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Singapore Unlimited: A Global Benchmark for Strategic Innovation, Resilience, and Overall Sustainability

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Abstract: Both current and future global challenges, such as growing economic instability, widening social inequality, access to food and potable water, proper education and healthcare, are provoked by climate change, environmental degradation, overpopulation, as well as irresponsible private greed and public impotence. This paper aims to display how the combination of a clear strategic vision, diplomatic excellence, environmental awareness, and resilience allows a small city-state, scarce in land and natural resources, to continue its sustainable success story, serving as not only a regional but also a global benchmark. The intentional and systematic building of a welfare state in the midst of a region characterized by historic conflicts and colonial exploitation is based on the unique synthesis model of Singapore, allowing long-lasting stability and prosperity. Strategic government planning, cooperation in various areas (digitalization, education, environmental protection, FinTech, research and development, smart cities) in the form of highly goal-oriented public-private partnerships or mission-based ecosystems serve as an ideal breeding ground for creating shared value, including sustainable economic development, social responsibility, and overall security. The applied innovation-driven approach renders possible the continuity of Singapore's exceptional advantage as a regional hub and benchmark.

Keywords: effective diplomacy; global benchmark; holistic education; overall sustainability; resilience; Singapore; strategic innovation

1 Introduction

A global state of emergency, defined by the lack of value-based leadership, the mainly profit-oriented corporate shortsightedness, the growing distrust in public and civic institutions, as well as the seemingly unbridgeable cultural gaps and civilizational differences, exacerbates the problem of acute tensions building (cycle of violence) and morbid discrepancies (extreme inequality, living conditions, social



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instability and insecurity, both explicit and implicit modern slavery, etc.). Hence, the ever-growing number of chinks in the shield amplifies the signs of the overall dysfunctionality of the current global order. The imminent threats posed by climate change, the inevitably required structural changes, the fragility of global value chains as experienced as a result of the coronavirus pandemic, the interdependence of each link, as well as the resulting volatility of economies deeply entangled in international trade and service providing undeniably call for the application of multidimensional and multitask management strategies.

Just like at the moment of its newly gained independence back in 1965, once again and out of pure necessity, Singapore is facing another major hurdle. Due to the high-end digital infrastructure, as well as the exceptionally open and business-friendly environment, registering a company (e.g. a limited liability company) in Singapore only takes a few hours. Opportunities in the Southeast Asian city-state are nearly limitless, activities giving added value are more than welcome and appreciated. Nevertheless, a cacophonic symphony of challenges puts the resilience of the hard-fought welfare state to the test. In order to successfully perform the necessary transition to a truly sustainable economy and society, a comprehensive effort in form of an overall national movement, including a wide range of measures and projects, creativity-boosting education for intellectual capital building and cutting-edge innovation, is needed for Singapore to maintain its exemplary position.

An overview of the elements of the regional commercial and financial hub's unique success story allows us to understand the dynamics behind the creation of a benchmark state of excellence from a very disadvantaged starting position. Also, the examination of its valuable set of assets clearly shows that it is in possession of the prerequisites to become sustainable. Furthermore, this research highlights both the steps already taken and the strategic plans laid out to repeat the 'Singapore miracle' on a more elevated level of development.

2 Methodology

This paper is part of an ongoing research project, started in 2019, that aims to determine the unprecedented and unmatched path of sovereign Singapore in the context of sustainable development. It synthesizes sector-specific facts in order to highlight interactions and prospects in the light of an ever-changing local and global environment.

With regard to the complexity of the topic and due to the fact that Singapore's strategy consists of mostly interdependent elements, this research was conducted with the integration of the holistic approach and deductive method. Hereby, both economic, environmental, infrastructural, historical, political, social, and technological aspects were taken into account. Because of the limited availability



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of scientific literature for this niche, the proven transparency of local authorities and relevant government agencies enabled the use of official publications (assessment reports, media releases, project presentations, speeches, surveys) and statistics as reliable sources. Evaluation of retrieved datasets showed consistency with indexes elaborated by various trusted intergovernmental international organizations and independent research institutes. Furthermore, the thematic analysis used quantitative data and qualitative findings, published in articles and expert opinions of recognized media outlets.

3 Results

3.1 Driving Factors of Sustainability

3.1.1 Foundation

Per definition and in economic terms, the concept of sustainability is about producing goods and providing services without exploiting, let alone depleting, irreplaceable natural, “financial, social resources”, as well as irreparably damaging the environment in order to maintain and improve a highly developed level, or “to achieve successful catching-up and social welfare” (MNB, 2021: 7) in the case of emerging countries. Irrefutable evidence and data confirm the impact of human activity as a catalyst for climate change (IPCC, 2021: 12). Therefore, Resolution 48/13, adopted by the United Nation’s Human Rights Council in October 2021, recognizing “the right to a clean, healthy and sustainable environment as a human right that is important for the enjoyment of human rights” (UNHRC, 2021), is a crucial milestone. It underlines the urgency of any human activity to be in compliance with the altogether 17 Sustainable Development Goals, outlined in the 2030 Agenda (UN, 2015), adopted by the United Nations in 2015.

