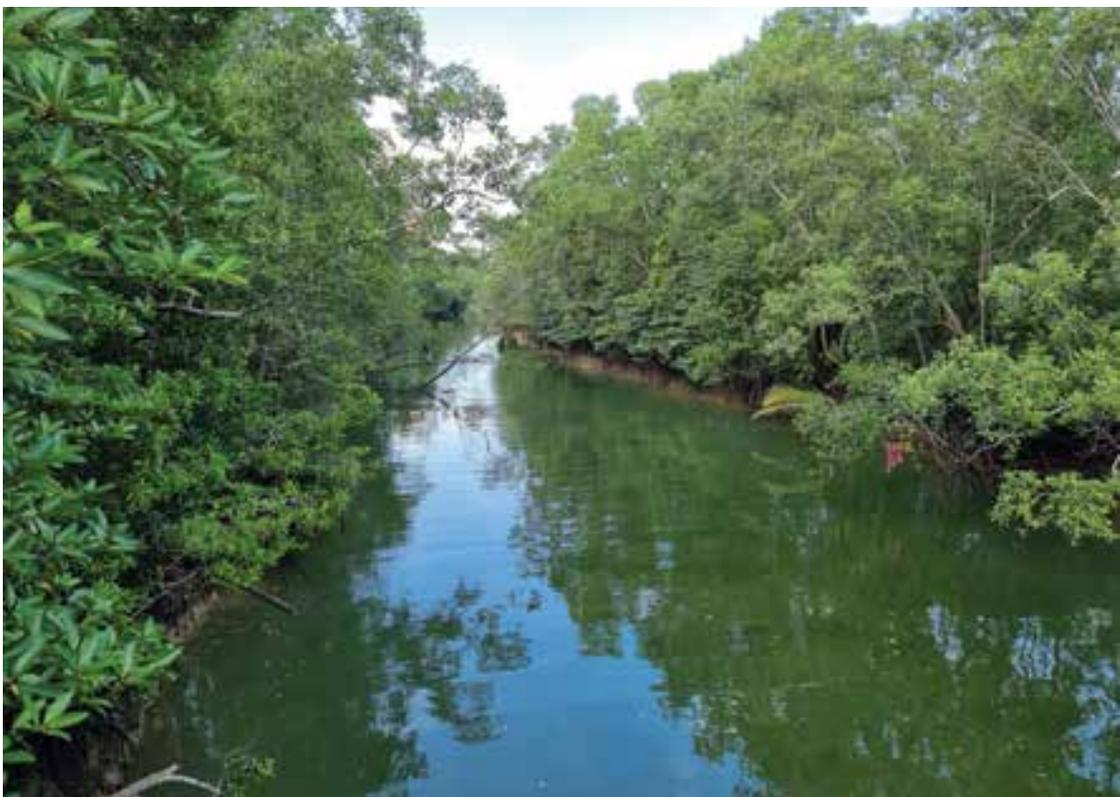
Source: Muhammad Zailan Bin Mohd Zain

- 66 National Parks Board. (2020, March 4). *NParks to work with the community to transform Singapore into a City in Nature*. <https://www.nparks.gov.sg/news/2020/3/nparks-to-work-with-the-community-to-transform-singapore-into-a-city-in-nature>
- 67 Hicks, R. (2019, September 30). How will low-lying Singapore's built environment survive rising seas?. *Eco-Business*. <https://www.eco-business.com/news/how-will-low-lying-singapores-built-environment-survive-rising-seas/>
- 68 Public Utilities Board. (N. D.). *Kallang River @ Bishan-Ang Mo Kio Park*. <https://www.pub.gov.sg/abcwaters/explore/bishanangmokiopark>

The more forests removed, the more needed to be spent on man-made sponges. Re-greening thus is not just an eco-friendly move, but also a fiscally prudent one. The Bishan-Ang Mo Kio Park canal was a prime example of how a natural defence measure to allow flooding could conserve financial resources while bringing about benefits to the social and environmental aspects of the neighbourhood (see **Figure 12**), impacting the triple bottom line in a positive manner.

According to research conducted at the University of Southampton, mangroves could help with decreasing erosion and preventing water from moving further inland.<sup>69</sup> This was another of nature's defences adopted by Singapore as a concerted coastal defence measure to fight against rising sea levels (see **Figure 13**).

### **Figure 13: Nature's Defence: Mangrove Swamps**



Source: Photo was taken by the first author

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69 Ayanaputra, P., & Lohatepanont, K. (2019, September 2). Sinking cities. *Bangkok Post*. <https://www.bangkokpost.com/world/1740904/sinking-cities>

## STAYING AFLOAT: A GLIMPSE OF THE FUTURE

A more radical idea was to build amphibious structures. Prof. Wong Poh Poh from the University of Adelaide in Australia suggested in *The Straits Times* that Singapore should build homes that were anchored to the ground but could float when flooded.<sup>70</sup>

According to Mr Tan from Miniwiz, floating infrastructure off the coast of Singapore was a very real possibility. “Floating schools, markets, villages even? We're not there yet. But that could happen,” he said. In the future, buildings would possibly be built on pontoons that floated just off the coast, he also suggested.<sup>71</sup> Beyond just an idea, Keppel Corporation had already started to explore building a floating city in Singapore.<sup>72</sup> Rather than relying on one form of engineering or on natural measures solely, hybrid options could include building sloping walls (engineering) fronted by mangroves (nature-based). The former would protect the coastline from erosion, while the latter would stabilise the soil.<sup>73</sup>

Moving forward, what might the future look like for Singapore? One thing for certain is that despite efforts to mitigate the loss of land to rising sea levels, Singapore needed to be prepared for a reduction in usable land area. If Singapore’s land was reduced, could she consider leveraging on her underground space? It was not far-fetched to consider a city that existed underground<sup>74, 75</sup>, floated on the water and/or was situated some distance off the ground in the air.<sup>76</sup> The

70 Ayanaputra, P., & Lohatepanont, K. (2019, September 2). Sinking cities. *Bangkok Post*. <https://www.bangkokpost.com/world/1740904/sinking-cities>

71 Hicks, R. (2019, September 30). How will low-lying Singapore’s built environment survive rising seas? *Eco-Business*. <https://www.eco-business.com/news/how-will-low-lying-singapores-built-environment-survive-rising-seas/>

72 Tham, Y. (2021, June 22). Keppel working on project to explore floating city in Singapore. *The Straits Times*. <https://www.straitstimes.com/singapore/politics/keppel-working-on-project-to-explore-floating-city-in-singapore>

73 Tan, C. (2021, June 28). Flexibility crucial in coastline protection plan: PUB. *The Straits Times*. <https://www.straitstimes.com/singapore/flexibility-crucial-in-coastline-protection-plan-pub>

74 Urban Development Authority. (N. D.). *Underground space*. <https://www.uragov.sg/Corporate/Get-Involved/Plan-Our-Future-SG/Innovative-Urban-Solutions/Underground-space>

75 Urban Development Authority. (N. D.). *Underground developments: A benchmarking study to explore best practices in underground space management*. [https://www.uragov.sg/-/media/Corporate/Get-Involved/Plan-Our-Future-SG/Underground-Works/Benchmarking\\_Study.pdf](https://www.uragov.sg/-/media/Corporate/Get-Involved/Plan-Our-Future-SG/Underground-Works/Benchmarking_Study.pdf)

76 Lim, S. H. (2015, October 7). Vision SG100: Floating cities in the sea. *The Straits Times*. <https://www.straitstimes.com/opinion/vision-sg100-floating-cities-in-the-sea>

subsurface geology of downtown Singapore had been modelled: this, if extended to the whole island, would help in planning for the strategic use of underground space. Similar to how Singapore had built a reputation for offshore and marine engineering, she could also apply this concept to other industries. Already, Singapore was leveraging on the space in her reservoirs to build one of the world's largest solar farms (see **Figure 14**) that could supply up to six million kilowatt-hours of energy per year and potentially reduce over 4,000 tonnes of carbon dioxide emitted by Singapore annually. This amount of greenhouse gas emissions was equivalent to that of more than 900 passenger vehicles a year.<sup>77</sup> Indeed, Singapore's effort to balance sustainability, economic and social development demonstrate that scarcity is the mother of invention.

**Figure 14: The World's Largest Floating Solar Farm**



Source: SUNSEAP Group

77 Chong, C. (2021, March 24). Singapore now home to one of the world's largest floating solar farms. *The Straits Times*. <https://www.straitstimes.com/singapore/singapore-now-home-to-one-of-the-worlds-largest-floating-solar-farms>

As you read this case study, the tides creep ever higher. Time and tide truly wait for no man, thus the importance of acting swiftly to respond strategically and effectively to environmental changes and build a better, more livable Singapore.

Singapore should continue to trailblaze a new path that balances the triple bottom line. The question was, how should it balance between the various bottom lines and manage the different hypotheses presented by the experts?

Would Singapore be able to see the 100<sup>th</sup> Anniversary? How do we evaluate the impacts of any measures adopted? What are the measures that Singapore needed to carry out to fight against the rising tide?

# FRESH: Evolving its Business Model

*Sarah Cheah, Gayathiri D/O Sivaraj, Colin Lim  
and Benjamin Smith*

## INTRODUCTION

**I**n November 2021 was fast approaching, the Director of the Future Ready Food Safety Hub (FRESH) in Singapore went through his calendar which was filling up fast with appointments for the next two months. Since the official launch of FRESH – a research center focused on investigating the safety of novel foods – by the Singapore government on 27 April 2021, the center had attracted much interest from multinational corporations (MNC) and startups of novel foods. They ranged from cultured meat makers to insect protein bar manufacturers that were exploring Singapore as a location for their operational headquarters for the Southeast Asian market. Jointly established by Nanyang Technological University (NTU), Singapore Food Agency (SFA), and the Agency for Science, Technology and Research (A\*STAR), FRESH was a tripartite organisation that functioned as a national public-private partnership (PPP) research and development (R&D) platform to bring together regulators, public researchers and the industry.

FRESH's mission was to build local food safety science and R&D capabilities to strengthen Singapore's food safety ecosystem in collaboration with international standards and research organisations, and support food security and sustainability goals. As the Director prepared for the upcoming board meeting to review the longer-term operating model for FRESH, beyond its initial ten-year plan, he reviewed the development of the country's food innovation ecosystem and the growing list of its stakeholders among whom the concept of novel foods had gained traction. The value chain of food production from farm to fork and the shared value created by FRESH to date along with future projections and ambitions were key in his mind.

To put FRESH on a path that could strengthen both the ecosystem and value chain, the Director contemplated two possible options for the business model of FRESH. The first option was to remain as a public-funded institution that would allow it to pursue long-term food security objectives which were strategic to the country but not commercially viable to the organisation. The second was to become a corporatised entity where the organisation would account for its costs and revenues as a stand-alone company. This would offer greater managerial autonomy and accountability, while reducing political interference to enhance institutional credibility and economic efficiency. As the deadline for board materials drew near, the Director had to decide on the business model soon to develop the budget proposal.

## GLOBAL FOOD SECURITY AND SUSTAINABILITY ISSUES

Concerns over decreasing global food security had been growing worldwide due to factors ranging from growing population and demand for food, to declining levels of arable land due to urbanisation and climate change. This was exacerbated by the onset of the COVID-19 pandemic.<sup>1</sup> It was predicted that an additional 30 million people would face food insecurity in 2030 due to the lasting effects of the pandemic.<sup>2</sup> The global food system was also under stress due to a myriad of factors like food export restrictions and changing consumption patterns. World hunger had increased in 2020 with the prevalence of undernourishment (PoU) increasing from 8.4 to 9.9 percent in just one year.<sup>3</sup> An analysis of the evolution of global food security since the 1970s to present day revealed that food security could not be achieved without development in sustainability.<sup>4</sup> Defined by the Food and Agriculture Organisation (FAO) of the United Nations, sustainable diets had low environmental impact and contributed to global food security.<sup>5</sup> This underscored the need for countries worldwide to transform their food systems to cater for sustainable diets to reduce environmental degradation and natural resource depletion.

