The Hong Kong Polytechnic University

Department of Building and Real Estate

Sustainable Urban Renewal Model for A High Density City - Hong Kong

by

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CERTIFICATE OF ORIGINALITY

I hereby declare that this thesis is my own work and that, to the best of my knowledge and belief, it reproduces no material previously published or written, nor material that has been accepted for the award of any other degree or diploma, except where due acknowledgement has been made in the text

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ABSTRACT

Like other developed countries in the world, the importance of urban renewal in improving the physical environment conditions and the living standards of the public is recognized in Hong Kong. However, many previous studies revealed that a lot of urban renewal projects failed to tackle the problems of urban decay and to satisfy affected parties, and brought the dilemmas and conflicts among the three domains: economy, environment and society.

To address the deficiencies of current practices and ascertain the quality of the renewal projects, defining what constitutes a sustainable urban renewal project and how to implement it are crucial issues that have attracted considerable attention in academia and construction industry. In view of this, this study is initiated. The objectives of this research are to develop a sustainable approach in planning urban renewal projects to be conducted in Hong Kong by means of urban design; to identify the relationship between urban design considerations and the sustainable development objectives; to determine the underlying factors that contribute to sustainable urban regeneration and to derive a model for assessing the sustainability level of local urban renewal projects.

Through comprehensive literature review, the urban renewal practices and their associated problems were clearly identified. Sustainability concept, value of urban design, design considerations enhancing triple sustainable development objectives, and their interrelationship were also explained. By adopting questionnaire surveys and various statistical analyses such as Independent T-test and Exploratory Factor Analysis, general views of the key stakeholders in Hong Kong on the significance of each design consideration for sustainable development, and the underlying factors that account for the variances in their perceptions could be found. Based on the factors highlighted, the assessment design criteria of the model were identified and its framework was also derived. This framework served as a hierarchy for conducting Analytic Hierarchy Process, which was used to find out the relative importance of individual design criteria and form the skeleton of the assessment model.

In order to ensure that the model derived can effectively assess the sustainability level of local urban renewal projects, a valid assessment tool has to be made. Both qualitative and quantitative indicators were developed under various design aspects for benchmarking the project performance systemically. With the help of the experts from the industry and academia, the indicators have undergone a detailed evaluation process, which have revealed that the model composed of 34 indicators was a reliable and valuable tool to achieve the goal of producing sustainable urban renewal projects in Hong Kong.

Critical factors meeting the sustainable development objectives and the assessment model are two major outputs of this study. The research findings help to strengthen the understanding of local developers, urban designers and government officials on how to plan a sustainable urban renewal project to create a sustainable community afterwards. They should take into account of those crucial factors extracted from an analysis of the sample opinions from relevant parties in order to attain excellent performance in local projects in the future. Furthermore, the assessment model suggested here can ascertain that local urban renewal projects carried out in the future can deal with the urban problems and benefit the community in various aspects effectively and efficiently because the impacts of the projects on economy, environment and society can be predicted in advance and necessary adjustment to the renewal proposals can also be made.

Apart from its practical applications, this research is also useful in academia. Although there is abundant research studying the concept of sustainability and the value of urban design respectively, there are few attempts to combine them into urban redevelopment literature. There are a number of schemes and indicators available for assessing sustainable development, but they are not tailor-made for measuring the performance of urban renewal projects. Therefore, the findings of this research can enrich the contents of related topics.

PUBLICATIONS ARISING FROM THIS THESIS

Journal Papers

1. Chan, E.H.W. and Lee, G.K.L. (2006). Design-led sustainable urban renewal approach for Hong Kong. *The HKIA Journal*, 2nd Quarter, 46, 76-81.

2. Chan, E.H.W. and Lee, G.K.L. (2007). Design considerations for environmental sustainability in high density development: a case study of Hong Kong. *Environment, Development and Sustainability*, Published online (DOI: 10.1007/s10668-007-9117-0).

3. Chan, E.H.W. and Lee, G.K.L. (2008). Applicability in Hong Kong of London's experiences on urban redevelopment practices. *Property Management*, 26(2), 125–137.

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5. Chan, E.H.W. and Lee, G.K.L. (2008). Critical factors for improving social sustainability of urban renewal projects. *Social Indicators Research*, 85(2), 243–257.

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1. Lee, G.K.L. and Chan, E.H.W. (2006). Effective approach to achieve sustainable urban renewal in densely populated cities. *1st International CIB Student Chapters Postgraduate Conference on "Built Environment and Information Technologies"*. CIB Students Chapters, Ankara, Turkey, 16-18 March 2006.

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CHAPTER 1 INTRODUCTION

1.0 Introduction

This chapter provides an overall picture of the study. It begins with the justification for this research followed by the research objectives, research methodology, delimitation of the study, and significance of the research. An overview of the structure of this thesis is also provided at the end of this chapter.

1.1 Justification for this Research

1.1.1 From a Macro Point of View

Nowadays, numbers of global problems can be found on Earth and they have aroused public concern all over the world. As shown in Figure 1.1, global warming/ climate change is one of the most alarming issues that should be tackled without delay. Global warming is primarily caused by the massive increase of greenhouse gases in the atmosphere. Generally speaking, certain amounts of greenhouse gases including water vapour, carbon dioxide, ozone, methane, nitrous oxide, etc. are essential to control the temperature of the Earth by balancing the energy input from the sun and energy loss to the space (Maslin, 2004). The energy from the sun is in form of short-wave radiation which penetrates the atmosphere and is partly absorbed by the air, land and oceans. The Earth's surface becomes warm after absorption of solar radiation and then emits long-wave infrared radiation. The greenhouse gases trap and re-emit some of this infrared radiation to the Earth, which further warm the atmosphere. The temperature of the Earth cannot be kept to an acceptable level for all habitants in the ecosystem without a natural blanket/ greenhouse effect created by greenhouse gases. However, when the atmospheric concentration of greenhouse gases increases steadily due to excessive emissions from various sources, long-wave infrared radiation being trapped by the greenhouse gases cannot escape from the Earth, making it difficult for the Earth to cool and leading to a continuously increase in the average temperature of the Earth. The general increase in the Earth temperature

adversely affects the macro climate which leads to the climate change problem ultimately.

It is believed that the global warming/ climate change problem is closely related to our built environment. On one hand, this problem imposes a number of negative impacts on the environment and the population at national and city scales (Figure 1.2). On the other hand, the activities carried out at the city level would worsen the problem. As mentioned by Houghton (2001), most of the warming observed over past 50 years is attributable to human activities. The increase in the amounts of carbon dioxide and other greenhouse gases is caused by various types of human activities including burning of fossil fuels, land clearing, deforestation, agriculture, etc. which leads to an increase in greenhouse effect (Houghton, 2001). Building construction, a kind of human activities, significantly contributes to global warming/ climate change. Mazria (2006) stated that the building sector was responsible for half of all US greenhouse gases emissions annually and these emissions were increasing at an alarming rate. The emissions are mainly accounted for by the combustion of carbon-based fossil fuels for the generation of energy during the whole construction process, from building materials extraction, product manufacture, and product transportation.

In order to mitigate the adverse impacts of such global problem on present and future generations, the principles of sustainability/ sustainable development should be incorporated in every international political agenda. “Sustainability” is a buzzword in past decade. Since 1987, after sustainable development was clearly defined by World Commission on Environment and Development (WCED), the concept of sustainability drew great attention from professionals, academia, government officials and the general public. Throughout the years, there are considerable discussions over a common definition of sustainable development and the relative importance of its 3 foremost elements, but the significance of the concept is recognized worldwide indubitably. To achieve the sustainability at the global level, a certain amount of economic, environmental and social objectives should be met. Hong Kong, just a small city in the world, cannot solve the world problems and meet all sustainable development objectives on its own. However, it can make a contribution to global sustainability by introducing sustainable construction activities. In Hong Kong, the

construction activities can be briefly divided into 2 main types i.e. new development projects and urban renewal projects. However, this research only put its focus on urban renewal and it intends to achieve local sustainability through the urban renewal process. It is strongly believed that a wide variety of activies/ practices can be adopted throughout the renewal process in order to achieve sustainability at city scale and to mitigate the world problems to a certain extent.

1.1.2 From a Micro Point of View

Urban renewal is a complex process that has been commonly adopted to cope with changing urban environment, to rectify the problem of urban decay and to meet various socioeconomic objectives since Industrial Revolution (Couch, 1990; Adams and Hastings, 2001; Lee, 2003). However, many renewal projects completed are roundly criticized because they are not handled properly and have induced different social and environment problems (Rothenberg, 1969; Alexandre, 1992; Chui, 2003; Ha, 2004). Hence, academia and municipalities have recently initiated a new approach in which the concept of sustainability is incorporated into urban renewal projects in order to create sustainable communities (Visic, 1995; Peng, 1999; Alexander, 2000; Couch and Dennemann, 2000; Shutkin, 2000; Alker and McDonald, 2003; Rydin et al., 2003).

At the beginning, the concept of sustainability/ sustainable development is mainly applied to global issue; however, the attention has recently shifted onto regional, city and neighborhood issues (Shutkin, 2000; Berek, 2002). As designing, building and managing a community through urban renewal is considered as one of the most important tasks at the local level, deciding how to apply sustainable concept to urban renewal to revitalize the communities is a matter of concern that should be properly addressed (Berek, 2002).

When the concerned parties have been struggling to find some effective ways to transform such abstract concept into real urban renewal practices, previous urban design literature coincidentally argued that urban design could bring a wide range of economic, environmental and social outcomes, and good urban design could further improve the sustainable values (Couch, 1990; Rowley, 1998; CABE and DETR,

2001). It appears that urban design can effectively achieve sustainable redevelopment. However, little urban redevelopment literature attempts to combine the concepts of sustainability and urban design at the same time.

Even though the interest in studying sustainable urban renewal/ urban regeneration and the value of urban design is growing around the world, these issues are being studied separately. Some researchers examine the concept of sustainable urban renewal/ urban regeneration approach (Campbell, 1996; Devuyst, 2000; Shearlock et al., 2000; PD, 2003) while others investigate the benefits delivered by urban design (Vandell et al., 1989; Couch, 1990; Rowley, 1998; Berke, 2002). Many of them have given their own examples of good urban design features which can enhance economic, environmental and social benefits of development projects, but no general agreement can be made on them. In order to verify the effectiveness of urban design practices in achieving sustainable urban renewal, it is necessary to have a study to link up both issues and highlight the ingredients of such approach.

Nowadays, sustainable development is a common goal of many worldwide urban policies, and many urban renewal projects are claimed to be sustainable; however, limited assessment or evaluation tools are available to examine the extent to which urban renewal projects have generated sustainable outcomes (Hemphill et al., 2004). The majority of evaluation models commonly used in recent years are mainly for assessing the sustainable development in which assessment of environmental performance of the project has made up a large proportion. Many of them adopt indicator-based approach with quantitative assessment criteria which fails to recognize the importance of subjective factors and human aspects. When looking into the literature, it appeared that a widely accepted means of evaluating urban renewal is absent at this moment and the model developed by Hemphill et al. (2004) has yet been regarded as the most comprehensive one to assess the sustainability performance of urban regeneration. Even though it adopted indicator-based approach addressing both tangible and intangible issues, it failed to provide a mechanism to assess the sustainability level of particular urban regeneration scheme before commencement of the project. In addition, assuming equally importance of economic, environmental and social objectives and equally importance of each indicator under particular issue is not realistic in the real world.

In the absence of an interface between sustainable urban renewal and urban design, and an assessment model composed of valid and reliable ingredients to evaluate the sustainability level of individual urban renewal project, it is in need of a philosophy to fill these knowledge gaps. Hence, this research founded on Hong Kong context was initiated. Hong Kong was selected as the key study area because of its challenging context. In the past, the Hong Kong Government had not paid much attention to sustainable development and the general public had little knowledge about the concept. Although both parties nowadays understand more about the concept and start to have visions of achieving sustainable development, the emphasis of the planning policies and practices including the urban renewal strategy in Hong Kong have still been put on land use allocation, creation of scarce and valuable development land, and profit making. A certain amount of urban renewal projects have been conducted by the private developers and the quasi-government bodies, but they are mainly about the physical redevelopment of buildings with limited improvements on social-economic aspects. It appears that urban renewal in Hong Kong is not doing well now and a practical way to achieve sustainable development in 3 major dimensions namely economic development, environmental quality and social equity is urgently required for the benefit of current and future generations.

In addition, Hong Kong is one of the cities with the highest population and development density in the world. The topographic and demographic characteristics have imposed constraints on urban design, and induced additional difficulties in implementing sustainable urban renewal projects with balanced economic, environmental and social outcomes. As a result of re-unification of Hong Kong with China, Asian financial turmoil, outbreaks of SARS (Severe Acute Respiratory Syndrome) and bird flu, and fluctuations in performance of local economy, Hong Kong has undergone tremendous changes in political, economical and social environments in the past decade which make urban renewal in the territory become more complex. In view of this, it is beneficial to make a start on studying Hong Kong in order to indicate how a sustainable community can be created by merging the concepts of sustainability and urban design into urban renewal practices, and developing a model with high applicability and generality.

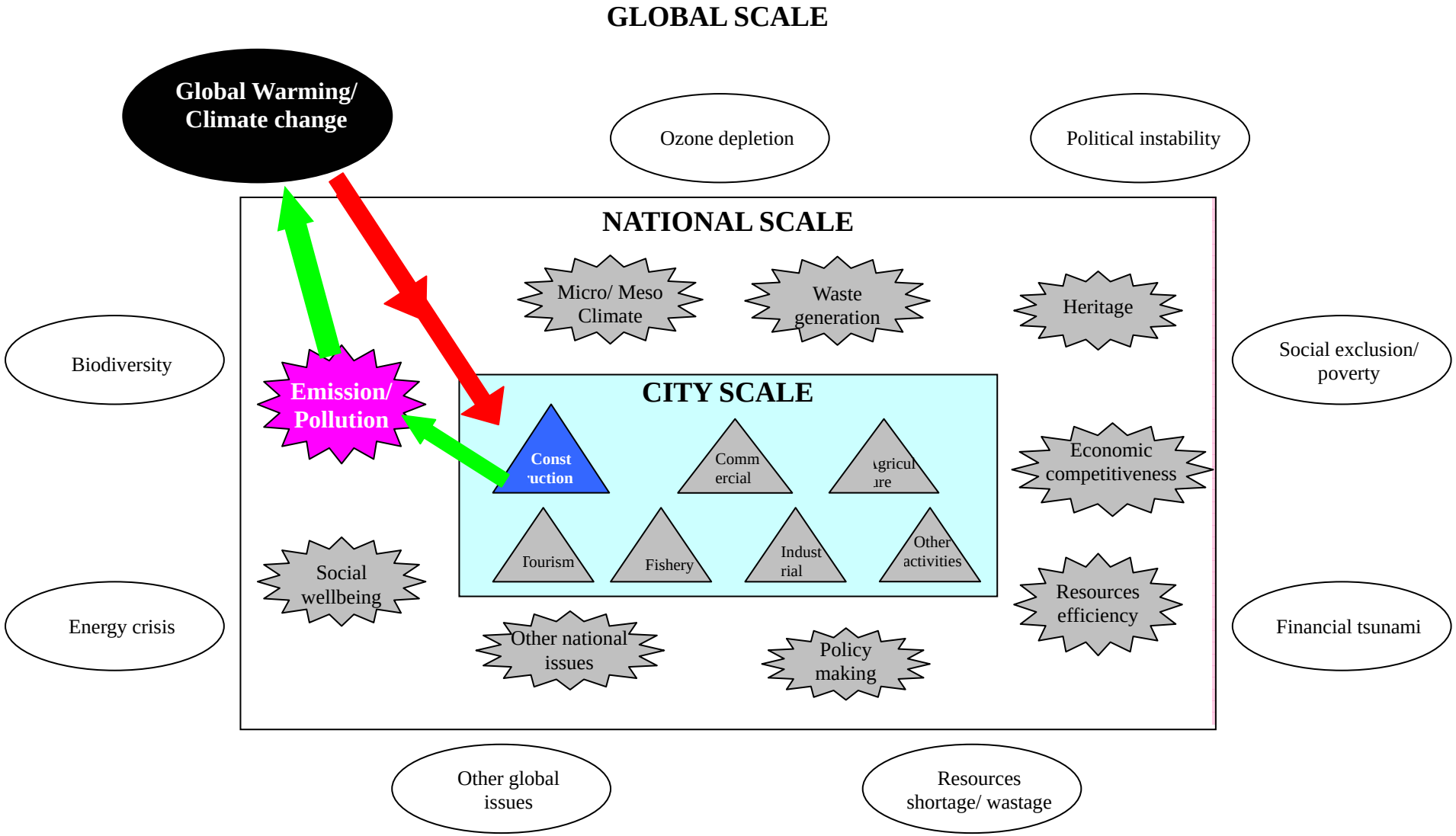


Figure 1.1 Relationships between Global Issues & Human Activities

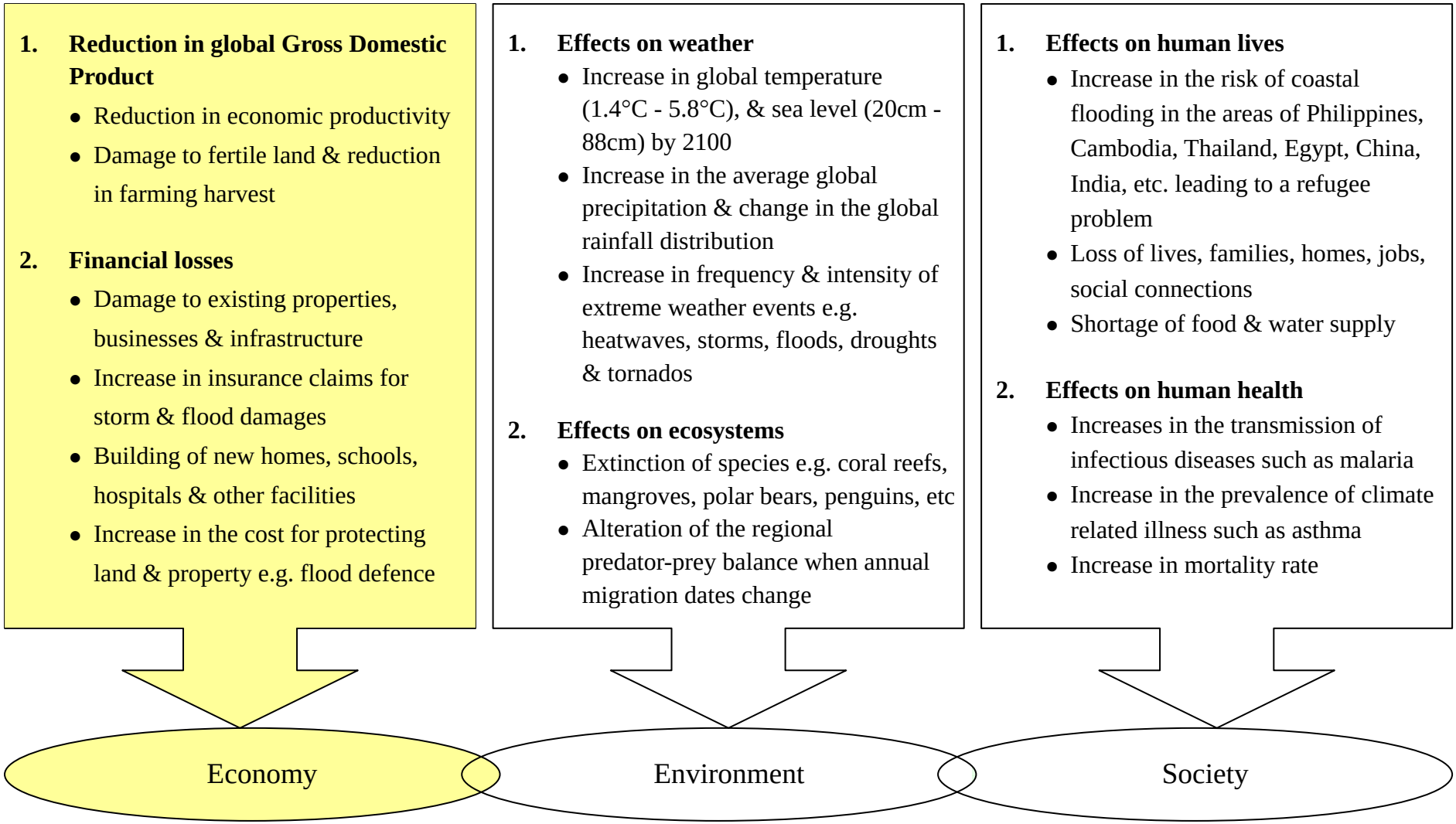


Figure 1.2 Impacts of Global Warming/ Climate Change on Various Aspects

1.2 Research Objectives

The primary aim of this research is to achieve sustainable urban renewal in Hong Kong by developing a yardstick to measure and evaluate the design quality and performance of different urban renewal projects. The specific objectives of this research are shown below:

(i) To develop a theoretical and conceptual framework for a sustainable urban renewal approach that is built on the relationships between urban renewal, sustainable development and urban design, and the interplay of various urban design principles and corresponding design considerations;

(ii) To examine the characteristics of the urban (re)development in Hong Kong;

(iii) To justify the selection of the urban design considerations highlighted in the captioned framework for enhancing the sustainability level of local urban renewal practices;

(iv) To establish a feasible assessment model - Sustainable Urban Renewal Project Assessment Model (SURPAM) by means of perception surveys, expert judgments and statistical analyses for advocating sustainable urban renewal in Hong Kong; and

(v) To evaluate the components of the SURPAM to be adopted in the urban renewal process by capturing the experts' views.

1.3 Queries & Issues to be addressed in the Study

This research is structured to improve the conceptual understanding of the issues in relation to urban renewal, sustainable development and urban design, to identify the specific factors affecting the sustainability level of local urban renewal projects and to derive an assessment model. The study attempts to address the following queries throughout the whole research process:

(i) Why should the sustainability concept be adopted as the guiding principle for urban (re)development?

(ii) How does urban design contribute to sustainable (re)development?

(iii) How to achieve sustainable urban renewal through urban design in Hong Kong, as the study area of this research?

(iv) How to ensure that the urban renewal strategies in Hong Kong to be established in the future fulfill long term sustainability objectives e.g. stimulation of economic growth, preservation of natural environment, and improvement of the quality of population's life?

In response to these queries, this study has linked the concept of urban renewal, sustainable development and urban design together to form an analytic framework, and has set down a number of issues for investigation:

(i) Sustainable urban renewal approach is an appropriate mechanism to achieve sustainable development at the local level especially in Hong Kong where environmental and social well-being of the communities are always overlooked in planning financially viable redevelopment projects.

(ii) Urban design is the major facilitator in sustainable urban renewal approach allowing the incorporation of more sustainable attributes from economic, environmental and social perspectives in local urban renewal process.

(iii) A model to assess the extent to which the urban renewal projects meet the sustainable development objectives is required to predict and mitigate adverse effects of local renewal programme before implementation.

(iv) The method and process of the assessment allow the public to raise their concerns and express their views on the renewal projects, identify the design criteria being highlighted/ ignored in the projects, and evaluate the effectiveness

of the projects in sustaining different renewal areas.

1.4 Research Methodology

In order to meet the aim and objectives of this study, address the queries and associated issues, a research methodology comprising quantitative and qualitative techniques was adopted. This research firstly verifies the role of urban design in sustainable urban renewal approach to be adopted in Hong Kong. It is mainly founded on previous research conducted in the West studying the theories of urban redevelopment, sustainable development, urban design, and their interrelationships. In this study, comprehensive literature review is undertaken in the first instance to identify a potential problem worthy a research and formulate a research framework. Then, a cross-sectional and correlational design approach is employed to collect quantitative data from urban (re)development practitioners in London and Hong Kong, and local citizens in selected districts. The target respondents are requested to fill in questionnaires and the data collected would be examined through a series of statistical analyses.

This research also attempts to derive a systematic and reliable mechanism to evaluate the design of individual urban renewal project carried out in the territory. In this study, an assessment model is developed by adopting a multi-criteria decision making method. Based on the results of data analyses and with the help of the experts representing different disciplines of town planning, architectural design, property development, academia and social concern groups, the skeleton of the model is formed. After making reference to various assessment tools available for evaluating sustainable development, the content of this assessment model is fine-tuned and made ready for further evaluation conducted at the end of the research process. Details of the research methodology are discussed in Chapter 4.

1.5 Delimitation of the Study

The major delimitation of this study is that the main research focus was confined to the urban renewal in Hong Kong and therefore further generalization of the findings of this study elsewhere was beyond the scope of this research. Another delimitation

of this study is that when capturing the professional views, only 3 disciplines of urban design practitioners i.e. architects, town planners and property development managers were surveyed even though other professional disciplines like surveyors, engineers and builders might also be involved in the urban design process. Instead of investigating all 18 districts when carrying out the questionnaire survey, this study mainly focuses on 4 old urban areas i.e. Yau Tsim Mong, Sham Shui Po, Wan Chai, and Central & Western Districts with abundant urban redevelopments to be conducted by the quasi-government bodies in previous decades. In addition, this research did not attempt to conduct comparative study of potential cross-national, cross disciplinary and cross district effects on sustainable urban renewal in Hong Kong. This study was limited to the renewal of urban areas because the context in urban areas is more dynamic than that in rural areas, and the urban decay problems are always found in the urban areas. The model derived in this study is tailor-made for the medium to large scale urban renewal schemes with mixed-use developments in which more households and citizens would be affected.

1.6 Significance of the Research

The Urban Renewal Strategy pinpointed that around 9,300 private buildings in Hong Kong were 30 years old or above in 2001 (HPLB, 2001b). Many of them are beyond repair and remain limited serviceable life span because prompt and proper building maintenance and management were absent in the past. Their conditions are so poor that more than a hundred of accidents related to unsafe building conditions have occurred in recent years (Lee and Chan, 2005) and the lives of the public are currently in danger. Since about 14,000 dilapidated buildings are anticipated to be found in 2011, it is quite likely that the number of urban renewal projects in the territory will increase in coming decade in order to improve the built environments. Once the projects are announced, thousands of local citizens living in an existing community are affected. To minimize the harm to affected parties and maximize the benefits brought to the new community, many local architects, urban planners, builders, scholars, policy makers and government officials look for new frameworks in planning urban renewal projects to guide the economic development and rectify associated social and environmental problems. In this regard, this study is important as it aims to develop a sustainable urban renewal approach for Hong Kong.

This study provides a clear picture of sustainable urban renewal by taking into account of the perceptions of different stakeholders who design, build and use the urban fabric. The research is timely and useful as it delivers valuable information on the factors that contribute to sustainable urban renewal in the territory. It strengthens the understanding of local developers, urban designers and government officials on the interrelationships between spatial and physical characteristics of an area and its economic, environment and social qualities. Furthermore, this research has generated a meaningful, useful and reliable assessment model to evaluate the design quality as well as the sustainability level of different urban renewal proposals. It provides a systematic way to select the most appropriate design for an area undergoing urban renewal, and to refine the details of the renewal project before implementation. It is believed that the renewal projects being assessed can effectively solve the urban decay problem and benefit the present and future generations upon completion.

In additional to practical usage, the findings of this research are also constructive in academia. Many previous studies were conducted to investigate the deficiencies of urban redevelopment, the concept of sustainable development and the value of urban design but few of them integrated these issues into a study. Although a number of evaluation tools and indicators were available, not all of them were applicable to assess the performance of urban renewal projects and capable to address both tangible and intangible issues. Thus, this research has been initiated in order to fill these knowledge gaps and provide a valuable tool for the urban renewal professionals.