The interconnected combination of the following platforms serves as a foundation for global sustainability efforts to be even possible to succeed. The Sendai Framework for Disaster Risk Reduction (2015) highlighted climate change as a factor that exacerbates the “increasing frequency and intensity” of natural disasters (UNDRR, 2015: 10). The Paris Agreement (2016) set out to limit the global average temperature increase by a maximum of 2, but preferably 1.5°C above pre-industrial levels and to significantly reduce greenhouse gas emissions. The Glasgow Climate Pact (2021) reaffirms the previous limitation commitment, urges to speed up the carbon neutrality process, technology transfer, and climate/green financing, as well as accentuates the necessity to put an end to deforestation (UNFCCC, 2021).

Using Galileo Galilei’s analogy that “mathematics is the alphabet with which God has written the universe,” it can be concluded that statistical data and projections on



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population growth and aging, human fertility and mortality, as well as net international migration are key elements in determining the trend of or, in other words, the present and "future challenges to sustainable development" (UN DESA, 2019: 3). The constant growth of the total global population (an estimated 8.5 billion people in 2030 and 9.7 billion in 2050) (UN DESA, 2019: 5) is aggravating the global challenge.

A sustainable economy provides the resources to ensure sustainable living conditions for the population and the conditions for building a knowledge-based, resilient society. Also, international cooperation is essential to address global challenges effectively (Hean, 2017).

3.1.2 Modeling Sustainability

Amidst the global challenges of overpopulation, urbanization, climate change, resource scarcity, social inequality, business ethics, stakeholder responsibility, as well as transparency, sustainability models display corresponding objectives, priorities, and values. Those models revolve around four areas based on economic (corporate), environmental (ecological), social, and governance impacts, also taking into account diverse driving and influencing factors (finance, legislation, technology, etc.) to illustrate this densely woven web as precisely as possible.

A great initiative dates back to 2007, when an ecologically responsible Taiwanese textile producer implemented its very own Everest SustainAbility Model (ESM), "based on the 7R Discipline (rethink, redesign, reduce, reuse, repair, recycle, recover)," that "emphasizes balanced development among economy, society, and environment" (Everest Textile, 2021) and reflects everything that urgently needs to be done on a global level. The Doughnut Model of Sustainability, created by Kate Raworth in 2017, represents another interesting and useful tool. This complex, multilayer analysis not only takes economic, ecological, political, as well as social factors and their level of interaction into consideration but also allows to determine their respective shortages or excesses relative to the "safe and just space" (Raworth, 2017: 49) of optimal functioning in terms of sustainability. The ever-evolving environment and the complexity of this specific model justify a detailed analysis of Singapore that shall be presented in a separate paper.

Though the current research does not aim to analyze the (local) ramifications of the coronavirus pandemic, they are undoubtedly omnipresent. As a consequence, the global healthcare, as well as the resulting economic, psychological, social, and moral crisis are obvious obstacles in the advancement of sustainability efforts, mostly in terms of available funds for necessary financing. On the other hand, the multifaceted challenge posed by climate change, the demographic explosion, recurring pandemic waves, and urbanization, requiring rapid responses and instant solutions, inevitably provokes an acceleration in the digitalization process, cross-border and cross-sector collaboration, all accelerating the transition towards



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comprehensive and truly sustainable development. However, despite all the scientifically proven data, numerous professional suggestions, and expert warnings, the required global joint effort to tackle this very complex set of challenges is deeply undermined by unilateralist leanings or already implemented fragmented national responses, as well as the ongoing trade war between the world's two largest economies, the People's Republic of China and the United States of America. On top of that, there is an acceleration in the tendency of sharply "rising public and corporate debt" (IMF, 2018: xi) levels, predating the pandemic, that aggravates the unwillingness to both tangible and effective international cooperation and solidarity.

3.2 Correlation Between Innovation and Sustainability

The ancient Greek philosopher Plato described necessity as the "real creator" of invention or, to use a more contemporary term, innovation. Since the deeply interconnected biosphere is gradually deteriorating, the complex sustainability challenge mankind faces undeniably exhibits the urgency for joint action. "We need a level of ambition similar to that of the Marshall plan—which created the OECD—and a vision akin to that of the New Deal, but now at the global level." (OECD, 2020: 3), according to OECD Secretary-General Angel Gurría.

There is nothing new about the fact that one's main rival is always within, both on an individual and a community level. Overcoming the physical, mental, and psychological obstacles takes bold visions, steadfast determination, endurance, and self-criticism to be able to perform optimal adjustment whenever necessary. Also, numerous examples show how to implement a strategic plan. Consequently, empirical observation clearly points at the prerequisites of a successful shift to a sustainable future. A change in the mindset of public officials, investors, and the general population mainly depends on fine-tuning regulatory instruments, as well as raising the level of awareness, responsibility, education, and proper incentives. In addition to that, building a comprehensive infrastructure with intelligent financing, featuring both hard and soft elements, enables "open and collaborative innovation" operating within a multi-stakeholder, cross-border framework (UNCTAD, 2017: 21–29).