## THE SINGAPORE FOOD STORY

To strengthen the country's food security, the Singapore government consolidated in 2018 all food-related functions across three existing government agencies – Agri-Food and Veterinary Authority of

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- 1 Premanandh, Jagadeesan. "Factors affecting food security and contribution of modern technologies in food sustainability." *Journal of the Science of Food and Agriculture* 91, no. 15 (2011): 2707-2714.
  - 2 FAO, IFAD, UNICEF, WFP and WHO. 2021. In Brief to The State of Food Security and Nutrition in the World 2021. Transforming food systems for food security, improved nutrition and affordable healthy diets for all. Rome, FAO. <https://doi.org/10.4060/cb5409en>.
  - 3 *ibid.*
  - 4 David E. McCarthy, "The necessary link between food security and sustainability," *Yale Environment Review*, December 3, 2015, accessed September 10, 2021, <https://environment-review.yale.edu/necessary-link-between-food-security-and-sustainability-0>.
  - 5 FAO and WHO. 2019. Sustainable healthy diets – Guiding principles. Rome. <http://www.fao.org/3/ca6640en/ca6640en.pdf>.

Singapore (AVA), National Environment Agency (NEA) and the Health Sciences Authority (HSA). On 1 April 2019, a new agency, SFA, was incepted with the responsibility of overseeing food safety and security from farm to fork in Singapore. Land-scarce and import-dependent Singapore was regarded as one of the most food-secure countries around the world.<sup>6</sup> Although more than 90 percent of its food needs were met by imports, the city-state topped the Global Food Security Initiative (GFSI) published by The Economist's intelligence unit for two consecutive years in 2018 and 2019.<sup>7</sup> To strengthen the country's food resilience and to overcome its resource constraints, SFA set an ambitious '30 by 30' vision to achieve local food production using less than 1 percent of available land to meet 30 percent of Singapore's nutritional needs by the year 2030. This was a whopping increase of 20 percent, up from 10 percent in 2020.<sup>8</sup> To achieve the "30 by 30" vision, the Singapore government committed S\$144 million<sup>9</sup> in 2019 through the Singapore Food Story R&D Program.<sup>10</sup> This was to facilitate R&D in three strategic areas: sustainable urban food production, future foods (also known as novel foods) and food safety science and innovation.<sup>11</sup> In each of these areas, further funding were set aside for developing the industry.

### **Strategic Areas for R&D and Industry Development**

On the front of sustainable urban food production, SFA established the S\$30 million 30×30 Express grant scheme in April 2020 to enable local agri-food producers to ramp up production rapidly in three

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- 6 Siau Ming En, "The Big Read: Far from people's minds, but food security a looming issue," TODAYonline, May 26, 2017, accessed June 23, 2021, <https://www.todayonline.com/singapore/big-read-far-peoples-minds-food-security-looming-issue>.
  - 7 Vanessa Liu, "Singapore tops food security index for 2nd straight year," The Straits Times, December 10, 2019, accessed June 23, 2021, <https://www.straitstimes.com/singapore/singapore-tops-food-security-index-for-2nd-straight-year>.
  - 8 Ministry of Sustainability and the Environment (MSE), "Speech by Mr Masagos Zulkifli, Minister for the Environment and Water Resources, at the Committee of Supply Debate 2019, on 7 March 2019," Committee of Supply Debate 2019 - Mr Zulkifli, Minister for the Environment and Water Resources, March 7, 2019, accessed June 23, 2021, <https://www.mse.gov.sg/resource-room/category/2019-03-07-speech-at-the-committee-of-supply-debate/>.
  - 9 S\$ = Singapore dollar; US\$1 = S\$1.35 on September 22, 2021.
  - 10 National Research Foundation, *SINGAPORE HARVESTS FROM INVESTMENTS IN SCIENCE & TECHNOLOGY AND INVESTS IN NEW AREAS FOR FUTURE GROWTH AND RESILIENCE*, Annex C, March 27, 2019, accessed September 5, 2021, <https://www.nrf.gov.sg/docs/default-source/modules/pressrelease/11th-riec-press-release.pdf>.
  - 11 Linette Lai, "Singapore to invest \$700m in food, medicine and digital tech research for long-term competitiveness," The Straits Times, March 27, 2019, accessed September 5, 2021, <https://www.straitstimes.com/singapore/singapore-to-invest-700m-in-food-medicine-and-digital-tech-research-for-long-term>.

key categories – leafy vegetables, eggs, and fish. In February 2021, another S\$60 million was reserved for the new Agri-Food Cluster Transformation Fund to help the farmers to harness technology to increase food production.<sup>12</sup> The SFA also partnered with the Housing Development Board (HDB), Singapore’s public housing authority, to launch public tenders in 2020 to lease out the rooftops of public buildings for urban farming.<sup>13</sup>

In the area of novel foods, Singapore was the first country in the world to approve ‘lab-grown’ meat in December 2020, paving the way for many lab-grown meat producers to set up operations in Singapore to develop the local foodtech ecosystem. Enterprise Singapore (ESG), a government agency, had allocated a sum of over S\$55 million<sup>14</sup> to accelerate the growth of promising local agri- and aqua- culture companies. Aside from the dedicated R&D budget and industry development grants, Singapore had put in place pro-business policies earning its second-place ranking for being the easiest location to do business in the world, after New Zealand, by The Economist Intelligence Unit.<sup>15</sup> Eat Just Inc., for example, chose Singapore as the location for its US\$120million plant-based protein facility.<sup>16</sup>

The area of food safety science and innovation was critical as its failure would compromise the viability of novel foods as a sustainable food option in Singapore, and even around the world. To this end, FRESH

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- 12 Jack Ellis, “Singapore launches \$45m agritech fund to boost urban food production,” AgFunderNews, February 18, 2021, accessed September 4, 2021, <https://agfundernews.com/singapore-launches-45m-agritech-fund-to-boost-urban-food-production.html>.
  - 13 Cheryl Tan, “Tenders awarded to turn 9 HDB carpark rooftops into urban farming sites,” The Straits Times, February 23, 2021, accessed July 2, 2021, <https://www.straitstimes.com/singapore/tenders-awarded-to-turn-9-hdb-carpark-rooftops-into-urban-farming-sites>.
  - 14 Rachel Chia, “ESG sets aside over S\$55m for local agriculture, aquaculture firms,” Enterprise Singapore, June 29, 2020, accessed September 5, 2021, <https://www.enterprisesg.gov.sg/media-centre/news/2020/june/esg-sets-aside-over-55m-for-local-agriculture-aquaculture-firms>.
  - 15 World Bank Group, “*Doing Business 2020: Comparing Business Regulation in 190 Economies*,” 4, 2020, accessed September 5, 2021, <https://www.edb.gov.sg/en/why-singapore/business-friendly-environment.html>.
  - 16 Farhan Shah, “Eat Just CEO Josh Tetrick is on a plant-based quest and he’s starting in Singapore,” The Peak Magazine, January 5, 2021, accessed July 1, 2021, <https://www.thepeakmagazine.com.sg/interviews/eat-just-josh-tetrick-interview-plant-based/>.

was launched on 27 April 2021 by the Singapore government to drive food safety research to support the R&D surrounding the novel foods. FRESH had the mission to build the local food safety science and R&D capabilities to support Singapore's food innovation ecosystem and to ultimately secure the country's food supply.

### **Munificence in Funding**

Apart from government funding, the food innovation ecosystem attracted investment from private companies and venture capital (VC) firms. In 2019, Singapore-based firms received US\$177 million through 37 investment deals – the highest level of investment for agri-food tech among ASEAN markets. In the same year, the investment arm of ESG, SEEDS Capital, appointed seven co-investment partners to catalyse more investments into the ecosystem.<sup>17</sup> Venture funding activity in agri-food tech in Singapore had increased exponentially from under a billion in 2012 to S\$10.5 billion in 2018, according to ESG. This was bolstered by investments from the state investment firm of Singapore, Temasek Holdings, of up to S\$5 billion in the broader agri-food tech sector. In August 2019, SEEDS Capital had co-invested with Openspace Ventures in Nutrition Technologies to establish the largest high-tech, commercial-scale insect protein production facility in Southeast Asia. In 2020, the food-tech startup Next Gen Foods<sup>18</sup> established its R&D center and headquarters in Singapore. Impressed by the extent of funding made available to startups, the founders believed Singapore to be the “Silicon Valley for food-tech” in future.<sup>19</sup>

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17 Enterprise Singapore, “Industry Profile,” AGRITECH, November 11, 2020, accessed July 8, 2021, <https://www.enterprisesg.gov.sg/industries/type/agri-tech/industry-profile>.

18 Next Gen Foods specialised in plant-based meat market, focusing on chicken-focused products.

19 Singapore Economic Development Board, “Pioneering the next generation of food innovation in Asia,” EDB, April 16, 2021, accessed September 5, 2021, <https://www.edb.gov.sg/en/business-insights/insights/pioneering-the-next-generation-of-food-innovation-in-asia.html>.

## Growing Awareness of Food Sustainability

As Singapore embarked on its SFS campaign, the country had seen increasing interest from the industry and the public towards urban farming in community spaces.<sup>20</sup> There was also heightened awareness in the society about the need for sustainable food practices. Several community projects under the Zero Waste Masterplan introduced in 2019<sup>21</sup> saw positive results such as a 10 percent decrease in the production of food waste by Singaporeans from 744,000 tonnes in 2019 to 665,000 tonnes in 2020. The decrease was a result of the growing concerns amongst Singaporeans on food security.<sup>22</sup> In a recent study, Singaporeans were found to be proactive in leading healthier lifestyles, with 77 percent of Singaporeans indicating that food product reformulation was welcomed.<sup>23</sup> On the other hand, a separate study revealed that a third of Singapore respondents found Genetically Modified (GM) foods unappealing, raising questions about their future acceptance of novel foods.<sup>24</sup>

## Developing Talent Pipeline

To spearhead innovations in Singapore's future agri-food production, the country would need to develop progressive farmers who were also viewed as technologically-savvy agricultural professionals, or 'agri-technologists' and 'agri-specialists'.<sup>25</sup> Apart from agricultural professionals, a robust food innovation ecosystem would require trained human capital in novel foods and food safety development.

20 Laura Nelson, "A LITTLE HISTORY ON THE MOST RECENT EVOLUTION OF VERTICAL, URBAN FARMING IN SINGAPORE," Association for Vertical Farming (AVF), March 11, 2021, accessed July 5, 2021, <https://vertical-farming.net/blog/2021/03/11/a-little-history-on-the-most-recent-evolution-of-vertical-urban-farming-in-singapore/>.

21 The Zero Waste Masterplan introduced in 2019 was an important factor that underscored numerous other initiatives that resulted in greater consumer awareness and changed attitudes and behaviours

22 Colin Ng, "FOOD WASTAGE STATISTICS IN SINGAPORE," Best in Singapore, June 7, 2021, accessed September 6, 2021, <https://www.bestinsingapore.co/food-wastage-statistics-singapore/>.

23 Institute of Grocery Distribution, "Food industry and government efforts to encourage healthier diets in Singapore through product reformulation paying dividends," Institute of Grocery Distribution, June 21, 2018, accessed September 6, 2021, <https://www.igd.com/articles/article-viewer/t/food-industry-and-government-efforts-to-encourage-healthier-diets-in-singapore-through-product-reformulation-paying-dividends/i/19164>.

24 Nanyang Technological University, Holders of unfavourable attitudes towards genetically modified food likely to be against other novel food technologies, NTU-Harvard team finds, 1, June 9, 2020, accessed September 6, 2021, [https://www.ntu.edu.sg/docs/default-source/corporate-ntu/hub-news/newsre\\_1.doc379a36a2-ec61-4894-97ed-4163d8d29330.pdf?sfvrsn=6b910225\\_3](https://www.ntu.edu.sg/docs/default-source/corporate-ntu/hub-news/newsre_1.doc379a36a2-ec61-4894-97ed-4163d8d29330.pdf?sfvrsn=6b910225_3).

25 Ministry of National Development (MND), "Future of farming," MND Link Jul/Aug 2017 Issue, August, 2017, accessed July 2, 2021, <https://www.mnd.gov.sg/mndlink/2017/Jul-Aug/future-of-farming.htm>.