Furthermore, most of the previous studies relevant to this research are based on the situations in the West rather than in the Asian countries. Despite the fact that each Asian country has very distinct characteristics in economic condition, political and social environment, and scale and speed of development, they have common aims of creating sustainable communities, and meeting the needs and expectations of their citizens. Therefore, this study derived from local context can be served as a reference for other Asian countries and provide a platform for the urban scholars to conduct further studies on related topics in the future.

1.7 Thesis Framework

The thesis is composed of 8 chapters in which each of them has its own focus. Figure 1.3 depicts the thesis framework, followed by a brief introduction to individual chapters.

Chapter 1 presents the introduction of this research. It specifies the reasons to conduct this study, highlight the research objectives and issues to be addressed, and identifies the scope, the process and the value of this study.

Chapter 2 reviews the literature relevant to 3 major concepts namely urban renewal, sustainable development and urban design. The purpose of this chapter is to outline the significance and deficiencies of global urban renewal practices, present the sustainability concept and its value, formulate a conceptual framework for a sustainable urban renewal approach and discuss how urban design helps to achieve sustainable urban renewal on a local scale.

Chapter 3 reviews the history of urban redevelopment in Hong Kong, highlights the local regulatory controls over urban renewal and identifies the problems/ adverse impacts associated with current renewal practices. It illustrates the sustainable (re)development in the territory and introduces numbers of critical urban design principles for achieving sustainable urban renewal in Hong Kong.

Chapter 4 sets out to describe the research design and methodology adopted in this study. It provides a detailed description of the research process, instrument, sampling and data collection procedures. It also presents various statistical techniques used in this research to analyze the data collected, and the evaluation method adopted to examine the reliability of the final research outputs.

Chapter 5 shows the results obtained from the data analyses which include descriptive analyses of demographic characteristics of the respondents, Pearson’s correlation analysis for evaluation of the relationships between variables, and independent t-test for identifying the people’s perceptions of the importance of individual urban design

considerations. It also includes exploratory factor analysis for identifying the underlying factors that might contribute to local sustainable urban renewal as well as analytic hierarchy process for calculating a set of priority ratings of extracted factors with respect to 3 sustainable development objectives. In addition, it presents the results of Kendall's *W* which was employed to confirm whether there was substantial agreement among respondents from 2 different expert groups on the rankings of the design criteria.

Chapter 6 explains the key findings of this study. It firstly demonstrates how individual factors make a significant contribution to the community undergoing urban renewal from economic, environmental and social perspectives. Then, it bases on the findings obtained in Chapter 5 to build up a conceptual framework for a Sustainable Urban Renewal Project Assessment Model (SURPAM), an assessment model for evaluation of the sustainability level of the urban renewal projects conducted in Hong Kong.

Chapter 7 highlights the purposes of deriving the SURPAM, its value, structure and assessment mechanism. It attempts to discuss the details of assessment indicator which is an important component of the SURPAM for evaluation of the urban renewal projects. The details cover the selection criteria for individual indicators, types of indicators used worldwide, and development of appropriate indicators to represent individual design criteria and corresponding point scoring system. Most importantly, this chapter has shown in details the evaluation process of this assessment tool with the help of the experts from the industry as well as the academia, and indicated how the SURPAM can be applied in real practice.

Chapter 8 begins with a brief overview of the whole study. It summarizes all findings gained in previous chapters by revisiting the aim and specific objectives of this research, and shows how these findings address the queries stated in Chapter 1. Then, it ends with the sections indicating the implications of this research, its limitation, the agenda for further study and the conclusion.

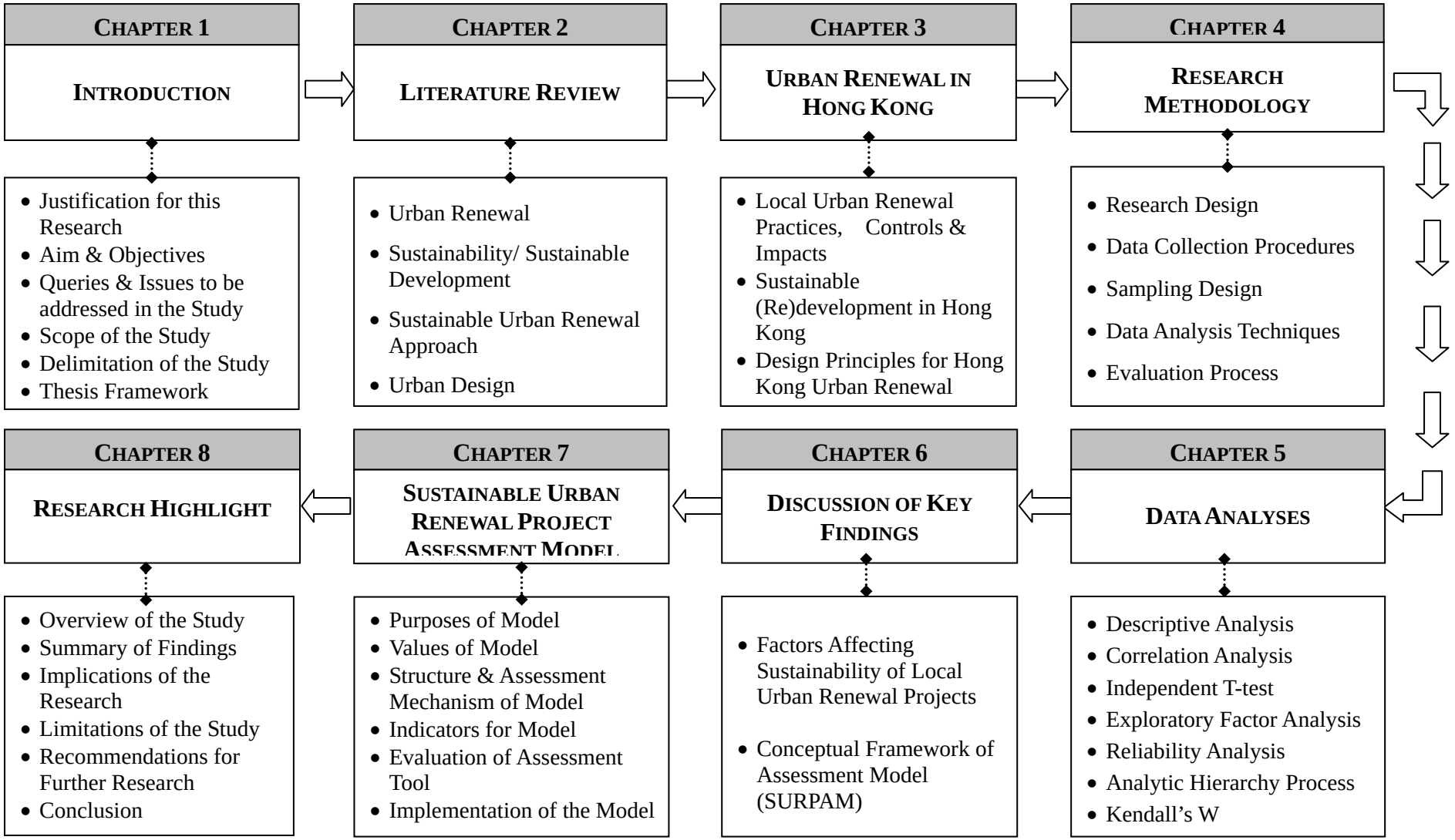


Figure 1.3 Thesis Framework

CHAPTER 2 LITERATURE REVIEW

2.0 Introduction

This chapter examines 3 main topics including urban renewal, concept of sustainability/ sustainable development and urban design through a comprehensive literature review. After the clarification of the origin and the definition of the term "urban renewal", the significance and deficiencies of global urban renewal practices are reviewed. Then the sustainability concept and its value are discussed, and a theoretical and conceptual framework for a sustainable urban renewal approach is formulated. Before ending this chapter, past research in urban design, which is selected as a primary means to achieve sustainable urban renewal, is also studied.

2.1 Urban Renewal

When looking into the literature related to urban renewal, some terms and concepts are often mentioned but their meanings vary. In order to avoid confusion, the meanings of the terms frequently used in this study e.g. urban renewal, urban regeneration and urban redevelopment should be elaborated in the first instance. Although the researcher has studied the urban renewal literature of numbers of countries, the review of urban renewal in this section mainly made reference to the US and UK literature because their contexts were discussed in greater detail and were more relevant to study the Hong Kong's urban renewal process.

2.1.1 Terminologies in respect of Urban Renewal

2.1.1.1 Urban Renewal

Urban renewal is seen by Couch as a process involving "physical change, or change in the intensity of use of land and buildings" resulting from the "economic and social forces" imposed on the urban areas (Couch, 1990). This phenomenon is clearly reflected in the urban renewal policies for Britain and the United States (US). Due to the rapid growth of the population, economic restructuring and change in the social

needs, urban areas in Britain are redeveloped to create better living environments by demolishing obsolete houses, offices and shops, rebuilding new premises and providing various types of amenities e.g. public transport, schools, recreation facilities, etc. In addition to demolition and reconstruction of buildings, the urban renewal programmes with comprehensive forethought and coordination also include conservation and rehabilitation (Steel and Slayton, 1965).

The concept of urban renewal covering slum clearance, redevelopment, rehabilitation and conservation was laid down officially in the Housing Act 1954 (Choo, 1988). Steel and Slayton (1965) stated that urban renewal in the US was known as a slum clearance programme which aimed to remove or rehabilitate slum and blighted areas. The activities in the programme such as displacement of substandard accommodation and redistribution of different land uses were not only for physical improvement of the living environment but also for social status enhancement and stimulation of economic growth. The same idea is highlighted by Priemus (2004) that urban renewal did not simply involve "brick and mortar" and it had to be seen as a process combining physical, social and economic agendas.

In Hong Kong, urban renewal is accepted as "…the plan, process and programme through which the environment quality of large derelict areas … is upgraded through large scale clearance and redevelopment…according to new layouts in comprehensive plans prepared for the purpose" (PLB, 1996). The Planning and Lands Bureau (PLB) (2000) further mentioned that urban renewal was a traditional term used widely by the Government to refer to urban redevelopment, urban rehabilitation, urban regeneration and urban renaissance. Urban renewal is not a "slash and burn" process but is a "comprehensive and holistic approach" to revitalize aging urban fabric by "redevelopment, rehabilitation and heritage preservation" (Ng, 1998; HPLB, 2001b; URA, 2002).

In this study, urban renewal is defined as a process that includes clearance of slum or blight areas, urban redevelopment, urban revitalization, building rehabilitation, preservation and conservation to improve urban fabric, and meet some economic and social objectives.

2.1.1.2 Urban Regeneration

Urban regeneration is rather a new concept that was derived in the 1990s (Roberts, 2000). The term "urban regeneration" has various meanings in the world. Wikipedia (2004) pointed out that the meaning of the term "urban renewal" was equal to that of urban regeneration in Britain English. Occasionally, urban regeneration shares similar meaning with urban renewal in the literature. According to Hemphill et al. (2002), urban regeneration includes "rehabilitation of existing structures", "redevelopment of buildings" as well as "reuse of urban land". Urban renewal in Hong Kong is also referred to urban regeneration as stated in the Planning and Lands Bureau's Response to Public Comments (PLB, 2000). However, numbers of scholars pinpointed that urban regeneration had a broader meaning than urban renewal (Couch, 1990; Roberts, 2000). Couch (1990) described urban regeneration as reinvestment in existing urban environment to increase employment and consumption, and enhance the quality of life of the citizens. Roberts (2000) defined urban regeneration as "comprehensive and integrated vision and action" adopted to solve urban problems and bring about "lasting improvement in the economic, physical, social and environmental condition of an area". He also stated that urban regeneration "moves beyond the aims, aspirations and achievement of urban renewal, redevelopment and urban revitalization."

Urban regeneration in the guidelines developed by Regional Activity Centre (2004) included "renovation, rehabilitation of obsolete infrastructure and built-up land" and "restructuring of urban fabric, renewal of urban economy and achievement of social equity." In other words, urban regeneration also concerns about long-term community development in addition to physical environment enhancement.

In this research, urban regeneration is defined as a process of urban renewal incorporating the elements of sustainable development to achieve long lasting improvement and commitment. Further details of sustainable development/ sustainability are shown later in this chapter.

2.1.1.3 Urban Redevelopment

Choo (1988) stated that the term "urban redevelopment" was coined in the 1930s and it formed the fundamental principle of the "Slum Clearance and Community Development and Redevelopment" Programme under the Housing Act 1949 of the US. Urban redevelopment in general is recognized to have a narrower meaning than urban renewal. Meltzer and Orloff (1953) defined redevelopment as a process involving site clearance, dislocation, displacement, or relocation. Redevelopment is merely an integral part of urban renewal under current urban renewal policies in Hong Kong (PLB, 1996 and 2000).

In contrast, some researchers advised that the term "urban redevelopment" should be understood from a more dynamic perspective (Choo, 1988). Lee (2003) pointed out that urban redevelopment was to convert blight and deteriorating urban areas into livable and favorable urban community. Slayton (1953) and Twichell (1953) also suggested that urban redevelopment not only included the clearance of blighted and slum areas and the rebuilding projects but also involved rehabilitation and conservation measures. Urban redevelopment seeks to address urban decay, improve the living and working conditions, and prevent blighting process. From this point of view, it seems that the terms "urban renewal" and "urban redevelopment" share similar meaning and can be regarded as synonymous. That's why urban renewal and urban redevelopment are used interchangeably in some studies (Choo, 1988; HKHS, 2004)

However, these terms are invented in different sequences. The term "urban renewal" is developed later than "urban redevelopment"; therefore, it is expected that urban renewal integrating more planning considerations and development options than urban redevelopment. For that reason, this research insists on distinguishing urban renewal from urban redevelopment, and urban redevelopment mentioned here is only defined as demolition and reconstruction of buildings.

2.1.2 Theoretical Foundations of Urban Renewal

Urban renewal is a concept originated in post World War II (WWII) era (O'Flaherty,

1994; Lee, 2003). However, it is possible to detect numbers of urban renewal activities in response to economic and social transformation after the Industrial Revolution. Change of the usage of land and buildings, and increase in development densities provided some sorts of evidence of urban renewal at that time (Couch, 1990). O'Flaherty (1994) also conveyed that urban renewal programmes were authorized in various states before and after WWII.

As mentioned by Rothenberg (1969), the US federal government is an active partner in urban renewal. In the late 1940s and the early 1950s, urban renewal was of concern to the US and major urban renewal legislation was enacted there (Rapkin, 1980). To retain, restore and improve the function and structure of the society, the idea of urban renewal was introduced in the Housing Act 1949 and its position was further reinforced in the Housing Act 1954. The most conspicuous evidence is that the name of the programme changed from "Slum Clearance and Community Development and Redevelopment" in 1949 to "Slum Clearance and Urban Renewal" in 1954 respectively (Choo, 1988; Lee, 2003). Urban renewal activities at that moment did not limit to slum clearance, urban redevelopment and provision of public housings to the low-income groups but did expand to rehabilitation of substandard housings and conservation programmes (Steel and Slayton, 1965). Since 1956, urban renewal legislation has undergone numerous amendments in response to changing political, economic and social environment in order to ensure that the process could run smoothly, efficiently and effectively.

For instance, the Housing Act 1956 established the concept of General Neighborhood Renewal Plan to segment the urban renewal activities for larger areas in separate projects and complete them in a period of years in order to ascertain that renewal areas and adjacent districts were developed as a whole to achieve comprehensive community development (Steel and Slayton, 1965). Three years later, Community Renewal Programmes were proposed to prioritize the urban renewal needs in different areas based on the financial, social resources required and available for the renewal projects (Rapkin, 1980). Rapkin (1980) pinpointed that the concept and practices of urban renewal in the US altered throughout the years but its main target to improve urban fabric and quality of life of the public remained unchanged.

2.1.3 Significance & Deficiencies of Global Urban Renewal Practices

Urban renewal is conducted to achieve a number of goals especially for slum clearance (Steel and Slayton, 1965; Rothenberg, 1969; Rapkin, 1980; Taylor and Newton, 1985; Cuthbert and Dimitriou, 1992; PLB, 1996; Lü, 1997; Carmon, 1999; Chan, 2000; Ha, 2004). The Housing Act of 1937 of the US defined "slum" as "any area where dwellings predominate which, by reason of dilapidation, over-crowding, faulty arrangement or design, lack of ventilation, light, or sanitation facilities, or any combination of these factors, are detrimental to safety, health or morals" (Rothenberg, 1969). According to Abrams (1966), slum is known as "a building or area that is deteriorating, hazardous, unsanitary, or lacking in standard conveniences" and "the squalid, crowded, or unsanitary conditions under which people live irrespective of the physical state of the building or area." Rothenberg (1969) also stated that slums represented suboptimal resource use, and generated negative social costs e.g. fire hazards, health menace, crime, etc. Slum clearance is regarded as removal and reconstruction of substandard and ineffectively used areas in order to create suitable and comfortable living environments for every citizen (Choo, 1988). Apart from restoration of the urban areas to acceptable conditions, various cities conduct urban renewal to serve other objectives.

2.1.3.1 Common Objectives of Urban Renewal Practices

(1) Provision of Accommodation for Various Social Groups

When an urban area develops, its economy grows rapidly and the land prices increase due to the keen competition of the profitable spaces. Consequently, the poor are unable to afford such high land prices and forced to live either in crowded and substandard housings in urban areas to save commuting costs or in city fringes to reduce accommodation expenses (Taylor and Newton, 1985). In order to assist them, the government of some places renews the urban areas and provides them affordable housings i.e. subsidized public housings in acceptable standards (Rothenberg, 1969; Carmon, 1999).

The demographic trends also have significant implications for the demand of various types of housings. In the past, the demand for affordable, low price accommodation dominated in the property markets of the developing societies when the population of lower income groups was high. After that, the economy grew and the demand for medium quality and luxury housings prevailed (Ha, 2004). For recent decades, the demand for housings in smaller size increased as the total numbers of household raised despite the population size (Howe, 1990). Not surprisingly, if government intervention to cope with the housing shortages is absent, the provisions of low cost accommodation or the housings for groups with special needs e.g. elderly, the disabled, etc. in the urban areas may be inadequate as the developers are more willing to provide housings for middle and higher income groups to increase their net profits. In view of it, urban renewal projects supplying a variety of accommodation for different social groups are necessary.

In addition, housing policy under the urban renewal programme can reduce the population density and feeling of overcrowding by decentralization of population to periphery of the city, and proper design of private and public spaces (Rapkin, 1980; Adams and Hastings, 2001; Fung, 2001b).

(2) Reform of Population Mix

It is unhealthy for an urban area to have population with single status particularly concentration of the poor. Carmon (1999) suggested that a major cause and symptom of neighborhood deterioration was segregation of the lower classes. Middle and upper classes always tend to keep their distances from the lower ones and ultimately the growing disparity between rich and poor results. To avoid this phenomenon, population mix should be advocated. Redistribution of people in different classes can be achieved directly by provisions of accommodation or community facilities for various groups within the same area. Also, it can be done in an indirect way. As mentioned by Carmon and Moshe (1988), younger people, and those with higher education level and socioeconomic status would be attracted to form an affluent segment of existing population after renewal of the urban environment. The diverse mix of population is also welcomed by the Department of the Housing and Urban Development of the US when implementation of urban renewal policy

(Jacobson, 1999).

In some countries, various races live in the same community. They have different cultures, habits, religions and needs, and very often, there are conflicts among racial groups (Couch, 1990). To integrate different racial groups and meet their special needs, some areas and facilities should be designated for them when drafting the urban renewal proposals (Wikipedia, 2004).

(3) Stimulation of Productivity and Economic Growth

Better physical condition of the buildings and image of the neighborhood often lead to an increase in property prices (Li and Brown, 1980). To obtain the economic gain, urban renewal projects are carried out to improve the aesthetic appearance of the urban areas. The PLB (1996) also pinpointed that renewal of part of an urban area by the Government could act as a catalyst for the redevelopment of neighboring areas by other private developers. Therefore, the property values of an urban area as a whole enhance. Fishelson and Pines (1984) further conveyed that some urban renewal projects intended to raise the intensity of land use through replacement of low-rise blocks by high density houses to increase the total revenue. Apart from the provisions of high commodity accommodation, more spaces are spared for industrial and commercial activities under the renewal schemes in return for additional financial benefits (Rapkin, 1980; Lü, 1997).

Owing to the restructuring of the economy and the changing demands of the public, part of the existing buildings and land uses is no longer capable to make contribution to the overall productivity and the economic growth. The profits earned by some businesses decline which leads to the massive layoffs. A number of people loss their current jobs or become underemployed. Their incomes and consumption powers reduce which further worsen the economy (Couch, 1990). Therefore, urban renewal process has to commence to convert the urban lands and buildings into more profitable uses (Rothenberg, 1969). More local job opportunities are generated and the economic base of the local community can be strengthened (Cuthbert and Dimitriou, 1992; Queensland government, 2004). A better relocation of land use and a more efficient allocation of fixed assets, financial and human resources can then be

achieved thereafter (Lee and Keown, 1979).

(4) Efficient and Compatible Land Use

Urban renewal activities are usually conducted to achieve better utilization of urban lands (Ng, 1998; Adams and Hastings, 2001). According to Cuthbert and Dimitriou (1992), many low-density buildings were built in the past and the maximum development potentials of sites were underused. Their property values are usually lower than the site redevelopment values; therefore, urban renewal to cover urban land by a more efficient use is likely to be considered to optimize the economic benefits (Carmon and Hill, 1988; Carmon, 1999). Couch (1990), Rosenthal and Helsley (1994), and Munneke (1996) also mentioned that when the potential earnings gained from the refurbishment or replacement of buildings exceeded current returns, urban renewal activities would be put forward and the decaying or low value buildings would be expelled from the well-located lands (Rapkin, 1980).

Pencil or piecemeal redevelopments are very common when the concept of comprehensive land use planning is not well developed. The absence of comprehensive approach to redevelopment generates numerous problems including incompatible land uses (Cuthbert and Dimitriou, 1992; Fung, 2001b). For instance, industries that create environmental nuisance locate near the residential or commercial areas, and low rent public housings situate by the side of high price dwellings. To address these problems, urban renewal schemes with comprehensive planning and re-zoning should be carried out.

(5) Rectification of Construction Deficiencies

Buildings deteriorate over time. If they are poorly constructed or maintained, their deterioration rates further increase (Rapkin, 1980; Margolis, 1981; Jones, 2002). When the building structures are beyond repair condition and their remaining service lives are anticipated to be short, obsolescence is unavoidable and urban renewal works have to be conducted to change the physical conditions of the properties (Couch, 1990; O'Flaherty, 1994). Instead of physical environment, urban renewal also imposes positive impact on visual appearance of the city landscape which helps to create

aesthetically pleasant and desirable living and working environment for the public (Queensland government, 2004).

When the time passes, the building technologies advance and the construction standards upgrade. Many existing properties are not up to the current standards in terms of design, construction technique and quality level. Hence, they have to be renewed to rectify out of date building design, fire safety design and building services installation so as to provide healthy and safety built environments for the residents (HPLB, 2001b).

(6) Enhancement of Neighborhood

Social problems and unfavorable neighborhood environment probably endanger the lives and property of the citizens and their future generations. For some developing countries e.g. Israel, urban renewal attempts to achieve social goals such as reduction of social disparities and improvement of the living conditions of the residents (Carmon and Hill, 1988). Traffic congestion, noise and air pollution are some typical examples of undesirable features found in urban areas (Taylor and Newton, 1985). As social well-being can be deeply affected by poor environmental quality (Estes, 1993), some cities undergo urban renewal schemes to enhance the transportation networks and the conditions of the surroundings (Lü, 1997; Adams and Hastings, 2001).

Sometimes, urban areas are redeveloped to fight against crimes (Lee and Keown, 1979; Jacobson, 1999). According to Carmon and Hill (1988), community facilities, public amenities, and arenas for leisure and cultural activities provided through urban renewal programme can reduce vandalism and juvenile delinquency indirectly. The provisions e.g. schools, medical and institutional facilities, etc. meet the basic needs of the society (Rothenberg, 1969) while the amenities such as open spaces and community centres facilitate social interaction (Cuthbert and Dimitriou, 1992; Chui, 2003).

Some common reasons for urban renewal identified by different scholars worldwide are presented in Table 2.1.

Table 2.1 Common Reasons for Urban Renewal

	Lee & Keown (1979)	Rapkin (1980)	Taylor & Newton (1985)	Carmon & Hill (1988)	Couch (1990)	Cuthbert & Dimitriou (1992)	PLB (1996)	Lü. (1997)	Carmon (1999)	Jacobson (1999)	Chan (2000)	Adams & Hastings (2001)	HPLB (2001b)	Wikipedia (2004)
Slum Clearance														
To remove blight areas	•	•	•		•	•	•	•	•		•	•	•	•
Provision of Accommodation for Various Social Groups														
To reduce population density	•	•			•	•	•	•	•		•	•		
To provide affordable housings		•	•	•	•				•	•	•			•
To provide high price dwellings		•						•						
To provide housings for people with special needs											•		•	
Reform of Population Mix														
To attract people with higher socioeconomic status				•	•				•	•				
To segregate/ integrate different racial groups					•									•

	Lee & Keown (1979)	Rapkin (1980)	Taylor & Newton (1985)	Carmon & Hill (1988)	Couch (1990)	Cuthbert & Dimitriou (1992)	PLB (1996)	Lü. (1997)	Carmon (1999)	Jacobson (1999)	Chan (2000)	Adams & Hastings (2001)	HPLB (2001b)	Wikipedia (2004)
Stimulation of Productivity and Economic Growth														
To improve physical condition	•		•	•	•	•	•	•			•		•	
To relocate different land uses	•	•			•	•	•	•		•				•
To increase jobs opportunities	•					•				•				
Efficient and Compatible Land Use														
To avoid incompatible land use		•				•		•				•	•	
To achieve better utilization of urban lands	•	•	•		•	•	•	•	•			•	•	
Rectification of Construction Deficiencies														
To rectify out of date design & installation							•						•	
To remove structures beyond repair condition		•			•		•	•					•	
To reduce poorly built structures		•	•		•		•					•		
To replace structures having short remaining economic life		•			•		•							

	Lee & Keown (1979)	Rapkin (1980)	Taylor & Newton (1985)	Carmon & Hill (1988)	Couch (1990)	Cuthbert & Dimitriou (1992)	PLB (1996)	Lü. (1997)	Carmon (1999)	Jacobson (1999)	Chan (2000)	Adams & Hastings (2001)	HPLB (2001b)	Wikipedia (2004)
Enhancement of Neighborhood														
To reduce crime	•			•						•	•			
To solve traffic problems			•			•		•						
To control pollution	•					•						•	•	
To provide open space/ community facilities	•			•	•	•	•	•	•	•	•	•	•	

Most often, it is impossible to meet all objectives as shown above as some of them are inconsistent and incompatible (Rapkin, 1980). Slum clearance always reduces the provisions of affordable housings for the poor. There is a trade-off for usage of lands among construction of various types of dwellings, provision of industrial and commercial facilities, and provision of open spaces and other public facilities. Better utilization of lands may lead to densely development of urban areas which is contradictory to the goal of reducing population density.

Some scholars even comment that urban renewal is not a panacea for solving urban decay as it generates several urban problems to the community (O'Flaherty, 1994; Ng, 2002; Lee, 2003).