Innovation-driven structures are largely defined by the number of intellectual property (IP) filings. East and Southeast Asia (especially the People's Republic of China, the Republic of Korea, and Singapore) are rapidly overtaking classic North American and European IP leaders both in numbers and in per capita proportion (WIPO IP Statistics Data Center, 2021). Furthermore, inclusive innovation generates inclusive development, which implies that adopting an integrated approach shall increase the effectiveness (UNCTAD, 2017: 8–9) and accelerate the transition to sustainability.



A new paradigm for cooperation on global challenges seems promising. The idea of the mission-based ecosystem (Figure 1), introduced at the World Economic Forum in 2021, is that successful solutions to the current complex challenges depend on a strong and shared mission that mobilizes the intellectual potential of participants and stimulates focusing, as well as on the promotion of self-sustaining, complementary operations (Romeo et al., 2021).

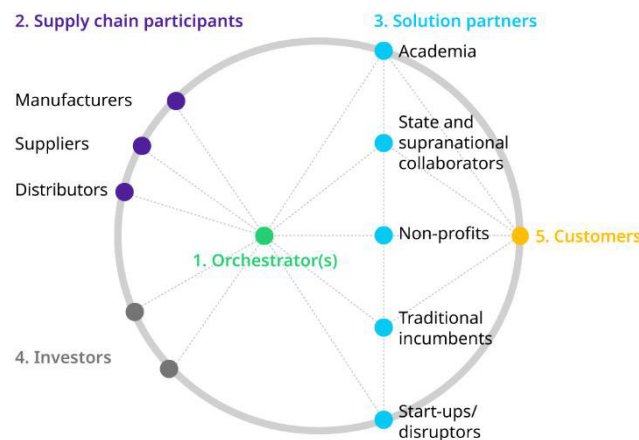


Figure 1

Illustrative Model of an Effective Mission-based Ecosystem

Source: Oliver Wyman Analysis Available: <https://www.oliverwyman.com/our-expertise/insights/2021/feb/a-new-paradigm-for-collaboration-mission-based-ecosystems.html>

The imperative hereby is to put such innovative methods to the test in order to gather valuable data in a relatively short period of time as pressure is intensifying by the hour. Since starting its journey as a sovereign state, Singapore has been being a living laboratory. It is the experience of working against all odds that allows an in-depth analysis of its ever-evolving and ambitious vision, by reason of this current research, primarily in terms of sustainability.

However, empirical scientific results reveal that innovation willingness (desirability) and capabilities (feasibility) are less of the barriers to innovation and sustainability—in particular in the bioeconomy—than the innovation opportunities (unsuitable institutional framework and policies) (Wilde – Hermans, 2021) that require urgent and customized adjustments. In addition, “eliminating the provision of finance for fossil fuel developments internationally goes hand-in-hand with increasing climate finance, and stopping fossil fuel subsidies” (Stockwell et al., 2021: 7), which is desperately needed for successful mitigation, disaster prevention, and catching-up of primarily low-income countries in the most affected regions.



4 Discussion: Past, Present, and Future

4.1 Singapore's Strategic Vision and Endurance

4.1.1 From Poverty to Wealth: A Unique Success Story

The story of independent Singapore is—apart from the periodically appearing economic or healthcare crises sweeping over the region or most of the planet—one of constant development, filled with outstanding achievements. It often takes a charismatic leader with a clear vision to steer a country to a wealthier state, like in the case of Lee Kuan Yew (1923–2015) and Singapore's outstanding metamorphosis. This stands in harsh contrast with the German post-WWII approach that distances itself from visionaries, based on some deterring historical examples, as the famous quote by former German chancellor Helmut Schmidt, according to which "Anyone who has visions should go to the doctor," (Palmer, 2015) shows. Evidently, the newborn city-state did not have to tackle a shameful past. Following centuries of European colonization, at the time of the proclamation of its independence in 1965, Singapore found itself in dire straits.

Naturally, the city-state's unique geolocation at the crossing point of major maritime trade routes has been being its greatest asset, but wouldn't have been enough by far to rise to the elite club of industrialized welfare states. It took the right combination of a strategic vision, unflinching determination, bold policies, tough measures, and a joint effort. "Targeted crime reduction policies, effective policing and the combating of corruption (...) are the key elements of the Singaporean model of governance that helped bring down levels of violence and crime" (UNODC, 2019: 27), laying the foundation for the comprehensive social contract established that, to this day, is built upon the trusted partnership, the meritocratic system, and the rule of law. Defense capabilities had to be created in order to compensate for vulnerabilities and by mastering the art of balancing diplomacy, practiced ever since, with the goal of "winning the influence game" (Watkins et al., 2001).

Lee Kuan Yew's legendary and exemplary strategic vision, conceptualized based on extensive research, is a highly interconnected conglomerate of concepts. Creating an open economy with a business-friendly, transparent (i.e. practically corruption-free) environment, a strong state marked by good governance, as well as both effective and efficient bureaucracy attracted foreign investments to this culturally and ethnically diverse melting pot. Soon, "TNCs and their global/regional networks entangled" (Magasházi, 2021: 220) Singapore, making it a regional commercial, distribution, and financial hub, having the busiest transshipment container and the world's second largest port. For a country that lacks farmland and natural resources, investment in human capital, as the most valuable natural resource, proved to be vital. Therefore, special emphasis has been being put on



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building a highly competitive education system and a most extensive social safety net. Singapore's first major transition from a mere manufacturing location to a dominantly value-added service-providing economy, devoted to research & development, ultimately led to the development of a thriving high-tech sector.