To build this talent pipeline, the SFA formulated an “Attract, Emplace and Retain” strategy<sup>26</sup> by partnering with Institutes of Higher Learning (IHLs) and farms to offer structured internships in the agri-food sector. In 2019, 21 students were attached to 11 farms. In the same year, a Part-time Diploma in Applied Science in Urban Agricultural Technology was launched by SFA in collaboration with Republic Polytechnic (RP), with more than 60 adult learners subscribing to it.<sup>27</sup> Another avenue to develop human capital was the SkillsFuture Work-Study Initiative, where 96 percent of those trained were employed within 6 months after completion of their programmes.<sup>28</sup> At a more specialised level, the SFA worked with NTU and Wageningen University & Research (Netherlands) to introduce a Graduate Certificate in Food Science & Technology<sup>29</sup> to attract a broad spectrum of interested individuals from current IHL students to working adults. The range of skillsets developed were intended to meet the growing demand for roles in the food innovation ecosystem such as agronomists, agriculturists, aquaculturists, nutritionists and geneticists.<sup>30</sup>

## Extending the Market Beyond Singapore

Beyond the local context, Singapore capitalised on its geographic location and positioned itself as an attractive gateway to the Southeast Asian market, in order to attract global agri-tech companies like Eat Just Inc. The Global Innovation Alliance (GIA) was a joint initiative between ESG and the Singapore Economic Development Board to

26 SFA, *Corporate Report 2019/2020*, 5, 2020, accessed September 9, 2021, <https://www.sfa.gov.sg/docs/default-source/publication/annual-report/sfa-ar-2019-2020.pdf>.

27 Ministry of Trade and Industry Singapore, “Speech by SMS Koh Poh Koon at the Official Launch of the Part-Time Diploma in Applied Sciences and the Opening of the Agricultural Technology Laboratory,” Ministry of Trade and Industry Singapore, January 9, 2019, accessed September 9, 2021 <https://www.mti.gov.sg/Newsroom/Speeches/2019/01/Speech-by-SMS-Koh-Poh-Koon-at-the-Official-Launch-of-the-Part-Time-Diploma-in-Applied-Sciences>.

28 Ang Qing, “4 new SkillsFuture work-study programmes to be launched by January 2022,” *The Straits Times*, August 13, 2021, accessed September 9, 2021, <https://www.straitstimes.com/singapore/parenting-education/4-new-skillsfuture-work-study-programmes-to-be-launched-by-jan-2022>.

29 SFA, *Corporate Report 2019/2020*, 5, 2020, accessed September 9, 2021, <https://www.sfa.gov.sg/docs/default-source/publication/annual-report/sfa-ar-2019-2020.pdf>.

30 Low Youjin, “Where the Jobs Are: Shedding image of ‘shorts, boots, floppy hat’, farming sector a pull for youths as S’pore bolsters food security,” *TODAY*, February 26, 2021, accessed September 6, 2021, <https://www.todayonline.com/singapore/where-jobs-are-shedding-image-short-boots-floppy-hat-farming-sector-pull-youths-spore>.

support Singapore startups and international startups in venturing abroad and scaling up in Asia using Singapore as a springboard, respectively.<sup>31</sup> Close partnerships with startup enablers were crucial for a robust food innovation ecosystem as a form of support. Aside from that, events such as Future Food Asia and Indoor Ag-Con Asia connected both local and international stakeholders across the value chain to facilitate collaboration. The market dimension was maximised as Singapore continued to forge links with other innovation centers around the world to become a center of technology, innovation and enterprise in Southeast Asia.<sup>32</sup>

### **Building Support Structures**

Support for the development of a food innovation ecosystem came in many different forms. To ramp up the production capability of local aquaculture enterprises, ESG funded the first ever Aquaculture Innovation Center that adopted a consortium approach with 11 research institutes, universities and polytechnics. Apart from access to finance, Singapore anchored global accelerators like GROW, Hatch Blue and Trendlines to provide mentorship to agri-tech startups in Singapore.<sup>33</sup> The establishment of the Singapore Institute of Food and Biotechnology Innovation (SIFBI) brought together A\*STAR's research capabilities in food-related areas under one roof, which facilitated the development of innovative food solutions and accelerated the growth of food innovation.<sup>34</sup> However, as novel foods continued to emerge from land-based aquaculture to lab-grown meat in the country, it would be pivotal to have a food safety framework to ensure that novel foods were safe for consumption before being

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31 Enterprise Singapore, "Global Innovation Alliance," Enterprise Singapore, accessed September 7, 2021, <https://www.enterprisesg.gov.sg/industries/hub/startup/global-innovation-alliance>.

32 Research Innovation Enterprise Council, Singapore harvests from investments in science & technology and invests in new areas for future growth and resilience, 3, March 27, 2019, accessed September 5, 2021, <https://www.nrf.gov.sg/docs/default-source/modules/pressrelease/11th-riec-press-release.pdf>.

33 Enterprise Singapore, "SEEDS Capital appoints seven partners to co-invest in agrifood tech startups," Media Releases, January 15, 2019, accessed July 7, 2021, <https://www.enterprisesg.gov.sg/media-centre/media-releases/2019/january/seeds-capital-appoints-seven-partners-to-co-invest-in-agrifood-tech-startups>.

34 A\*STAR, "SIFBI'S CAPABILITIES IN FOOD SCIENCE AND BIOTECHNOLOGY," A\*STAR, accessed September 7, 2021, <https://www.a-star.edu.sg/sifbi/capabilities>.

made available to consumers. It would also be key to build expertise and resources to support such a framework. Working with the SFA, and consolidating input from across the ecosystem, FRESH would help to define the framework and related protocols for novel foods and ingredients. It would also implement them to assess food safety in all aspects ranging from new food processing techniques to the storage of alternative proteins in biodegradable packages. FRESH was also equipped to advise food technology companies on how to prepare for regulatory assessments.<sup>35</sup>

## **FRESH'S ENGAGEMENT APPROACH**

Prior to the formation of FRESH, its direct stakeholders – SFA, A\*STAR and NTU – had already been active in their respective areas to strengthen Singapore's food security and food safety.<sup>36</sup> While SFA focused on building a highly productive, innovative and sustainable agri-food industry, its National Center for Food Science (NCFS) housed SFA's food inspection and laboratory testing services to ensure the safety of traditional food. NCFS also scanned the environment for new food safety threats. A\*STAR's SIFBI was set up to develop biotechnological solutions to accelerate the discovery and production of healthy and sustainable foods. This would create new opportunities in established industries such as food manufacturing. To support the transformed agri-food industry and build safe and sustainable food systems, NTU's Food Science and Technology Programme aimed to equip students with the knowledge and skills required to meet such demands. As food safety challenges continued to increase in complexity with the introduction of more novel foods, it became apparent that a collaboration platform was

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35 Shabana Begum, "New hub at NTU will study safety of novel foods," The Straits Times, April 28, 2021, accessed July 15, 2021, <https://www.straitstimes.com/singapore/environment/new-hub-at-ntu-will-study-safety-of-novel-foods>.

36 Ministry of Sustainability and the Environment, "Speech at Launch of The Future Ready Food Safety Hub at NTU – Ms Grace Fu," Ministry of Sustainability and the Environment, April 27, 2021, accessed September 23, 2021, <https://www.mse.gov.sg/resource-room/category/2021-04-27-speech-at-future-ready-food-safety-hub>.

required to coordinate the efforts of these institutions in the area of novel food safety. In this regard, FRESH would provide expertise and the generation of scientific data to SFA to support novel foods and would also develop new risk assessment approaches (See **Exhibit 1**). FRESH's direct R&D collaboration on assessment methods with SFA supported the development of a new regulatory framework for companies to guide the process of selling novel food products in Singapore.<sup>37</sup> With this new framework, startup Eat Just's cultured chicken became the "first-in-the-world" company to have received regulatory approval for the sale of cultured chicken.<sup>38</sup>

Apart from its direct stakeholders, FRESH was very active in knowledge sharing and scientific collaboration with international regulators, with the aim of harmonising approaches and methodologies. While FRESH interacted with scientists directly, its approach was to seek an agreement in the scientific community for a way to promote an alignment in both domestic and foreign policy. For instance, a data generation and collaboration study with Health Canada (HC) was underway along with constant knowledge sharing with the European Food Safety Authority (EFSA). The importance of cultivating collaborative ties with international regulators was underscored with the establishment of an international expert working group to provide scientific advice on food safety.<sup>39</sup>

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37 Singapore Food Agency, "Banking on novel food as a sustainable food option," Food for Thought, April 14, 2020, accessed September 15, 2021, <https://www.sfa.gov.sg/food-for-thought/article/detail/banking-on-novel-food-as-a-sustainable-food-option>.

38 Rachel Phua, "Lab-grown chicken to be sold in Singapore after 'world's first' approval for cultured meat," Channel News Asia, December 2, 2020, accessed September 15, 2021, <https://www.channelnewsasia.com/singapore/eat-just-lab-grown-chicken-cultured-meat-first-approval-sfa-450071>.

39 SFA, *Annual Report 2019/2020*, 6, October 15, 2020, accessed September 15, 2021, <https://www.sfa.gov.sg/docs/default-source/publication/annual-report/sfa-ar-2019-2020.pdf>.

In Singapore, attracting and expanding agri-industry activities was a joint effort among public agencies including A\*STAR,<sup>40</sup> ESG<sup>41</sup> and Economic Development Board (EDB).<sup>42</sup> FRESH worked closely with these agencies to engage novel food companies that were keen to develop new food innovations or novel foods for market launch and/or production in Singapore. For example, plant-based food startup Next Gen Foods planned to launch its “chicken” brand TiNDLE in Singapore after successful fund raising of the seed round from investors, including EDB’s venture arm.<sup>43</sup>

FRESH’s objective was to help foster collaboration in food safety across the ecosystem. By working with IHLs and public research institutes (PRIs) to conduct joint R&D in food safety aspects across the food value chain, FRESH supported the development of talent and capability in food safety science. Such collaboration was much needed in both foundational science and translation projects related to future food safety. For example, FRESH organised a food allergen workshop involving local IHLs and RIs to bring together local research experts to fill a particular gap in R&D.

A big part of FRESH’s role was to get the message out and connect partners to promote the growth of a wider food safety network in Singapore and to share knowledge about novel foods. Since its launch, FRESH had received engagement requests from over 20 companies with a project pipeline involving nine companies. These

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40 A\*STAR, “SINGAPORE FOOD STORY THEME 3 GRANT CALL,” A\*STAR, August 19, 2021, accessed September 15, 2021, <https://www.a-star.edu.sg/Research/funding-opportunities/sfs-theme-3>.

41 Enterprise Singapore, “Enterprise Singapore sets aside over S\$55 million to help local agriculture and aquaculture companies build new capabilities and innovate to accelerate growth,” Media Release, June 26, 2020, accessed September 16, 2021, <https://www.enterprisesg.gov.sg/-/media/esg/files/media-centre/media-releases/2020/jun-2020/enterprise-singapore-sets-aside-over-55-million-to-help-local-agriculture-and-aquaculture-companies-build-new-capabilities-and-innovate-to-accelerate-growth.pdf>.

42 EDB Singapore, “Advance, Accelerate, Access: Singapore, the innovation hub gateway to feeding Asia and the world,” EDB Singapore, August 11, 2021, accessed September 16, 2021, <https://www.edb.gov.sg/en/business-insights/insights/advance-accelerate-access-singapore-the-innovation-hub-gateway-to-feeding-asia-and-the-world.html>.

43 EDB Singapore, “Food tech start-up Next Gen raises \$13.2m in funding,” EDB Singapore, February 26, 2021, accessed September 16, 2021, <https://www.edb.gov.sg/en/business-insights/insights/food-tech-start-up-next-gen-raises-13-2m-in-funding.html>.

engagements were a mixture of research consultancy service projects and research collaborative projects.

As more novel foods and food innovations were being explored in the country, more questions around food safety were raised in the public discourse.<sup>44</sup> FRESH knew it was of paramount importance to understand consumer perceptions, concerns and aspirations.<sup>45</sup> To instil public confidence in novel foods, FRESH reached out to consumers via risk communication to provide education on novel food safety.<sup>46</sup> Serving as the bridge between the food industry and consumers, FRESH raised awareness about novel foods to increase consumer acceptance.<sup>47</sup> “This will help consumers better understand the safety and benefits of certain types of novel foods, as well as emerging food safety risks. With this knowledge, consumers will be better equipped to make informed choices,” said the Minister for Sustainability and The Environment during FRESH’s launch.

## **NOVEL FOOD PRODUCTION VALUE CHAIN**

In the traditional production value chain of farmed meat, seeds and fertilisers were sourced as input for processing into feedback for animals bred for their meat. Upon maturity, the animals were taken to slaughterhouses for meat production and processing before marketing, distribution and consumption. As these value chain activities were well established, their safety aspects were well regulated in many countries. For example, Singapore governed these activities through its Slaughter-Houses and Meat Processing

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44 Guan Yu Lim, “Science of safety: Singapore’s Future Ready Food Safety Hub outlines novel foods, agriculture and aquaculture focus,” FoodNavigator-Asia, August 19, 2021, September 16, 2021, <https://www.foodnavigator-asia.com/Article/2021/08/19/Science-of-safety-Singapore-s-Future-Ready-Food-Safety-Hub-outlines-novel-foods-agriculture-and-aquaculture-focus#>.