2.1.3.2 Shortcomings of Current Urban Renewal Practices

(1) Destruction of Existing Social and Community Networks

When urban renewal process commences, existing buildings are demolished and residents are forced to be relocated. The families living in the same community have to move to other strange places to have a new life. Children may leave existing schools and parents may quit current jobs. Existing social networks are destroyed, long term relationship and friendship established in previous neighborhoods are lost and social assistance is no longer provided in time of need (Rothenberg, 1969; Rapkin, 1980; Taylor and Newton, 1985; Carmon and Hill, 1988; Couch, 1990; Ng et al., 2001). Neighborhood disruption makes individuals feel inconvenience, loneliness, anxious, upset and insecure (Rothenberg, 1969; Chui, 2003). The negative psychological effects persist until new community ties are assembled. However, it is not an easy task to build up new social relationship (Ng, 2002). A survey conducted in 2000 suggested that nearly 1/3 of the interviewees did not know the names of their neighbors and less than 1 in 10 persons had good relationship with them (Ng, 2002). Chui (2003) also revealed that "community sentiment" could not be nurtured in newly established community and problems like rising crime and family crises came up. If a substantial portion of the neighborhood leaves,

those remaining in the areas undergoing the renewal process hesitate to invest in establishment of community network again (Rothenberg, 1969). According to a previous study conducted by Ha (2004), almost 30% of residents perceived that the relationships with neighbors, social culture and sense of belongings of the residents got worse upon completion of the redevelopment projects.

Local businesses are also expelled as the renewal process usually results in sharp increase in land rents (Carmon, 1999). Even though the dealers relocate their businesses elsewhere successfully, they still suffer as their long-time business relationship with the clients vanishes. They have to spend time to compete with the people of the same trade to reestablish reputation and relationship with new customers.

(2) Expulsion of Vulnerable Groups

One of the criticisms of redevelopment is that it fails to improve the quality of life of the potential beneficiaries under the urban renewal programmes such as slum dwellers and the poor (Rothenberg, 1969). Urban renewal often displaces existing residents in weak positions (Ha, 2004). Once the private developers are involved in urban renewal projects, the main focus of the projects will shift to economic benefits rather than social equity. Well-located urban lands are then occupied by high price dwellings or properties in great demand. The people with low bargaining and consumption powers like the lower income groups and the elderly living in such areas are forced to leave. Upon completion of renewal process, the average quality of the properties improves, but those people cannot enjoy it as the property costs are beyond their affordability. Hence, they have to search for affordable properties elsewhere. As they are unwilling and unable to migrate far away from their existing communities, they tend to accumulate in other part of the conurbation nearby which form another blighted areas (Rothenberg, 1969; Alexandre, 1992).

People of races other than aboriginal inhabitants are more vulnerable to attack. According to Couch (1990), black populations in the US suffer a lot in urban renewal process as they concentrate in the areas in which the process takes place.

Their well-located accommodation is replaced by more productivity and economic uses. During the land conversion mechanism, some of them lose not only their houses but also their jobs.

Urban renewal programmes that intend to improve social welfare place social cost burden on the poor, the elderly and the minority groups (Rothenberg, 1969; O'Flaherty, 1994; Yeung, 1999). The majority of the benefits e.g. increase in property values, improvement of living environment and the surroundings, etc. from urban renewal goes to middle or higher income groups but the vulnerable groups cannot enjoy its favorable outcomes (Chui, 2003; Lee, 2003).

(3) Generation of Adverse Impacts on Environments

Urban renewal projects probably increase the development density of the urban areas especially in those sites with high commercial values (Adams and Hastings, 2001; Kanwerayotin, 2001). The existing physical environments and the quality of life of the residents may not be improved although the renewal projects are conducted.

The immature urban renewal policies formulated in the past encouraged piecemeal and incomprehensive redevelopment (Tang, 2002). Undesirable features like air, noise and air pollutions, traffic jams, absence/ inadequacy of green spaces and public facilities still exist in untouched areas (Alexandre, 1992). The US has experienced that large-scale slum clearance under its urban renewal schemes fail to revitalize the urban areas and generate new jobs. In contrast, the clearance produces vacant lots and abandoned accommodation (Lee, 2003). Lee (2003) also pointed out that urban redevelopment agencies in the US disregarded the neighborhood, heritages and natural environment when undertaking urban renewal which ultimately deteriorated the quality of life of the citizens.

To conclude, many places in the world have adopted urban renewal to address the urban problems and create better environments for their people to live and work. Some of them succeed while some do not. The rationale behind is that

many urban planning policies fail to solve the conflicts among 3 main aspects namely stimulation of economic growth, conservation of environment and achievement of social equity. As a result, the original aims of the renewal schemes cannot be met, urban problems may worsen and other side effects may be induced.

2.2 Sustainability/ Sustainable Development

2.2.1 Initiation of the Concept

The origin of sustainable development concept can be traced to a series of worldwide environmental and social movements started in 1960s (Estes, 1993). In 1972, the first United Nations (UN) Conference on Human Environment held in Stockholm acknowledged that the earth only has finite amount of scarce resources and therefore, the carrying capacity of the earth should not be exceeded. The energy crisis in the 1970s further aroused the global attention to the importance and urgency of environmental protection and resources conservation as the natural resources available for present and future generations were going to be exhausted (Jones and Clements-Croome, 2004).

In 1980, the World Conservation Strategy published by the International Union for Conservation of Nature and Natural Resource (IUCN) also drew states' attention to the problems of "poverty, population pressure, social inequity and the terms of trade" happened over the world (Bentivegna et al., 2002). The strategy emphasized that interdependence relationship between environmental conservation and economic development should be considered and economic growth should be relied on maintenance instead of expense of natural resources. In 1987, the World Commission on Environment and Development (WCED) published an international report called "Our Common Future" which is also well-known as the Brundtland Commission Report. This report clearly defined sustainable development as "a development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs" (WCED, 1987). Since then, the concept of sustainable

development to safeguard the interest of generations had gained worldwide support and attracted global discussions.

In 1992, this concept was strengthened at the second United Nations Conference on the Environment and Development (UNCED) held in Rio de Janeiro. Sustainable development principles and the tasks securing sustainable development were laid down in five crucial documents namely Agenda 21, Rio Declaration on Environment and Development, Statement of Principles for Global Consensus on the Management, Conservation and Sustainable Development of Forests, Framework Convention on Climate Change and Convention on Biological Diversity (UNDESA, 1992; Mottershead, 2004a). Afterwards, subsequent Earth Summit review meetings i.e. Earth Summit Rio +5 and World Summit on Sustainable Development (WSSD) Rio +10 were held in New York and Johannesburg respectively, and the focus of attention was not primarily put on environmental sustainability but shifted to “promote economic and social development while preserving and protecting the environment” (UN, 1997; UN, 2002). Apart from revisit of the focus of international sustainable development, the meetings also offered an opportunity for different countries to review their achievement at global, regional and local levels, to evaluate the effectiveness of allied implementation plans, and to make necessary adjustments (Mottershead, 2004a).

The definition set out by WCED is commonly referred worldwide; however, it is not a universal acceptable definition as different people have their own interpretation towards the same word “Sustainability”. As a result, many other definitions of sustainability/ sustainable development can be found in the world. In order to provide a clear picture about this concept, some typical and well-known definitions are shown in Table 2.2.

Table 2.2 Definition of Sustainability/ Sustainable Development

International

"*Sustainable development is development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs*." (WCED, 1987)

United Nations Environment Program (UNEP) defines sustainable development as:
"*Development which improves people's quality of life, within the carrying capacity of earth's life support systems*." (ESCAP Virtual Conference, 2003a)

The World Conservation Union (IUCN) defines sustainable development as "Caring for the Earth":
"*The guiding rules are that people must share with each other and care for the Earth. Humanity must take no more from nature than nature can replenish. This in turn means adopting lifestyles and development paths that respect and work within nature's limits. It can be done without rejecting the many benefits that modern technology has brought. Provided that technology also works within those limits*." (ESCAP Virtual Conference, 2003a)

"*Development comes about by accessing natural resources, and combining those resources with human creativity and effort to bring about improvements in the way of life of people. However, development is clearly having its toll on our natural environment. So much so, that the interaction between humankind and the earth's resources is said to be threatening the natural systems on which our social and economic development are based. A new development paradigm is obviously needed in order for us to combat such threat, and that new paradigm is what is known as sustainable development.*" (ESCAP Virtual Conference, 2003b)

"[*Sustainable] development is essential to satisfy human needs and improve the quality of human life. At the same time, development must be based on the efficient and environmentally responsible use of all of society's scarce resources - natural, human, and economic.*" (Government of Canada, 2003)

Local

"*Sustainable Development in Hong Kong balances social, economic and environmental and resource needs, both for present and future generations, simultaneously achieving a vibrant economy, social progress and a high quality environment, locally, nationally and internationally, through the efforts of the community and the Government.*" (PD, 2000)

"*The concept of sustainable development requires a change of mindset to bring about full integration of the needs for economic and social development with that to conserve the environment*." (Sustainable Development Unit, 2001)

"*The term Sustainable Development is seen by many people as a tool and a potential solution to balancing economic development, social assets and environmental protection for current and future generations.*" (Civic Exchange, 2002)

"*…sustainable development: an integration of social equity, environmental quality and economic growth for the benefit of this and future generations*." (Lai, 2002)

"*[Sustainable development] is to integrate Hong Kong people's aspiration for economic prosperity with the ethical utilization of natural resources and the emphasis on social equity for the present and future generations.*" (HKPCSD, 2004)

Academia

"*The concept of sustainable development can be broken into two parts. On the one hand, "sustainability" relates to the question of the "carrying capacity" of the earth, while giving no attention to social issues, particularly those concerning equity and social justice. "Development", on the other hand, would appear to assume and even necessitate continual economic growth and ignore the question of ecological constraints or "carrying capacity". When these two concepts are put together, a very different one emerges, and the result is much more than the sum of the parts…. Sustainability may be divided into three types: social, ecological and economic.*" (Samson, 1995)

"*…define the centre of the triangle as representing sustainable development: the balance of these three goals [i.e. economic, environmental and social interests]*." (Campbell, 1996)

"*Sustainable development is a dynamic process in which communities anticipate and accommodate the needs of current and future generations in ways that reproduce and balance local social, economic, and ecological systems, and link local actions to global concerns*." (Berke and Manta Conroy, 2000)

"*Sustainability is a local, informed, participatory, balance-seeking process, operating within an equitable ecological region, exporting no problems beyond its territory or into the future.*" (Dumreicher et al., 2000)

" *… sustainable development: the integration of economic, social and environmental policy domains, and long range, holistic planning.*" (*Shearlock et al., 2000)*

"*… the economic, environmental, and social concerns must be integrated and balanced in order to provide for human needs today without compromising the ability of future generations to meet their own needs. At the scale of cities, this means preserving and enhancing economic opportunities, social capital, and ecological health*." (Shutkin, 2000)

From the definitions, it can be noticed that economic development, environmental quality and social equity are the foremost ingredients of sustainability concept commonly recognized in the world. Therefore, this research also confines the components of the term "sustainability" to these 3

aspects. However, different places have their own emphasis on each of three elements (Samson, 1995). Several areas stress the importance of natural environment conservation (Bergstrom and Dobers, 2000). Some of them focus on economic regeneration without considering environmental and social agendas (Alexander, 2000; Curwell and Deakin, 2002) while others regard social sustainability as the core element of sustainable development (Chiu, 2003).

2.2.2 Major Components of Sustainability Concept

In the following part, a brief introduction to each of 3 foremost elements of sustainability concept i.e. economic development, environmental quality and social equity, and their interrelationship is provided.

2.2.2.1 Economic Development

The condition of economy has direct impacts on social well-being. Poor economy probably leads to business closure, a high level of unemployment, an increase in crime rate, etc. The quality of life of the public further deteriorates during economic recession. Consequently, every municipality aims to sustain long-term economic growth to retain acceptable living standard of the citizens (Couch, 1990). Sustainable return on investment, increase in land, property or rental values, wealth accumulation, presence of a variety of services, employment creation and generation of new economic activities are some features indicating continuous economic development (Shearlock et al., 2000; Lee, 2003).

2.2.2.2 Environmental Quality

Destruction and depletion of natural resources such as forest, soil, water, air and fuel would adversely affect the human life of current and future generations. In order to avoid negative impacts on global environment, measures for preserving natural resources are required. For instance, consumption of resources and waste production have to be minimized (Pincetl, 2001), and use of renewable resources has to be promoted (Estes, 1993). Sources that probably pollute the

environment and lead to global warming/ climate change problem have to be suppressed, and measures protecting habitat and species have to be taken (Shearlock et al., 2000). In addition, provision of open spaces, tree planting, and landscape gardening are some examples of green design adopted to restore the health of the ecosystems (Shutkin, 2000; Pincetl, 2001).

2.2.2.3 Social Equity

Equity is a fundamental and essential dimension of social sustainability (Chiu, 2002). Equity does not mean that everybody can have exactly the same amount of resources as each individual has his/her own desires and abilities. As discussed by Pincetl (2001), social equity mainly implies consideration of the social, cultural and spiritual needs of various social groups to ensure that a more efficient and equitable allocation of limited resources can be achieved. It also means that distribution of public benefits and burdens is fair, and disparities in wealth accumulation and living quality amongst groups are kept to a minimum (Shutkin, 2000). Provision of housings, public facilities and amenities, and enhancement of health, security, cohesion, diversity and the quality of life for all parties regardless of their incomes and social status is another example to attain social equity. To ensure that the voices of the public are heard by the decision makers for sustainable urban development, community participation is encouraged (Barnett, 1995; Pincetl, 2001; Berke, 2002).

Even though a variety of definitions and considerable debates about the relative importance of 3 elements are present, it is generally accepted that “sustainable development” considering economic, environmental and social aspects is beneficial to the well-being of current and future generations. Hence, the concept of sustainability is interpreted here as integration and balance of the 3 fundamental domains i.e. economic development, environmental quality and social equity, through an on-going process of change and adaptation, to fulfill inter-generation and intra-generation needs. According to Berke and Conroy (2000) and Shearlock et al. (2000), the most effective way to achieve sustainability is to reach the overlapping areas of 3 circles representing different elements (Figure 2.1). Indeed, it is not an easy task to balance those aspects.

If the balancing mechanism functions improperly, conflicts among economic, social and environmental interests would be induced (Campbell, 1996). As mentioned by Campbell (1996), depletion of Earth's resources, and destruction of natural environment such as removal of green spaces and leveling of the hills are followed by economic development of an urban area. Lands and properties can only be used as private commodities to optimize profits or public goods e.g. affordable housings and public facilities to meet the needs of the society. Excessive waste production and over-consumption of energy, water and natural resources by the residents enjoying comfortable and convenient way of life would degrade the quality of environment (Hamphill et al., 2002).

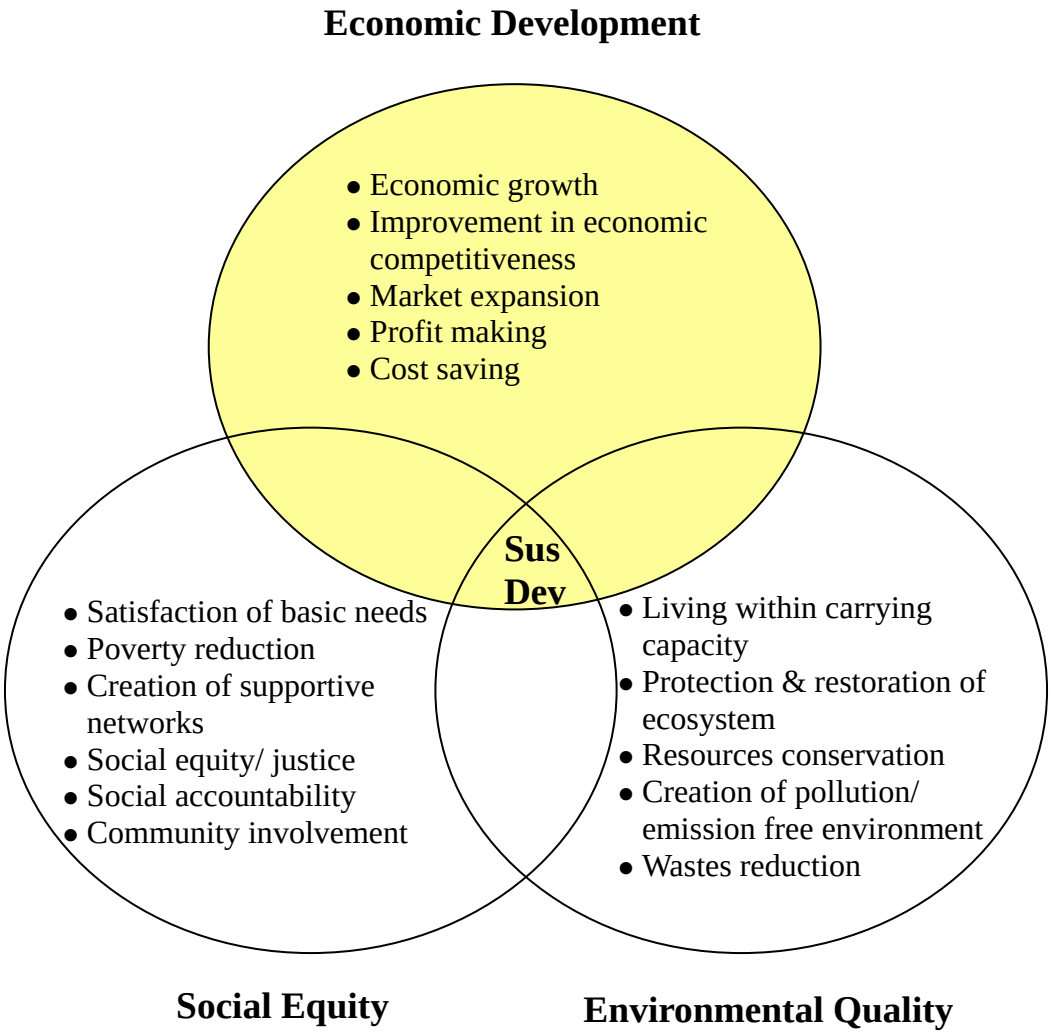


Figure 2.1 Relationships among 3 Sustainable Development Objectives

Sources: Berke and Conroy, 2000; Shearlock et al., 2000

Not surprisingly, sustainable development is a good target and therefore, this

term can be heard in all domains. "Sustainable Zoning", "Sustainable Design", "Sustainable Construction", "Sustainable Building", etc. are some examples commonly mentioned by the planners, designers and builders in their fields (Campbell, 1996; Curwell and Deakin, 2002). However, some scholars comment that the term "sustainable" seems to be overused and wonder whether those parties understand what is the spirit of this term, which aspect should be sustained and how it could be achieved (Tang, 1994; Berke and Conroy, 2000; Bentivegna et al., 2002; Berke, 2002; Lai, 2002; Chi, 2003; Lee, 2003).

In recent years, many international meetings and conferences were held to discuss the future direction of global urban development. Meanwhile, various documents, declarations and convention were made to put the notion of sustainability into reality (UN, 1997; Lai, 2002; UN, 2002; Hong Kong SAR, 2004; Mottershead, 2004a). Furthermore, states or cities in developed and developing regions try to incorporate this concept into their planning strategies by different means. For instance, the concept of new urbanism in creating compact urban forms was popular in the US once (Berke, 2002). However, it gave little attention to economic development, environmental protection and social equity when it was initiated. Since then, the idea of sustainable development to overcome the demerit of such design approach was widely touted (Berke, 2002).

Berke and Conroy (2000) had analyzed 30 plans of the US and they stated that the plans had integrated the sustainable development principles. Canada has also initiated sustainable development strategies at the provincial and federal levels since 1995 (UNDESA, 2002). Belgium is another developed country that commits to prepare national sustainable development strategies to eradicate poverty and social inequity, and protect the natural environment (UNDESA, 2002). In Switzerland, local communities are encouraged to apply the principles as stated in Agenda 21 and legislation for sustainable development is enforced (Eberhard et al., 1998; Corbière-Nicollier et al., 2003). The BEQUEST European Union (EU) Network attempts to address environmental and other sustainable issues before urban development commences (Deakin et al., 2002). Leeming (2000) mentioned that sustainable urban development to create

a stable community was reflected in the urban policy of the UK.

With the help of the Canadian experts, Tarija, a major city of Bolivia, provides a successful example for other cities undertaking Bolivia Sustainable Urban Development Project to meet the needs of the citizens (Marcondes, 1999). In Hong Kong, a consultancy study on sustainable development has been conducted, and Council for Sustainable Development and Sustainable Development Unit (SDU) are established to promote and implement the concept of sustainability (PD, 2000). Philippine, Africa, Brazil, Colombia, China, India, Indonesia, and Thailand are some developing counties implementing sustainable development strategies (Jenks, 2000). Compared with developed counties, they may have more difficulties e.g. inadequate institutional support, limited resources and control, and low degree of public participation in formulating the strategies (UNDESA, 2002). However, their efforts to promote sustainable development have not been frustrated as early incorporation of sustainability concept into planning policies can avoid long-term detrimental impacts such as social exclusion and excess depletion of natural resources on future development of those regions.

Sustainability is not just a global issue. This concept also applies to local level (Devuyst, 2001). “Think globally, act locally” becomes a fashionable slogan that embraces the sustainability concept when considering different local development options in decision-making process (Alexander, 2000; Bergstorm and Dobers, 2000; Berke, 2002). The importance of implementing sustainable development at the local level to create sustainable communities is stipulated in Chapter 28 of Agenda 21 launched at Rio Declaration 1992 (Jackson and Roberts, 1997; Lafferty, 2001). Sustainable development at the local level serves a number of purposes: to design, plan, build and manage a city or community in a more sustainable way (Devuyst, 2000; Shearlock et al., 2000; Lee, 2003); to solve the conflicts among ecological, economic and social interests (Campbell, 1996; Leeming, 2000) and to maximize the benefits for present and future generations (PD, 2003). According to Campbell (1996), local scale sustainable development refers to economic growth, employment, wealth equality, environment protection and social justice.

2.3 Sustainable Urban Renewal Approach

2.3.1 Formation of the Approach

As mentioned before, urban renewal projects can improve the built environment and the quality of life of the citizens to a certain extent. However, they may impose negative impacts on social, economic and environmental domains of the communities when they fail to strike a balance among those aspects (O'Flaherty, 1994; Bentivegna et al., 2002; Ng, 2002; McLaughlin, 2003). As discussed by Tang (2002), property-led urban regeneration approach solely to refurbish the physical condition of the city prohibits sustainable growth of the community. To minimize the deficiencies in the urban renewal projects, a sustainable approach is necessary. Such approach is intended to be developed by applying the concept of sustainability to urban renewal, a major local issue that draws a great attention from the public. It is because the literature mentioned in previous section proves that applying this global concept to local issue at city level can meet various objectives and produce positive outcomes (Campbell, 1996; Devuyst, 2000; Leeming, 2000; Shearlock et al., 2000; PD, 2003). The idea of merging sustainability concept into urban renewal process to secure long-term economic, environmental and social well-being of the public can be represented by the terms "sustainable urban renewal" or "urban regeneration" (Ng et al., 2001). However, "sustainable urban renewal" would be the primary word for that approach in order to enhance the consistency of this study.

A real sustainable urban renewal has to address 3 dimensions namely economic renewal, environmental renewal and social renewal (Figure 2.2). Economic renewal aims to improve the competitiveness and attractiveness of local economy, and then stimulate its growth. It includes the programmes upgrading backward/ transforming traditional industry, retaining labor in existing community and attracting investments form outsides. Environmental renewal can be divided into 3 major areas, i.e. physical improvement, preservation of community landmarks and conservation of natural environment. It places emphasis on the balance between new development and conservation of existing provisions.

Social renewal aims to improve social condition of the individuals and the community as a whole without destroying their connection to the past, and neglecting the distinctive features of a local area. It includes programmes such as provision of local job opportunities, supply of affordable housing and amenities, community building, preservation of local custom and culture, and restoration of repairable building and historical properties.

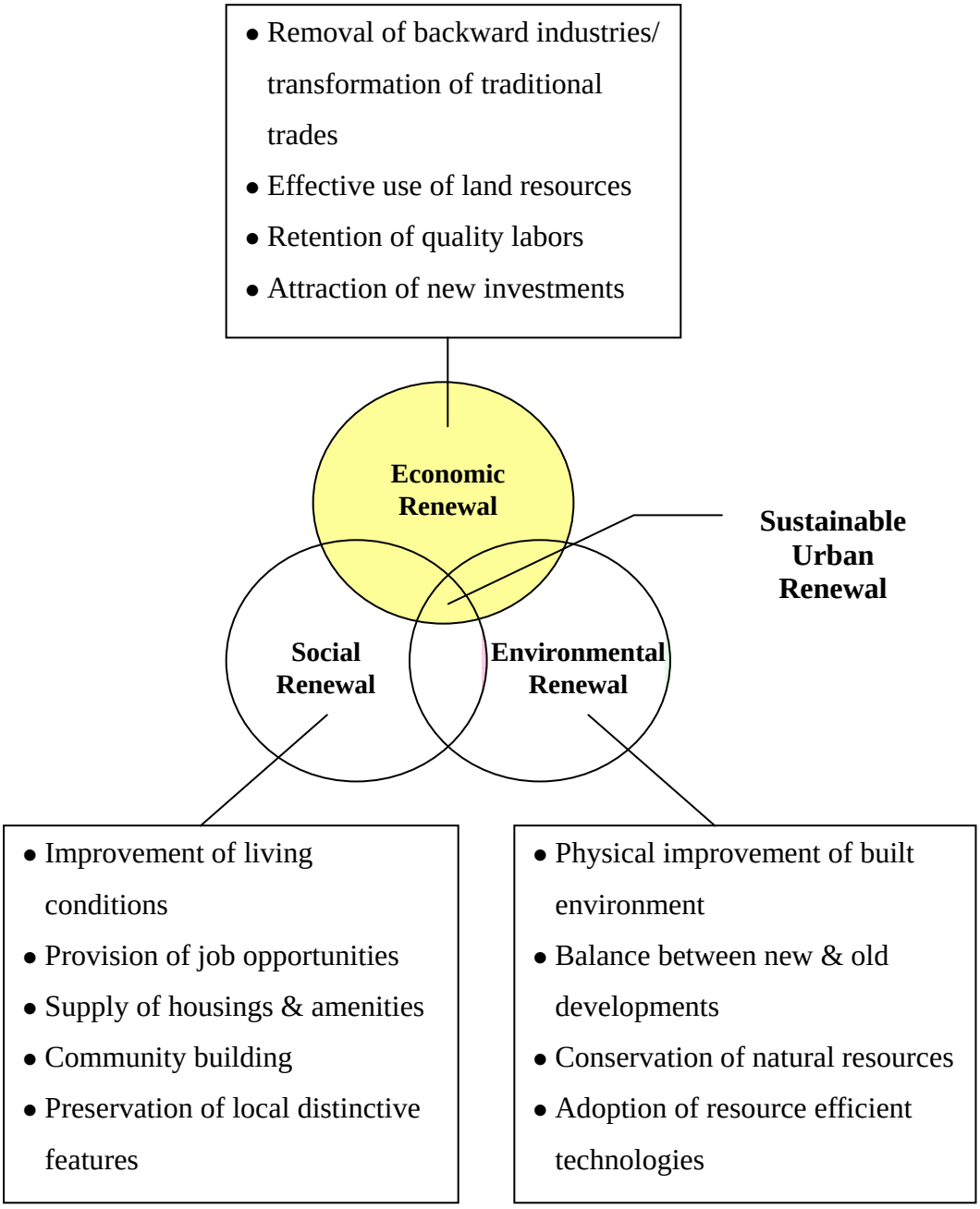


Figure 2.2 Sustainable Development Objectives achieved in Urban Renewal Process

2.3.2 Popularity of Sustainable Urban Renewal Approach

Throughout the years, the academia has directly or indirectly visited the concept of sustainable urban renewal in their studies (Blackman, 1995; Peng, 1999; Couch and Dennemann, 2000; Alker and McDonald, 2003). Ng et al. (2001) have proposed sustainable urban regeneration strategy for Hong Kong in their study. They identified 5 principles including participation, community, equity, environment and economy and 8 major factors such as transportation, form of development and public space provisions that should be considered for urban improvement. As mentioned by Walker (2002), sustainable development and urban regeneration are dual concerns to rectify the deficiencies of past developments and to preserve future financial prosperity, ecology well-being and social benefits. Therefore, social, economic and environmental aspects contributing to the achievement of sustainable development should be assessed before urban renewal takes place (Alker and McDonald, 2003). Furthermore, Priemus (2004) pointed out that successful urban renewal should be "demand-driven" and the demands did not limit to business establishment, job creation, housing provision, availability of amenities, greenery and open spaces or environment-related matters. The demands of all concerned parties should be considered and the final urban renewal plans should be agreed by most of the concerned parties although in most of the cases, not all of their demands can be addressed (Priemus, 2004). The idea of reaching mutually agreement is similar to the balancing approach in the sustainability concept which is crucial to produce a good urban renewal strategy.