Even without calling it by its name, Lee Kuan Yew understood the concepts of sustainability and sustainable development long before becoming global trends and requirements. For his vision to become a reality, the leadership "set out to transform Singapore into a tropical garden city" (Lee, K.Y, 2014: 189), the then Prime Minister leading by example with planting trees on numerous occasions. Hereby, the utmost importance of an effectively and successfully implemented strategic vision is reflected in the anonymous Greek proverb saying that "a society grows great when old men plant trees whose shade they know they shall never sit in." More than five decades later, this tradition still lives on; a symbolic gesture sending out a clear message of commitment and continuity as far as striving for sustainable development and becoming a benchmark of excellence, in the long run, is concerned.

4.1.2 A Global Benchmark of Excellence

A number of ambitious and inspired leaders around the world have questioned whether Singapore's remarkable journey could be replicated or, at least, parts of it adapted to other cultures or countries. Taking education, as one of the main elements contributing to the city-state's development to this date, as an example, it is fair to say that despite the possibility "for smaller higher education systems such as in Singapore or Hong Kong to import the whole systems by attracting talented academics from abroad", it rather seems "impossible for the midsize higher education systems" (Lim – Shin, 2018: 184), which renders it much harder to copy a success story. However, the adaptation of some core features and the implementation of best practices can largely contribute to improving the overall quality and effectiveness even under different circumstances.

While only accounting for 0.073% (5.7 million people) of the total world population, Singapore's gross domestic product (GDP) based on purchasing-power-parity (PPP) (560 billion USD) represented a 0.424% share of the world total in 2020 (IMF, 2021). Despite its small size (726 km²), this particular welfare state has been leading international rankings in a wide array of fields (Chart 1) for years. This reflects not only the resilient nature of the meticulously woven fabric that many regard as the main driving force behind the 'Singapore miracle' but holds real potential for further growth with regard to sustainability.



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Table 1. Singapore's Merit/Medal Table (Compiled by the authors)

Category	Year	Rank
<u>Asian Digital Transformation Index</u>	2016–	1.
<u>Global Competitiveness Index 4.0</u>	2019	1.
<u>Public Safety</u>	2019	1.
<u>End of Childhood Index</u>	2018–	1.
<u>International Student Assessment</u> (Reading, Mathematics, Science)	2015–	1.
<u>Index of Economic Freedom</u>	2021	1.
<u>Ease of Doing Business</u>	2020	2.
<u>Top Container Ports</u>	2018–	2.
<u>Network Readiness Index</u>	2020–	3.
<u>Global Financial Centres Index</u>	2021	4.
<u>QS World University Ranking</u> (National University of Singapore / Nanyang Technological University)	2019	11. / 12.

Compiled by the authors according to the sources above

A cooperative ecosystem requires a healthy and functioning public-private partnership environment, where sharing know-how and best practices is essential. Also, there is an urgent need for cross-border collaboration in order to speed up the catching-up process of less developed economies and, thus, avoid future conflicts. It is at that point where Singapore leads the way in "promoting innovation, skill and productivity enhancements, and transformation of key industries" (Parks et al., 2018: 63) in the Southeast Asia region. "The Singapore Cooperation Program (SCP), established in 1992, has focused largely on capacity building and technical," instead of financial "assistance" (Parks et al., 2018: 24). Singapore's approach has been shared "with more than 132,000 government officials from over 180 countries, territories, and intergovernmental organisations in areas such as the green economy, sustainable development, urban planning, flood and water management, and disaster risk reduction," (Fu, 2021) thus, contributed to accelerating the catch-up process of less developed regional and global partners. Within the framework of a joint regional initiative of ASEAN+3 and The World Bank, the Southeast Asia Disaster Risk Insurance Facility operates from Singapore as "a platform for financial preparedness to disasters" (SADRIF, 2021) by improving resilience.



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4.1.3 Challenges

An inevitable shift from an investment- and, consequently, consumption-driven to an innovation-driven economic structure is needed in order to enable sustainable development. Therefore, intensive research and development activities, as well as sustainability-enhancing innovations are substantial. Countries that have already gained experience in serving as an ideal breeding ground for startups, future-oriented laboratories, and innovation centers or clusters are in an advantageous position. However, finding adequate responses to and executing strategic planning for the sustainability challenge requires a preliminary in-depth analysis of both the current state and the prospects of any given organization or political entity.

The classic, competition-based SWOT analysis (Chart 2) displays the present situation of the interaction of various factors. It allows identifying the assets available to stakeholders and the elements, trends mostly beyond direct influence or imminent adaptability.