45 *ibid.*

46 *ibid.*

47 Shabana Begum, “New hub at NTU will study safety of novel foods,” The Straits Times, April 28, 2021, accessed September 16, 2021, <https://www.straitstimes.com/singapore/environment/new-hub-at-ntu-will-study-safety-of-novel-foods>.

Factories Act (See **Exhibit 2**). Globally, the meat market valued at US\$322.8 billion in 2018 was forecast to reach US\$408.2 billion by 2025, growing at a CAGR of 3.4 percent during the 2019-2025 period.<sup>48</sup> The leading meat producing companies in the world included Tyson Foods Inc., JBS S.A., and Cargill Meat Solutions Corp. In the US, which was the second largest consumer of meat after Europe, these three companies commanded more than half the market share with sales of close to US\$100 billion in 2020.<sup>49</sup>

In the production value chain of novel foods, the materials required for input, the preparation and processing activities were radically different from that of traditional farmed meat. Compared to that of traditional farmed meat, plant-based meat required greater levels of processing. First, a variety of inputs had to be sourced and produced, comprising ingredients for proteins (e.g., wheat, soy), fats (e.g. canola, sunflower), structural ingredients for gelling, thickening and stabilising (e.g. carrageenan derived from seaweed, gum, starch, binding agent), and other ingredients (e.g. aromas, salts, colouring agents). These ingredients were then processed using mixing and heating to form interim products, which were then processed further to give different textures, such as coarse ground for burger/nuggets, emulsified for sausages and loose for taco meat (See **Exhibit 3**).

The production of cell-based meats would require feedstock input (e.g., corn/collagen for scaffolding, bacteria/soybean for growth medium) and animal-based input (e.g., blood from cow fetus for extraction of fetal bovine serum to be added to the growth medium, muscle/embryonic stem cells from pigs). These inputs were then

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48 WBOC, "Global Meat Market Share 2021, Classification, Market Analysis, cagr, Scope, Type, Application, Stakeholder, Top Players, Segmented Analysis, Sales, Revenue Process AND Forecast By 2021-2025," WBOC, May 24, 2021, accessed September 23, 2021, <https://www.wboc.com/story/43944758/global-meat>.

49 Statista, "Leading meat and poultry processing companies in the United States in 2020, based on sales," Statista, March, 2020, accessed September 18, 2021, <https://www-statista-com.libproxy1.nus.edu.sg/statistics/264898/major-us-meat-and-poultry-companies-based-on-sales/>.

processed using a bioreactor with the addition of antibiotics to control bacterial growth. The animal cells multiplied in the growth medium were then grown on scaffold to form muscle cells, which were stimulated to increase protein content. The muscle fibers were shredded and more ingredients (e.g., vitamins, flavours and minerals) were added to provide nutrition and taste. The final products were textured to resemble traditional farmed meat for marketing and consumption (See **Exhibit 4**).

As novel food production activities were still in an experimental stage, the long-term effects on human health due to using certain additives and gums had been debated worldwide. For example, wheat and soy commonly found in plant-based proteins were known as major food allergens. Using mycoprotein (e.g., Quorn) as a plant-based protein had been reportedly linked to allergies while using carrageenan as a structural ingredient was associated with gastrointestinal inflammation and colon cancer. The use of antibiotics to control the growth of bacterial pathogens in the meat tissue culture medium had also raised international concern about their safety to public health.<sup>50</sup> It was evident that before being allowed to sell novel foods and ingredients in Singapore, companies would be required to provide information to demonstrate their food safety for SFA's review. The expertise to support SFA's safety assessment of novel food companies would be anchored in FRESH, which would have the R&D capability to conduct literature reviews, perform studies on in-vitro/in-vivo toxicology, efficacy and bioavailability, as well as undertake exposure assessments.

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50 Raychel E. Santo, Brent F. Kim, Sarah E. Goldman, Jan Dutkiewicz, Erin M. B. Biehl, Martin W. Bloem, Roni A. Neff and Keeve E. Nachman, "Considering Plant-Based Meat Substitutes and Cell-Based Meats: A Public Health and Food Systems Perspective," *Frontiers in Sustainable Food Systems* 4, no. 134, August 31, 2020, accessed September 18, 2021, <https://www.frontiersin.org/articles/10.3389/fsufs.2020.00134/full#B113>.

Apart from complementing SFA by providing R&D for food safety risk assessments, FRESH would offer consultancy to novel food companies by providing guidelines and know-how on newly developed risk assessment protocols. It would assist companies and SFA to plan studies required to ascertain and substantiate the safety of new products and novel foods. SFA would grant regulatory approval only upon satisfactory review of a novel food company's dossier comprising the required safety assessment information.

See **Exhibit 5** for a summary of the key roles of FRESH in R&D and consultancy, in addition to talent development and risk communication. **Exhibit 6** provided a list of novel food players with activities in Singapore.

## **FRESH STRATEGY**

In the past decade, the development and production of plant-based and cell-based alternatives to farmed meat had gathered much interest from academia, the industry and the government. Despite their appeal in promoting environmental sustainability and animal welfare, there had been limited research on the potential safety risks associated with meat alternatives. Given its own constraints in arable land and natural resources, Singapore was well ahead of other developed economies in pioneering the novel food industry's development for food security. FRESH knew that its rare and valuable expertise on novel food safety assessment would position it well to not only support Singapore's transformation of its own agri-industry, but also play a catalytic role in the international novel food scene with Singapore's strong reputation for stringent food safety standards.

As the Director of FRESH prepared for the upcoming board meeting to review its operating model in the long term, he deliberated on the

two possible options for its future business model – to remain as a public-funded institution or to become a corporatised entity.

### **Remaining as a Public-funded Entity**

FRESH was established as a public-funded entity under the Singapore Food Story R&D Programme, with the mission to build the local food safety science and R&D capabilities to support Singapore's food innovation ecosystem and ultimately secure the country's food supply. As a public-funded entity, FRESH received public sector funding in support of its public sector mandate. It also had access to public research funding and resources from various grant funders (e.g., NRF and A\*STAR), and could collaborate closely with other public sector agencies (e.g., EDB, ESG, A\*STAR, PRIs) facilitated by Whole-of-Government (WOG) approach, to achieve its mission. By virtue of its public-funded entity status, FRESH would be required to comply with public sector governance, and would not be able to source for less traditional sources of funding (e.g., VC or private equity funding). This would place some limits on the range of instruments available to FRESH for financing its growth. Given its national mandate for operations, FRESH would not be able to engage overseas bodies nor have the latitude to participate in overseas R&D activities. Its character as a public sector-funded organisation would oblige it to focus on contributing to Singapore's interest.

As the Director scanned the environment for organisations with similar missions that were funded by the public, he was piqued by the model of New Zealand's Food Safety Science & Research Center (NZFSSRC). The Center had been established in 2016 to harness the best of scientific expertise across the industry, the government and the research providers. Co-funded by the New Zealand government and industry partners, the \$5 million research center was managed by the Ministry of Business, Innovation and Employment and the

Ministry for Primary Industries. Since its launch, NZFSSRC had focused on ensuring that New Zealand's food safety system remained at the forefront internationally.<sup>51</sup>

### **Becoming a Corporatised Entity**

To become a corporatised entity, a public-funded institution would be required to adopt business management practices and to create a shareholding structure to separate ownership from management. Upon corporatisation, a public-funded entity would become a state-owned corporation where the government would retain majority ownership of the corporation's stock. Should FRESH become a corporatised entity, it would have the autonomy to improve its organisational efficiency, commercialise its operations, and introduce corporate and business management techniques to public functions. It would have the flexibility to explore a larger range of funding sources to sustain or expand its business operations. A corporatised entity, however, would not be eligible for public sector research grants (e.g., NRE, A\*STAR). Instead, it would need to introduce new business functions to create new revenue streams to finance its operations that were previously funded by public resources. If FRESH were to secure new sources of funding, it would be obligated to serve the interest of the funders. Should any conflict of interest arise between the new funder and the Singapore government, FRESH would have to carefully iron out such sensitivities to ensure that national security was not compromised.

Interestingly, FRESH noted the state-owned corporation with a similar mission in New Zealand -ASUREQuality Limited. The company was formed in 2007 from the merger of two entities, ASURE New Zealand Limited and AgriQuality Limited, funded by the

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51 Beehive.govt.nz, "Massey to host \$5m Food Safety Research Centre," Beehive.govt.nz, October 30, 2014, accessed September 23, 2021, <https://www.beehive.govt.nz/release/massey-host-5m-food-safety-research-centre>.

Ministry of Agriculture and Forestry Quality Management. As a state-owned enterprise, AsureQuality provided food quality assurance and offered certification, inspection, testing and training. With over 1700 staff at more than 100 locations throughout New Zealand, AsureQuality's underlying business was financially sustainable. In 2020, it achieved a net profit of \$20.0 million on the back of a record revenue of \$255.9 million.

### **LOOKING AHEAD**

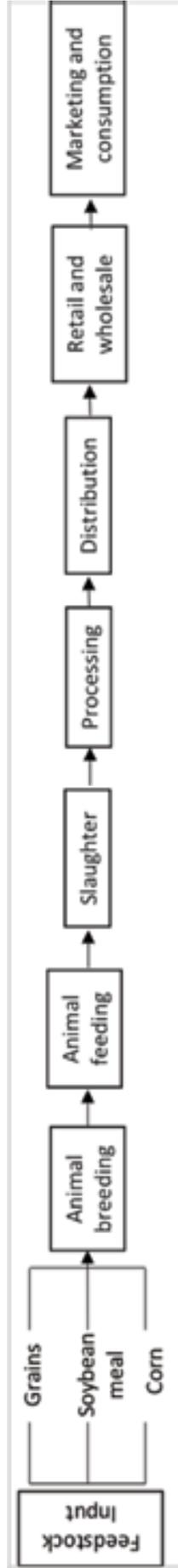
As the Director looked at the two options presented on his table, he knew he had to decide on the business model soon to develop the budget proposal. Should FRESH remain as a public-funded institution that would allow it to pursue long-term food security objectives which were strategic to the country but were not commercially viable to the organisation? Or should it become a corporatised entity that would account for its costs and revenues for greater managerial autonomy and accountability, while reducing political interference to enhance institutional credibility and economic efficiency?