In addition, many countries around the world have adopted this approach when preparing urban redevelopment proposals (Visic, 1995; Alexander, 2000; Shutkin, 2000; PD, 2002a). Couch and Dennemann (2000) and Hemphill et al. (2004) suggested that urban regeneration and sustainable development were major strands of British urban planning policy. The aim of the Unitary Development Plan (UDP) of Liverpool City Council is to achieve economic regeneration, environmental improvement and social equality at the same time (Couch and Dennemann, 2000). After the urban renewal process, economic decline was reversed, housing quality was improved, and more open spaces, retail and

transport facilities were provided in the Liverpool City. When reviewing contemporary planning policies, in particular those for urban regeneration, Scottish Executive not only focuses on economic agendas but also puts great emphasis on environmental issues and social inclusion (Lloyd, 2002). For instance, national park was introduced in Scotland to balance the needs of the community and the environment, and numbers of pollution controls were adopted to improve the environmental quality and the health health. Vancouver, a famous city in the United States, has suffered serious urban decay problems. After incorporating the sustainable development principles into urban regeneration programmes, an energy efficient community was designed, an effective and efficient network linking the resident homes and working places was established, and a green and vibrant city was created. Furthermore, Californian government assesses the urban redevelopment plans to ensure that sustainable development elements are taken into account (Devuyst, 2000). The Community Redevelopment Agency of the City of Los Angeles implements sustainable development practices in economic, environmental and social redevelopment of deteriorating urban neighborhoods (Pincetl, 2001). Upon completion of the sustainable urban renewal process, many blighted areas in Los Angeles were removed, many open spaces were provided, depletion of natural resources e.g. soil, fuel and water reduced, resources efficiency increased and their corresponding expenses significantly reduced. San Francisco also commits to incorporate sustainability criteria into urban renewal policies while Colorado has launched a sustainable downtown redevelopment strategy (Lee, 2003).

2.3.3 Tactics to Achieve Sustainable Urban Renewal

It appears that the sustainable urban renewal approach gains strong support from the researchers, professionals and government officials worldwide. In order to ensure that such approach is effectively adopted and the sustainable development objectives are met through urban renewal process, it is necessary to identify an appropriate way to turn abstract sustainability concept into solid urban renewal strategy.

With reference to the foreign experiences, sustainable development objectives can be achieved by means of urban design. Urban design can interpret the broad principles of the sustainability concept into practical design policies (Cookson Smith, 2000). China Square redevelopment project conducted by the Urban Redevelopment Authority in Singapore is a good example showing that incorporation of urban design concept into urban renewal projects can revitalize dilapidated urban areas to the satisfaction of those affected. As mentioned by Choy and Chan (1998), the China Square redevelopment project not only solves the urban decay problem but also creates a vibrant environment with architectural merits and historical characters. By combination of new developments and the selective conservation of shophouses with traditional Chinese architecture and cultural significance for commercial and residential uses, and linking those developments with open areas, amenities and pedestrian walkway, the distinct character of China Square is preserved, its physical environment and visual appearance are enhanced, and the quality of life of the citizens living there is improved.

The regeneration of the Hulme area of the City of Manchester provides another excellent example showing how urban design helps to meet the sustainable development objectives through urban renewal. As mentioned by Symes and Pauwels (1999), the UK Central Government and the Manchester City Council attempted to integrate economic, environmental and social concerns when preparing regeneration programme for Hulme. By providing social provisions, refurbishing disrepair buildings, mixing different land uses, re-planing the layout of buildings and streets, adopting energy saving and recycling initiatives, and linking the developments with outdoor spaces and secure pedestrian walkway, a harmonious, lively, sustainable community is formed and the living standard of the citizens is greatly improved.

In view of the above fact that successful urban regeneration/ sustainable urban renewal should be design led, this study advocates using urban design tactics when preparing urban renewal proposals in order to create a sustainable community upon completion of the projects. To allow a better understanding of the conceptual framework for the sustainable urban renewal approach adopted in

this research, Figure 2.3 indicating the interrelationship among different components is presented.

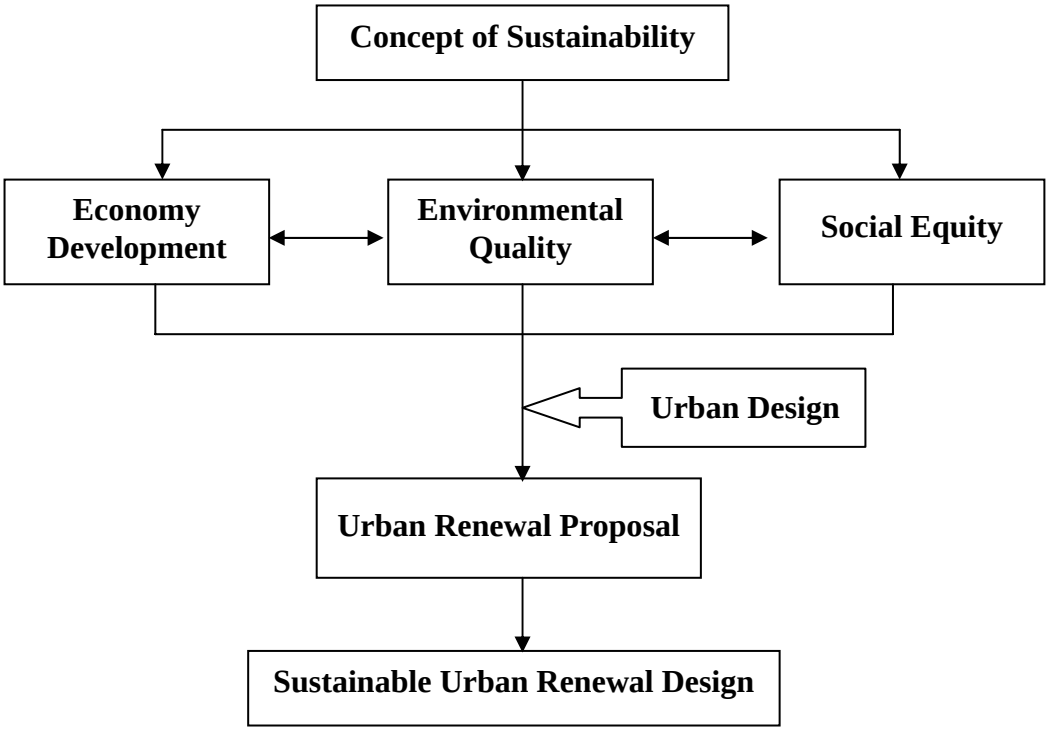


Figure 2.3 Conceptual Framework of Sustainable Urban Renewal Approach

2.4 Urban Design

2.4.1 Concept of Urban Design

The term urban design was coined in North America in the late 1950s when the American Institute of Architecture established a Committee on Urban Design and commissioned a scholar to discuss such topic (Rowley, 1994). Throughout the years, there are considerable examinations and clarifications of the definition and the scope of urban design in academia (Rowley, 1994). Even though there is general agreement that urban design exists, there is no conclusion of what urban design is and no single, unified and lasting definition of urban design can be found.

Urban design aims at creating a vision for an area and then deploying the skills and resources to realize that vision (English Partnerships, 2000). It is regarded

as a collaborative and multi-disciplinary process of giving physical design directions to urban growth, conservation and change, and shaping the physical setting for an urban area (CABE, 2003). The Councillor's Guide to Urban Design published by Commission for Architecture and the Built Environment (CABE) pinpointed that urban design is a process involving politicians, a wide range of stakeholders and different kinds of professionals such as architects and planners, and the quality of the urban design depends largely on how these people working together (CABE, 2003).

Since urban design deals with physical setting of an area, some people mix "urban design" with "urban planning" or "architecture" and use those terms interchangeably. In fact, they are not the same. As mentioned by Arida (2002), "urban design is the interface between urban planning and architecture". Architecture focuses on physical design of buildings and the areas nearby while urban planning deals with design of the built environment from macro perspective at a less detailed level, which embraces zoning to manage land-use distribution and growth management in order to regulate pace of development. Urban design involves both disciplines, but focuses on physical features of the built environment that goes beyond a single building or individual parcel of land. Urban design emphasizes on the relationships between urban spaces like interface between public and private realms, areas between buildings and streets, and spaces beneath buildings or within buildings (Barnett, 1982; CABE, 1997). In view of it, urban design can be described as "large-scale architecture" or "physical aspect of urban planning" (Barnett, 1982).

According to the Department of the Environment, Transport and the Regions (DETR) (2000), urban design can also be defined as "the art of making places for people" where places refer to a specific space in which people can organize or participate in various activities, and enjoy their daily life. Economic growth, environmental conservation, community development, preservation of local character, expression of cultural and heritage values and visual enhancement are common motivations for "making places" and all of the movies aim to improve the quality of life of the humans rather than just the quality of the urban form (Rowley, 1994). Therefore, attention should be paid to not only how the places

look but also how they function and relate to each other (DETR, 2000; Raymond, 2000; Inam, 2002). That explains why some scholars regarded urban design as a process to enhance aesthetic value and satisfy functional requirements (Vandell et al., 1989; Couch and Dennemann, 2000). Other than planning and architecture, urban design also tackles subjective qualities e.g. human relationship, expectation, culture, behaviour, perception of places, etc. which play equally important roles in creation of cities (Arida, 2002). Hence, urban design can be seen as a process concerned with satisfaction of social and emotional needs as well.

2.4.2 Value of Urban Design

Urban design is a powerful and effective tool for achieving a higher quality of life, a greater economic vitality and a more efficient use of resources, and it is a key to create attractive, usable, durable and adaptable places (CABE, 1997). As mentioned by Montgomery (1998), urban design helps to shape the urban environments and transform different aspects of urban life into physical/ usable city forms. Considering diverse features of the city and concerns of the citizens in the design of physical environment not only promotes sustainable lifestyles for the public but also facilitates future economic, environmental and social development (Rowley, 1994; Oktay, 2004). Previous studies have also proved that proper urban design can enhance property values (Vandell et al., 1989; Rowley, 1998), improve environmental quality as well as the quality of life of the citizens (Couch, 1990; DETR, 2000; Raymond, 2000; Inam, 2002; Berke, 2002; Lee, 2003; Longmire, 2003; Council for Sustainable Development, 2004b).

According to Barnett (1982), urban design can resolve some urban problems like inefficient land use, misallocation of resources, and unnecessary destruction of buildings and structures with special architectural features or historical characters. Vandell et al. (1989) have adopted an economic model to evaluate the benefit of urban design previously. They analyzed the design qualities of a set of 102 commercial buildings in the US and they found that good design did not necessarily cost more but the rental value consistently increased. In 2001, CABE and DETR examined economic, social and environmental value added by

good urban design and the findings confirmed that good design probably added positive value in those aspects (CABE and DETR, 2001). Investors, developers and users are beneficial as investment opportunities, productivity, return from businesses and job offers increase, environmental quality improves, and a variety of easily accessible amenities is provided (CABE and DETR, 2001). In addition, Lee (2003) studied the design characteristics of 7 urban redevelopment projects in Seoul and he concluded that good urban design led to a higher level of residents' satisfaction.

In short, good urban design not only delivers benefits to individual parties but also contributes to the well-being of economy, environment and society, which are the fundamental aspects of sustainable development (Rowley, 1994). Therefore, it is not surprising that DETR (2000) regarded urban design as "a key to create sustainable development". This idea is supported by Maroochy Shire Council (2005) that "[g]ood urban design can contribute to urban sustainability by improving or enabling social equity, economic vitality and environmental responsibility." Since urban design is proved to be an effective means to achieve sustainability, many researchers and practitioners attempt to create a high quality and sustainable built environment for the citizens through urban design process (PD, 2002b, Lee, 2003).

After looking at the concept and value of urban design, and its relationship with sustainability, it is believed that urban design can achieve sustainable urban renewal by changing existing built environment with due consideration to the economic, social and environmental agendas at the beginning of the planning process. As a widely recognized definition of urban design is not available in the world, the term "urban design" in this study is referred to the art of shaping physical urban environment, preserving nature and built fabric with unique features, satisfying social and emotional needs of the people, and linking people and 3-dimensional spaces in a process that leads to sustainable cities/ communities.

2.4.3 Identification of Key Urban Design Principles & Considerations

Undoubtedly, good urban design benefits various stakeholders and contributes to sustainable communities (Vandell et al., 1989; Couch, 1990; Rowley, 1998; Raymond, 2000; Corbett and Corbett, 2000; CABE and DETR, 2001). However, some people may wonder how good urban design can be achieved. Good urban design cannot be achieved unless the underlying principles are highlighted and expressed in more concrete terms (Cookson Smith, 2000; DETR, 2000; Inam, 2002). Over the years, there have been many attempts to define the good practice principles of urban design. Jacobs (1961) had introduced numbers of principles for planning and rebuilding American cities. She believed that public safety, bustling street life, mixed uses, permeability, public consultation, etc. were crucial to successful urban design. Tibbalds (1992) had also highlighted 10 principles for producing positive urban design outcomes. They include considering places before buildings; understanding and respecting the context; encouraging mixing of uses; designing at a human scale; allowing freedom to walk about; consulting with the community; building legible environments; designing durable and adaptable buildings; encouraging incremental and evolutionary change; and promoting intricacy, joy and delight.

In order to create a community suitable for the people to live and/ work inside, the Ahwahnee Principles were introduced in USA in 1991. They have suggested 15 community design principles mainly focusing on mobility, ecological aspect and social concern (Corbett and Corbett, 2000). In the UK, English Partnerships, the Housing Corporation and the Urban Design Alliance has formed a group to prepare the Urban Design Compendium, which outlines the key principles of urban design including making places for people; enriching the qualities of existing places; making connections between places; working with the landscape; mixing uses and forms; managing the investment; and designing for change. As described by DETR (2000), good urban design emphasizes design principles to create “a successful place (i) with its own identity; (ii) with attractive and successful outdoor areas; (iii) with variety and choice; (iv) where public and private spaces are clearly distinguished; (v) that is easy to get to and move through; (vi) that has a clear image and is easy to understand, and (vii) that can change easily”.

In addition, previous studies have stressed numbers of areas that should be considered during the urban design process for enhancing economic, environmental and social benefits of the development projects. Montgomery (1998) has suggested 12 indicators showing the characteristics of "successful urban places". He pinpointed that urban designers should pay attention to social, psychological and cultural dimensions when planning physical spaces, and they should consider activity, image and city form which were essential elements in making good urban places. Rowley (1998) also published 50 urban design criteria that should be considered in securing the quality of urban design. They were categorized into 4 concerned areas namely functional and social use considerations; natural environment and sustainability considerations; visual considerations, and the urban experience.

The guidelines derived from the Congress for the New Urbanism Charter stated that mix of compatible land uses, construction of different housing types, improvement of accessibility, provision of public gathering spaces, etc. are necessary to revitalize surroundings (Corbett and Corbett, 2000). Couch and Dennemann (2000) also provided good practice urban design guidance to meet physical and visual criteria. The design guide published by DETR has indicated 8 important aspects that define the physical form of development fulfilling the urban design objectives (DETR, 2000). Furthermore, a nation-wide survey conducted in 2001 for Audit Commission indicated that 6 issues including crime rates, medical services, accommodation, retail facilities, public transport and education provisions play significant roles in establishing a decent place to live and work (Audit Commission, 2002). Pitts (2004) further revealed that sustainable urban design cannot be achieved unless scale of the development; building types and density; transport arrangement; landscape and ecology; consumption of natural resources; and generation of wastes and pollution are taken into account. Blair et al. (2004) also suggested that sustainability can be implemented in the areas of urban form, density, transport, site planning, building design and proper management for socio-economic and environmental benefits.

In Hong Kong, Planning Department (PD) has issued urban design guidelines

which underpin the future urban development directions. They emphasize the importance of urban design and address issues like development height profile, waterfront development, cityscape, pedestrian environment and pollution mitigation (PD, 2002b). The participants in the discussion forum further indicate that urban design has close relationship with sustainable development, and layouts of street and open space, design of building and transportation network are key elements in creating sustainable urban spaces in Hong Kong (Council for Sustainable Development, 2004a).

After the literature review, it can be noticed that there are no consistent and definite rules in producing good urban design. Various scholars and urban planners have their own preferences, principles or considerations when designing urban areas (Lee, 2003). However, with reference to those studies, a number of design principles contributing to each of 3 sustianable development dimensions can be identified for the selection of the most relevant and appropriate urban design considerations for further analyses. As shown in Figure 2.4, a total of 5 major design principles are highlighted for each of 3 dimensions with the literature backup. Some of the principles have already been shown and discussed above, and the rest are extracted from other studies in a similar way. Based on the design principles highlighted in the figure, 46 urban design considerations are then shortlisted for this study. The items in the Table 2.3 are not definitive but the most typical design variables are included.

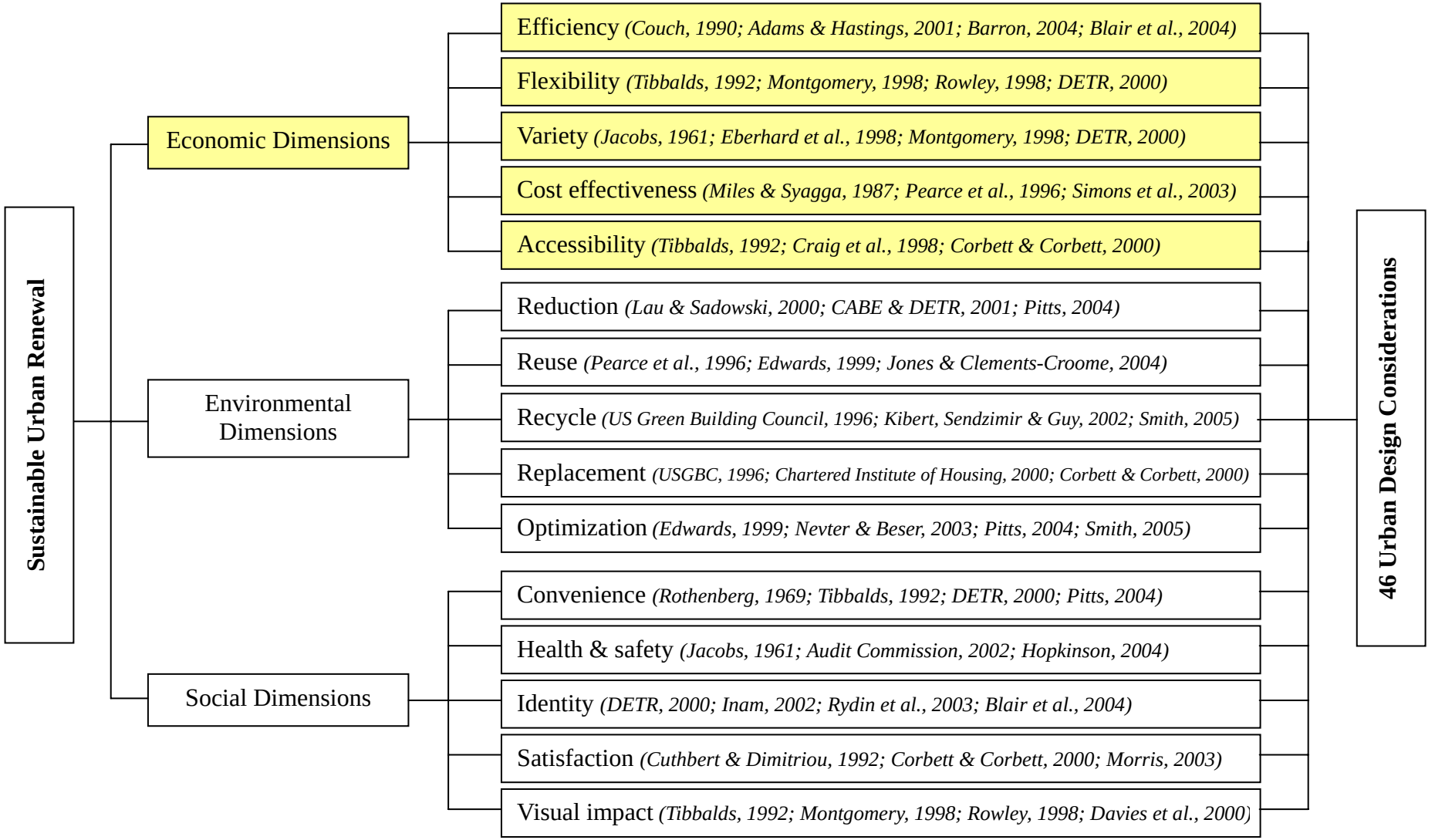


Figure 2.4 Theoretical Framework for Selection of 46 Urban Design Considerations

Table 2.3 List of Urban Design Considerations

Urban Design Considerations
D1. Mixed-use development
D2. Establishment of local business activities e.g. retail shops, banks
D3. Variety of business activities
D4. Provision of public facilities e.g. school, health care services, sports facilities
D5. Diversity of public facilities
D6. Provision of open spaces e.g. parks, seating areas
D7. Presence of nightlife
D8. Adaptability of development to the changing needs
D9. Efficient use of land & space
D10. Arrangements for maintenance & management of buildings, facilities & spaces
D11. Provision of pollution control measures
D12. Air quality & noise level
D13. Installation of energy efficient devices
D14. Optimization of natural lighting & ventilation
D15. Incorporation of environmental design e.g. sun shades, balcony
D16. Use of recycled, recyclable or durable materials
D17. Wildlife conservation
D18. Installation of water saving devices
D19. Waste management including waste collection, reduction & recycle
D20. Preservation of historical structures & features
D21. Promotion of local distinctiveness
D22. Preserving & facilitating social network
D23. Availability of local employment
D24. Provision of accommodation for different income groups
D25. Provision for basic needs of disabled, elderly or children
D26. Community involvement in public decision making
D27. Sense of belongings on community
D28. Security against crimes
D29. Convenience, efficiency & safety of drivers
D30. Convenience, efficiency & safety of pedestrians
D31. Convenience, efficiency & safety of public transport users
D32. Access to provisions for disabled, elderly or children
D33.Access to public facilities
D34. Access to open spaces
D35. Access to work

Urban Design Considerations
D36. Proximity to business activities
D37. Accessibility of the development
D38. Building design & overall appearance
D39. Compatibility with neighborhood
D40. Building density, height & mass
D41. Layout of buildings & streets
D42. Design of open spaces e.g. appearance, location, shape & size
D43. Provision of landscapes e.g. trees, planters
D44. Appearance of street furniture e.g. street lamps, benches, signage, rubbish bins
D45. Appearance of pedestrian routes & sidewalk
D46. Rehabilitation of repairable building structures

2.4.4 Relationships between Design Considerations & Sustainability

Each of 46 design considerations given above can meet 3 sustainable development objectives, but not to the same extent. Based on learned text and previous research, these considerations are categorized into 3 groups in order to indicate how they increase economic, environmental and/ social sustainability of a community. Under each category, only items that can enhance particular aspect significantly are included (Table 2.4).

2.4.4.1 Economic Sustainability

It is expected that the development can be more economically feasible and viable in the long run when the following items are considered. An increase in development potentials, land, property and rental values, and profits from business, attraction of additional investments, employment generation and reduction in general expenditure are typical economic goals to be achieved.

Mixed development with a great variety of uses can attract a lot of consumers to move in and spend money as their time for searching various activities is saved. An increase in consumption not only stimulates the economic growth of an urban area but also induces keen competition between investors on land and space

acquisitions. The increase in demand for scarce land and spaces would result in higher rental values and asset prices. Integration is the most common form of mixed development. It groups similar or compatible activities within a building or in a zone. Car park in a commercial/ office block, and school/ market within a residential development are typical examples of vertical and horizontal integration of land uses (Tang and Lam, 2000). In order to minimize conflicts among different land users and negative impacts on the built environment, incompatible land uses like factory and residential development have to locate separately.

Apart from mixed-use development, investors at Castle Wharf in Nottingham pointed out that access to work is also an essential factor to be considered in making investment decisions (CABE and DETR, 2001). According to Corbett and Corbett (2000), distance from work is related to productivity. If the workers are required to go to work in a place far away from their communities, some sacrifices in productivity result.

Urban design creates jobs by attracting new business and retaining contemporary companies in a particular area. Establishment or preservation of different economic activities secures employment of the citizens (Eberhard et al., 1998). Availability of employment draws population while high concentration of people supports local economic activities (Oktay, 2004). Positive outcomes to the economy are also generated when the employees provide and purchase a variety of goods and services, and pay taxes to the government.

Every resource including land and space has value in alternative use (Barron, 2004). When the resource is consumed for a particular usage, the option to use it for other purposes is forgone and opportunity cost is incurred. The use of a resource is regarded as inefficient if the alternative use has higher productivity and yields higher net benefits. Therefore, efficient use of resources is encouraged to optimize the economic gains.

Montgomery (1998) pinpointed that types of activity available in an urban area could reflect the performance of its local economy. A vibrant city contains

diversified activities that are taken place throughout the day. Within a lively community, people can be found spending money and walking around the streets day and night. Presence of daytime activities to maintain normal operation of a town is common and understandable while existence of evening activities and nightlife mirrors vitality of the economy.

When the time passes, the political environment and economy of a city, technology level, and demands of the citizens change. Buildings and provisions within a development, that are not capable to cater for changing needs may become obsolete even though their service lives have not yet expired. To optimize full utility values of individual buildings and their facilities, and avoid premature replacement, the building and urban forms should be highly adaptable (Montgomery, 1998). Adaptability to changes is vital to economic development. Investment returns can be maximized if the cityscape and the provisions inside can be altered rapidly to meet varying market demands and take advantage of unexpected business opportunities. Therefore, investors are willing to price higher for the building and site layout with higher flexibility to address changing circumstances (Rowley, 1998).