Table 2. SWOT Analysis of Singapore

Strenghts	Weaknesses
(Political and social) stability Transparency – Diplomacy Open economy (free trade, hub) Education – Digitalization Sound financial assets – Resilience	Land scarcity Lack of natural resources Dependence on fossil fuels
Opportunities	Threats
Cooperative ecosystems (PPPs) Innovation (IPs) Structural change (smart, intelligent) FinTech – Green finances – Web 3.0	Climate change Population ageing and decline Labor shortages Volatility of economy China–U.S. trade war

Compiled by the authors according to the sources above

Due to the scarcity of natural resources and land, Singapore faces multiple challenges with regard to its fuel mix and the transition of its electricity infrastructure (Figure 2). Since the deployment of renewable resources, for geological reasons (calm seas, narrow tidal range, lack of rivers and geothermal energy sources, low wind speed) (NCCS, 2021b), is virtually limited to solar PV systems and waste-to-energy plants (APEREC, 2021: 182), accounting only for a marginal portion of the energy supply, the city-state is dependent on fossil fuel imports. Although piped and liquefied natural gas—the cleanest burning fossil fuel—accounts for about 95% of the city-state’s power generation (SES, 2021), it still undermines carbon neutrality goals.



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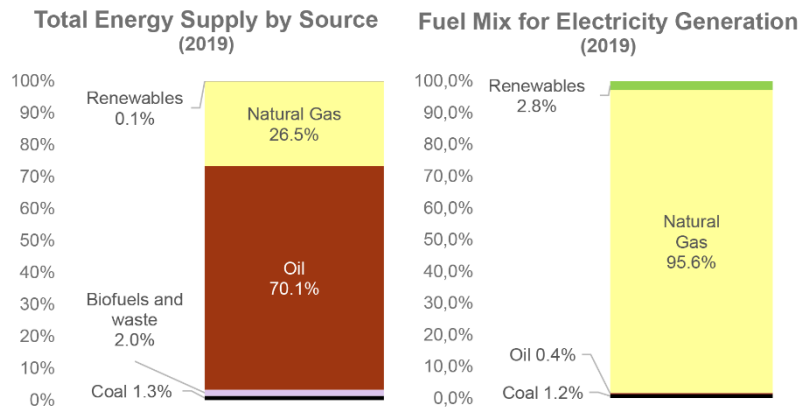


Figure 2

Singapore's Total Energy Supply by Source (2019) and Fuel Mix for Electricity Generation (2019)

Sources: IEA World Energy Balances / Singapore Energy Statistics; Compiled by the authors

The city-state's vulnerability to the various threats (mostly flooding because of rising sea levels and heavy rainfall) posed by climate change is immense. Despite the fact that Singapore's carbon intensity (i.e. carbon dioxide emissions per dollar of economic output) is relatively low, ranking 126th out of 142 countries examined, per capita emissions are high (27th) (NCCS, 2018). In contrast to the pledges made by most developed countries, Singapore has determined to reach its net-zero target by only 2060. Also, while "moving from an emissions intensity target to an absolute cap on emissions and adopting the latest IPCC¹ reporting guidelines, as well as gas coverage, the level at which Singapore will limit emissions remains unchanged," (Stockwell et al., 2021: 15), which marks Singapore's overall climate targets as being "critically insufficient" (Figure 3) by the Climate Action Tracker research consortium.

Since creativity drives innovation that is indispensable for sustainability, the Teach Less, Learn More initiative, launched in 2005, aims to develop children's creativity and prepare them for life (Loo, 2018). In addition, Singapore has been at the forefront of adjusting its education system in compliance with the requirements of future-oriented sectors and professions, based on continuous consultations between the government, educational institutions, and corporations active in the city-state. These companies are not simply partners but regarded and treated as allies (Magasházi, 2020).

¹ Intergovernmental Panel on Climate Change



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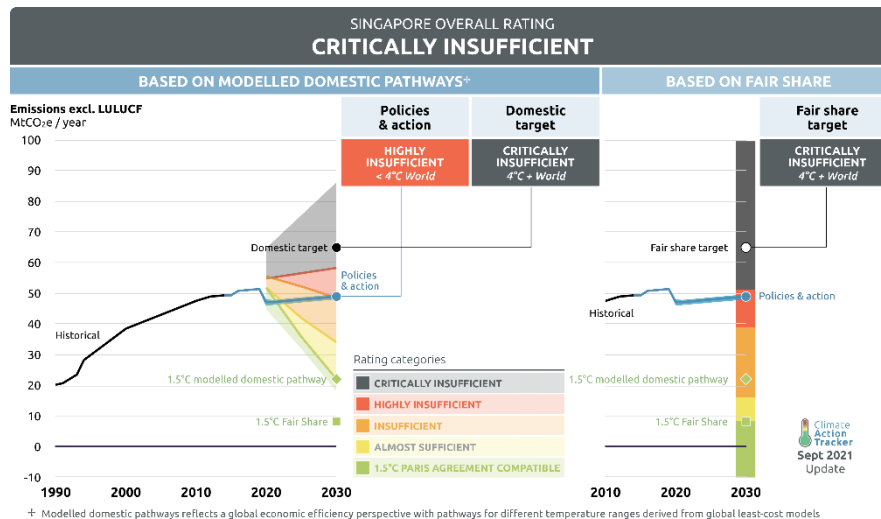


Figure 3
Assessment of Singapore's Climate Policies (Summary, 15.09.2021)
(Source: ClimateActionTracker.org)

As a developed, industrialized, and wealthy country, Singapore faces the problems of population aging and decline, resulting in labor shortages that require the revision of the very strict and highly controlled migration policy. However, using the tried and tested method, talent and activities generating high added value are offered attractive opportunities. The job-creating impact of the transformation process towards sustainability defines priority skills in the key areas of the digital (both tech-heavy and tech-lite competencies), green (construction, finance, manufacturing, trade), and care (education, health) economies (SSG, 2021: 6).