**EXHIBIT 1: OBJECTIVES OF FRESH**



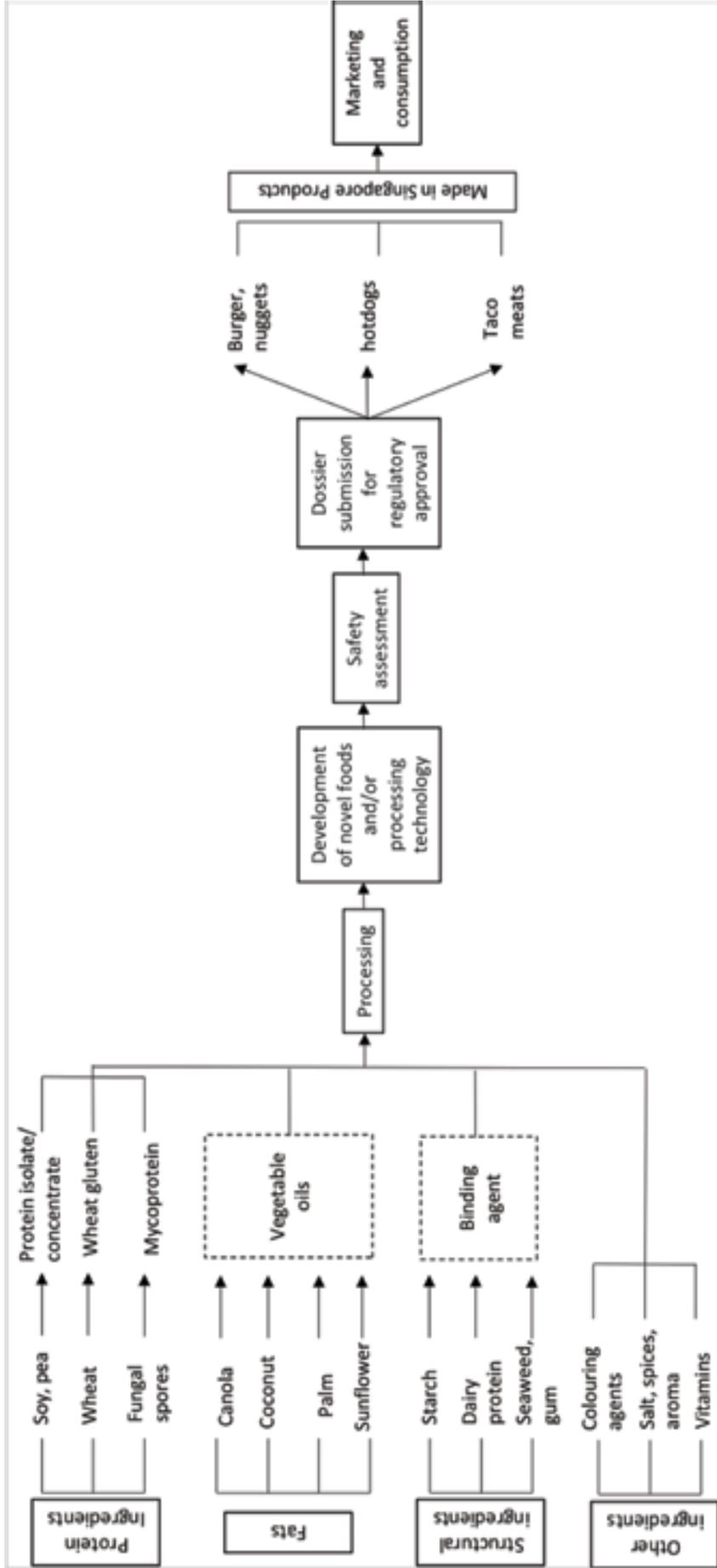
Source: FRESH

**EXHIBIT 2: VALUE CHAIN OF TRADITIONAL FARMED MEAT**



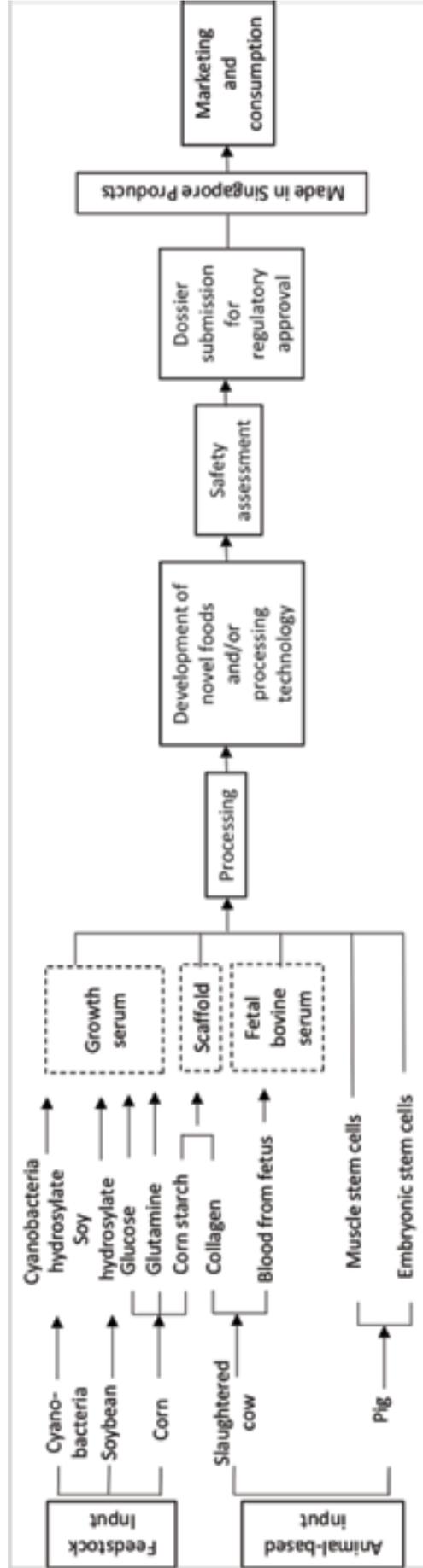
Source: Raychel E. Santo, Brent F. Kim, Sarah E. Goldman, Jan Dutkiewicz, Erin M. B. Biehl, Martin W. Bloem, Roni A. Neff and Keeve E. Nachman, "Considering Plant-Based Meat Substitutes and Cell-Based Meats: A Public Health and Food Systems Perspective," *Frontiers in Sustainable Food Systems* 4, no. 134, August 31, 2020, accessed September 18, 2021, <https://www.frontiersin.org/articles/10.3389/fsufs.2020.00134/full#B113>.

**EXHIBIT 3: VALUE CHAIN OF PLANT-BASED MEAT**



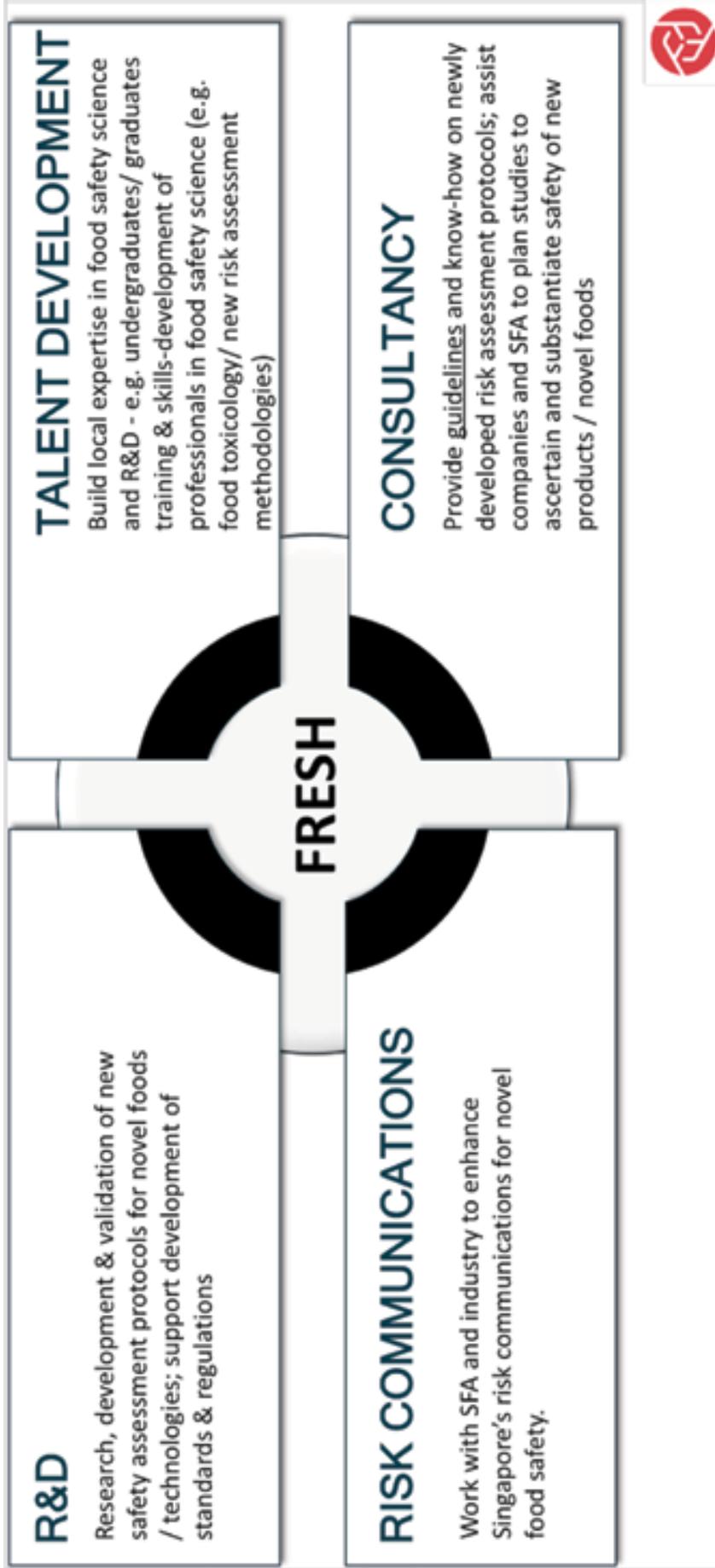
Source: Raychel E. Santo, Brent F. Kim, Sarah E. Goldman, Jan Dutkiewicz, Erin M. B. Biehl, Martin W. Bloem, Roni A. Neff and Keeve E. Nachman, "Considering Plant-Based Meat Substitutes and Cell-Based Meats: A Public Health and Food Systems Perspective," *Frontiers in Sustainable Food Systems* 4, no. 134, August 31, 2020, accessed September 18, 2021, <https://www.frontiersin.org/articles/10.3389/fsufs.2020.00134/full#B113>.

**EXHIBIT 4: VALUE CHAIN OF CELL-BASED MEAT**



Source: Raychel E. Santo, Brent F. Kim, Sarah E. Goldman, Jan Dutkiewicz, Erin M. B. Biehl, Martin W. Bloem, Roni A. Neff and Keeve E. Nachman, "Considering Plant-Based Meat Substitutes and Cell-Based Meats: A Public Health and Food Systems Perspective," *Frontiers in Sustainable Food Systems* 4, no. 134, August 31, 2020, accessed September 18, 2021, <https://www.frontiersin.org/articles/10.3389/fsufs.2020.00134/full#B113>.

**EXHIBIT 5: KEY ROLES OF FRESH**



Source: FRESH

**EXHIBIT 6: NOVEL FOOD PLAYERS ACTIVE IN SINGAPORE**

Novel food type	Company	Year of establishment	Country founded	Year of product launch in Singapore
Cell-based meat	ClearMeat	2018	India	2020
Cell-based meat	Eat Just	2011	US	2020
Cell-based meat	Shiok Meats	2018	Singapore	2021
Insect proteins	Altimate Nutrition	2020	Singapore	pending
Insect proteins	Asia Insect Farms Solution	2017	Singapore	pending
Insect proteins	Insectta	2017	Singapore	pending
Plant-based meat	Beyond Meat	2009	US	2019
Plant-based meat	Evo Foods	2019	India	2021
Plant-based meat	Green Monday	2012	Hong Kong	2018
Plant-based meat	Heura Foods	2017	Spain	2019
Plant-based meat	Hey Maet	2020	China	2020
Plant-based meat	Impossible Foods	2011	US	2019
Plant-based meat	Life3 Biotech	2020	Singapore	pending
Plant-based meat	Next Gen Foods	2020	Singapore	2021
Plant-based meat	Quorn	1985	UK	2021

Source: FRESH



# How Many Bottom Lines is One Life Worth?

*D. Krishna Bhaskar and Vivek Choudhary*

**B**etween 2001 and 2016, the otherwise monochromatic pages of Indian newspapers were strewn with numerous reports of suicides of Rajanna Sircilla's traditional weavers.<sup>1</sup> After two decades of insufficient work, scarce revenue, and meagre lifestyles, the weaver community of Sircilla was plagued with financial instability.

In a bid to generate more income, these weavers had invested in new weaving machinery known as power looms. Whilst the looms increased their production of cloth, sales remained stagnant as there was no market for this increased production.

The weavers' futile attempts to fill their empty pockets and their investment in these new looms left them in crippling debt. This lethal combination of financial hardship and desperation left the community in much distress, resulting in high suicide rates.

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<sup>1</sup> Sircilla is a town in the Rajanna Sircilla district of the Indian state Telangana. It is widely known as a "Textile Town" owing to the dominance of its textile industry. Source: Government of Telangana. (2021, October 29). Sircilla municipality. Retrieved from <https://sircillamunicipality.telangana.gov.in/>

This case study discusses the factors that contributed to the high suicide rates of this community and the interventions that had an impact on the situation.

## GENERAL BACKGROUND

The textile industry is one of the oldest industries<sup>2</sup> in the Indian economy, dating back several centuries. Decentralised power looms (see **Figure 1**) are a major component in this sector.<sup>3</sup> One of the major power loom centres of the country is Sircilla, a small town in the Rajanna Sircilla district of Telangana with a population of about 92,000 people (as of its 2011 census).<sup>4</sup> In the 1920s, Sircilla's textile industry was dominated by handlooms, which are manual weaving systems.

**FIGURE 1: PICTURE OF A POWER LOOM**



Source: Taken by authors.

