Spatial Planning for a Sustainable Singapore

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# Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preface</td>
<td></td>
<td>vii</td>
</tr>
<tr>
<td></td>
<td>Contributors</td>
<td>ix</td>
</tr>
</tbody>
</table>
| Chapter 1 | Sustainability Planning and Its Theory and Practice:  
  An Introduction | 1    |
|          | Tai-Chee Wong and Charles Goldblum                                     |      |
| Part I   | Global Development and Planning                                        |      |
| Chapter 2 | Planning the World Metropolis on an Island-City Scale:  
  Urban Innovation as a Constraint and Tool for Global Change | 17   |
|          | Charles Goldblum                                                      |      |
| Chapter 3 | Sustainable City Centre Development:  
  The Singapore City Centre in the Context of Sustainable Development | 31   |
|          | Ole Johan Dale                                                        |      |
| Chapter 4 | Integrated Resort in the Central Business District of Singapore:  
  The Land Use Planning and Sustainability Issues | 59   |
<p>|          | Tai-Chee Wong                                                         |      |
| Chapter 5 | Singapore River: Six Strategies for Sustainability                    | 79   |
|          | Chwee Lye Low                                                          |      |
| Part II  | Transport, Industrial, Housing and Nature Planning                    |      |
| Chapter 6 | Singapore’s Urban Transport: Sustainability by Design or Necessity? | 95   |
|          | Paul A. Barter                                                        |      |</p>
<table>
<thead>
<tr>
<th>Chapter</th>
<th>Title</th>
<th>Author(s)</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>Achieving Sustainable Industrial Development Through a System of Strategic Planning and Implementation: The Singapore Model</td>
<td>Kum Chun Seetoh and Amanda Hwee Fang Ong</td>
<td>113</td>
</tr>
<tr>
<td>8</td>
<td>Public Housing in Singapore: A Sustainable Housing Form and Development</td>
<td>Tony Tan Keng Joo and Tai-Chee Wong</td>
<td>135</td>
</tr>
<tr>
<td>9</td>
<td>Vertical Living and the Garden City: The Sustainability of an Urban Figure</td>
<td>Xavier Guillot</td>
<td>151</td>
</tr>
<tr>
<td>10</td>
<td>Nature and Sustainability of the Marine Environment</td>
<td>Loke Ming Chou</td>
<td>169</td>
</tr>
<tr>
<td>11</td>
<td>Singapore’s Natural Environment, Past, Present and Future: A Construct of National Identity and Land Use Imperatives</td>
<td>Min Geh and Ilsa Sharp</td>
<td>183</td>
</tr>
<tr>
<td>12</td>
<td>Conclusion: Beyond Sustainable Development?</td>
<td>Belinda Yuen</td>
<td>205</td>
</tr>
<tr>
<td></td>
<td>Index</td>
<td></td>
<td>211</td>
</tr>
</tbody>
</table>
Preface

In the last four decades, Singapore’s urban development has gradually received an international reputation. From a city of just under two million people in 1960, we replaced squatters and slums with mostly high-rise, high-density public housing as well as industrial estates, commercial centres and parks and gardens. We demonstrated to our earlier well-meaning critics that a high-rise housing programme need not be automatically doomed to failure. Indeed Singapore now serves as an example of shaping successful residential communities to the massive population of Asia. Our city is now at nearly 4.5 million people. It is green and clean, with flowing traffic, functioning infrastructure and proper space allocated for every urban need. It is no longer as clinical as it was in the 1970s, as we can afford to go beyond the basic needs and have added finer and more colourful things to our cityscape.

Yet, when people ask me for books to provide an overview of the experience of our urban transformation, there are sadly very few. Singaporeans are more workers than writers. Not enough people have recorded how we did it, or shared the experience with people in other countries, or even with our own younger urban planners and administrators who are less familiar with the historical perspective. This matter is becoming very pressing as most pioneers who went through the start up process of transformation have retired by now. Some are no longer with us and so their valuable visionary yet pragmatic experience is gone for good. As the years go by, I have increasingly realized that there is a wealth of wisdom and know-how amidst us yet to be unearthed.

The publication of this broad-based book on our urbanization effort, therefore, is most timely. But we should think of it only as a beginning.