Being at the heart of global value chains, global production, and innovation networks (Magasházi, 2021: 56–59) has both benefits and risks. The uncertainty surrounding the coronavirus pandemic, for example, forced a shutdown of vital industries such as tourism and MICE (meetings, incentives, conferences, and exhibitions) events, the implementation of a protective isolation policy in order to minimize the risk for citizens, all multiplying the economy's volatility factor. However, with Singapore adapting to the new normal, it has been speeding up the transition process in becoming a high-tech, FinTech, and innovation center in the age of Web 3.0. Therefore, the longevity of its strategic position seems to be reinforced.

Singapore's high ranking in a number of sustainability-related indexes (Chart 3), elaborated and published by various international or multilateral (non-) governmental organizations, independent analytical, educational, and research institutions, is a reflection of the overall positive trend.



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Table 3. Singapore's Rank in Sustainability-related Indexes

Category	Year	Rank
<u>Smart City Index</u> (Structure + Technology)	2021	1.
<u>Newsweek Future of Travel Awards</u> (International Airline / International Airport)	2021	1. / 1.
<u>Asian Green City Index</u>	2011	1.
<u>Corruption Perceptions Index</u>	2020	3.
<u>Global Innovation Index</u>	2020	8.
<u>Human Development Index</u>	2020	11.
<u>FM Global Resilience Index</u>	2021	12.
<u>Environmental Performance Index</u>	2020	39.

Source: Compiled by the authors

Singapore ranks 11th out of 189 countries in the Human Development Index² 2020 (UNDP, 2020: 343) but falls back 92 positions when adjusted with planetary pressures (UNDP, 2020: 241), reflecting its structural dependence on fossil fuels for energy production and its elevated level of greenhouse gas emissions per capita. “No country has ever managed to reach a high level of human development with low resource use”, meaning that the “Singapore-style development is not sustainable” (Wignaraja, 2021), according to the UN Assistant Secretary-General and UNDP Regional Director for Asia and the Pacific.

Singapore's outlook for becoming a regional and global benchmark in its own right was very dim at the moment of its birth as a sovereign state. Though many query the Lion City's successful transition to a sustainable economy, based on the lineup of historic facts, unequivocal data, and empirical observations, one should refrain from ruling out that Singapore, against all odds, has the potential to prove its doubters wrong again by becoming, this time, a torchbearer of sustainability in Southeast Asia and on a global scale.

Rising tensions, notably, the hostile competition in form of the China–U.S. trade war, mostly fueled by the quest for economic supremacy and military dominance in

² The Human Development Index (HDI) displays the level of wellbeing in the examined countries in a more complex way than GDP. It is determined based on the average of three sub-indicators: Life expectancy at birth, education, and gross national income (GNI) per capita at purchasing power parity (PPP).



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the Asia-Pacific region, with a hint of ideological differences. The difficult solution-finding process faces the seemingly irresolvable two-way problem that the West is reluctant to accept that its—so far unquestioned—supremacy has come to an end while, on the other hand, “China does not understand the world” (Karpov, 2021) it is about to become to dominate. There is a difference in approach, too. While industrialized Western countries follow the concept of geopolitics, Asian-style enforcement of interests is exerted along with geoeconomic priorities. A comparison (Chart 4) highlights the harsh contrast.

Table 4. Geopolitics vs. Geoeconomics (Compiled by the authors)

	Geopolitics	Geoeconomics
Geography	Political (expansion)	Economic (connection)
Influence/Power	Military	Economic
Strategy	Intervention	Domestic development
Approach	Dominance-based (dependence)	Opportunity-based
Domestic Affairs	Interference (control)	Non-interference

Source: Compiled by the authors

Furthermore, China’s growing influence is accelerated by “Western hubris” (Mahbubani, 2018: 29), the gradual decline of values and poor leadership, as well as the failure to deliver tangible results because of a hypocritically outlined PR strategy, based on empty promises and pledges (e.g. environmental goals, financing, sharing COVID-19 vaccines). On top of that, the lack of vision and mutually beneficial cooperation (still being in the bubble of a post-colonialist attitude; missing to share know-how and best practices even with allies) but also fragmented national responses (growing unilateralist leanings) strongly undermine advocacy for establishing democratic systems in the rest of the world, including countries that feel and practically have been exploited and left behind.

Evidently, this ongoing conflict on the global stage poses a major security challenge for Southeast Asian nations, trapped between two superpowers. Luckily, the greatest achievement of the cooperation within the ASEAN (Association of Southeast Asian Nations) framework is avoidance of conflict between member states. Though back in 1965, Singapore’s fears of external aggression seemed realistic, a military conflict with any of its direct neighbors, Indonesia or Malaysia, is “virtually zero today” (Mahbubani, 2018: 50). However, regional actors sooner or later will be forced to make a choice. Again, “the big strategic game in Asia isn’t military but economic” and its future “will be written in four letters, RCEP,”



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standing for a "massive economic ecosystem" (Mahbubani, 2021), the Regional Comprehensive Economic Partnership.