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- 2 The earliest surviving cotton threads in India date to 4000 BC. Source: Indic Inspirations. (N. D.). *Indian textiles*. Retrieved from <https://www.indicinspirations.com/collections/indian-textiles>
  - 3 Indian Brand Equity Foundation. (2021, July). *Powerloom industry and exports in India*. Retrieved from <https://www.ibef.org/exports/powerloom-industry-in-india.aspx>
  - 4 Government of Telangana. (2021, October 29). *Sircilla municipality*. Retrieved from <https://sircillamunicipality.telangana.gov.in/>

In the 1980s, to increase productivity, the weavers of Sircilla purchased second-hand English power looms from Bhiwandi, another weaving hub in India, where cloth production was declining. Since then, the majority of handloom units were replaced by power loom units and Sircilla became a specialised centre of cloth production due to the ease of operation and high volume of production of the power looms.<sup>5</sup>

However, increased cloth output did not translate to increased sales. The cloth produced by the Sircilla weavers was still low in the value chain for the following reasons:

- The weaves produced were of low quality. The majority of the weaves were low-grade cloth (locally known as lungi-grade cloth) and were valued at only \$0.05<sup>6</sup> per metre, as opposed to regular cotton weaves which were sold at \$3.85 per metre. Cloth of superior quality could retail for as much as \$11.50 per metre.
- The Sircilla weavers were not as skilled at using power looms as their peers, leading to lower product quality and market demand. As such, they lacked the funds to invest in the production of cloth of better quality, and were trapped in a vicious cycle which perpetuated low weaving proficiency.
- There was a lack of adequate infrastructure to develop processing units in the power loom sector, which restricted the economies of scale.<sup>7</sup>

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5 Rao, M. H. P. (2018, September 13). Weaving magic back into Sircilla. *Telangana Today*. Retrieved from <https://telanganatoday.com/weaving-magic-back-into-sircilla>

6 All currency in this case study is denominated in US Dollars (USD), with a conversion rate of 75 Indian Rupees (INR) to 1 USD.

7 National Council of Applied Economic Research. (2009). *Assessing the prospects for India's textile and clothing sector*. Retrieved from [http://texmin.nic.in/sites/default/files/Report\\_NCAER\\_CITI\\_nmcc\\_20091001.pdf](http://texmin.nic.in/sites/default/files/Report_NCAER_CITI_nmcc_20091001.pdf)

- An increase in local yarn prices and cheaper yarn imports from China and Thailand worsened the situation. Sircilla weavers, who relied heavily on local yarn, suffered whereas their competitors (private firms, in some cases) who used imported yarn benefitted from lower input costs.

Despite poor valuation in the market, producing low-quality material continued to be the primary economic activity of the Sircilla weavers.

## **SOCIO-ECONOMIC BACKGROUND**

In 1978, Sircilla and its surrounding regions were affected by the emergence of left-wing extremism and violent protests in the area that resulted in an economic downturn.

In 1991, Sircilla's weaving community faced yet another financial crisis due to the lifting of government restrictions pertaining to the Indian economy.<sup>8</sup> This economic liberalisation led to increased exports of local yarn to more profitable markets in the US and Europe, resulting in an increase in local yarn prices;<sup>9,10</sup> increased imports of cheaper goods (including textiles) from Thailand and China; and new operations being launched by major companies headquartered in other Indian states to dominate the textile industry with superior modern technology such as autolooms.<sup>11</sup>

As such, Sircilla's weavers not only incurred higher cost prices, but were also less able to compete with textile producers muscling

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8 Panagariya, A. (2004, July). *India's trade reform*. Retrieved from [https://www.brookings.edu/wp-content/uploads/2016/07/2004\\_panagariya.pdf](https://www.brookings.edu/wp-content/uploads/2016/07/2004_panagariya.pdf)

9 South India Textile Research Association. (2007, October). *Movement of yarn prices & cotton costs during 1997-2006*. Retrieved from [https://www.fibre2fashion.com/news/textile-news/newsdetails.aspx?news\\_id=42270](https://www.fibre2fashion.com/news/textile-news/newsdetails.aspx?news_id=42270)

10 International Institute for Sustainable Development. (2007, October). *Price volatility in the cotton yarn industry: Lessons from India*. Retrieved from [https://www.iisd.org/system/files/publications/trade\\_price\\_case\\_cottonyarn.pdf](https://www.iisd.org/system/files/publications/trade_price_case_cottonyarn.pdf)

11 Pradesh, A. (2015, December 19). Sircilla: A weaving industry fighting to survive. *Threads Unpicked*. Retrieved from <http://threads-unpicked.com/sircilla-a-weaving-industry-fighting-to-survive/>

in on their domain. The Indian government attempted to help these weavers by reducing customs duties on power looms and introducing the Technology Upgradation Fund Scheme in 1999 for the textile industry, with a 6% interest reimbursement and 15% capital subsidy.<sup>12</sup> However, this relief was inadequate for the weavers, who still had to deal with poor market conditions, meagre income, and tough competition.

In light of the low income and instability of weaving work in Sircilla, many young weavers began to switch professions, causing the number of weavers who were actively engaged in weaving to shrink by 13.3% between 1995 and 2010 despite an increase in the population. This departure of young weavers demoralised the community of weavers that had been left behind, as it was a testament to how dire the market conditions were. Additionally, only 10.9% of Sircilla weavers believed that their children would follow their footsteps and take up the loom as weavers due to the time-consuming nature of the work and low income.<sup>13</sup>

## **SPIRALLING DOWN TO ‘BELOW’ THE BOTTOM-OF-THE-PYRAMID**

### **Debt-Trap of Microfinanciers**

Sircilla weavers were already at the bottom of the pyramid, being the poorest socio-economic group in the community due to their low levels of income and high accrued debt. Upgrading from manual weaving to pre-owned power looms proved to be unsustainable as the short-term gains they achieved were transient.

12 “Upgradation” refers to the replacement of machine parts with newer or better parts as well as the purchase of new machinery. Source: IDBI Bank. (N. D.). *Fund scheme for textile and jute industries-TUF Scheme*. Retrieved from <https://www.idbibank.in/tufs-textile-jute-industries.asp>

13 National Council of Applied Economic Research. (2010, December 23). *Handloom census of India 2009-10*. Retrieved from <http://handlooms.nic.in/Writereaddata/Handloom%20report.pdf>

Coupled with the stagnation in both quality and quantity of cloth produced, the increased production costs over the years caused the income of many Sircilla weavers to further plummet to as little as \$14 per week. This environment of financial distress sparked a trend of borrowing money for professional and personal needs, with several handloom weavers resorting to taking loans to upgrade to power looms and then to buy yarn that was compatible with these upgraded power looms.<sup>14</sup>

A further complication was that these weavers began borrowing from microfinance corporations, which were organisations that catered to lower-income clients who were typically ineligible for loans from traditional sources of organised financial markets like banks due to the lack of proportionate assets that can serve as collateral. With stagnant market conditions and the relatively high interest rates charged by these micro-financiers, weavers soon accumulated insurmountable debt. Furthermore, these loans were often recovered on a non-negotiable schedule, adding to the despair of the debt-ridden weaver community.

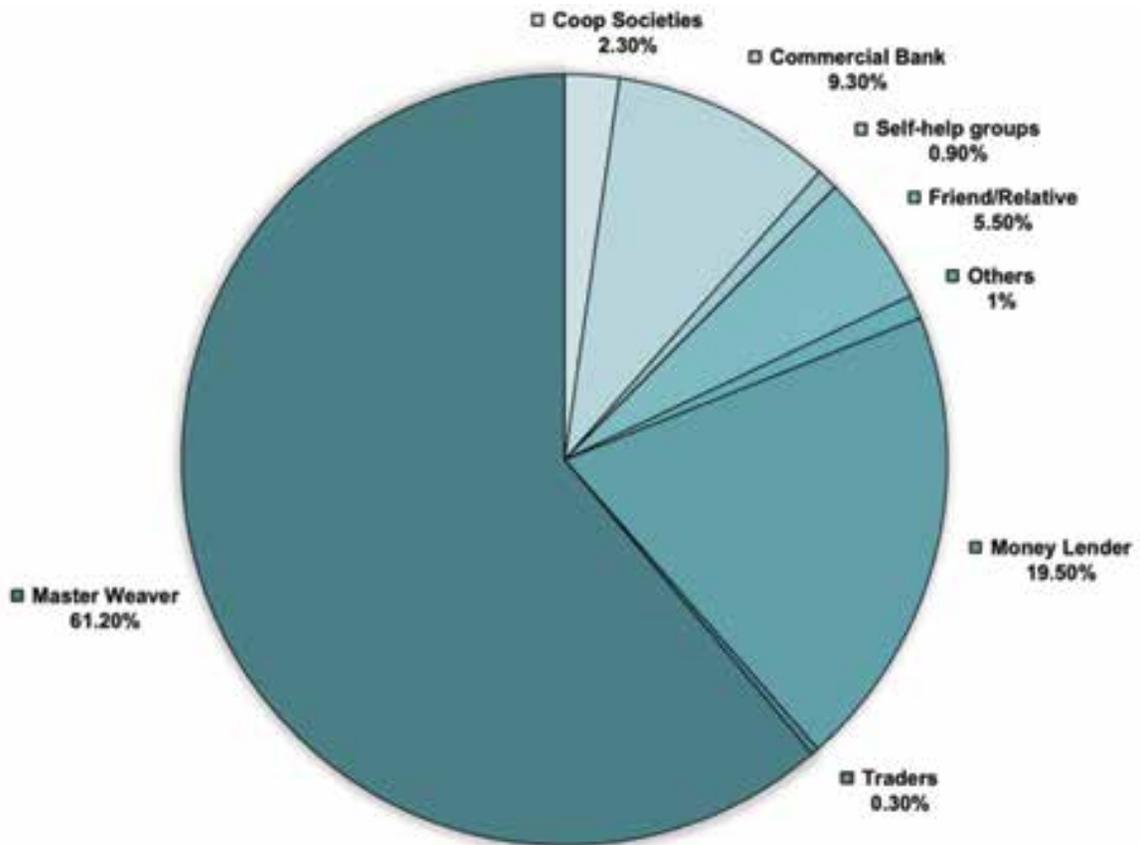
According to the 2010 handloom census of India, a total of 27,964 households had taken on debt to purchase materials for small scale textile operations, with 14,805 of those being rural indebted households; this was around 52.9% of all indebted households involved in small scale textile operations.<sup>15</sup> Master weavers, who were weavers at the top of the pyramid, were the main lenders and accounted for around 60% of the loans taken. This was immediately followed by money lenders, accounting for around 20% of loans taken. **Figure 2** below summarises the various sources of loans.<sup>16</sup>

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14 Rao, M. H. P. (2018, September 13). Weaving magic back into Sircilla. *Telangana Today*. Retrieved from <https://telanganatoday.com/weaving-magic-back-into-sircilla>

15 In Andhra Pradesh, the state where Sircilla had belonged before February 2014. The survey had been conducted at the state level.

16 National Council of Applied Economic Research. (2010, December 23). *Handloom census of India 2009-10*. Retrieved from <http://handlooms.nic.in/Writereaddata/Handloom%20report.pdf>

**FIGURE 2: SOURCES OF LOANS OF WEAVERS IN 2010<sup>17</sup>**

Source: 2010 handloom census of India.

### Inadvertent Smackdown by Government Policies

A debt relief scheme introduced in the 1990s covered overdues and outstanding monies owed by artisans, by up to \$135.<sup>18</sup> An “artisan” was defined as an individual who was “engaged in any activity of rural development relating to cottage and village industry, handicrafts, weaving and other rural crafts”: this included handloom weavers but not power loom weavers.<sup>19</sup> As such, this scheme was inapplicable to the numerous Sircilla weavers who had already transitioned to power looms.

<sup>17</sup> Andhra Pradesh was divided into two states in February 2014: the new state where Sircilla belongs is called Telangana.

<sup>18</sup> Vikraman, S. (2017, April 13). Express economic history series: In loan waivers, ‘moral hazard’ and continued hope for political gains. *The Indian Express*. Retrieved from <https://indianexpress.com/article/explained/express-economic-history-series-in-loan-waivers-moral-hazard-and-continued-hope-for-political-gains-4610914/> this would have provided sufficient support to the weavers to pay part of the loans and/or purchase of yarns.