If I appear to be speaking rather immodestly about our urbanization, there are good reasons. More and more people, from both developed and developing countries, come to find out about our experiences. Despite the fact Singapore is only a newly developed country, our planners and a whole host of related experts are sought out by the developing world. In fact, it is because we are newly developed, and we have done well, that our experience is most useful. We learned the theories from the west, we managed to adapt them to Asian conditions, and we have had the strong support of our political leaders, who generally stayed clear of professional matters and let us do the right things without undue interference. Singapore in the last 40 years thus functioned as an urban laboratory in its full scientific sense. I can
think of few parallel examples like ours. Our experience is therefore relevant to the majority of cities in the newly developed and developing countries, particularly in populous but land-short Asia. This book offers a peek into these experiences.

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Chapter 1
Sustainability Planning and Its Theory and Practice: An Introduction

Tai-Chee Wong¹ and Charles Goldblum²

The more specific characteristics that make sustainability planning different from business-as-usual in the profession include a long-term approach to decision-making, a holistic outlook integrating various disciplines, interests, and analytic approaches, a questioning of traditional models of growth and acceptance that limits to these exist, a new appreciation of the importance of place, and proactive involvement in healing societies and ecosystems.

(Wheeler 2004: 34)

1.1 Background of Urban Planning in Global Cities

To begin with, the 1987 Brundtland Commission Report’s statement that “sustainable development is development that meets the needs of the present without compromising the ability of the future generations to meet their own needs” (WCED 1987) may arouse little passion but it is necessary for resuscitating the origins of associating urban planning with modern values of sustainability. For over three decades, planning for sustainable urban development has been an attempt to monitor runaway and seemingly uncontrollable rates of urban expansion with particular relevance to developing countries. Not only that, but planning for the upper circuit global cities in the developed world has turned out to be equally critical as globalization and city competition intensify. What has characterized city competition is that it requires entrepreneurship and economic growth to support job creation, professional and skills training as well as research and development to enable further reinvestment. Accompanying growth are nevertheless the reward and outcome of tangible material incentives and motivation leading to rising automobile use, consumerism and waste, environmental damage, and greater commuting distances. Cities are increasingly

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designed primarily for car users, much less for pedestrians or cyclists. Globalization has also resulted in social polarization, exasperating the drive towards equity and wealth redistribution. Social sustainability is being challenged (see Sassen 2001; Hugon 2003; Wong and Yap 2004).

Economic restructuring in the globalization era has strengthened links and interaction between major cities situated at the top of the transcontinental urban system organized in a hierarchical manner. The bulk of the surplus would be gained by global cities in proportion to their scaling effects of agglomerations and productivity levels, specified sometimes as “surproductivity”. Because of the multiplier effects of their high-value activities, global cities are also described as the “growth machines” (Logan and Molotch 2002). Financial liberalization and rising connectivity of the information and goods flow has nullified the physically rigid meaning of time and space (Bonnet 2000; Hugon 2003; Newman and Thornley 2002). Apart from highly localized issues, common problems, especially the global environmental ones which are considered counterproductive, are transferable across national boundaries.

Indeed, the concern with sustainable urban development arises and takes place in a world of economic globalization and of technological revolution, a world where the financial market’s selective expansion and innovation in the realm of communications systems has benefited strategic urban locations specifically catalytic to economic growth. Cities having built up a silent but revolutionary capacity in mastering flows (goods, people and information), in terms of paths and speed could affect their position and functions, their scale and ability in coping with these issues. If the rise of ecological ideas and consciousness in the early 1970s has been associated with “zero economic growth” (a concept promoted by the Club of Rome during the first oil crisis) and with the ideals of small/local dimensions (Schumacher 1973), the relationship between global dynamics and local development as expressed by the notion of “glocalism” are associated with mega-urban dimensions. The processes leading to this new representation of urban growth, the way to master its effects at urban, territorial and world scales, and to match it with the ideal of “sustainable development” naturally question the significance and the very nature of urban planning.