Furthermore, Craig et al. (1998) conveyed that transportation improvement led to economic prosperity in the US as good transportation network could enhance land values within a development. This opinion is in line with that of Lau and Sadowski (2000). They highlighted that convenient transport made land valuable and the prices of buildings along the transportation routes were much higher than the others. As mentioned by Li and Brown (1980), and Rabiega et al. (1984), proximity to commercial establishment and high accessibility to amenities e.g. recreational areas and open space probably improve the property transaction values since the buyers in general are willing to pay more if the transportation system is safe and convenient for them to move around. Shultz and King (2001) also pointed out that provision of open spaces had positive impact on its values and the impact further increased when the location of the open spaces was close to the surrounding properties.

Not surprisingly, property market plays an important role in stimulating economic growth of an urban area especially in the Asian countries. High property transaction prices are commonly observed in the real estate market of prosperous economy. According to the research findings obtained by Cheung et al. (2004), good quality units locating at high floor levels or with sea and park views normally have higher transaction prices. Li and Brown (1980) found out that the housing prices increased with decreasing density, and the property sale price rose when the visual appearance was to the satisfaction of the public. Apart from visual quality, building density, height and mass, building design like configuration of a unit also affect the rental value and the sale price of the building significantly (Li and Brown, 1980; Vandell et al., 1989; Lee, 2003).

In additional to the building itself, features of the neighborhood may influence the property values as well. Shultz and King (2001) discovered that the housing values dropped sharply when the property located close to industrial land use. The main reason is that the residential land use is not compatible with the industrial land use. Industry induces negative impacts on the built environment such as traffic congestion, air and noise pollutions and thus the residents are reluctant to live therein. This result implies that the property prices are sensitive to compatibility of the development with the neighborhood. Furthermore, quality of environment affects the property and land values (Diamond, 1980). The values are depressed if unfavorable externalities such as air and noise pollution are present (Li and Brown, 1980; Shultz and King, 2001) and they increase when the air quality is good enough (Hanley and Spash, 1993). In view of this, high quality of air and acceptable noise level should be maintained to sustain the asset values.

The total number of economically viable points for trading increases with increasing permeability of the layout of streets and buildings (Montgomery, 1998). The permeability of a city becomes higher if the width of the building blocks is shorter and more streets are provided between buildings (Jacobs, 1961). According to Cookson Smith (2000), building and street patterns can stimulate investments in neighborhoods when the properties, streets and pedestrian walkways are integrated properly.

Rehabilitation of apartments not only improves their prices but also enhances neighboring property values (Carmon and Moshe, 1988). Cagann (1991) discovered that rents of apartment units were increased by 8% or above immediately after renovation. Housing Rehabilitation Programmes of Community Development Corporations (CDCs) in the US has brought numerous economic benefits (Simons et al., 2003). For instance, close proximity to rehabbed housings has positive effect on the sales prices of residential units nearby. In addition, jobs are created, retail sales and property transaction increase, and government's revenue from tax rises (Simons et al., 2003). The hedonic pricing model analysis conducted by Chau et al. (2004) also indicated that rehabilitation or refurbishment of deteriorating properties enhanced their market values. Property prices and rental values of refurbished buildings increase because their physical conditions are restored and improved. Rehabilitation creates economic benefits as time and cost of the owners and communities incurred to improve existing conditions are much lower than new construction (Pearce et al., 1996).

Arrangements facilitating future maintenance and management of buildings, facilities and spaces are essential to a development as they provide incentives to the management staff to conduct routine maintenance and management works. Routine maintenance reduces the deterioration rates of the structures and their facilities, and lowers the operation and future repair costs (Miles and Syagga, 1987; Matulionis and Freitag, 1991). A reduction in energy consumption through proper management preserves the environment and saves the capital expenditure (Chartered Institute of Housing, 2000). An example provided by Corbett and Corbett (2000) showed that a corporation saved approximate $18 million in a year by switching off office lightings, air-conditionings and equipment e.g. photocopiers, computers, printers, fax machines, etc. when they were not in use. By replacing existing provisions with energy-efficient lightings and electronic ballasts, the city of San Jose saves $20,000 electric expense annually (Corbett and Corbett, 2000).

Total cost for waste handling can also be reduced when there is effective waste management programmes. Through recycling of wastes, total amounts of wastes and the expenses incurred in disposing them can be lowered. In Kolding of Denmark, the waste handling scheme has decreased total charges to the tenants for refuse removal by 40,000 DKK annually (Vliet and Gade, 2000). Furthermore, less consumption of other scarce resources like energy and water saves money when there is a charge for using them. Very often, people rate the relative costs and benefits for protecting or consuming the natural capitals (Dasgupta et al., 2000). They are expected to use the resources in profligate way when the prices for consuming them are low or negligible, vice versa. It explains why adoption of environmentally friendly building design and installation of energy efficient and water conservation devices for saving resources with charges can make the development more financially sustainable in the long run.

2.4.4.2 Environmental Sustainability

Design considerations mentioned here can sustain the environment by encouraging more efficient use of natural resources, and delivering pollution free and ecologically supportive urban landscape.

Measures/ technologies to control pollutions or maintain the air quality and noise level to acceptable standards can offset the negative impacts of developments on the environment. For instance, tight control over pollutant emissions, construction and promotion of mass public transit networks, usage of non ozone-depleting materials, etc. enhance air quality and mitigate the problem of global warming/ climate change. Installation of acoustic enclosure or noise barrier, and separation of noise source and noise-sensitive area can mitigate structural and airborne noise (Lau and Sadowski, 2000).

Environmental sustainability cannot be achieved when the development exceeds the carrying capacity of an urban area. Harm to natural environment increases when development intensity increases (Tang and Lam, 2000). One of the effective means to limit development intensity and reduce the environmental

stress is to control the density, height and mass of the buildings within a development. Spatial arrangement of buildings and streets also influence climatic conditions. Presence of high-rise buildings and narrow streets creates canyons in which solar heat, thermal energy dissipated from mechanical plants, dust and smoke emitted by the vehicles, etc. are trapped (Lim and Leung, 2000). The canyon effect thus raises the temperature of an urban area and it results in urban heat island. To avoid unfavorable impacts on microclimate, due consideration to the layout of buildings and streets is highly recommended.

Natural landscape and open space are important to protect urban ecology and improve overall environmental quality (Nevter and Beser, 2003). Open spaces are regarded as a city lung of the urban areas as they provide a break in the congested urban environment. Green spaces such as parks, in particular, ameliorate local climate (Oktay, 2004). Trees and plants are useful to control sunlight and wind (Corbett and Corbett, 2000). They moderate wind speed and regulate wind direction to change the airflow patterns between and within the buildings. In addition, they provide shading over the land surfaces to control indoor and outdoor temperatures (Cookson Smith, 2000). A study undertaken by the University of California revealed that the ambient temperature in well-shaded areas was about 10 degrees lower than that in poorly shaded regions (Corbett and Corbett, 2000). Furthermore, vegetation filters the air. Cookson Smith (2000) pointed out that planting could remove up to 75% of suspended particulates in the ambient air. Plants can regulate the level of greenhouse gas i.e. carbon dioxide and release oxygen into the atmosphere. As mentioned by Ong and Zhang (2004), well-planned and proper designed open space and greenery can mitigate harshness of the environment and enhance aesthetic value of an urban area simultaneously. It appears that design of open space should be taken into account to sustain the natural environment and produce a desirable built environment.

Wildlife conservation is also vital to environmental sustainability. In additional to the aesthetic reason, preserving wildlife ascertains well-being and balance of the ecosystems (Fung, 2004). Within an ecosystem, all living things like organisms, plants and animals species, and human coexist. They affect one

another as well as the entire environment. Therefore, protecting ecosystems and important habitats is essential to sustain the Earth.

Consumption of natural resources can be more effective through building design or by mechanical means. Proper building orientation and façade design can maximize the ingress of sunlight and facilitate natural airflow while installation of insulation systems, selection of light colored materials, use of low-emissivity glazing, and provision of external shading devices such as fins and balconies, etc. can regulate heat entering and leaving the buildings without inducing excessive solar heat gain and heat lost. As a result, only a reasonable amount of energy has to be used for providing artificial lighting, and additional cooling and heating (Chartered Institute of Housing, 2000). In addition, installations of environmentally friendly fittings such as energy efficient and water conservation devices can prevent unnecessary wastage of scarce resources during operation of the buildings.

Invaluable natural resources do not limit to energy and water. Land is also indispensable to the ecology as it supplies food, and supports construction of shelters and other infrastructure. Hence, efficient and effective uses of land resources are required in order to secure long-term productivity of such rare resources.

Proper arrangements for maintenance and management of buildings, facilities and spaces are also beneficial to the environment. Such arrangements facilitate and encourage routine maintenance and proper management which help to extend the services life of the properties and their facilities, and prevent premature replacement. Hence, wastes generated from and new resources used for replacement can be greatly reduced. In addition, retrofitting existing electrical systems, use of energy-efficient lightings and components, operation of lighting, air-conditioning and lift in genuine needs, regular checking and timely maintenance of plant and equipment such as pumps and motors, and frequent inspection and prompt repair of leakage of water supply pipes can also help to reduce consumption of natural resources such as energy and water.

In order to reduce total amount of wastes generated in the long run, reuse and recycling of materials are required. By appropriate recycling processes, materials can be changed into other forms and become useful again. Apart from recycled and recyclable materials, durable materials can also be used in the construction process as they are long lasting, and do not require frequent maintenance and replacement. When the heritage is retained and the derelict properties are refurbished, generation of demolition and construction wastes can be minimized (Jones and Clements-Croome, 2004). Obviously, preserving and repairing existing structures require fewer materials and resources than new construction (Pearce et al., 1996). As a result, more natural resources can be saved and used elsewhere.

CABE and DETR (2001) further indicated that good pedestrian and public transport access is beneficial to the environment by reducing total amount of vehicles. By doing so, respirable suspended particulates, carbon dioxide, nitrogen dioxide and volatile organic compounds emitted by vehicles, traffic noise, land uses for roads and carparking facilities are diminished substantially. The air then becomes cleaner, the town atmosphere becomes quieter and the spatial arrangement of a city becomes more efficient. As pinpointed by Hopkinson (2004), an increase in the ownership and use of private car would worsen the environment because production of energy for the cars requires burning of non-renewable and polluting fossil fuels. If the working places, areas and facilities for daily life operations are easily accessible, the citizens are more likely to go there by public transport, by bicycle or on foot instead of using private cars, which greatly reduce those unfavorable impacts on the natural environment and the health of the local citizens.

Appearance of the pedestrian routes and street furniture is influenced by the design, and the selection of materials, construction, maintenance and management practices. To minimize the negative impacts on the environment, environmentally friendly products should be chosen, and regular maintenance and proper management are also required. Regeneration Scrutiny Panel (2002) pointed out that street cleansing, litter and dog-fouling picking, graffiti and poster removal, etc. along the pedestrian sidewalk improve the streetscene as well as the

overall environmental quality of Rotherham. Street furniture items e.g. street lamps, benches, signage, sculptures, rubbish bins of appropriate design and location can minimize disruption to the urban spaces and natural landscapes (Design and Development Co-ordination Team, 2004).

2.4.4.3 Social Sustainability

Built environment affects social well-being. Urban design to alter the physical fabrics of a city can fulfill the physical needs and desires of various parties in the community. However, achieving social sustainability for a city always goes beyond the manipulation of the physical environment. Therefore, intangible values of the community, and psychological and emotional needs of the public should also be taken into account in order to sustain social wellness.

Provisions of various types of amenities are vital to a society. Public facilities such as schools and medical centres cater for the basic needs of the citizens (Rothenberg, 1969) while others like sports facilities and community centres offer venues for holding different leisure activities. To look after vulnerable groups such as disabled, elderly and children within a community, special provisions should be readily available for their uses. In addition, open spaces provide buffer zones in crowded areas to facilitate social gathering and public interaction (Cuthbert and Dimitriou, 1992; Chui, 2003). When participating activities in outdoor spaces, people feel refreshed, and gain confidence and self-esteem (Morris, 2003). Green areas soften the hard lines of the buildings and roads, and add interest to cityscape (Davies et al., 2000). They further offer social and psychological benefits as greenery helps people to relax, concentrate and feel happy (Corbett and Corbett, 2000). Both open spaces and green areas can improve physical and mental health of the residents. Walking and outdoor sports like cycling in these places improve residents' physical health while the aesthetic appearance of green landscape enhances the mental well-being of the residents by relieving their stress and anxiety (Morris, 2003). Since all of the above are public goods and everyone belonged to various socio-economic groups can enjoy, the sense of place and civic pride of the citizens can be promoted.

Provision of accommodation for various classes can moderate the impact of social inequality (Grange, 2004). The families who are unable to afford high cost housings and those who pursue superior dwellings can be satisfied at the same time. Housing is not just a shelter provided to the citizens. It provides a sense of security, facilitates social interaction, and encourages exchange of residents' customs and cultures within the neighborhood (Chiu, 2003). Furthermore, homeownership is highly related to life satisfaction, self-esteem and psychological health of the public (Simons et al., 2003).

Employment is one of the major focuses of social sustainability (Omann and Spangenberg, 2002). Employment provides incomes to the individuals and the working area offers a place for social contact and interaction. Stiglitz (2001) found that divorce rates, suicide rates and the incidence of alcoholism increase when the unemployment rate is high in the community. According to Omann and Spangenberg (2002), social problems such as poverty, social exclusion, welfare dependence and psychological problems reduce when the employment rate increases.

Availability of different commercial activities such as retail shops and cafés is necessary for the citizens who demand some sorts of gathering places to stay after work (CABE and DETR, 2001). People desire to live in an environment with choice (Walker, 2002; Porta and Renne, 2005). They favor a diversity of businesses and amenities as they can choose among a great variety of options day and night to meet their lifestyles.

Accessibility seems to be an essential realm in improving social sustainability. The citizens aspire to live, work and participate in leisure and cultural activities without traveling too far (Cookson Smith, 2000). Che Musa (2000) pinpointed that the people would like to be housed in areas with employment opportunities and facilities for different family members in the proximity. Through land use planning, distances among residences, amenities, employments and services are reduced and the movement of the residents is kept to a minimum (Hopkinson, 2004). Freedom of movement from place to place is recognized as a basic

human right. Therefore, everybody regardless of his/her age and physical condition should have proper and convenient access to a number of places in order to ease their daily lives.

The environmental impact of the automobiles is obvious but their impact on the community is also significant. Road traffic accident is one of the social impacts concerned by the citizens (Hopkinson, 2004). Fatal accidents and serious injury are common especially in areas with high traffic density and complex transport network. In addition, vehicles isolate one person from another and traffic congestion reduces the time available for social gathering (Lee, 2003). A study conducted in San Francisco indicated that the traffic level was in inverse relation to the number of friends and social acquaintance of a person (Appleyard and Lintell, 1972). In contrast, provisions of convenient, efficient & safe public transportation routes and pedestrian walkways help to increase social contact at street level. When the people walk around or travel by mass transportation systems, they can meet their friends and thus inter-personal relationship improves. In this way, social environment in particular a sense of community can be strengthened. Furthermore, promoting effective mass public transit and providing a pleasant environment for the pedestrians can improve social well-being as well as the public health because these practices provide an incentive for the pedestrians to walk, lower the amounts of harmful pollutants produced by the private cars, and reduces stress induced by traffic jams, traffic accidents and pollution problems on drivers and pedestrians (Corbett and Corbett, 2000).

In addition to economic and environmental values, green building design and resources saving installations also have positive impacts on the community. It is because these measures significantly reduce the adverse effects induced by a development on the built environment and at the same time increase the comfort and productivity of the building occupants. A win-win situation can be achieved as the present generation can enjoy the fruit of the development without sacrificing the long term benefits of future generations (Blair et al., 2004).

Heritage bears witness to changes in time and it is left by former generations identifying who we are, what we do and how we live in the past. We, as the present generation, have the obligations to preserve the heritage properly for enjoyment of future generations (Fung, 2004). Apart from preservation of historical structures and features, local characteristics/ distinctiveness of an area undergoing redevelopment should be respected and existing community network has to be conserved. Daily activities, customs, ways of living and interaction, etc. of a community can be retained or improved through urban design since those abstract features can be reflected by physical built forms.

Poor townscape design practices destruct uniqueness of places and hinder development of a sense of belonging among the residents. Oktay (2004) stated that pedestrian-oriented streetscapes could encourage outdoor interaction among the citizens. According to Porta and Renne (2005), visual images of street furniture and pavement, and interconnectivity of street layouts have impacts on social sustainability of places. Street networks with buildings influence not only the movement of the pedestrians but also the feeling of security (Porta and Renne, 2005). Hence, presence of cul-de-sacs and winding paths are not preferable.

Security is an essential element in every neighborhood. As mentioned by Corbett and Corbett (2000), people prefer to stay in a safe and security place where thieves, burglars or vandals are absent, and the crime rate is low. The public would like to know what is going on in the public areas around their dwellings and hence urban design that fails to keep the spaces under public surveillance reduces a sense of security of the citizens.

Public participation is another matter of concerns during urban design process. When a development is conducted without working with the local community, the public is not likely to react favorably (Barnett, 1982). On the contrary, when the residents are involved in planning their communities and decision making process, the outcome of the urban design is very likely to meet their needs and desires (Rydin et al., 2003). In this way, confrontation and social

oppression are minimized and the senses of belongings of the citizens are enhanced (Inam, 2002).

Table 2.4 Values of Individual Urban Design Considerations

Urban Design Considerations	**Economic** Sustainability	**Environmental** Sustainability	**Social** Sustainability
D1. Mixed-use development	√		
D2. Establishment of local business activities e.g. retail shops, banks	√		√
D3. Variety of business activities	√		√
D4. Provision of public facilities e.g. school, health care services, sports facilities			√
D5. Diversity of public facilities			√
D6. Provision of open spaces e.g. parks, seating areas		√	√
D7. Presence of nightlife	√		√
D8. Adaptability of development to the changing needs	√		
D9. Efficient use of land & space	√	√	
D10. Arrangements for maintenance & management of buildings, facilities & spaces	√	√	
D11. Provision of pollution control measures		√	
D12. Air quality & noise level	√	√	
D13. Installation of energy efficient devices	√	√	√
D14. Optimization of natural lighting & ventilation	√	√	√
D15. Incorporation of environmental design e.g. sun shades, balcony	√	√	√
D16. Use of recycled, recyclable or durable materials		√	
D17. Wildlife conservation		√	
D18. Installation of water saving devices	√	√	√
D19. Waste management including waste collection, reduction & recycle	√	√	
D20. Preservation of historical structures & features		√	√

Urban Design Considerations	**Economic** Sustainability	**Environmental** Sustainability	**Social** Sustainability
D21. Promotion of local distinctiveness			√
D22. Preserving & facilitating social network			√
D23. Availability of local employment	√		√
D24. Provision of accommodation for different income groups			√
D25. Provision for basic needs of disabled, elderly or children			√
D26. Community involvement in public decision making			√
D27. Sense of belongings on community			√
D28. Security against crimes			√
D29. Convenience, efficiency & safety of drivers	√		
D30. Convenience, efficiency & safety of pedestrians	√	√	√
D31. Convenience, efficiency & safety of public transport users	√	√	√
D32. Access to provisions for disabled, elderly or children			√
D33.Access to public facilities	√	√	√
D34. Access to open spaces	√		√
D35. Access to work	√	√	√
D36. Proximity to business activities	√	√	
D37. Accessibility of the development	√		
D38. Building design & overall appearance	√	√	
D39. Compatibility with neighborhood	√		
D40. Building density, height & mass	√	√	
D41. Layout of buildings & streets	√	√	√
D42. Design of open spaces e.g. appearance, location, shape & size		√	
D43. Provision of landscapes e.g. trees, planters		√	√

Urban Design Considerations	**Economic** Sustainability	**Environmental** Sustainability	**Social** Sustainability
D44. Appearance of street furniture e.g. street lamps, benches, signage, rubbish bins		√	√
D45. Appearance of pedestrian routes & sidewalk		√	√
D46. Rehabilitation of repairable building structures	√	√	

Based on the discussions as stated above, it seems that it is necessary to include all items under each of 3 categories to develop a sustainable town or city. However, it is not the case in the real world. Different places own dissimilar amounts of scarce resources such as lands and capital, and different people have diverse emphasis on various aspects within an urban development. Therefore, the significance of the design considerations varies from place to place and from time to time. Very often, a tradeoff is required to ensure that the resources available in the urban spaces are used appropriately to the satisfaction of as many parties as possible, but in actual fact making a tradeoff decision is a very difficult process especially in preparing urban renewal strategy for densely populated areas. As urban renewal projects involve more site constraints than new developments, and execution of urban renewal activities affects a lot of local residents with divergent needs and expectations, deciding which design aspect should be considered in the schemes beforehand is not an easy task. To ensure that suitable tradeoff decisions can be made, being familiar with the concerns and considerations of different stakeholders towards the 3 sustainable development objectives is necessary.

It is well known that Hong Kong is a densely populated city in which many urban redevelopment/ renewal projects have completed, are in progress or going to be undertaken in the near future. Conducting detail study here and gathering valuable opinions from various local stakeholders help to determine how urban design influences local economic development, environmental protection and

social equity in the renewal process, and how sustainable urban renewal can be achieved in the future.

CHAPTER 3 URBAN RENEWAL IN HONG KONG

3.0 Introduction

This chapter aims to deepen the understanding of Hong Kong as a study area. Local urban redevelopment efforts, regulatory controls for urban renewal in Hong Kong and the impacts associated with local practices are introduced in the first instance while sustainable (re)development in the territory and the urban design principles for achieving sustainable development are illustrated afterwards.

3.1 Local Urban Redevelopment Attempts

3.1.1 Background

Hong Kong has gone through a long process of developing from a small fishing village in the past to an international city nowadays. Its territory covers Hong Kong Island, Kowloon Peninsula, the New Territories and more than 200 outlying islands. Hong Kong was a former colony of the UK from 1840s to 30 June 1997 (Lo and Chung, 2004). After that, exercise of sovereignty over Hong Kong was resumed by the People's Republic of China and Hong Kong became a Special Administrative Region (SAR) under the principle of “One Country, Two Systems”. Within 160 years, Hong Kong underwent rapid developments in various aspects e.g. physical, political, financial and social dimensions. High population density is a prominent feature of Hong Kong as nearly 7 million people reside in a territory of about 1,100km^2 (Census and Statistics Department, 2004 and Census and Statistics Department, 2005).

High-density urban form of development is adopted here as a result of limited land supply, and changing economy and population needs. Few lands are available and suitable for development because more than 70% of the lands in Hong Kong are hilly. Developments usually concentrate around the Victoria Harbor and certain parts of the New Territories with more flat lands (Cuthbert and Dimitriou, 1992; Fung, 2001b; Council for Sustainable Development, 2004b). High-density development not only

creates crowded living environment, traffic congestion and incompatible land uses but also poses constraints on urban design (Fung, 2001b). In order to optimize the use of scarce land resources and tackle the cons of such form of development, thoughtful planning is essential. The approach of comprehensive planning applies to new development as well as urban renewal. As discussed by Ng (1998), redevelopment of underused or ineffective used urban lands not only deal with the physical constraint on new land production but also address numerous urban problems e.g. misuse of lands, lack of amenities, deterioration of urban fabric and substandard living condition. In Hong Kong, the objectives of urban renewal vary from time to time (PLB, 1995; HPLB, 2001b) but the main theme is to re-plan poorly developed urban districts, and convert old and run-down areas into an environment fulfilling current living requirements and community expectations.

Urban renewal in response to degrading urban environment, economic restructuring, social polarization, under or over-utilization of lands and obsolescence of buildings in Hong Kong becomes a hot and urgent issue in recent decades (PD, 1998; Ng et al., 2001). Nowadays, Hong Kong suffers severe problem of urban decay. According to the Housing Planning and Lands Bureau (HPLB) (2001a), there are approximately 38,400 private multi-storey residential buildings in Hong Kong and about 1/3 of them are 20 to 40 years old. The HPLB (2001b) also conveyed that up to 2010, more than 9,000 private buildings in Hong Kong Island, Kowloon, Tsuen Wan and Kwai Tsing would be 30 years old and above, and 2,000 of them required urgent redevelopment. Those old building blocks are usually found in disrepair and unsanitary conditions, which have created potential hazards to the health and safety of the general public.

With reference to the statistical data from the HPLB, more than 150 accidents related to unsafe building conditions e.g. collapse of concrete canopies or illegal structures, falling of external finishes or windowpanes, etc. occurred in past few years (HPLB, 2001a). Figure 3 has shown these alarming numbers of the accidents which happened between 1990 and 2001. The urban decay problem is going to get worse as Land Development Corporation (LDC) (2000) estimated that the number of buildings over 30 years old would increase by 50% by 2011.

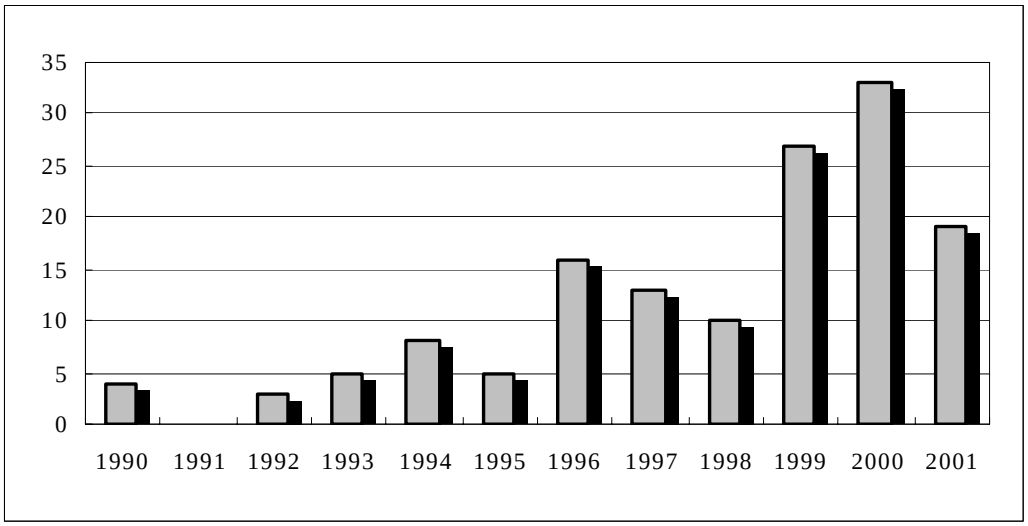


Figure 3.1 Number of Accidents related to Unsafe Building Conditions

Source: HPLB, 2001a

In Hong Kong, urban renewal has a history of about 50 years and many parties would like to upgrade the physical environment, revitalize the city and improve the quality of life of the residents through urban renewal. Unfortunately, various difficulties would be encountered throughout the renewal process. For instance, fragmented and multiple ownership of land lots poses difficulties on land acquisition. Longer time and higher cost are consumed in contacting segregated owners and negotiating compensation with them (Ng, 2002). Then, project lead-time is lengthened and financial risks increase (PLB, 1996). In addition, rehousing resources are inadequate to meet the demand of affected citizens. Relocation of properties' or businesses' owners is inevitable in urban renewal. However, some of them are unwilling and cannot afford to leave far away from their premises and hence they opt for rehousing in the same district instead of cash compensation (HPLB, 2001b). Although none of the above would be investigated in this study, such information can provide a clear and complete picture of what is happening about urban renewal in the territory.