<sup>19</sup> Agricultural and Rural Debt Relief Scheme, 1990, 018 Uttar Pradesh State Laws (1990). Retrieved from <https://www.latestlaws.com/bare-acts/state-acts-rules/state-laws/agricultural-rural-debt-relief-scheme-1990/>

Furthermore, inflation in the price of cotton, which was the main raw material for traditional weavers, had amplified adverse effects on weavers' businesses. In 1990, national cotton exports surged exponentially, scaling almost ten times to 374,000 tons between 1990 to 1991, from an annual average of 34,000 tons between 1996 and 1990. This hike in exports caused the cotton supply in India to dwindle and the prices for yarn to triple, posing a problem for the Sircilla weavers. Many of the smaller power loom enterprises were forced to cease operations, causing thousands of weavers across India to lose their main source of income. More of such exports were approved in early 1997, causing larger power loom enterprises to shut down as well. During this time, an increase in power tariffs across the state - up to five times of their original levies - worsened the situation for Sircilla weavers.

The difficulties of these issues compounded and pushed many Sircilla weavers deeper into despair. Dwindling income and skyrocketing debts forced these weavers further down the socio-economic pyramid. At this point, the weavers had either already collapsed or were truly on the verge of collapse. They were no longer at the bottom of the pyramid but rather - *they were below the bottom of the pyramid*.<sup>20,21</sup> These weavers were suffering not just economically but also psychologically. Realising that they no longer had any means to feed their family, several weavers in Sircilla chose to end their lives.<sup>22</sup> **Figure 3** depicts the annual number of suicides in the weaver population between 1997 to 2015.

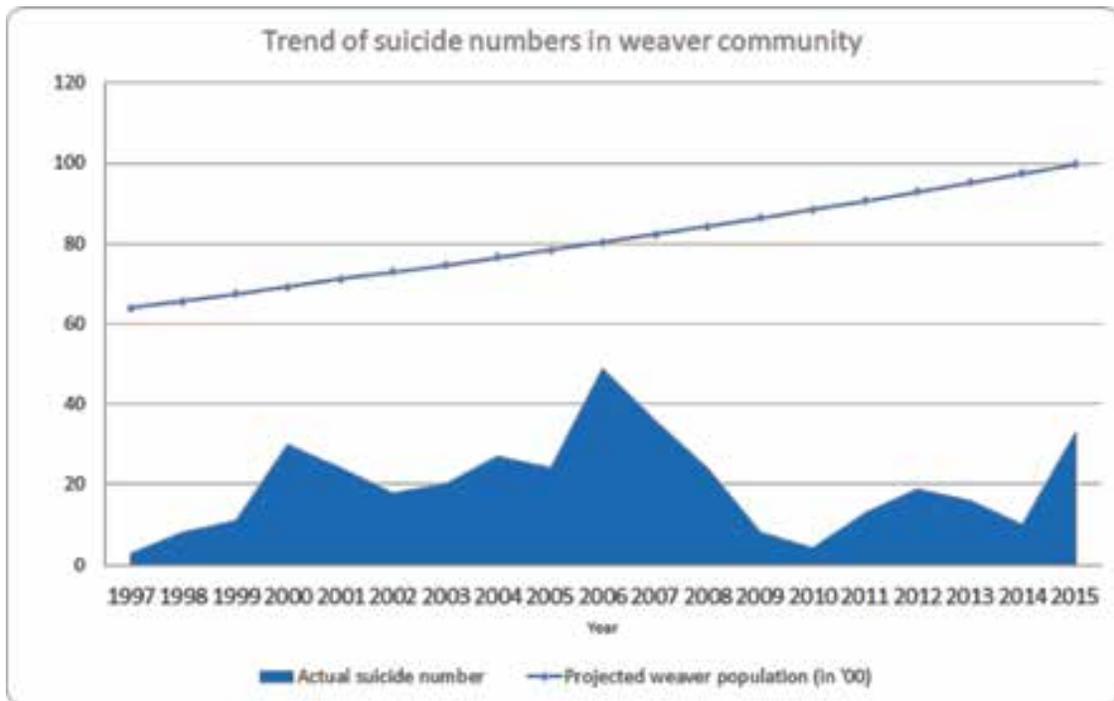
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20 INCITE! Women of Color Against Violence (Ed.). (2009). *The revolution will not be funded: Beyond the non-profit industrial complex*. South End Press.

21 Kivel, P. (2009). Social service or social change?. In INCITE! Women of Color Against Violence (Ed.), *The revolution will not be funded: Beyond the non-profit industrial complex* (pp. 129-151). South End Press. Retrieved from <https://sfonline.barnard.edu/navigating-neoliberalism-in-the-academy-nonprofits-and-beyond/paul-kivel-social-service-or-social-change/>

22 Patnaik, U. (2003). Global capitalism, deflation and agrarian crisis in developing countries. *Journal of Agrarian Change*, 3(1-2), 33-66.

**FIGURE 3: TREND OF POPULATION, WEAVER POPULATION, AND SUICIDE RATES BETWEEN 1997 AND 2015**



Source: Department of Handloom and Textiles, Rajanna Sircilla.

Between 1997 and 2015, the average suicide rate in India was 0.0028%. Alarming, during the same period, the average suicide rate in the Sircilla weaver community alone was 0.25% - nearly a hundred times as much. This was one of the highest statistics recorded for any community of a common profession in India. The high suicide rates resulted in weaving becoming an endangered profession in the district.

As an interim relief, the government provided palliative benefits to the grieving families of the deceased weavers. Distributing cash to bereaved families was argued to be counterproductive given that this compensation was *ex post facto*.<sup>23</sup> It was only much later that the root causes of Sircilla weavers' suicides were considered, and more

23 Rao, M. H. P. (2018, September 13). Weaving magic back into Sircilla. *Telangana Today*. Retrieved from <https://telanganatoday.com/weaving-magic-back-into-sircilla>

tailored interventions were introduced to reduce the suicide rates of the community.

## GOVERNMENT INTERVENTIONS

### 2004 – Ban on Liquor, Ex-gratia Payments

In 2004, alcohol was a common escape for the weaver community, resulting in a high prevalence of alcoholism.<sup>24</sup> The government temporarily banned the sale of alcohol to prevent further deterioration of their living conditions. Additionally, the new State Government considered the rising suicides and issued an ex-gratia payment policy for affected families.

Each family was paid ex-gratia<sup>25</sup> of approximately \$1,350 and an additional sum between \$670 to \$2,020 to repay debts. However, this did not seem particularly effective as many weavers still chose to end their lives due to financial and psychological distress during this period of time. After two years of implementation, this intervention bore some fruit - there was a temporary decrease in suicides between 2006 and 2009, but there was never a suicide-free year.

### 2009 – Ban on Repayment to Microfinance Firms

In 2009, the government banned the repayment of loans to microfinance corporations in light of numerous reports of coercive practices to secure loan repayments. The rationale for this finds basis in the suicide trends from 1997-2009 (see **Figure 3**).

In 2006, Muhammad Yunus, a pioneer of microfinance in Bangladesh, was awarded the Nobel Peace Prize. This sparked a microfinance

24 Galab, S., & Revathi, E. (2009). Understanding powerloom weavers' suicides in Sircilla. *Economic & Political Weekly*, 44(8), 12-15.

25 Paid voluntarily out of kindness, without the giver recognising any liability or legal obligation.

boom across India and other Asian countries: more microfinance companies emerged and more people began to take loans from these companies. This period also witnessed a corresponding higher rate of weaver suicide, with the death toll reaching an all-time high in 2006. The pressures of the microfinance system, which was often unyielding in its payment schedules with little room for negotiation, may have contributed to the already high suicide tolls in the Sircilla weaver community, making a case for the government to ban repayment of microfinance loans.<sup>26</sup> This seemed to lead to a brief decrease in suicides from 2009 to 2010, as seen in Figure 3. However, weavers eventually began borrowing money from similar informal agencies, at parallel extortionary rates. As the market conditions remained stagnant, several weavers fell back on loan payments and re-entered the debt cycle through local money lenders. Suicides began increasing again.

### **ANALYTICAL EXERCISE<sup>27</sup>**

In late 2016, a new administrative team took charge of the district. The local member of the State Cabinet, as a long-standing public representative, decided to make a permanent bid to eradicate suicides in the Sircilla weaver community and met the Chief Minister<sup>28</sup> of the State to ask for an enduring solution.

A two-pronged approach was suggested: first, ensure eradication of the weavers' suicides, and second, build efficiency and sufficiency. This strategy - survival first, efficiency later - was a clear overarching departure from the previous efforts made.

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26 We refer to the census of Andhra Pradesh since Telangana was only formed in 2014. In 1921, the state of Telangana was still a part of Andhra Pradesh.

27 The data provided in this exercise are modified for the case study without compromising the richness of the analysis/insights. Names and designations have been masked for protecting confidentiality.

28 Highest elected head of the government in the State.

Assume that you have been brought on board to help draft a new policy. Being trained to work with data, you begin by observing the statistics related to the issue.

You then obtain the data and tabulate the issues faced by weaver families who had lost an earning member (see the **Exhibit 1** for data related to surviving weavers). At the bottom of **Exhibit 2**, you tabulate the reasons related to the suicide. You then calculate correlations<sup>29</sup> using the suicide numbers and the interventions used. You summarise your findings in **Table 1**.

**TABLE 1: CORRELATIONS BETWEEN SUICIDE RATES AND PRE-2016 INTERVENTIONS**

Intervention	Correlation coefficient
Liquor Ban, Ex-Gratia Payments	0.23
Ban on Payment to Microfinance Firms	- 0.34

Source: Created by authors.

You then realise that the liquor ban and ex-gratia payments were actually associated with an increase in suicides, while banning payment to microfinance firms was associated with a decrease in suicides. This puzzles you. You remember from your MBA class that correlation is not causation and start investigating the actual reasons behind the weavers' suicides.

You realise that on top of being unable to repay microfinance firms and struggles with alcoholism, there are other reasons that may have driven the weavers to suicide. You start to wonder which of the other issues need to be tackled first and how exactly to tackle them. Over

<sup>29</sup> Assuming both variables are continuous (a year in which intervention has been implemented is marked with a "1", otherwise it is marked with "0").

the span of one month, you hold meetings with different stakeholders in a bid to garner some recommendations.

Firstly, you meet the representatives of families who had lost an earning member through suicide. Having read up extensively on the matter, you expect this to be a long and detailed meeting. You are prepared with the status of government responses on various matters and keep your officers ready with you for answering any sensitive questions. In fact, you are willing to go over and beyond the call of duty if it means a bereaved family could get back on its feet. However, to your surprise, when you meet the families, they ask for government housing, residential school seats for their children, and a permanent government job for the main earning member of the family instead of any support for their business from the government. They seem to have lost faith in their traditional occupation, and very clearly want out.

On the following Monday, you meet Ms. Divya Thota, the head of a non-governmental organisation. Based on her experience with clients over a decade she says that a liquor ban would be the most effective intervention. “Alcoholism breaks families down,” Ms. Thota says confidently. “A liquor ban would help weavers get sober and get their lives back on track. A liquor ban is definitely our best bet.” While her suggestion makes sense, you recall that suicide rates increased when a liquor ban was introduced. Nevertheless, you keep this suggestion in mind and thank her for the input.

A couple of days later, you meet a local politician Mr. Saidulu. “I believe that a ban of repayment to lenders would be a fantastic idea,” Mr. Saidulu said, with a ready enthusiasm. “Why not make the repayments of loans a criminal offence? This would make local informal organisations stop loaning money, stop their extortionary

practices and stop the weavers from borrowing money from them.”

“That’s a possible idea,” you reply, tempering Mr. Saidulu’s enthusiasm. “We will examine it.” Deep down, though, you are doubtful about cracking down on informal moneylenders. They rarely, if ever, show up on the government radar and there is also a genuine need for them in certain pockets of villages where banks do not have any branches. There is also the connected matter of loaning through self-help groups (usually prevalent in these parts and mostly consisting of women in the habitation) - firstly, they only lend out to their own, and secondly, from the repayment rates of more than 98%, the model does seem to be working on the ground. After all, microfinance corporations no longer operate in the ecosystems where such groups exist. You find yourself reluctant to disrupt this equilibrium.

A week later, you meet Mr. Narsing Rao, a respected former politician who retired in 2014. He takes a different tack. “Actually, why don’t we abolish the middlemen and have the government procure clothes straight from the weavers?” Mr. Narsing Rao suggests with a vivacious smile on his wrinkled face. “These middlemen take a huge cut of the weavers’ profits. Removing them from the equation would greatly increase their profit margin! If we do this, we have a good chance at helping them break even and maybe earn more to repay their debts.” You swiftly scribble this idea down on your notepad whilst keeping mum about the fact that the government has no need for procuring a high volume of clothes at the moment and that such a proposal could be a non-starter even before being placed on record.