The objective of spatial planning for sustainability is primarily to counter the adverse effects of urban developments by means of systematic and organized land use planning activities. Sustainability planning has a holistic outlook which calls for an integration of the goals of the three Es (Economic, Environmental and Equity concerns) into an organized coherent system for a long-term objective formulation and plan implementation. No country can or should conduct sustainability planning in isolation, as the “stretching and deepening of global-scale processes” has exerted intricate interaction and reaction in one way or another on local scales (see Olds 2001: 19). The extent of local impact depends on the level of integration with the advanced economies, from supply and demand, trends and cycles in the international marketplace, as far as sales of land parcels in the city centres. Such a commodity chain is functionally organized on the premises of the international division of labour, the technological ladder position and the pricing mechanism.
The potential for profitability is highly dependent on the timing and specific location of the commodity at stake.

Olds (2001: 20–32) has identified five dimensions in which globalization could change urban space: (a) greater inflow of international financial capital and credit into the local/regional marketplace – their significance of growth in volume, complexity and transactions; (b) globalization of property markets; (c) role and intensity of transnational corporations’ activities; d) extent of the stretching of world social networks, social relations (impact of lifestyle by distant sources), and consumption; and (e) mega-projects which create new forms of urbanity. To be effective in sustainability planning, therefore, concerted efforts need to be derived from three levels: (a) both the public and private sectors at the national level; (b) cross-country cooperation at the regional level; and (c) intercontinental cooperation at the world community level. Within cities, movements such as “livable communities”, “landscape ecology” and “participatory planning” have been placed on the planning agenda aimed respectively at enhancing neighbourhood livability, preserving and restoring the natural landscape as well as sharing power between the top municipal officials and ordinary citizens in the planning and decision-making processes (Wheeler 2004: 16). Apparently, they all constitute desirable elements to improve quality of life and to tackle public health problems and deteriorating physical conditions that all citizens are concerned with.

1.2 The New Trends in Asia

As a matter of fact, urban territories are not to be considered as passive receivers of flows generated or accelerated by the transactional revolution (McGee 1998; Castells 1996; Ascher 1995). They react, adapt to this trend or even anticipate it. But haphazard growth and fierce world competition together with social and geopolitical insecurity tend to place mega-urban development and urban planning in a new and, in some instances, contradictory situation with regard to environmental issues.

In Asia, the new trends affecting city status and the logics of urban development might be observed as in other parts of the world. Asia’s major urban regions have experienced, for example, urban peripheral expansion in the form of the “extended metropolis” (Ginsburg et al. 1991). Beyond the exclusive case of “global cities” like Tokyo, New York and London (Sassen 1991), we have witnessed the opening of selective places where there is a new generation of urban projects strongly related to new information and communication technologies (namely technopoles and high-tech corridors following more or less the North-American Silicon Valley pattern) to international functions and events (World Exhibitions, World Cups, Olympic Games). Developing new urban districts to incorporate a new stadium, a new university and research laboratory or other international tertiary functions is definitely not an innovation in itself; but these
developments are now part of a typology of projects characterized by their large scale and their international dimension (in terms of investment resources, of urban actors, as well as of urban functions). New urban projects are also defined as a new way of making or modernizing cities which appears as a result of mega-projects led by investment opportunities more than as a product of comprehensive, problem-solving planning.

Because of their strategic position in the world economy and their situation on the major international trade routes, also under the combined effects of the accelerated urbanization of their populations and of the accelerated transformation of their territories, South and East Asian countries are particularly responsive to these trends, which might be illustrated by some projects often presented as showcases (Antier 2006). Under the category of technological parks, we may mention the Hyderabad Knowledge Park, the Mumbai-Pune Knowledge Corridor, the Electronic City of Bangalore. Projects of this kind are often furnished with international airport and new town projects, such as Cyberjaya and the Multimedia Supercorridor in Kuala Lumpur Metropolitan Area or the Media Valley High-Tech Development Corridor connected with the Incheon International Airport in the Seoul Metropolitan Region. Mega-projects are also strongly associated with international events like the Olympic Games (Seoul 1998; Beijing 2008) or World Exhibitions (Lisbon 1998; Nagoya-Aichi 2005; Shanghai 2010). These projects have a direct or indirect effect on the whole urban structure, the redefining of the central functions, the shape and dimension of the core area (and often its exclusiveness in terms of land prices and eviction of the poor urban dwellers, and the rejection of their ‘informal’ activities and settlements). Furthermore, the extension and structure of the peripheral zone through an expressway and mass transportation have brought about mixed land use to the rural areas by creating new industrial zones with the support of foreign direct investment, often in association with public or private new town development (like Muang Thong Thani in the Bangkok Extended Metropolitan Region or the new town development in the Jakarta Metropolitan Region – Jabotabek).