In the past, many urban renewal projects were profitable as low-rise buildings and under-developed urban lands could be replaced by higher value properties at lower site assembly and redevelopment cost (PLB, 1995 and 1996). When time passes, fewer sites with high redevelopment potential remain and the number of redevelopment projects that are financially viable decreases (Ng, 2005). The presence of non-viable projects probably reduces the incentives of both public and

private sectors to invest in urban renewal. Furthermore, the condition of the economy and the performance of the property market can lead to the market failure in renewing the urban areas. The Asian financial crisis and the collapse of the property market in 1998 lowered the demand for private residential buildings and hence the private sectors reduced the supply of flats through redevelopment (Ng, 2002). As a result, the redevelopment rate of dilapidated areas has slowed and the problem of urban decay gets worse. In previous decades, the Hong Kong Government has made an attempt to achieve various socio-economic objectives by implementation of different urban renewal schemes. In addition to the public sector, the private developers also play an important role in local urban renewal. The details of their influence and contributions are discussed as follows.

3.1.2 Past Efforts to Urban Renewal in Hong Kong

As mentioned by Cuthbert and Dimitriou (1992), urban redevelopment took place frequently in early colonial period because the living environment of the citizens in Hong Kong was adversely affected by "typhoons, fires, inadequate sanitation, and epidemics of cholera and the plague". For instance, 3 slum clearance projects in Tai Pang, Lower Lascar Row and Kau U Fong were conducted to prevent spread of plague in 1904 and 1905 (Ng, 1998). In 1953, the Hong Kong Government replaced sub-standard urban squats by resettlement blocks to accommodate the homeless after a fire (Tang, 2002). Before 1960, the concept of urban renewal was vague and government intervention in urban renewal was kept to a minimum. Apart from slum clearance, the Government primarily focused on provision of public housing to accommodate sharp growth in population caused by mass influx of refugees from the Mainland China and the high local natural increase (i.e. net difference between the number of births and the number of deaths) (Liu, 2002). At that time, the majority of urban renewal activities were driven by the property market and undertaken by private developers.

Afterwards, the attitude of the Hong Kong Government changed and its involvement in urban renewal increased. From 1960s to the late 1970s, several schemes including a pilot scheme in Sheung Wan Urban Renewal District, Environmental Improvement Areas (EIA), Comprehensive Redevelopment Areas (CRA) and Urban

Improvement Scheme (UIS) were implemented (PLB, 1996; PD, 1998; Ng et al., 2001; Liu, 2002; Poon, 2002), but their effects on improvement of urban areas were insignificant. In 1968, the first urban redevelopment project in the Western District on the Hong Kong Island was launched officially, but it failed to renew all derelict parts (Cuthbert and Dimitriou, 1992). As indicated by Ng (1998), failure of those projects is largely due to uncoordinated and fragmented urban policies and programmes initiated by the Hong Kong Government. During that era, the Government attempted to develop rural New Territories, new town and reclaimed lands in addition to the renewal of derelict urban districts. Few resources were available particular for urban redevelopment (PD, 1998; Liu, 2002) so that the scale of those projects was limited and the result always not to the satisfaction of the stakeholders.

At that moment, several comprehensive redevelopment projects were conducted by the private sector. For example, obsolescent industrial land was redeveloped into private residential estate i.e. Mei Foo Sun Chuen with abundant supporting facilities in 1967 while redevelopment of the Taikoo Dockyard at Quarry Bay commenced in 1975 (PD, 1997). However, detailed planning for urban renewal was generally absent and pencil type or piecemeal developments still dominated. Such kind of development deteriorates rather than improves the urban environment as the density of urban areas increases (Adams and Hastings, 2001). According to Adams and Hastings (2001), the demand for urban renewal in 1980s mounted due to bad quality of building structures especially for those constructed before 1970s, poor living environment of the citizens and economic restructuring. To rectify worsening urban decay problems, meet the needs of the general public and cope with the urgent requirement for urban renewal, the pace of urban renewal had to be speeded up. Consequently, the Government set up an agency solely responsible for handling such matter and a study for establishment of an urban redevelopment agency i.e. LDC was undertaken in 1983.

The LDC adopted a “caring approach” to regenerate dilapidated areas in Hong Kong and commenced operation in 1988 under the Land Development Corporation Ordinance (LDCO). It was an independent statutory body and was the first dedicated urban renewal agency established in Hong Kong. Under the LDCO, the

LDC was responsible for identifying sites for urban renewal; preparing redevelopment schemes; acquiring and resuming lands, rehousing affected residents and cooperating with the private developers in conducting urban renewal projects (Cuthbert and Dimitriou, 1992; Liu, 2002). At the beginning of its operation, the Hong Kong Government has provided a non-revolving interest bearing loan facility of $100 million to the LDC as initial funding. Due to the limited financial assistance from the Government, the LDC was required to operate urban renewal as a business in accordance with "prudent commercial principles" for survival (Ng, 1998; LDC, 1998). Therefore, the LDC mainly conducted urban renewal projects in areas where profits could be made and formed joint venture with private developers so as to make the best use of private sector resources and expertise, and reduce its risk (Chan and Tang, 1998; LDC, 2000; Ng, 2002). To ascertain great and quick returns on the money invested in urban renewal projects, the LDC and its joint venture partners concentrated on conducting commercial or small plot redevelopments (Adams and Hastings, 2001). Limited achievement in fulfilling social and environmental needs was gained, and many deteriorating properties and dilapidated areas were left behind. Throughout 12 years, the mode of operation of the LDC such as selection of areas to be renewed, development schemes approval procedures, land acquisition procedures, public private partnership practices and bulldozer approach attracted widespread criticism. Its pace of urban renewal was also commented to be so slow that only 16 out of 52 urban renewal projects announced had completed successfully. The LDC was merely a profit making body and even argued to be a tool to facilitate the private developers in assembling land for redevelopment.

Since 1992, the Government recognized the weakness of the LDC and intended to review existing urban renewal policies (LDC, 2000). A public consultation document was issued in 1995 for acceleration of urban renewal process. One year after the consultation, a policy statement "Urban Renewal in Hong Kong" stating the new initiatives on urban renewal was published. According to the PLB (1996), "LDC will not be able to deal with the urban renewal problem in future on a sufficient scale or quick enough using its current mode of operation". Therefore, the Government proposed to replace the LDC by the Urban Renewal Authority (URA) with new operating mechanism, greater powers and more initial capital in order to renew dilapidated urban areas in a more effective way (Tung, 1998; Ng, 2002). A

"Consultation Paper on the Urban Renewal Authority Bill" was then published in 1999. Afterwards, Urban Renewal Authority Ordinance (URAO) was enacted in 2000 and the URA came into operation in 2001.

In 2001, the URA took up the role of LDC to deal with urban renewal matters. Ng et al. (2001) commented that this change opened a "new page" on Hong Kong urban renewal practices. The URA follows the guidelines stated in the Urban Renewal Strategy (URS) prepared by the Government on the basis of the result of URS study in 1998. That study identified the seriousness of the urban decay problem and the areas requiring urgent redevelopment. In order to improve the quality of life of citizens, the URS specified that "people-centred" approach should be employed when conducting urban renewal (HPLB, 2001b). Since then, a thoughtful area-based approach with comprehensive planning instead of piecemeal redevelopment was attempted to be adopted in the renewal process (Adams and Hastings, 2001). As financial assistance from the Government increases, the URA is able to conduct less profitable or financially not viable projects putting more emphasis on fulfillment of social and environmental objectives (Adams and Hastings, 2001; Ng, 2002). To motivate the private developers to undertake less commercially attractive projects, the URA links profitable projects to non-viable ones (PLB, 1995; Tung, 1999). Until 20 December 2007, URA has launched 27 redevelopment projects in addition to 3 on-going redevelopment projects initiated by its predecessor, the former LDC (URA, 2002; URA, 2003; URA, 2004; URA, 2005; URA, 2006; URA, 2007a). The URA aims to redevelop more than 2,000 dilapidated buildings in 9 target areas under 225 projects within 20 years (HPLB, 2001b). In addition to urban Redevelopment, the URA also promotes another 3Rs i.e. Rehabilitation, Revitalization and pReservation. However, it can be clearly observed that the urban renewal projects conducted by URA within 7 years still emphasized on urban redevelopment and an integration of URA's 4Rs strategy was absent. Although URA is no longer required to operate under the prudent commercial principles, financial difficulty imposed by urban renewal remains fatal as the URA is expected to be self-financed in the long run. It is believed that such a fiscal oriented notion of the Hong Kong Government is not in favor of sustainable development which aims to integrate economic, environmental and social domains for the community. The projects initiated and undertaken by LDC, URA and Hong Kong Housing Society (HKHS) are listed in Table 3.1 – 3.2.

Table 3.1 Urban Renewal Projects Completed by LCU/ URA

Project location	Site Area (m^2)	Gross Floor Area (GFA) of Development (m^2)						Status	Organization in charge
		Residential		Commercial GFA (m^2)	Office GFA (m^2)	Government, Institution & Community (G/IC) GFA (m^2)	Open Space GFA (m^2)		
		GFA (m^2)	Unit (No.)						
1. Western Market, Sheung Wan	1,300	--	--	1,900	--	--	--	Completed in 1991	LDC
2. Tai Yuen Court, Wan Chai	500	4,000	100	300	--	100	--	Completed in 1993	LDC
3. 152 Queen's Road Central, Central	200	--	--	400	3,000	--	--	Completed in 1993	LDC
4. Ko Nga Court, Sai Ying Pun	900	11,200	226	--	--	1,200	--	Completed in 1994	LDC
5. Kui Yan Court, Sai Ying Pun	300	2,300	48	--	--	--	--	Completed in 1994	LDC
6. Li Chit Garden, Wan Chai	1,400	9,100	180	--	--	1,400	900	Completed in 1994	LDC
7. 12 Soy Street, Mong Kok	800	7,200	112	1,200	--	70	--	Completed in 1994	LDC
8. Yan Yee Court, Wan Chai	300	2,100	46	200	--	--	--	Completed in 1994	LDC
9. Ginza Plaza, Mong Kok	700	--	--	3,100	7,500	--	--	Completed in 1996	LDC
10. Ko Chun Court, Sai Ying Pun	100	1,300	26	70	--	--	--	Completed in 1996	LDC
11. Chow Tai Fook Centre, Mong Kok	800	--	--	3,600	8,500	--	--	Completed in 1997	LDC
12. Grand Millennium Plaza, Central	7,500	--	--	2,300	110,200	600	3,400	Completed in 1997	LDC
13. Yuen Po Street Bird Garden, Mong Kok	3,000	--	--	--	--	600	2,000	Completed in 1997	LDC

Project location	Site Area (m^2)	Gross Floor Area (GFA) of Development (m^2)						Status	Organization in charge
		Residential		Commercial GFA (m^2)	Office GFA (m^2)	Government, Institution & Community (G/IC) GFA (m^2)	Open Space GFA (m^2)		
		GFA (m^2)	Unit (No.)						
14. Sunrise House, Shun Ning Road (Single-person Hostel), Sham Shui Po	1,000	5,000	312	--	--	700	500	Completed in 1998	LDC
15. The Center, Central	8,800	--	--	4,800	122,100	3,100	5,900	Completed in 1998	LDC
16. Bulkeley Street, Hung Hom	400	2,400	54	600	--	--	--	Completed in 1999	LDC
17. Kwong Yung Street, Mong Kok	1,600	12,000	184	2,400	--	--	--	Completed in 2001	LDC/ URA
18. Queen's Terrace, Queen Street, Sheung Wan	8,000	60,600	1,148	400	--	5,200	1,200	Completed in 2003	LDC/ URA
19. Langham Place, Argyle Street/ Shanghai Street, Mong Kok	12,000	--	--	120,000 ~ 41,900 for hotel development (686 rooms)		6,500	1,100	Completed in 2004	LDC/ URA
20. 8 Waterloo Road, Waterloo Road/ Yunnan Lane, Yau Ma Tei	3,900	32,000	576	--		--	1,700	Completed in 2004	LDC/ URA
21. The Merton, Kennedy Town New Praya	6,100	62,800	1,182	--	--	--	2,300	Completed in 2005	LDC/ URA
22. Mount Davis 33, Ka Wai Man Road (Kennedy Town Link Site)	700	7,300	89	--	--	--	--	Completed in 2006	LDC/ URA
23. Tsuen Wan Town Centre	20,300	107,900	1,466	23,200	--	3,100	3,700	Completed in 2007	LDC/ URA

Note: Figures in above table for all projects are as at 20 Dec 2007 and subject to change.
Figures are rounded up to nearest $100m^2$.

Sources: LDC, 1998; URA 2002, 2003, 2004, 2005, 2006, 2007a

Table 3.2 Urban Renewal Projects Announced & Implemented by LCU/ URA/ Hong Kong Housing Society (HKHS)

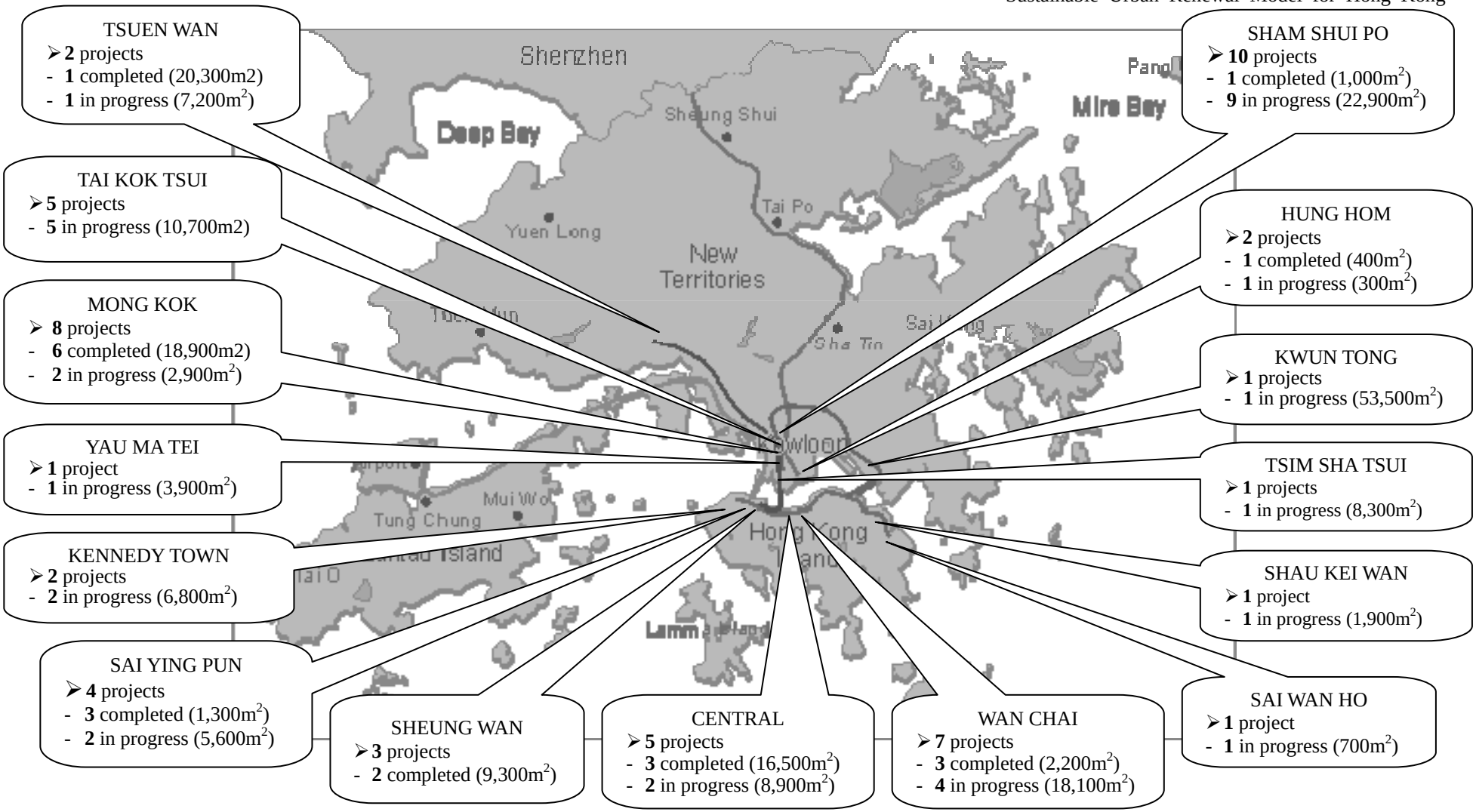
Project location	Site Area (m^2)	Gross Floor Area (GFA) of Development (m^2)						Status	Organization in charge
		Residential		Commercial GFA (m^2)	Office GFA (m^2)	Government, Institution & Community (G/IC) GFA (m^2)	Open Space GFA (m^2)		
		GFA (m^2)	Unit (No.)						
1. Wan Chai Road/ Tai Yuen Street, Wan Chai	6,800	52,500	904	3,400	--	5,700 for market 600 for day nursery	--	In Progress (By 2012)	LDC/ URA
2. Hanoi Road, Tsim Sha Tsui	8,300	45,500 (serviced apartment)	345	31,300 ~ 25,800 for hotel development (383 rooms)	--	--	1,200	In Progress (By 2008)	LDC/ URA
3. Yeung Uk Road (Tsuen Wan Link Site)	7,200	26,800	270	17,800	--	--	--	In Progress (By 2008)	LDC/ URA
4. Baker Court, Hung Hom	250	1,900	46	230	--	--	--	In Progress	URA
5. Bedford Road/ Larch Street, Tai Kok Tsui	1,200	9,200	182	1,100	--	--	--	In Progress	URA
6. Castle Peak Road / Cheung Wah Street, Sham Shui Po	1,000	7,500	149	1,500	--	--	--	In Progress	URA/ HKHS
7. Castle Peak Road / Hing Wah Street, Sham Shui Po	1,400	10,400	180	2,100	--	--	--	In Progress	URA/ HKHS
8. Cherry Street, Tai Kok Tsui	4,500	36,300	522	5,000		1,800	--	In Progress	URA
9. First Street/ Second Street, Sai Ying Pun	3,500	32,800	458	2,200	--	1,700 for residential care home for elderly	700	In Progress	URA
10. Fuk Tsun Street/ Pine Street Project, Tai Kok Tsui	500	4,000	72	800	--	--	--	In Progress	URA

Project location	Site Area (m^2)	Gross Floor Area (GFA) of Development (m^2)						Status	Organization in charge
		Residential		Commercial GFA (m^2)	Office GFA (m^2)	Government, Institution & Community (G/IC) GFA (m^2)	Open Space GFA (m^2)		
		GFA (m^2)	Unit (No.)						
11. Fuk Wing Street/ Fuk Wa Street, Sham Shui Po	1,400	10,600	155	2,000		--	250	In Progress	URA
12. Hai Tan Street/ Kweilin Street and Pei Ho Street, Sham Shui Po	7,400	55,100	880	9,400	--	2,200	1,500	In Progress	URA
13. Hing Wah Street/ Un Chau Street/ Fuk Wing Street, Sham Shui Po	2,200	16,500	333	1,100	--	2,200	--	In Progress	URA/ HKHS
14. Johnston Road Project, Wan Chai	2,000	18,000	381	2,600		--	--	In Progress	URA
15. Kwun Tong Town Centre	53,500	150,900	2,000	209,600	--	16,300 15,700 for public transport interchange	8,700	In Progress	URA
16. Lai Chi Kok Road/ Kweilin Street & Yee Kuk Street, Sham Shui Po	3,300	25,000	379	4,700	--	--	650	In Progress	URA
17. Larch Street/ Fir Street, Tai Kok Tsui	2,200	16,300	251	2,300		1,000 for social enterprises	--	In Progress	URA
18. Lee Tung Street/ McGregor Street, Wan Chai	8,900	Unspecified	1,313	10,800	--	2,100 for residential care home for elderly, RPC & public toilet 1,000 for social enterprises	3,000	In Progress	URA
19. Peel Street/ Graham Street, Central	5,300	22,000	290	35,800 ~ 8,800 for hotel development	--	1,200	1,600	In Progress	URA

Project location	Site Area (m^2)	Gross Floor Area (GFA) of Development (m^2)						Status	Organization in charge
		Residential		Commercial GFA (m^2)	Office GFA (m^2)	Government, Institution & Community (G/IC) GFA (m^2)	Open Space GFA (m^2)		
		GFA (m^2)	Unit (No.)						
20. Pine Street/ Anchor Street, Tai Kok Tsui	2,300	17,300	314	3,500		--	450	In Progress	URA
21. Po On Road/ Shun Ning Road, Sham Shui Po	1,400	12,500	166	2,100		--	250	In Progress	URA
22. Po On Road/ Wai Wai Road, Sham Shui Po	2,200	18,300	330	3,700	--	2,200	--	In Progress	URA/ HKHS
23. Queen's Road East, Wan Chai	400	2,800	96	200	--	--	--	In Progress	URA
24. Reclamation Street, Mong Kok	500	4,100	85	800	--	--	--	In Progress	URA
25. Sai Wan Ho Street	700	5,200	88	600	--	--	--	In Progress	URA/ HKHS
26. Shau Kei Wan Road / Nam On Street, Shau Kei Wan	1,900	17,800	300	1,700	--	--	--	In Progress	URA/ HKHS
27. Staunton Street/ Wing Lee Street, Central & Western	3,600	Unspecified	347	2,400	--	--	600	In Progress	URA
28. Un Chau Street / Hing Wah Street / Castle Peak Road, Sham Shui Po	2,600	19,500	356	3,900	--	--	--	In Progress	URA/ HKHS
29. Yu Lok Lane/ Centre Street Project, Sai Ying Pun	2,100	14,500	270	300	--	--	1,100	In Progress	URA
30. Macpherson Stadium, Mong Kok	2,400	16,500	227	2,400	--	5,300 for Stadium & Youth Centre	--	In Progress	URA

Note: Figures in above table for all projects are as at 20 Dec 2007 and subject to change.
Figures are rounded up to nearest $100m^2$.

Sources: LDC, 1998; URA 2002, 2003, 2004, 2005, 2006, 2007a; HKHS, 2005



Notes: Number in the blanket represents the total site areas of the projects.
Numbers in above figure are as at 20 Dec 2007 and subject to change.
Numbers are rounded up to nearest 100m².

Figure 3.2 Distributions of Urban Renewal Projects

From Figure 3.2, it can be noticed that the Hong Kong Government has conducted numbers of urban renewal projects across the territory in recent years. The projects mainly concentrate in Kowloon districts e.g. Yau Tsim Mong, Tai Kok Tsui, Sham Shui Po, etc. and in the areas along the coast such as Wan Chai, and Central & Western Districts. It is because these areas are early developed and many people living there suffer urban decay problems currently.

Apart from private developers and quasi-government bodies i.e. LDC and URA, the Town Planning Board (TPB), the PD, the Hong Kong Housing Authority (HKHA) and the HKHS also play important roles in urban renewal (PLB, 1996). Before establishment of the LDC and the URA, the TPB is responsible for all urban renewal matters including feasibility study, and preparation of outline redevelopment plan and detailed proposal (PD, 1997). The PD established in 1990 and the Urban Renewal Division formed under it in 1997 assists the HPLB (the former Planning, Environment and Lands Bureau) in review of urban renewal policies, formulation of the URS and expedition of planning and processing of renewal projects (PD, 1997 and 1998).

The HKHA acts as a housing provider to accommodate middle or low-income families who cannot afford private accommodation. In order to satisfy changing residents' needs and expectations, improve out-of-date healthy and safety housing standards, and optimize the development potential of existing sites, the HKHA has also launched several public rental housing redevelopment programmes in various estates e.g. Tsui Ping Road Estate (PD, 1998), North Point Estate, Wong Chuk Hang Estate, etc. (HKHA, 2004) since 1987. The HKHS has participated in urban renewal process for more than 30 years. In 1974, the HKHS started to undertake small to medium scale projects under UIS for the Government. Few years later, it begun to join larger scale comprehensive redevelopment projects such as CDA scheme (PLB, 1996). Similar to the HKHA, the HKHS also acts as a rehousing agent to provide affordable accommodation for the residents affected by urban renewal projects. By the end of 2002, the HKHS signed a Memorandum of Understanding (MOU) with the URA to implement urban renewal projects in line with existing URA's practices (HKHS, 2003). In Table 3.2, the renewal projects conducted by HKHS are also included.

3.1.3 Regulatory Controls for Urban Renewal in Hong Kong

As mentioned before, the URA and the private developers are 2 major parties actively involved in urban renewal in Hong Kong. No matter which party conducts the urban renewal projects, the project designers have to obey various statutory controls accordingly. In the following part, the major controls regulating the process and design of the renewal projects in different stages are discussed.

3.1.3.1 Pre-design Stage

Before planning the programmes in detail, it is necessary to determine the objectives and direction of the urban renewal in the first instance. The URA has to follow the policy guidelines on urban renewal stipulated in the URS. Under the URS published by the HPLB in 2001, urban redevelopment is one of the 4 major initiatives of the URA and the URA has to implement an urban renewal programme consisting 200 new projects and 25 uncompleted projects of the LDC in 9 target areas in 20 years (HPLB, 2001b). Under the URAO, the powers and duties of the URA are laid down, and the URA must follow the standard procedures to announce, plan and implement the renewal projects. The URAO also provides a mechanism for the people to object to the implementation of a development project proposed by the URA for the consideration of the Secretary for Housing, Planning and Lands (the Secretary). The details of processing such objections are shown in Figure 3.3. The private developers are not bound to the URS and the URAO unless they work with the URA to conduct the urban renewal projects. When they conduct the projects themselves, they are very likely to follow the business plan or corporate plan of their organizations. In Hong Kong, the major emphasis of the private developers is always put on meeting the demand of property market, increasing development potential of a site and maximizing total economic gain.

3.1.3.2 Planning Stage

When preparing the urban renewal proposals, it has to think about the future land uses of the urban areas. Land uses of an area are under the control of statutory planning system which is derived from the Town Planning Ordinance (TPO). The TPO is

enacted in 1939 and it provides a legal basis for the preparation and approval of statutory plans specifying the layout of the areas as well as the building types suitable for erection therein, and for the planning applications for change of land uses. The TPB is a statutory body with delegated authority under the TPO from the Chief Executive of the Hong Kong Government. The TPB is responsible to make decisions on whether or not to accept the statutory plans in terms of planning intention; layout, land use, size, type, height, plot ratio of the development, environmental, traffic and visual impacts, etc., and to consider the planning applications.