Thinking about the crippling debts which the weavers have accumulated, you head to your desk and decide to ring Mr. Tirupati Reddy, a former banker, for ideas to support the weavers financially. “What the lending agencies are doing to the weavers is just deplorable,”

Mr. Tirupati Reddy's voice perforates through the loudspeaker, with loud noises of traffic (he stays in a big city, unlike you in Sircilla). With static muffling his voice he adds, "What we need is a safe and legal means for loans to support the weavers. Why not offer loans at competitive rates instead? This would be a win-win situation. The government earns interest, and the weavers have money to get back on their feet in the meantime. And if the government guarantees the loans, the bankers would be happy too!"

You then decide to reach out to Ms. Priya Samala, a businesswoman who works in the textile industry, for a fifth opinion. "Well, loans don't seem like a very long-term solution. Why don't we dissolve local stores and get the weavers to find employment at large textile centres? There is a textile park on the outskirts of our town. I could possibly pull some strings," Ms. Samala suggests. You protest - "But that will fetch us another 300 jobs at best, and would only happen after a protracted negotiation. These are at least eight to ten thousand people to be accommodated." "You asked me for a solution, I gave you one which works. Try to accommodate the rest in other textile parks or other professions in the State", she responds, annoyed at your speed breaker. You recognise that her idea does make at least some sense. Yet again, you write down a fresh batch of notes onto your already crammed notepad.

Meanwhile, word has spread that you are taking suggestions and meeting people. Unannounced, one day, Mr. Divakar Sanugula, a former Central Government employee with roots in Sircilla, who is now retired in a nearby town, comes to your office. You greet him warmly (he taught you in a Government employee training module earlier in your career), and offer him a cup of tea. "Why are you

not saturating the insurance cover?”<sup>30</sup> he asks. You try to maintain a straight face but then remember from your coursework that insurance has always been a priority on paper for the government - there is no shortage of well-designed government insurance schemes for specific groups, including weavers. “The Centre and State have come together for an excellent insurance coverage scheme - but lack of local faith has made it a non-starter,” he adds. “It is your job to evangelise it. Trust me, you will see results in the long-term,” he adds before leaving.

You are down to your last two meetings - the penultimate meeting is with Mr. Gopal Swamy, a well-known and respected civil society activist who has worked extensively with cooperative societies (or “co-ops”)<sup>31</sup> in the State. Due to his strong belief in democracy, he suggests that the only way to save the community is through the power of the grassroots. “Trust me, any intervention crafted and implemented without the grassroots will end in an abject failure,” Mr. Swamy says in a sombre tone. “We need the people to make this work,” he continues, as you nod your head in agreement. He suggests that you draft a detailed proposal to strengthen the cooperative framework and allow the local units to organise themselves in a bottom-up manner.

Finally, you speak to Dr. Jyothi Mandava, an academic well known for her extensive work on businesses at the bottom of the pyramid. After you go through the case of Sircilla weavers with her, Dr. Mandava frowns and lets out a dejected sigh. “My work focuses on enterprises at the bottom of the pyramid, but these weavers are working below the bottom of the pyramid. You will have to work from the first principles.

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30 Adding more people to the insurance scheme so that everyone eligible is covered.

31 A cooperative is an “autonomous association of persons united voluntarily to meet their common economic, social and cultural needs and aspirations through a jointly owned and democratically-controlled enterprise.

What works for businesses at the bottom of the pyramid may not work for the weavers who are below the bottom of the pyramid,” she warns. Your face falls somewhat. She notices that and adds, in what seems to be her manner when dealing with her four-year-old son, “You know, you can simply implement everything. That way, one of the interventions is bound to work!” before shuffling across to the door and taking her leave.

After a month of speaking to various stakeholders, you retrieve your notepad, and your eyes water as they scan through numerous pages of your cursive handwriting, hoping for a solution to present itself. However, you are torn as you realise that all the recommendations made have their merits and may be equally valid. Whilst you attempt to make a choice, an unpleasant possibility also emerges - what if you have missed out on something critical? But then, you figure, you have met everyone you possibly could - surely there is a solution hiding amongst all their comments?

As a decision-maker, you have to think critically and choose an appropriate solution. What will you come up with?

**EXHIBIT 1: ISSUES FACED BY SURVIVING WEAVERS**

Year	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
<b>Intervention Implemented</b>																			
<b>Surviving Weavers</b>	6895	6563	6737	6900	7093	7274	7450	7626	7816	7983	8193	8406	8629	8844	9052	9268	9498	9737	9953
<b>Issues faced</b>																			
<b>Alcoholism</b>	13	30	20	15	29	30	22	12	18	22	28	20	16	38	11	32	26	21	21
<b>Microfinance &amp; Bank Loans</b>	24	9	22	31	34	21	37	25	14	21	16	11	15	14	19	14	37	27	49
<b>No insurance cover</b>	24	26	9	14	34	29	25	35	25	28	10	29	35	16	33	41	22	47	26
<b>Loans Breakdowns</b>	25	20	33	10	15	32	30	8	26	8	13	38	29	9	24	12	14	26	19
<b>Low Demand</b>	27	19	32	28	18	34	24	16	12	39	34	28	12	23	11	19	33	38	32

Source: Created by authors.

**EXHIBIT 2: INTERVENTIONS AND SUICIDE RATES BETWEEN 1997 AND 2015**

Year	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	
Intervention Implemented	Liquor Ban, Ex-Grain Payments																			
													Ban Payment to Microfinance Firms							
Wearer population	6398	6571	6748	6930	7117	7292	7470	7653	7840	8032	8229	8430	8637	8848	9065	9287	9514	9747	9986	
Suicide count	3	8	11	30	24	18	20	27	24	49	36	24	8	4	13	19	16	10	33	
Issues faced																				
Alcoholism	3	8	9	18	15	12	13	14	18	25	30	19	8	3	9	12	14	7	20	
Microfinance & Bank Loans	2	4	11	28	20	9	17	19	20	25	26	20	8	4	11	18	9	10	28	
No insurance cover	3	7	11	17	13	15	17	25	15	43	24	12	6	2	11	12	12	6	19	
Loans Breakdowns	2	4	6	17	15	14	15	22	24	47	35	16	8	4	10	14	12	8	18	
Low Demand	2	7	9	16	15	10	17	26	24	44	30	15	6	2	9	16	15	6	26	

Source: Created by authors.

# About the Editors



## **Foo Maw Der**

Foo Maw Der is a Professor at Nanyang Business School, Nanyang Technological University (NTU), where he is Director of the Asian Business Case Centre and Director designate of the Nanyang Technopreneurship Centre. Prior to NTU, he held faculty positions at the National University of Singapore (NUS) and the University of Colorado, Boulder (CU Boulder). He held honorary/guest professorships in Jilin University and Nankai University.

Maw Der co-founded Startup@Singapore and was a lead organiser of MIT's 50K (now 100K) business plan competition. He was a faculty fellow of the Asia Centre for Social Entrepreneurship and Philanthropy, and granted seed funding to social enterprises through the Lotus-NUS Fund. One of his primary interests lies in promoting fair and sustainable business practices. He is currently the Vice Chairman of the Consumer Association of Singapore CaseTrust's Advisory Council, and as a Societal Impact Fellow at the NTU Institute of Science and Technology for Humanity.

In the year 2000, at NUS, he was on a committee to jumpstart entrepreneurship at the University. Then, at CU Boulder, he was a faculty fellow of the Deming Center for Entrepreneurship. More recently, at NTU, he contributed to the establishment of a formal

Major in Entrepreneurship and served in a University task force to ramp up innovation and entrepreneurship across the University.

Maw Der's research uses management concepts to understand entrepreneurial processes in high growth startups. Past projects have delved into cognition, teams, and emotions, and how these processes impact individual well-being, team functioning, and venture success. His studies have been published in several premier journals, including the Academy of Management Journal, Entrepreneurship Theory & Practice, Journal of Applied Psychology, Journal of the Academy of Marketing Science, Journal of Business Venturing, Management Science, and Strategic Management Journal.

Maw Der is currently on the Editorial Review Boards of five Financial Times top business journals (FT50): the Journal of Business Venturing (as Field Editor), Entrepreneurship Theory & Practice (Editor from 2010 to 2017), Academy of Management Journal, Journal of Management and Strategic Entrepreneurship Journal.

Apart from this collection of cases, he has published two books with Cengage: *Unlikely Innovation: How Corporations Innovate to Lead Their Markets and Entrepreneurship: Theory, Process, Practice, An Asia Edition*.



### **Koh Cheng Boon**

Koh Cheng Boon is a Senior Lecturer at the Leadership, Management & Organisation (LMO) Division in Nanyang Business School, Nanyang Technological University (NTU), where he is also Deputy Director of the Asian Business Case Centre. He was awarded the Teaching Excellence Award in 2018 and the prestigious Koh Boon Hwee Scholars Award in 2017. Cheng Boon is fluent in English and Mandarin and has hosted several webinars and delivered NTU EMBA lectures in the latter language.

Cheng Boon was the Programme Director for AB1601 Organisational Behaviour and Design from 2012 to 2019. Currently, he serves as Programme Director for many graduate programmes and courses, including MSc Human Capital Management (HCM) and the Management Development Programme offered to high-potential managers as part of Nanyang Executive Education at NBS. He is also the Programme Director for the postgraduate courses B6888 Independent Research Module and SF 0002 Leadership in Context.

Prior to joining NTU in 2012, Cheng Boon was a Commander in the Republic of Singapore Air Force (RSAF); his last appointments were Commander of the Air Warfare Training Institute (AWTI) and Head of the Training Development Group from May 2007 to Dec 2011. During his tenure, he was involved in various milestone events such as the establishment of the Air Force Training Command (AFTC) and several National Day Parades (NDP). In 2003, he worked closely with various government and civilian agencies to develop a comprehensive security protection plan for the President of the United States' visit to Singapore. Cheng Boon was also actively

involved in the transformation journey of the 3<sup>rd</sup> Generation (3G) RSAF, in which he was a key leader in the change management process at AFTC.

Apart from his academic commitments, Cheng Boon serves in the Advisory Committee for the Singapore National Employers Federation (SNEF), where he played an advisory role in the development of the Structured Career Planning Session (SCPS) Guide. He has also been invited to speak publicly about Change Management and Learning Design, both in and outside the University.

Cheng Boon provides independent business consultancy services to various organisations (past and current clients include SMRT Corporation, Civil Aviation Authority of Singapore, National Council of Social Service, National Environment Agency, National University Hospital, Public Utilities Board, Hudson Singapore, Essentra, Roche Singapore, and the Singapore Armed Forces). His specialties include organisational development, leadership selection and development, personality assessment, and candidate selection amongst others. He is a certified Executive Coach who has been appointed to coach Commanding Officers in the SAF.

Cheng Boon's research interests include crisis leadership, emotional intelligence and leadership effectiveness, confidence-accuracy calibration, career transitioning, learning styles, and training development and evaluation. His research has been presented at the International Applied Military Psychology Symposium (IAMPS) and the International Military Testing Association (IMTA). Apart from this collection of cases, he has published an e-book titled *Science and Art of Leadership*.



### **Madeline Pua**

Madeline Pua graduated from the Royal Melbourne Institute of Technology with a Bachelor of Business (Management). She is currently an Assistant Manager at Nanyang Business School (NBS), Nanyang Technological University (NTU). In this role, she provides Assurance of Learning (AoL) – a key requirement for maintaining the School’s accreditation with AACSB and EQUIS – support for all the undergraduate courses at NBS. Her role also entails the collation and submission of official survey data for participation in ranking by leading business publications. In addition, Madeline is involved in quality assurance of the cases published by the Asian Business Case Centre (ABCC). In recognition of her extraordinary service, she was awarded the NTU Administrative Excellence Extra Mile Award and the NBS Service Excellence Award in 2021.

Prior to NTU, Madeline worked for the Victory Family Centre, Singapore, a non-profit organisation with an operating network of more than 10,000 churches in almost 100 countries. There, she drafted guidelines, policies, and standard operating procedures for the senior management team.

Madeline is passionate about sustainable human development. She served as a humanitarian missionary for a year in one of the Asian countries. During her stint, she supported the church in administrative functions to aid in operations on the ground and conducted leadership and language training for local leaders and staff.