The “territorial revolution” introduced in the rural areas by these large scale developments also signifies a large scale environmental revolution. The mixed land use, if examined from a functional and social point of view, questions the compatibility of agricultural and industrial or even tourist land uses, the economic conditions of access to water, sanitation, transportation, employment, and even the participation of the local inhabitants in the decision-making process that had made these new developments happen. In other words, the holistic concept of “sustainable development” apparently warrants a strong claim to address the complexity of these issues.

It should be noticed that these critical dimensions are partly or progressively integrated within the programme of urban projects, at least as a means of access to international loans, or to gain a positive image in the international city competition for foreign investment or tourist attraction. The object could be attributable to an extended awareness of the magnitude of the environmental challenge which the public authorities or developers have opted not to deny. Since the Rio de Janeiro Earth Summit of June 1992, many cities have adopted the principles of Agenda 21
and, at least, implement green plans and create new urban forests and parks, like Beijing in the perspective of the 2008 Olympic Games, Bangalore in relation to its high tech corridor mega-project, Shanghai Century Park in relation to the development of Pudong.

In this respect Singapore with its “park connector” system as an innovative urban development project is often referred to as a “model city”, a key for exporting its expertise in the realm of urban planning. But when it comes to the goals of sustainable urban development, how far can the remarkable experience of Singapore be separated from the specificities of the city-state? The dimension of Singapore’s territory questions its relevance to approaching the sustainable urban development issues. Also, the specificity of its urban planning system, the new generation of projects like high-tech corridors, regional urban centres, or the Punggol 21 waterfront new town – and most recently the multi-billion integrated resorts approved for Marina Bay and Sentosa Island which have been well integrated within the comprehensive urban planning system and guided by its Concept Plan – seldom exist in other Asian megacities. The case of Singapore appears to be an important prototype for reflection on the question of sustainable urban development and its specific conditions, practices and requirements in the context of Asian world city developments.

1.3 Sustainability Planning in Practice: Singapore in Search of Status as a Global City

Globalization has indeed a deep-rooted influence and implications for land use planning and related professional practice worldwide. While the globalization processes have generated a predominant proportion of revenues for the winners, a substantial part of the revenues are however used to counteract the adverse effects of globalization such as environmental pollution, heritage loss, widening income gaps or polarization, deskilling of certain categories of the workforce. This being necessary as the winners need to share power with the losers in order to sustain their profitable undertakings, and in doing so create new sources of revenue. Waste, for instance, can effectively be treated as a resource for renewed consumption.

The practice of sustainability planning in Singapore is most significantly reflected by its economic-centred national planning programme, which at the same time is supported by other relevant measures of sustainability. The economic core is a policy presumption that economic growth is the key to the creation of wealth and resources to support other pursuits in the context of a city-state restricted by land and natural resources that survives in prosperity but is always fragile – a notion that commands a popular acceptability among the population. Growth produces environmental damage. But without remedial resources to prevent further damages and in order to safeguard long-term health and environmental integrity, sustainable environmental development would be hardly tenable. Figure 1.1 shows the Singapore model of sustainability planning. It portrays the interconnectivity and
integration of social, cultural, demographic, educational, political and environmental measures, with the core component being economic sustainability.

Each of these measures is again backed by effective and pragmatic plans aimed at achieving sustainable results. For example, the National Green Plan which traces its origins in the “garden city” tree planting campaign of the early 1960s provides a comprehensive undertaking and commitment to the prospect of providing Singapore with a healthy environment, in eight ways: (a) averted a wasteland by optimizing the use of its limited land resources; (b) living in harmony with nature by permanently conserving some of its natural heritage and thus biodiversity; (c) ensuring clean air through rigorous enforcement of the law against polluters; (d) keeping the water flowing to enhance supply reliability, operational efficiency and recycling; (e) improving public health by a rapid response to disease outbreaks; (f) forging a strategic partnership to build up an environmentally aware citizenship; (g) enhancing external collaboration for tackling transboundary environmental problems; and (h) innovating sustainability by adapting world standard practices in sustaining environmentally friendly development (Ministry of the Environment 2002).