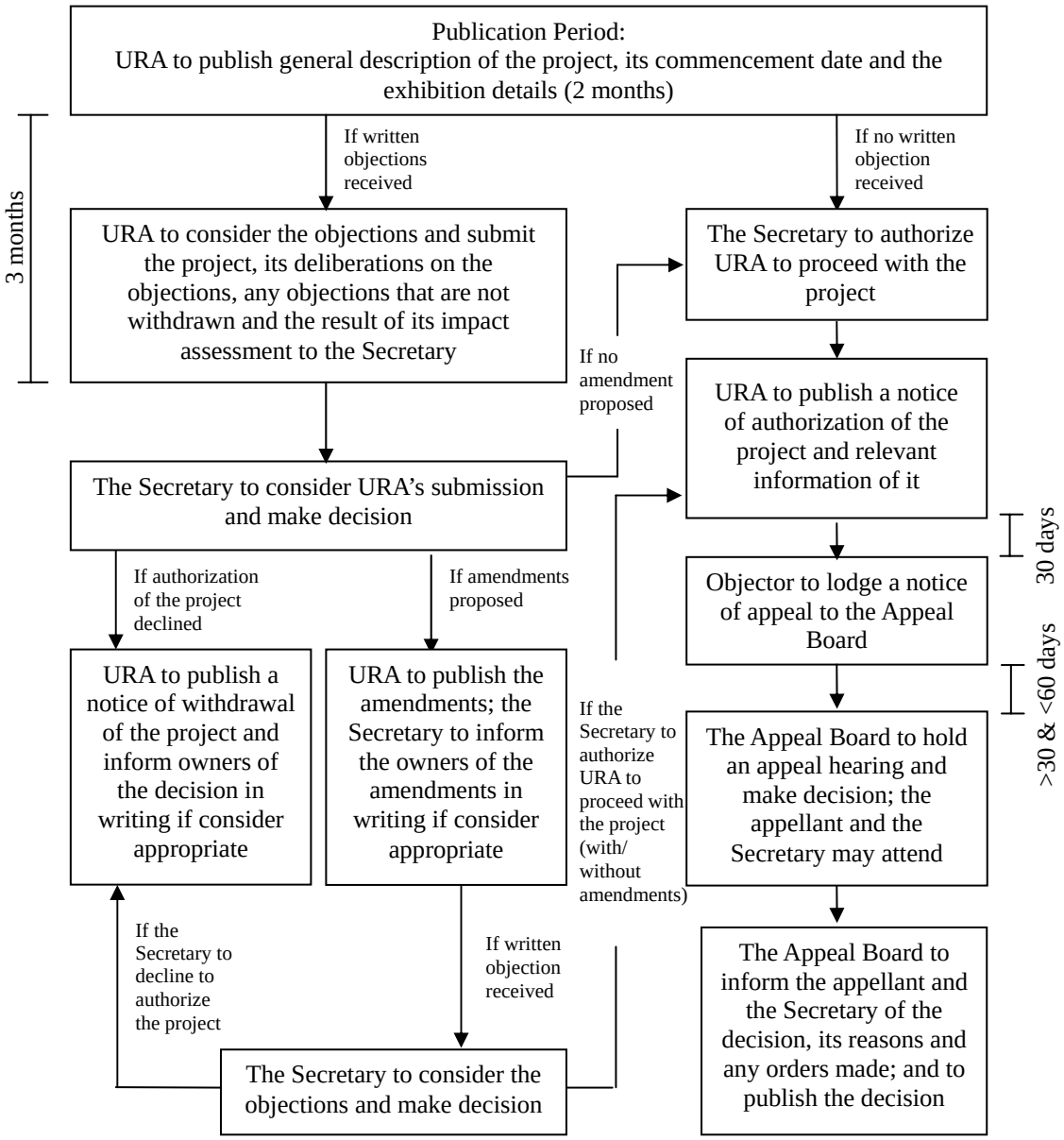


Figure 3.3 Procedures for Processing Objections to a Development Project

Source: URAO

Apart from the Outline Zoning Plans (OZPs) and the Development Permission Area

Plans (DPA Plans) prepared by the PD, the TPB also have to consider the Development Scheme Plans (DSPs) prepared by the URA under the URAO. DSPs are statutory plans relating to the renewal of the specific old urban areas and are published for public comments under the TPO if the TPB found suitable. Figure 3.4 presents a general process for making statutory plans when the TPB accepts a draft plan and decides to consider people's comments on such plan. Once the DSP is finalized, the owners and residents of existing community can foresee what will happen in their neighborhood. The plan is also valuable to provide a basis for the URA to enter into negotiation for land redevelopment for existing owners, or for the sale of the government land.

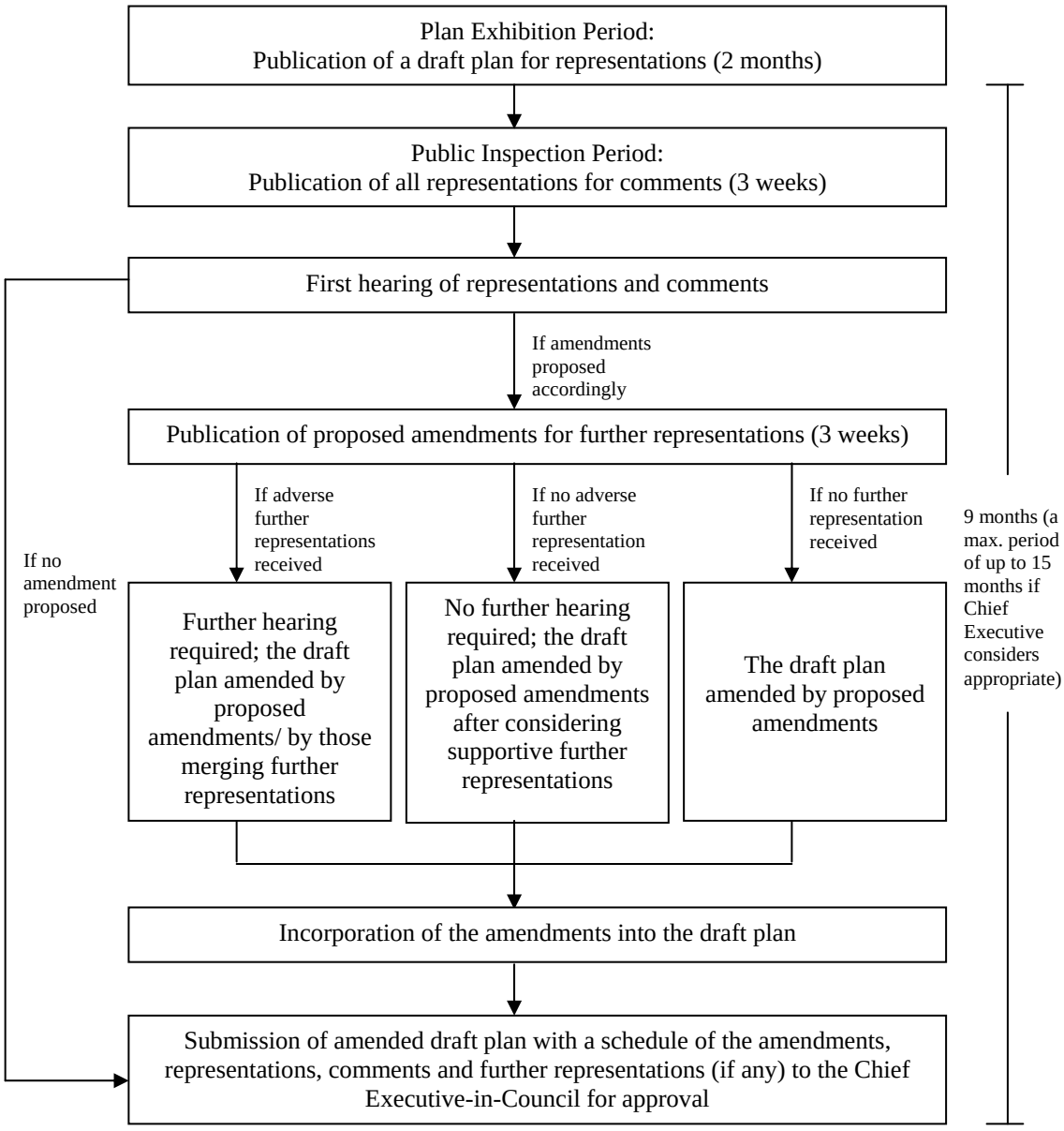


Figure 3.4 General Plan Making Process by the TPB

Sources: Town Planning (Amendment) Ordinance 2004; Civic Exchange, 2006

Unlike the URA, the private developers have no authority to prepare statutory plans for the urban areas undergoing urban renewal. However, they still play an important role in the planning stage and influence the uses of land in 3 different ways:

(i) The developers can be a Representor under Section 6 of the TPO to make representation regarding the draft plan/ proposed amendments within 2 months/ 3 weeks of their publication. They can also be a Commentor who comments on the representations made by someone else regarding the draft plan under Section 6A of the TPO in 3 weeks from the publication of the representations.

(ii) The developers can propose changes to existing statutory plan by making a Section 12A application at any time in order to facilitate their redevelopment works. They can propose a change to the zoning, permitted uses or development restrictions. The Section 12A application procedures are shown in Figure 3.5.

(iii) The developers can make a Section 16 application when their proposed use is listed under "Column 2" of the Notes of the statutory plan, or as is required under "Remarks" section of the Notes. The Section 16 application procedures are shown in Figure 3.6.

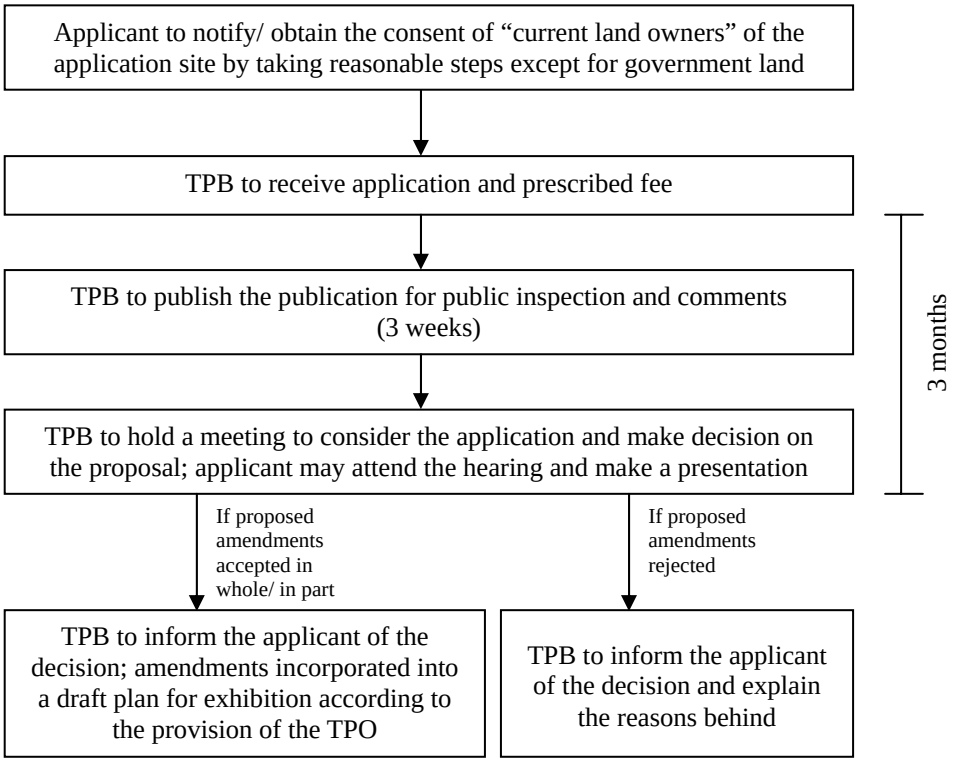


Figure 3.5 Procedures for Section 12A Application for Amendment of Plan

Sources: Chan et al., 2001; Civic Exchange, 2006

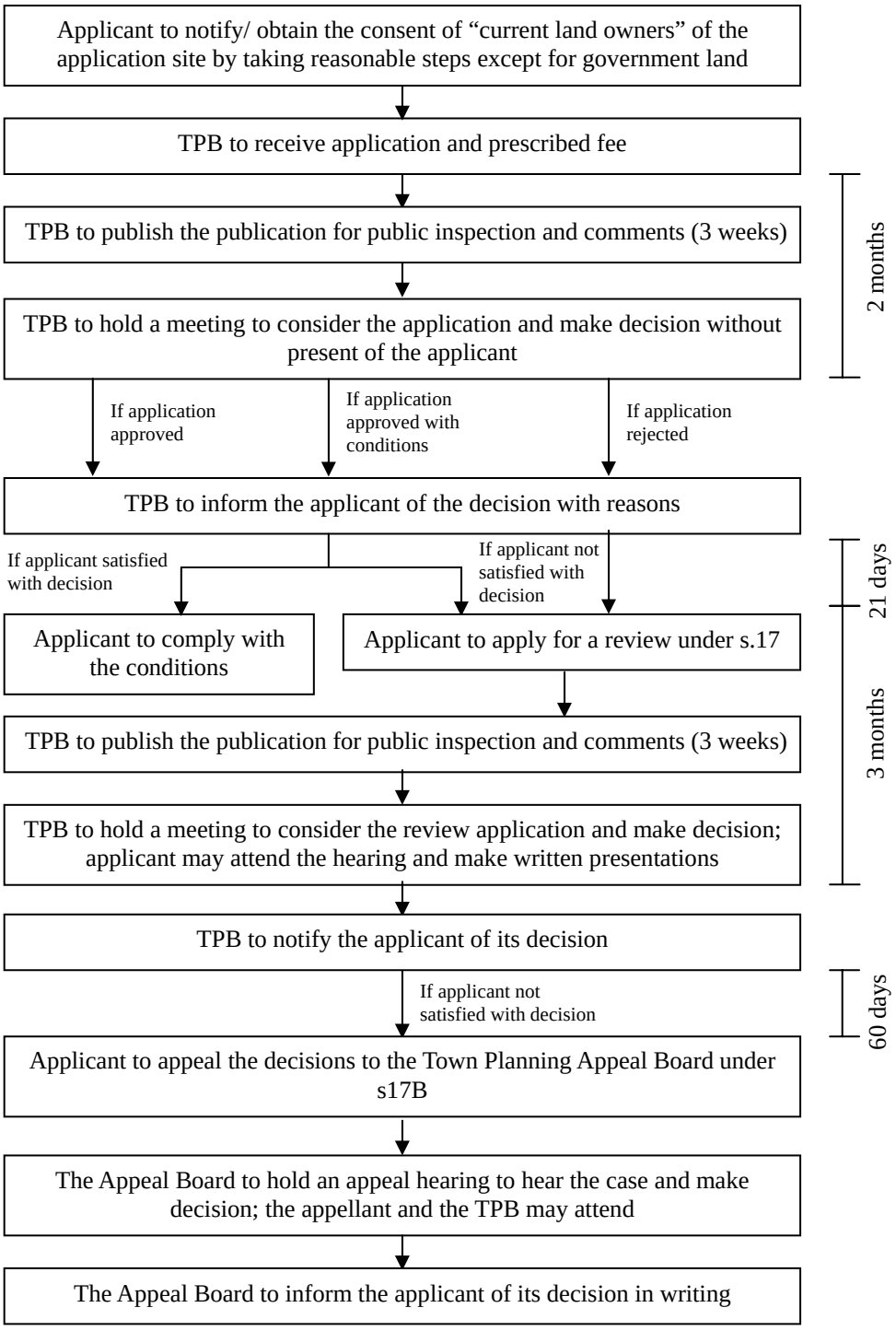


Figure 3.6 Procedures for Section 16 Application for Planning Permission

Sources: Chan et al., 2001; Civic Exchange, 2006

3.1.3.3 Land Assembly Stage

Acquisition of land is a difficult and complex task in the urban renewal process. During the land acquisition process, the URA and the private developers have to try

their best to persuade the affected parties to move out of their premises voluntarily by paying compensation to them. However, both parties may still face unwilling owners, missing owners and speculators intending to resell their units at a higher price which slow down the land assembly process and lengthen the duration of an urban renewal project. In order to speed up the land acquisition process, the URA, which has been delegated authority under the URAO, can apply in writing to the Secretary requesting him to recommend to the Chief Executive-in-Council the resumption under the Lands Resumption Ordinance (LRO). The Chief Executive will not order the resumption under the LRO unless the resumption of land is deemed to be required for a public purpose, i.e. for the purpose of a development scheme or a development project to improve the old and decaying urban areas. Once the resumption order is issued, the private properties will be resumed by the Government by forced purchases.

For the private sector, in order to ensure that the urban renewal programmes can be implemented effectively, the Land (Compulsory Sale for Redevelopment) Ordinance [L(CSR)O] was passed in 1999 allowing the owner (s) of 90% or more of the undivided shares in a lot to apply to the Lands Tribunal for an order to sell all the undivided shares in the lot for the purposes of redevelopment. This Ordinance helps the private developers to acquire the remaining units so that they can proceed with the demolition and construction works for the site with ease. In addition, the Landlord and Tenant (Consolidation) (Amendment) Ordinance (LTO) also assists the private developers in the eviction of tenanted properties. Before the LTO came to effect on 9 July 2004, the private developers usually find it difficult to recover the possession of the properties if they have already been let out. The developer has to serve a valid notice on the tenant to terminate a tenancy. When the tenant applies for a new tenancy or the developer applies for an order for possession to the Lands Tribunal, both parties have to go through a lengthy legal process. No matter whether or not the decision made by the Lands Tribunal is in the favor of the developer, the developer suffers lost as these procedures incur extra time and cost to the acquisition process as well as extra interest loss and risks. However, with the LTO, the procedures for termination of a tenancy are simplified, and time and cost consumed to recover the possession of properties for urban renewal are significantly reduced.

3.1.3.4 Detailed Design Stage

Similar to the new development projects, urban renewal projects are also under a series of statutory controls in this stage. These controls are administered by different government authorities and centrally coordinated by the Buildings Department (BD). The building plans showing the detailed design of the renewal project have to be submitted to the BD, which are then forwarded to all relevant government departments for comments under the centralized plans processing system. The BD will not approve the plans unless all requirements in respect to building design, town planning, major lease matters, transport, environmental issues, structural design, drainage works, etc. are complied with.

For the building control, the building plans of a renewal project are checked against the Buildings Ordinance (BO) and its allied regulations including:

(i) Building (Administration) Regulations;
(ii) Building (Construction) Regulations;
(iii) Building (Demolition Works) Regulations;
(iv) Building (Escalators) Regulations;
(v) Building (Lifts) Regulations;
(vi) Building (Planning) Regulations;
(vii) Building (Private Streets and Access Roads) Regulations;
(viii) Building (Refuse Storage and Material Recovery Chambers and Refuse Chutes) Regulations;
(ix) Building (Standards of Sanitary Fitments, Plumbing, Drainage Works and Latrine) Regulations;
(x) Building (Ventilating Systems) Regulations;
(xi) Building (Oil Storage Installations) Regulations; and
(xii) Building (Energy Efficiency) Regulation.

These regulations control different areas such as building design, structural details, construction, drainage works, street works, demolition works, etc. in order to ensure the health and safety of the occupants in a development. When preparing the detailed design of the renewal projects, the project designers also have to make reference to various Codes of Practice, and numbers of Practice Notes for administrative and technical guidance.

Under the TPO and the BO, approval will not be given when the building plans have breached the provisions in the statutory plans for an area to be renewed. Among these statutory provisions, density and intensity of (re)developments are key aspects to be controlled. Apart from the zoning plans and schedules, restrictions on plot ratio, site coverage, provision of open space and building height, etc. are also imposed in lease condition, Building (Planning) Regulations and other relevant ordinance like Hong Kong Airport (Control of Obstructions) Ordinance (Chan et al., 2001).

The detailed design is also subject to lease control. Numbers of conditions and restrictions can be found in the lease regarding use of land, layout of buildings, density of the development, development period, etc. Since the TPO and the BO are statutory laws and the lease is only a document listing the contract terms between the Government and the lessee, the statutory conditions in these Ordinances prevail over the lease requirements. When it is found that the lease requirements are more restrictive than the statutory laws, application for lease modification can be made upon payment of a land premium and approval of building plans may still be granted under the BO. Figure 3.7 has shown the procedures for processing lease modification.

In recent years, more and more people concern the environmental impacts imposed by the development. Therefore, the Government has passed a number of legislation for environmental protection. For example, Air Pollution Control Ordinance makes provision for abating, prohibiting and controlling air pollution; Water Pollution Control Ordinance controls the pollution of waters in Hong Kong; Noise Control Ordinance prevents and minimizes the noise from construction sites, domestic areas and public places, commercial and industrial premises, motor vehicles and other noisy equipment; and Waste Disposal Ordinance controls production, storage, collection, treatment, reprocessing, recycling and disposal of waste.

Furthermore, the renewal projects are subject to the control of the Environmental Impact Assessment Ordinance (EIAO) when they are classified as designated projects. Under the EIAO, an Environmental Impact Assessment Report and an Environmental Permit in relation to the designated project are required before building plans can be

approved. When the redevelopment is conducted on a contaminated land that is formerly used by a polluting industry, and is regarded as designated project under the EIAO, site investigation and practical remedial measures for clean-up of a site have to be conducted before commencement of the project (Civic Exchange, 2006).

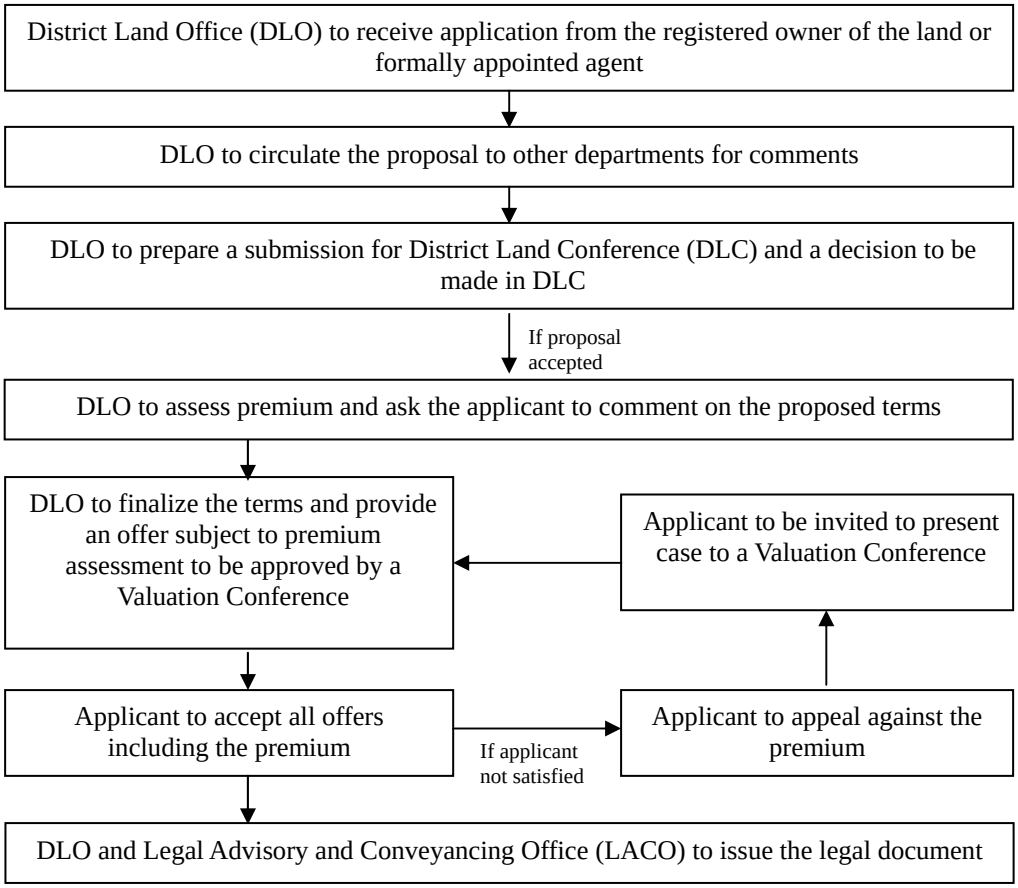


Figure 3.7 Procedures for Processing Lease Modification in Hong Kong

Source: Leung, 2002

In addition to the statutory controls mentioned above, the urban renewal projects are also significantly affected by a number of legislation. Lands Tribunal Ordinance, Factories and Industrial Undertaking Ordinance, Disability Discrimination Ordinance, Roads (Works, Use and Compensation) Ordinance, Fire Services Ordinance, Waterworks Ordinance, Electricity Ordinance, Gas Safety Ordinance, Lifts and Escalators (Safety) Ordinance are some examples that should be paid attention to (BD, 2005).

Based on the discussions as shown above, it can be observed that the urban renewal conducted by the URA and the private developers in Hong Kong is highly restricted

by the current legislative framework. The following continues to analyze the impacts of urban renewal on local community generated from the current strategies, policies and practices adopted in Hong Kong.

3.1.4 Impacts of Urban Renewal on Local Community

Urban renewal offers an opportunity for the Hong Kong Government to achieve certain goals in particular areas of the territory. Provision of accommodation and amenities, replacement of substandard, dilapidated and obsolescent buildings, and construction of infrastructure are common reasons for undertaking urban renewal in Hong Kong. As mentioned by the PLB (1995), urban renewal is a "resource-intensive and time-consuming process". To avoid the burden on the public purse, government intervention in Hong Kong regarding urban renewal is minimal. Therefore, a lot of non-government led, commercial based urban renewal projects are carried out.

In Hong Kong, the property market drives most of the urban renewal processes (Ng, 2002; Tang, 2002) and the private sector plays an active role in them. Hence, uncoordinated, sporadic and profit-based urban renewal practices dominate. Those practices create certain amounts of urban problems which have worsened existing built environment and adversely affected the way of life of the citizens. As stated by Chan (2002), urban problems especially environment related challenges are generated when the economy of a region is vibrant and the developments blindly follow the trends of the property market. Traffic congestion, air and noise pollution, and inefficient land use pattern are negative outcomes commonly observed in the territory.

Not surprisingly, the numbers of redevelopment activities increase with upward trends of rental and property prices or increasing demand for particular building type, vice versa. During the 1970s, there was a great demand in housing and land supply due to rapid industrialization of the economy of Hong Kong. Many sites were redeveloped into housing or industrial buildings simultaneously, which generated phenomena like overload of existing urban infrastructure, land use conflicts and pollution problems. The real estate development, construction of factories and associated infrastructure depleted a lot of valuable but limited natural resources like

arable land (Chan, 2002). Two to three decades ago, the economy of Hong Kong changed from manufacturing-based to service-based. To cope with the market change, industrial buildings in good locations i.e. near the central business districts were redeveloped into commercial or office blocks while others became obsolete and under-utilized. Those industrial blocks fell into disrepair over the years as nobody had an interest to maintain them.

When the net profit earned from the redevelopment of a site is expected to be high, the private developers would demolish the buildings therein regardless of their conditions. Many buildings in poor condition do not have priority to be redeveloped and are left behind. In order to maximize total profits gained from the renewal projects, the private developers focus on redevelopment of sites with high land prices and low land acquisition costs. Consequently, piecemeal redevelopments of low rise pre-war and tenement buildings in central urban districts prevail (Tang, 2002). Many deteriorating buildings requiring urgent improvement are neglected while numerous premises having physical utility value are removed (Barnett, 1982; Grange, 2004). Premature or frequent demolition and reconstruction of buildings create huge amounts of wastes that overload the carrying capacity of the landfills (Council for Sustainable Development, 2004b).

Local redevelopments adopt “bulldozer approach” to pull down substandard buildings and simply rebuild them (Liu, 2002). They show a little of consideration on the importance of urban layout, public facilities and infrastructure enhancement (PLB, 1995; Ng, 2005). Consequently, there is limited improvement to urban places as a whole. Like urban renewal projects conducted elsewhere, existing social bonds and networks are very likely to be destructed as residents or businesses have to be relocated when existing buildings are demolished. Most often, current tenants or owners are unable to stay in the same locations and forced to settle themselves in other old and dilapidated urban areas because the average quality of the properties improves and their costs are beyond their affordability after completion of urban renewal process (Yeung, 1999). It appears that the purpose of urban renewal projects to improve the quality of life of the citizens in the areas requiring substantially enhancement cannot be achieved and the benefits generated from those projects are mainly obtained by the outsiders e.g. private developers, investors, people

with higher bargaining and consumption powers or those with higher socioeconomic status.