Despite the outlined limiting factors and all things considered, the sustainability challenge is more about setting a course based on aspirations, as well as envisioning tangible results and putting in place mechanisms that render their successful implementation possible. In this regard, it is useful to perform a more comprehensive and possibility-driven approach, a SOAR analysis (Chart 5), that incorporates all levels of any given organization or entity. In the case of Singapore, this future-oriented examination serves the purpose of confirming the necessity for thinking in terms of a comprehensive national movement so that the results shall be accessible for the entire community.

Table 6. SOAR Analysis of Singapore's Sustainability Efforts (Compiled by the authors)

Strenghts	Aspirations
Multiculturalism – Stability – Resilience – Partnerships – Open economy – Transparency – Education – Digitalization – Strong financial foundation	Structural change Green economy Food self-sufficiency Sustainability
Opportunities	Results
Diplomacy (balancing, ASEAN) Innovation (IPs) FinTech – Green finances – Web 3.0	Cooperative ecosystem Eco-friendly energy shift Wealth and Health Regional stability

Source: Compiled by the authors

After having taken stock of the challenges, our focus shifts to the concrete steps, solutions, and projects that are in sync with Singapore's historically bold strategic vision and enable to successfully transform the above aspirations into reality.

4.1.4 Digitalized, Green, and Smart Future

Cooperation in various areas (digitalization, education, environmental protection, FinTech, research & development) in the form of highly goal-oriented public-private partnerships or on the foundation of mission-based ecosystems is essential in the ongoing transformation process. High-skilled labor is another crucial factor and, luckily, "Singapore has one of the highest proportions of foreign workers in the world—rising from 3 percent of the population in 1970 to 35 percent in 2010" (Parks et al., 2018: 50). With its sovereign wealth funds (GIC, Temasek) holding a wide variety of valuable assets, the city-state offers a range of migration incentives



and, most likely, encourages more intentional international relocation (Srinivasan, 2021). Also, strategic government planning and leading by example are key in promoting sustainability, the core elements hereby being adaptive legislation, as well as intelligent investment in innovative technologies and solutions, the impacts of which, ultimately, create value downstream and secure corporate profitability at the same time.

Comprehensive sustainability, however, can only be achieved through collaboration on a regional and global scale. Issue-focused management across multi-stakeholder networks has proven to be an effective problem-solving method as it encourages open dialogue for trust-building along with value-based shared interests (Roloff, 2008). The 33rd ASEAN Summit (2018), held in Singapore, put the issues of resilience and innovation on top of its agenda, featuring e-commerce, green jobs, the creation of smart cities, and regional connectivity (ASEAN, 2018). Singapore launched its Smart Nation initiative, promoting and adopting cutting-edge technology on both an economic (growth-boosting ecosystem and infrastructure), governmental (inclusive, personalized policies and services), and societal (accessibility, digital literacy) level, in 2014. Its aim is to improve the quality of life, build more effective communities, and create business opportunities (Government of Singapore, 2020b). In this regard, Singapore can be seen as a living laboratory for developing and testing digital solutions for a sustainable urban environment.

The ‘Smart City in a Box’ concept (Figure 4), elaborated by the Singapore-based consultancy firm Surbana Jurong, envisions an integrated interface of interconnected applications related to the four dimensions of the smart city (sustainability, efficiency, people, and security), displayed on a single miniature device (e.g. a mobile phone). This solution shall benefit the authorities not only in terms of planning but also in terms of uninterrupted monitoring and maintenance.

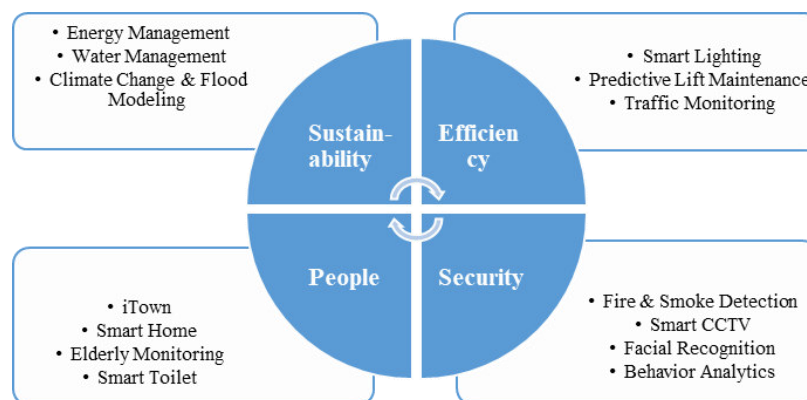


Figure 4

Model of the ‘Smart City in a Box’ Concept (Source: Surbana Jurong; Compiled by the authors)