Supplementary to the National Green Plan is the painstaking land transport policy of mitigating pollution and energy consumption. Tough measures were introduced to control car ownership in 1990, whilst the road network was expanded to cater for changing travel needs. Using the Vehicle Quota System (VQS), the car
population was pegged to a maximum of three percent annual growth where potential buyers have to bid for a Certificate of Entitlement (COE) before car registration. Starting in 1998, the Electronic Road Pricing (ERP) System was used to monitor traffic flow and congestion. ERP gantry points that charge vehicle users during operating hours have been installed in many parts of the island for such purposes. In a sustainable way, the notions of integrated land use planning (to reduce the need for travel), promotion of public transport (to make it attractive and comfortable for commuters), and finally, the “users pay” principle is deployed as usage management measures to ensure a more optimal use of road space (LTA 2007). Guided by economic growth as the national planning focus, land use planning practices are primarily led by the Concept Plan.

1.4 The Concept Plan and Sustainability Planning

The Singapore Concept Plan was first drafted in 1970 with the assistance of a United Nations expert team to guide the country’s long-term development. It is a land use planning blueprint designated by a specialized role for meeting the national goal of modernization and to raise Singapore’s economic standing underlain in respect of industrialization, public housing, infrastructure and building a modern central financial district. In responding to the set targets assigned, planning practitioners have to conceive strategic and concrete measures in order to realize them and to bring their actions to a fruitful end wherever possible. These measures are constantly adjusted subject to the impacts and processes of internal and external movements, notably the globalization factor. Ideas and theories have often been adapted to practices that are suited to local requirements.

The Singapore Concept Plan has a longstanding reputation for being continuous, and its consistency has been rendered possible by the same government being in charge over the last four decades. Established in 1971 on the basis of an export and multinational-led land use strategy, a full urbanization and infrastructural provision, supported by a “garden city” notion had been conceived to lift Singapore from a small to a large regional centre. Twenty years after, the Concept Plan was revised significantly in 1991 to reflect the newly identified goal of a dynamic global city that, in the early 2000s, promised to build a great city in which to live, work and play (Ministry of Trade and Industry 2003).

In terms of planning approach, practicing planners in Singapore could well have been consciously influenced by the prevailing thinking of different periods, such as the comprehensive and rational planning of the 1950s and 1960s, largely of positivist origins. From the 1970s onwards, more attention has been paid to advocacy and community-based planning in order to seek for more public participation; Singapore planners in public authorities have been comparatively much less “critical” and complex than the British planners as Watson claimed the latter were (Watson 2002). Singapore public authority planners have been more effective in response to calls of national ambitions and “instrumental in action and as implementers to particularly
As a whole, notably in the post-1990s, planners have been involved in planning processes which are more an integrated and globally responsive approach in line with the ambition of the city-state in transforming itself into an influential global city. Accordingly, missionary statements had varied over time as they complied with the specific needs of each particular period. In 1991, for example, Singapore’s national planning authority, the Urban Redevelopment Authority’s mission was “to plan, facilitate and regulate the physical development of Singapore into a Tropical City of Excellence”. This changed to building “towards a thriving world-class city in the 21st century” in 2001, and in 2006 “to make Singapore a great city to live, work and play in” (URA 1995, 2001, 2007). In interpreting Flyvbjerg’s work Rationality and Power (1998), it may be understood that the link between the planner’s rationality and state power here is weaker in two-way communications but stronger and effective in implementation and adaptive modification of instructed plans by following up with changes in ideas or local/regional/global circumstances. Guided by American-led pragmatism and communicative rationality, communicative planning practitioners construct free spaces with competence and apply principles of logic, scientific and empirical knowledge to guide their actions (see Fainstein 2003: 175). The present trend among practitioners, in keeping with the purity of their profession, primarily avoids a close examination of the relationship between planning, politics and urban development. A common consensus, which appears popular, has been reached on how to pave the path of growth to build up a world-class global city.

The focus of the most recent planning practice is revealed in the Concept Plan 2001 which has mapped out a vision over the next 40–50 years, based on a target population of 5.5 million. Land scarcity has remained the core planning element as it is expected that land demand will continue to rise following economic growth, which requires a larger population to support it. A greater variety of house types will continue to provide greater choice and also green and recreational spaces are made more accessible to the population. Flexibility and responsiveness are highlighted in support of businesses, especially those high-value and knowledge-driven industries able to help build Singapore into an international business hub (URA 2007).

1.5 The Chapters

This book is a collection of essays on a selected number of land use planning issues in Singapore. Of the two parts planned for the volume, Part 1 examines the relationship between the global development trend and the ways in which planning is organized and implemented in the context of a rapidly changing global landscape. In Chapter 2, Charles Goldblum focuses on the extent to which Singapore’s urban planning and approach has been impacted by world metropolitan development trends. Over the last four decades, the responsiveness of Singapore’s ruling government has been well reflected in its sectoral policies and strategic (social, economic, institutional, etc.) changes. The chapter aims to assess Singapore’s performance in
its urban planning approach, ranging from the first Ring Concept Plan focusing on new town development in the 1970s to the current planning concepts of regions and specialized corridors. Urban planning has indeed been deployed as a tool for adaptation to the prerequisites of the international economy or for preventing adverse environmental and social effects resulting from this adaptation, and as a means of permanent strategic innovation (from “global city” strategy to the “re-Asianization” process). Changes in planning and orientations such as the heritage conservation approach in urban renewal or town councils in new town management are revisited and analysed. The ways where planned urbanization is being used as a key to sustainably maintain Singapore’s competitive advantages are equally highlighted.

In following up Goldblum’s broad framework, Ole J. Dale in Chapter 3 presents a more detailed account of Singapore’s physical and socio-economic change in the city centre, from slums to modernity: what has taken place in the city centre is perceived to be most decisive in influencing its future path. It is a place that attracts tourist flow, a place built up with tall office blocks, retail outlets, convention and exhibition centres as well as being the cosmopolitan hub of the region. It is also a place that island-wide traffic converges on to witness commuting movements of a large number of white collar workers. Its importance has required sustainability planning to keep it up as a clean, green, efficient, pleasant and healthy environment.

As a regional city and a global city, the city centre is symbolic of enhanced and global competitiveness, a talent hub and a centre for innovation and enterprise. Also pertinent is the city-state’s waterfront which acts as a magnet to future international design competition as a theme park. Its magnitude and scale capture international attention as a test of new elements of sustainability planning. The challenges are about environmental quality, reconciling environmental and economic needs and dealing with rising expectations. Singapore city centre stands as an exemplary vibrant core where it also manifests itself as a classic case of testing a good sustainable city environment.

Tai-Chee Wong, in Chapter 4, follows up with a more substantive investigation of the current core activity in the Centre Area – the integrated resort at the Marina Bay. More specifically, his focus falls upon the newly emerged urban form being created downtown by global market forces to supplement financial and specialized services by high-value leisure businesses, seen as a rising pattern of Singapore’s post-modernist production system in the strategic and prime area. Hence, the chapter examines the changing and expanding functions of the Central Business District (CBD), and the circumstances in which this pattern has evolved and the land use planning implications. Arguably, it is interpreted as a continued effort of the city-state to pursue sustainable economic growth that requires the new input of knowledge-intensive and higher-end leisure industries. The sustainable economic development issue is justifiably weighed against the social issue, the casino.

Chapter 5 by Chwee Lye Low deals with another Central Area issue focused on the revitalization process of the Singapore River – the lifeline of early migrants and local-cum-international trade. Lessons of sustainable development in this water margin and seafront figure most characteristically in tandem with its river cleaning
programme in the 1970s. The successful clean-up has not only sustained fish life but has blended the reconfigured water landscape to support in subsequent decades the renewed lively night life along the river and beyond. It is a case in point that sustainable waterfront development practices carry a significance meaning in transforming as well as influencing the future of unique urban places with waterbodies.

Part 2 examines sectoral sustainable planning issues in turn, beginning in Chapter 6 with Paul Barter’s study of Singapore’s urban transport policies which have often been held up by observers as model of “sustainable transport”. The chapter briefly interprets the meaning of sustainable development in relation to the arena of urban transport. It then applies the conclusions to a brief review of the claim that Singapore is an exemplar of sustainable transport. However, of most interest here are the rationales that have justified Singapore’s approach. Several pivotal policy choices were taken in the 1970s, before the idea of sustainable development was prominent. It is observed that locally focused, mainly non-environmental imperatives dominated Singapore’s motivations. The study also considers if there are underlying connections between the idea of sustainable development and the particular imperatives that prompted Singapore’s policies. The answers provide insights that may have wider relevance.