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The Singapore Green Plan 2030, as a national movement involving all stakeholders to maximize the outcome by applying a cross-sector cooperation approach, is a milestone in the city-state's sustainability efforts. Announced in February 2021, it has five key pillars: City in nature, sustainable living, energy reset, green economy, and resilient future. Solutions include the reduction of consumption and waste by both households and the industry, promoting the use of green or more carbon-friendly infrastructure (cycling paths, public transportation), the extension of natural spaces (tree planting, building parks). With smart water technologies (seawater desalination, industrial and wastewater reclamation), the island, which has been heavily relying on freshwater imports, has embarked on a path "towards water sustainability" (PUB, 2016: 09). Helping local small- and medium-sized enterprises (SMEs), which account for nearly half of Singapore's GDP and employ three-quarters of the workforce (Government of Singapore, 2020a), in the adoption of sustainability practices, as well as investments increasing efficiencies, such as economic restructuring and job creation, are also important elements. Other steps feature limiting the number of registered vehicles in circulation, using eco-friendly cars, discouraging driving (ERP system), and assisting the construction industry in becoming green. It is crucial to implement innovative engineering and technological methods to raise the adaptability and resilience against the adverse impacts of climate change (sea-level rise, flooding), as well as to enhance vertical farming in order to increase food security (SG Press Center, 2021).

Singapore's proximity to the Equator means that it enjoys sunshine almost throughout the year. Hence, solar panels are increasingly integrated into the urban environment (NCCS, 2021b), placed e.g. on buildings and public transportation vehicles. The most prestigious investments in renewables are the floating solar farms, among the largest worldwide, that allow reducing carbon emissions by several thousand tonnes (Chong, 2021). Nevertheless, the constraint of deployment of renewables requires other sources for Singapore to tackle its greatest sustainability challenge: The current dependence on fossil fuels. Access to low-carbon energy through regional power grids not only enables the country's transition but also enhances regional cooperation and decarbonization efforts. In addition, low-carbon alternatives (hydrogen, carbon capture) are also taken into consideration (EMA, 2021).

A solution to the problem of regulating temperature is presented with the use of vertical greening facades that effectively act "as a passive approach towards sustainable building design in the urban area of tropical climate countries" (Othman – Sahidin, 2016: 50), concluded a study from 2016. In this context, the Tree House, which set a new record as the largest vertical garden in the world at the time of its handover in 2013, is another milestone example of biophilic connectivity. A number of innovative and sustainability-friendly technologies, such as natural insulation (e.g. bio-shading green walls, heat-reducing windows), carbon dioxide filtering, intelligent lighting, sloped design for improved rainwater harvesting, were used to



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improve its energy and water efficiency while lowering its carbon footprint (City Developments Limited, 2014).

Singapore, strategically welcoming digital technology professionals and fostering talent, also leading “in experimentation in artificial intelligence (AI) across multiple industries,” (Parks et al., 2018: 50) is the most advanced and committed country in the Southeast Asian region with regard to building Industry 4.0 (digital transformation) and Web 3.0 (decentralized platforms) capabilities. Singapore’s national AI strategy is promoting the creation of a sustainable ecosystem. Hereby, triple helix partnerships (researchers, corporate sector, government) allow fast deployment of innovative solutions, preferably developed by local professionals (goal-specific education), while the quick and secure accessibility of high-quality datasets, embedded in a trusted environment, offer ample opportunities for international cooperation (SNS, 2019: 6). Covering all walks of life, the strategy comprises border security, education, finance, government and municipal services, healthcare, and logistics (SNS, 2021). One model project serves as a comprehensive example.

The technologically sophisticated country’s unique geographic location predetermines its ongoing status as a major transshipment container port. The success of the overall sustainable development efforts depends heavily on the port’s expanding capacity, digitalization, environmental-friendly processes as its operation generates approximately 7% of the city-state’s GDP. The world’s second-largest port of call is gearing up by almost doubling its handling capacity of 37.2 million TEUs (twenty-foot equivalent unit) in 2020 by 2040 and preparing for the future with the application of technologically advanced, innovative, and sustainable solutions. Besides ecosystem creation and regeneration (coral relocation, use of prolific construction materials), the Tuas Port Project also features autonomous operations (eg. fully electric, automated guided vehicles and cranes), efficiency-enhancing, intelligent, transparent, and integrated (control and management) systems, as well as smart drones (MPA, 2021). This intelligent port has sustainability written all over it.

Conclusion

Singapore’s excellent geographic location, as well as its inimitable path towards building a wealthy and healthy economy along with a clear strategic vision and planning, fueled by unwavering determination, enabled with the clever selection of the right toolset at the right time, provide the necessary prerequisites for stepping on a higher level (of sustainability). With an abundance of valuable and indispensable assets (open, business-friendly, fully digitalized, stable, trusted, and transparent environment; efficient and intelligent global container transshipment hub; high-quality infrastructure and education; multi-stakeholder, cross-sector partnerships; a vibrant breeding ground for creativity, R&D, and innovation) at its disposal, the Southeast Asian city-state has been developing and implementing an



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array of actions and projects, already bearing tangible results. In addition to regional peace and stability, becoming a global benchmark for sustainable development requires Singapore to strengthen its resilience to economic volatility, to ramp up its defense and mitigate against the disruptive impacts of climate change, to accelerate the shift to carbon neutrality and energy efficiency, while remaining devoted to lifelong learning, global entanglement, and cooperation. A country with a high level of human development and low resource use seems to be possible, after all. With a strong portfolio dedicated to and marked by sustainability, Singapore has the potential to successfully transition from a regional commercial and finance to a resilient innovation, startup, FinTech, and green financing hub.

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