Sustainable industrial development and planning is addressed in Chapter 7, where Kum-Chun Seetoh and Amanda Ong discuss the evolution and processes of the industrial policy from the 1960s to the present. They illustrate how Singapore began with the low-cost and labour-intensive industrialization programme which systematically transformed itself to capital-intensive and high-tech and high-value added over four decades. Industrial growth and the expanded market share have enabled JTC Corporation to pay greater attention towards environmentally friendly measures in order to safeguard the living environment whilst intensification of the industrial land has become inevitable. The study also highlights the important role of the industry as a key economic contributor in providing details of a multi-pronged approach towards achieving sustainable environmental and social development.

Chapter 8 by Tony Tan and Tai-Chee Wong looks at the public housing of Singapore in terms of its longstanding and monumental existence as a sustained socio-political product serving the bulk of the population. Its form is characterized by high-rise and high-density buildings ornamented with ‘garden city’ greenery, and is complemented by central place services and infrastructure which have been in existence for over forty years. Yet, given its general popularity justified by the unanimous contention of land scarcity and ample potential in creating vertical living space, it is anticipated that this adapted Corbusian style and form will not merely continue but go higher to accommodate a larger population. Three key dimensions of analysis about sustainability are investigated by the authors: (a) social sustainability is imprinted by general affordability institutionalized by the self-financing central provident fund mechanism. This has been carved out in the political and welfare governance of the state; (b) public housing is integral to the economic sustainability because it is closely associated with Singapore’s growth-driven industrialization and
urbanization processes; and (c) environmental sustainability is useful in countering urban sprawl and thus promoting energy saving through a more compact land use. Full state sponsorship and dedication have furnished a whole spectrum of technical expertise required for the planning, design, management and maintenance, laying the foundation for a sustained functioning of the public housing system in Singapore.

In “Vertical Living and the Garden City: The Sustainability of an Urban Figure” (Chapter 9), Xavier Guillot’s interest lies with the sustainability of “Ring City” and “Garden City” to stay in people’s minds as a planning concept. In his exploration of this enquiry, he links it with the sustainability of existing urbanization processes and settlement patterns as they have developed in Singapore. By consensus, low-density residential living and high dependence on the automobile for commuting or urban sprawl beyond the city fringe driven by market demand does not fit in the sustainability norm. Constructing an urban figure sustainably involves equally sustainable planning of a cultural and political approach that deals meaningfully with the physical evolution of a place. A unique place is established over time on the basis of its identity, character and adaptability that are self-supporting in favour of a sustainable development.

In Chapter 10, Loke Ming Chou’s study moves on to the marine environmental protection in Singapore – a small island state highly reliant on the port economy and its further expansion to support sustained economic growth. Four decades of coastal development and land reclamation have transformed the coastline and marine habitat to the extent of no return if we were to trace back to the earlier dynamic levels of ecosystem and rich natural heritage. Heavy losses in marine habitat, especially coral reefs, mangroves are seen to be a necessary evil given the little choice available for territorial and trade expansion. From the mid-1990s, greater care is given to environmental impact assessment, and the approach has also changed from a “close-door” investigation to a more transparent review, sharing public feedback to serve the end of sustainability. Efforts in favour of habitat restoration from nature activists and public authorities have helped to build up stronger biotic communities and to support a more balanced marine biodiversity. Since the marine habitat losses are never economically quantifiable, the future challenge is centred on the public’s appreciation of the natural environment and habitats, hence making them part of the quality of life that they value, and to which the government sees the need to accommodate.

Another study on natural environment is presented by Min Geh and Ilsa Sharp in Chapter 11 from the perspectives of national identity and land use. For them, sustainability and preserving natural environment is tantamount to safeguarding Singapore’s identity and its “indigenous tropicality,” a uniqueness that needs to be differentiated from the parkland image of colonial and Western origins. As such, the local non-governmental organizations have a role to contribute. The identity with nature conservation has been established through the proactive involvement of NGOs, such as the Singapore Nature Society, academics and nature lovers and those conscious of or having a belief in conservationist movements as a means to arouse greater government commitment to preserve nature sites such as Chek Jawa.