The private developers have little interest in undertaking projects to safeguard natural environment and satisfy social needs of the public because environmentally friendly and socially desirable projects, which require so many commitments and injection of huge amount of capitals, are less financially viable. Despite the establishment of the LDC in the late 1980s, the private developers still had a great amount of influence over urban renewal as public-private partnership was adopted. The LDC worked closely with private developers to conduct profitable projects to increase the development reserve and did not consider environmental and social issues to be a priority. The experience of the LCD indicates that urban renewal without sufficient government support eventually fails to produce acceptable living environment for the citizens (Ng, 2002). As a result, the Hong Kong Government attempts to reform local urban renewal mechanism by setting up the URA with a greater government financial assistance, and a clearer urban renewal direction and strategy. However, in actual fact the URA still operated in a way very similar to the LDC which emphasized on the potential gains from the projects, and relied heavily on the performance of property market and contributions of the private sector.

3.2 Sustainable (Re)development in Hong Kong

Francesch (2004) discovered that focusing on traditional economic development in a region like Hong Kong would create rather than address social and environmental problems. Hence, sustainable development is crucial as it allows effective and efficient use of resources, improvement of citizens' quality of life when strengthening the economy. Hong Kong is a latecomer to sustainable development (Hills, 2002; Lo and Chung, 2004). The pace in Hong Kong is so slow that only 7 representatives were delegated to attend sustainable development related conferences in past 40 years (Lai, 2002). The general public does not pay much attention on the subject of sustainable development as they are not familiar with the concept and many find it abstract and vague. Unlike the West, the importance of sustainable development was not acknowledged in Hong Kong till 1989. This concept was first initiated formally

in Hong Kong when the Government published the White Paper on "Pollution in Hong Kong – A Time to Act" that mainly stressed the importance of local environmental protection and pollution control (Tang, 1994; Hills, 2002; Mottershead, 2004b). However, it contributed little to achieving sustainable development at the policy making level. Since mid-1990s, the Hong Kong Government has committed to consider the concept of sustainability holistically when making decisions about future development in the territory. The Territorial Development Strategy Review 1996 concluded that it was necessary to formulate planning policies and schemes which met the changing and inter-related economic, environmental and social needs of the community. One year later, a study on sustainable development for the 21st century (SUSDEV 21) was conducte. It laid down the definition of and guiding principles for local sustainable development, sustainable development indicators, and the details of a Computer Aided Sustainability Evaluation Tool (CASET) for assessing the implications of policies and proposals on sustainable development in Hong Kong (PD, 1998 and 2000; Mottershead, 2004c). This study has involved a series of public debate, discussions and consultations to bring out the ideas about the direction and scope of local sustainable development.

Although SUSDEV 21 had triggered off the concerns of the public and the administrators about the issue of sustainable development, the Hong Kong Government has never committed to implement Agenda 21 in Hong Kong. The Government has made other contributions to sustainable development in the territory apart from the SUSDEV 21 study. For instance, Commission on Strategic Development was established in 1998 to identify Hong Kong's long-term development needs and objectives. A pledge and proposed institutional arrangement to implement sustainable development concept was given by the Hong Kong Chief Executive in his Policy Address 1999 (Tung, 1999) and "Hong Kong 2030: Planning Vision & Strategy" study to explore and examine future development options was also launched in early 2001 (PD, 2002a). The Hong Kong 2030 study created a "new page" for the Hong Kong's urban development history as it was the first time the principle of sustainable development was incorporated as one of the key objectives in a territorial development plan.

The sustainability concept attracts the attention of the Hong Kong Government

because international experience proves that sustainable development creates good communities serving the needs of current population without sacrificing the resources available for the future generations. In order to promote that concept, and turn it into the strategies and practices, the Council for Sustainable Development and its supportive arm i.e. Sustainable Development Unit (SDU) are established respectively (Tung, 1999). They aim to integrate economic, social and environmental perspectives into sustainable development strategies after considering the expectations of various parties in different sectors (Roberts and Hills, 2002; Council for Sustainable Development, 2003; Council for Sustainable Development, 2004b).

Throughout the years, Hong Kong has been criticized for not performing well in urban redevelopment (Ng, 2005). It is because the Government and the private investors have priority over the economy instead of local environmental condition and social welfare of the local citizens when planning urban renewal projects. In order to preserve the public interests and improve their quality of life, substantial changes to current urban renewal policies are necessary. That's why the Government, design professionals and scholars in Hong Kong attempt to incorporate the idea of sustainability into urban renewal strategies in recent years (Fung, 2001b; PD, 2002b; Council for Sustainable Development, 2004a). The 1999 Policy Address stressed the need for a proactive, comprehensive and sustainable urban renewal approach to enhance the living conditions of the citizens by providing adequate open spaces, amenities, greenery; improving existing transport networks; preserving local identity, etc. (Tung, 1999; Cookson Smith, 2000). The HPLB (2001b) emphasized that promotion of sustainable development in the urban area was one of the main objectives of urban renewal in Hong Kong. The Government expects that the URA takes into account of the principles of sustainable development when planning and executing urban renewal programmes (PD, 2002a; URA, 2003).

Furthermore, Ng et al. (2001) pointed out that urban regeneration had to be sustainable, and "property-led", "profit-biased" and "physically-oriented" urban renewal policy should be transformed to a "people-centred" and "place-making" approach. They commented that it was inadequate to achieve sustainable urban renewal simply by establishment of URA, enactment of URAO and implementation of URS. Although URS claims that "people-oriented" approach should be adopted,

it can be observed from the ordinance that public involvement in urban renewal process is limited and "property-centred" is implemented (Ng et al., 2001). Urban landscape and physical improvement of old and dilapidated built-up areas by redevelopment are major focuses while people and their community are neglected (The Law of Hong Kong, 2000; Ng, 2002).

Even though the Government and the academia strongly believe that sustainable development is the right direction of future urban renewal, the query about how to achieve sustainable urban renewal has to be addressed. As mentioned in Chapter 2, urban design which plays an important role in delivering sustainability seems to be a possible way to meet this goal. This idea has been acknowledged in Hong Kong since early 2000s when 2 founding professional institutes i.e. the Hong Kong Institute of Architects and the Hong Kong Institute of Planners formed an Urban Design Alliance to promote the importance of urban design on delivery of a sustainable built environment for the general public. Physical land use planning alone is not sufficient to achieve sustainable development unless economic objectives are considered, ecology is preserved, and public needs and concerns are addressed in design process (Ng, 2004). Hence, thoughtful urban design practices with due consideration for the preferences of the stakeholders should be adopted to achieve sustainable urban renewal in the territory.

3.3 Sustainable Urban Renewal Design Principles for Hong Kong

The SUSDEV 21 and urban design guidelines published by the PD have highlighted numbers of urban design principles for Hong Kong in order to achieve sustainable development. However, when looking into the details of these documents, it can be found that not all of the principles are applicable to urban renewal. Although promoting sustainable development in the urban area is one of the major objectives of urban renewal, the URS adopted in Hong Kong has not clearly mentioned how it can be achieved. As it is widely recognized that Hong Kong is a unique city with the highest density in the world and urban renewal probably imposes additional hardship for local development, tailor made urban design principles for achieving sustainable urban renewal in the territory is required. Therefore, with reference to a variety of

international studies mentioned in Chapter 2, 6 key urban design principles taking into account of the attributes and special redevelopment needs of Hong Kong are emphasized in the following section.

(1) Compact Design and Intensive Development

Compact design and intensive development is a more efficient form of urban (re)development in Hong Kong. Urban renewal usually takes place in dilapidated urban areas with dense population and concentrated properties. During the urban renewal process, certain amounts of existing properties in a confined site are demolished and significant amounts of citizens are affected. In order to fill the gap in the urban fabric, utilize the renewed area and satisfy the needs of the general public, infill development with compact land use is highly recommended. Compact development prevails over diffused development in urban renewal process as it brings many benefits to the community. For instance, it creates opportunities for economic interaction among uses, promotes commercial activities especially at the street level, encourages pedestrian activities like walking and cycling, supports efficient public transport, reduces dependence on automobiles, fuel consumption and pollution problems, and facilitates social interaction. Of course, the scale and density of infill development has to be well-decided and properly controlled with reference to the carrying capacity of the renewed areas, otherwise negative impacts e.g. congestion, dangerous traffic, air and noise pollution, and social and family problems may be generated.

(2) Proper Mix and Balance of Land Uses

A renewed area has to contain a wide mix of land uses including office, residence, retail, entertainment, etc. performing in mutually supportive manner in order to establish a vibrant living, business and leisure environment. A lively region can generate pedestrian activities, facilitate social interactions and stimulate local economy by attracting citizens to visit frequently and stay for a longer period during each visit. However, offering a variety of uses without balancing them in a proper way is not recommended. A commercial area with a disproportionate high amount of offices leaves the renewed area empty after office hours; therefore, a mix of shops,

visitor attraction points and housings should be provided in order to serve the people having different activities during the whole day, and to bring the region alive.

(3) Establishment of Inter and Intra-regional Linkage

Different land uses in a renewed area should be linked with safe, comfortable and convenient pedestrian walkways and/ cycling paths, and the renewed area should be connected to other regions with streets, and convenient and efficient vehicular access. Since the location of the region undergoing urban renewal is fixed and its development is subject to various site constraints, provisions of large scale public infrastructure such as carriageway, bridge, Mass Transit Railway stations and public transport terminal in the renewed area may not be feasible. Therefore, the common ways to increase the accessibility of the renewed area from and to other districts are by connecting internal streets with the main road outside the renewed area, and providing parking spaces, bus or mini-bus stops, taxi stands, various lay-bys or direct access to multi-mode public transit.

(4) Respect for Positive Identity

Every area undergoing urban renewal has its own identity, value and recognizable image which are created by spatial arrangement of streets, building blocks and open spaces in consistent architectural forms, mixture of different land uses, and various human activities conducted day after day. Architectural forms, materials used, color scheme selected, etc. determine visual qualities while development patterns and human activities establish image, orientation and spirit of an urban area. Land uses effectively foster distinctive identities for different parts of a renewed area. For example, office and retail uses reflect economic vibrancy of an area, residential developments shape the area's image as a safe, well-maintained and livable environment, while recreational and cultural uses create a desirable and interesting place for the citizens/ visitors. In order to retain original positive identity of a renewed area, existing land uses, properties and features significantly contributing to the image of the area and truly reflecting the community's past achievement have to be preserved provided that conservation and restoration only require reasonable efforts and affordable expenses. During the urban renewal process, new

development is inevitable. New development in the renewed area has to reinforce or complement such positive identity. For instance, new signs and landmarks can be provided to reinforce sense of identity, and new structures have to blend well with existing elements.

(5) Plan for Comfort and Quality Living

Not surprisingly, the majority of people living in the areas in urgent need of urban renewal suffer some sorts of social problems. Therefore, guaranteeing the physical and psychological well-being of the citizens in the urban renewal process is paramount. Social well-being is affected by numbers of factors e.g. micro-climate in terms of temperature, relative humidity, ventilation flow and air quality; living condition; public safety; regional security, etc. in which all these factors would be influenced by urban design. For example, proper separation of tall buildings, multi-level building pattern or low density development can reduce heat island effect, contaminations of pollutants and wind-tunnel effects on streets and in public spaces. Improving linkage between properties by pedestrian walkways instead of vehicular travel lanes can enhance the air quality of the renewed areas by reducing emission of air pollutants from automobiles. The living condition of the citizens can be significantly improved when high quality and modern buildings are constructed, a variety of amenities is built and green spaces are provided. In addition, streetscape design, building and street pattern, arrangement of pedestrian walkway and roadwork, management of public spaces etc. also affect the feelings of safety and security of the citizens.

(6) Maximization of Community Participation

Compared to previous decades, the Hong Kong society nowadays becomes more democratic, and the local citizens become more educated. The well-educated citizens tend to pay more attention to the government policies and aspire to have more chances to express their views on the strategies affecting their living environment and standard of living. That explains why the general public nowadays would like to be actively involved in making decisions about urban (re)development in Hong Kong. Community participation is very important to urban renewal in Hong Kong. It takes

into account of the constraints, challenges, interests, and needs, etc. of the affected parties and concerned groups in both public and private sectors before preparing and implementing the renewal proposals, and it reduces confrontation between decision makers and local citizens, and social opposition to the final products of the urban renewal projects. Provided that all urban renewal projects intend to improve the built environment for the locals, the voices and messages of the existing community have to be clearly transmitted to the decision makers before implementation because nobody knows the community more and better than the local residents.

A total of 6 sustainable urban renewal design principles have been highlighted with detailed explanations. The validity and reliability of these principles were verified and confirmed by more than 70 scholars in a discussion forum[1] and a number of structured interviews. To ascertain that the local urban renewal projects are planned according to the principles, a number of design considerations should be taken into account and these considerations would be one of the major findings of this study to be generated in the research process.

[1] The Discussion Forum held in Jan 2007 was a main part of the Internal Networking for Young Scientists (INYS) Conference 2007. Participants' report and concluding declarations were published by British Council Hong Kong and Public Policy Research Institute, The Hong Kong Polytechnic University (ISBN 978-962-367-561-1)

CHAPTER 4 RESEARCH METHODOLOGY

4.0 Introduction

This chapter describes the research design and methodology where this investigation is built. It provides a detailed description of the research flow, sampling and data collection procedures. Then, the measurement of variables and the data analysis techniques used in this research are described, and the evaluation method adopted here are given.

4.1 Research Design

Research design is a detailed plan outlining the critical stages in a research to be followed by a researcher when conducting the study (Monette et al., 2002). The major function of the research design is to obtain relevant evidence to answer the research questions, to test theories/ hypotheses or to explain some phenomena (Kerlinger and Lee, 2000; De Vaus, 2001). Some key issues like how data is collected, what the target groups are, how these potential respondents are selected, what information is required from them are often addressed in the research design plan.

There are various types of research design such as cross-sectional design, experimental design, longitudinal design and case studies, and each of them has its own merits and inherent limitations. In order to assure that the most appropriate research design is chosen for a study, it is necessary to find in advance which one has enormous potential to achieve the goals of the research, provide convincing evidence to answer the research questions and produce results that can be generalized to a larger population. In this study, the cross-sectional, quantitative correlational design was employed. Cross-sectional is a one-off study in which the data is collected at one point of time and all analysis relies on existing differences between groups in the sample (De Vaus, 2001). Cross-sectional design is ideal for descriptive analysis of the characteristics of a population, their attitudes, preferences or other determinants of

their behaviors, and for clarification of causal link between variables. When there is a correlation between two variables, it means that causal explanation is possible. If there is no correlation between them, it concludes that causal relationship is unlikely to exist (De Vaus, 2001).

Correlational design attempts to investigate the relationships between at least two variables, and examine interrelationships among phenomena (Brewerton and Millward, 2001). Correlational design is widely used in behavioral research and its results have higher generality (Kerlinger and Lee, 2000). With the use of factor analytical tool, correlational design can also identify the underlying perception patterns of various groups of respondents (Brewerton and Millward, 2001). By adopting cross-sectional, quantitative correlational design in this research, consistency between empirical data and theoretical basis mentioned in Chapter 2 can be identified, and the pattern of the relationship among variables in urban renewal can be clarified. The variables in this study refer to a set of urban design considerations affecting economic, environmental and social interactions in a community.

The research flow of this study is shown in Figure 4.1.

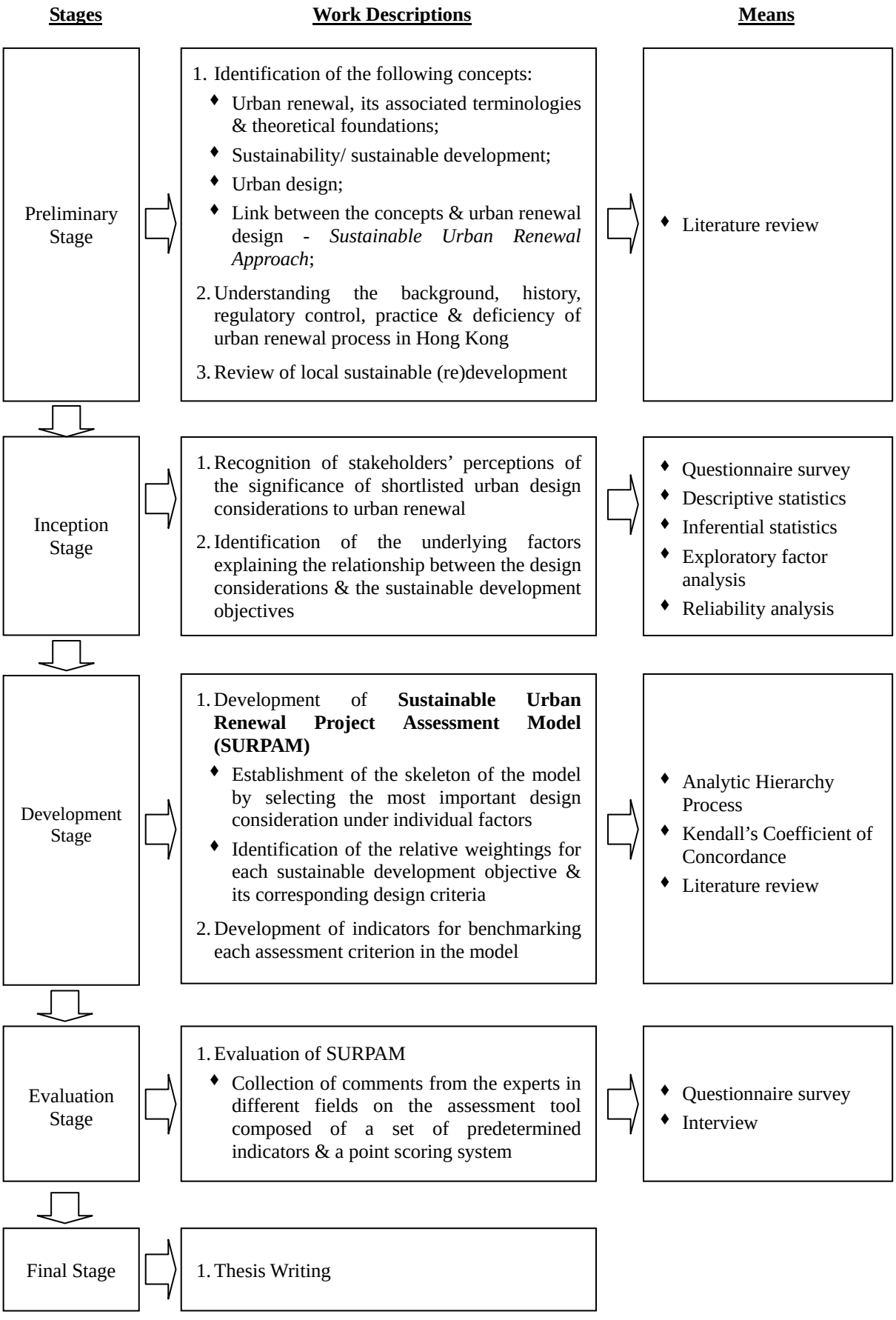


Figure 4.1 Research Flow of this Study

4.2 Data Collection Procedures

Data collection is a critical process for research study. Numerous data collection methods e.g. interview, questionnaire survey, observation, etc. are available to gather valid and reliable information. In this study, the questionnaire survey was selected as primary data collection strategy to identify how urban design considerations help to achieve sustainable urban renewal in the territory.

According to Monette et al. (2002), survey is a widely used research method for data collection and it can be used for descriptive, exploratory, explanatory and evaluative studies because of its flexibility. A survey can collect large amounts of data to be analyzed by different statistical tools to achieve various purposes. There are a number of techniques for conducting a survey and questionnaire is one of the most common ways of data collection in survey research, especially for gathering information like personal backgrounds, individual thinking and preference. The questionnaire survey allows rapid data collection from large samples of people at a lower cost. Therefore, structured questionnaires were used, and they were distributed to the respondents either through email, fax or direct contact in this study. Even though the means of distributing and receiving the questionnaires to and from various target groups were different, the consistency in whole data set could be ascertained as all respondents in the sample were required to complete the questionnaires themselves without under the influence of a third party.

In this research, a significant portion of questionnaires was sent through email rather than post because electronic survey possesses numerous advantages (Best and Krueger, 2002; Rhodes et al., 2003). It allows rapid access to different potential respondents across geographical boundaries, eliminates overall research costs accrued from printing, paper usage or postage, reduces the turnaround time for the questionnaires, and provides instant communication between the researcher and the target respondents to improve the reliability and validity of the data collected.

Although electronic mail survey is an efficient and convenient form of data collection, it has some drawbacks (Best and Krueger, 2002; Faught, Green, and Whitten, 2004).

Previous research criticized that email was only restricted to individuals with access to computer networks. To ensure that the respondents who have no internet access are also covered by this survey, fax is used as a supplementary tool for questionnaire distribution. In order to increase the response rates, an email/ fax reminder was sent to those respondents who did not return the questionnaire 2 weeks after the distribution of the first email/ fax. A month later, the second reminder was sent again to those who had not replied. For the target respondents whose email address and fax number cannot be identified, distribution by hand seems to be more appropriate. Therefore, apart from email and fax, direct contact is another way of delivering the questionnaires.

Figure 4.2 has presented the data collection procedures adopted in this study.

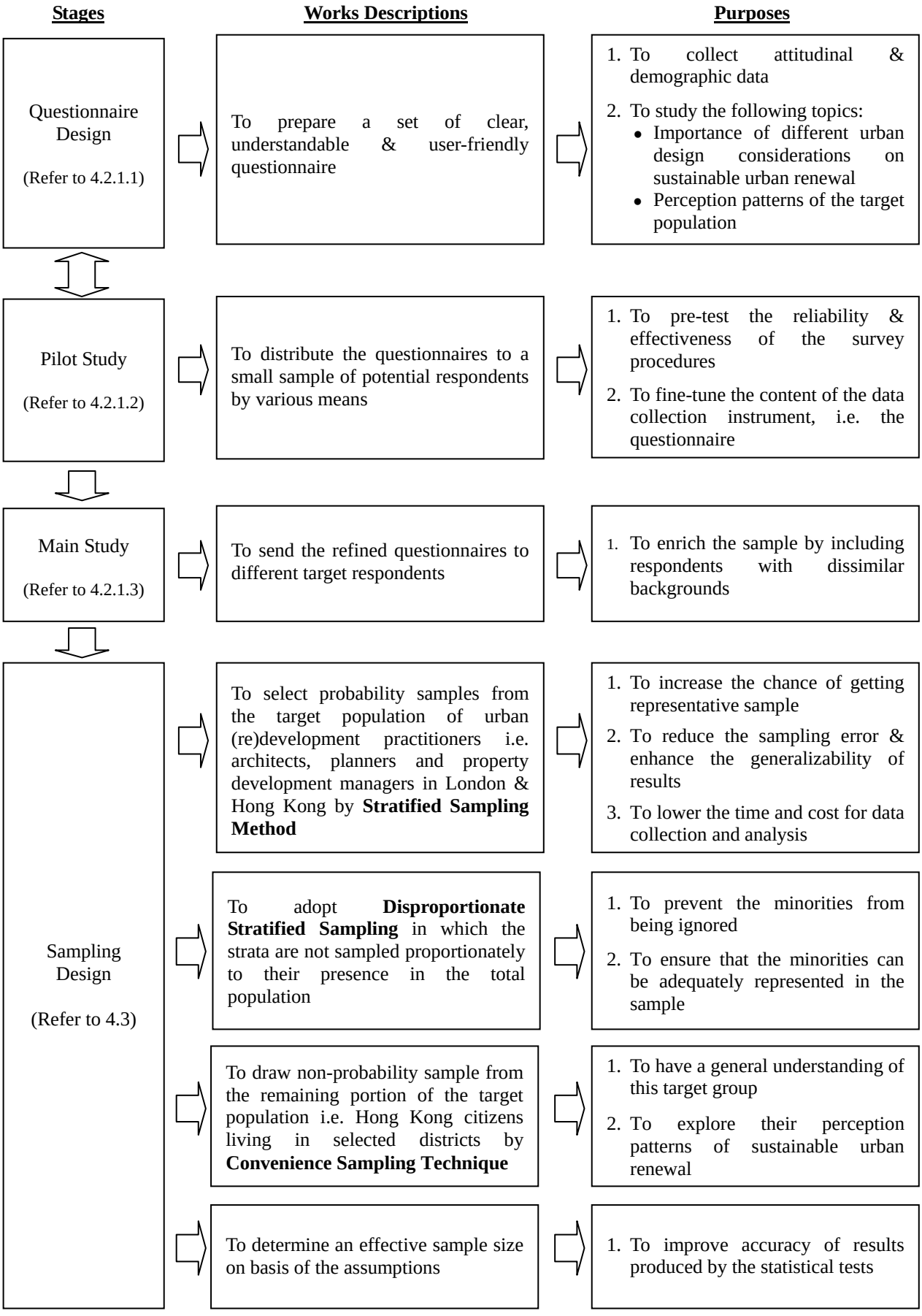


Figure 4.2 Data Collection Procedures adopted in this Study

4.2.1 Questionnaire Survey

The questionnaire survey in this research was designed to assess the value of different urban design considerations in meeting each of 3 sustainable development objectives by the analysis of the stakeholders' perceptions. Through reviewing their perceptions or preferences, it is possible to make more appropriate decisions for future (re)development in the territory.

4.2.1.1 Questionnaire Design

Basically, the questionnaires were developed to gather 2 major types of information i.e. attitudinal data and demographic data. Samples of questionnaire for the pilot study and the main study are provided in Appendix B. With the help of a rating scale, the respondents can report how they feel about the variables presented in the questionnaire. Then the researcher can rely on the attitudinal data to analyse the characteristics of their preferences towards the same topic. In addition, the demographic data relating to the age, sex, marital status, earnings, occupation, work experience, etc. of the respondents is required for future assessment of the representation of the sample, and for examination of the differences and similarities between groups' responses (Brewerton and Millward, 2001).

In order to ensure that the questionnaire is user-friendly and every item in it is understandable to different stakeholders, the questionnaire was designed in the following ways:

(i) A covering letter was attached to each questionnaire distributed through email or fax indicating the importance and the objective of the survey, the deadline for this survey and the method of returning completed questionnaire. A copy of the covering letter is given in Appendix A.
(ii) To facilitate the respondents to answer the questions, concepts of sustainability, urban renewal and sustainable urban renewal were defined, and some examples were given in the first place.
(iii) Check boxes were provided in the questionnaire. The respondents could select

their answers easily by clicking the boxes.

(iv) Chinese-language version of the questionnaire was prepared and used for collecting data from local citizens in the main study (Appendix C).

4.2.1.2 Pilot Study

Undertaking a pilot study before a large-scale research is particularly useful because it helps to revisit the research directions and the focus of the study, and refine the research questions (Walker, 1997). In this research, there are two major purposes of conducting the pilot study. The first one is to pre-test the survey procedures to see whether there is any potential technical problems associated with the distribution and receipt of questionnaires. According to Monette et al. (2002), pilot study is a small-scale trial run of the survey procedures to be adopted in main study. Any problems/ difficulties noticed during pilot study should be dealt with before main study is launched. In addition to the survey procedures, pilot study is also useful for development of the data-collection instrument. Hence, the second purpose of having a pilot study here is to examine the content of the questionnaire. The results of the returned questionnaires and the comments of the respondents would be very valuable for modifying and fine-tuning the questionnaire to be used in subsequent survey.

In order to ensure that representative comments were obtained, a small part of the potential samples, say 30 experienced practitioners representing different disciplines of town planning, architectural design and property development which are actively involved in planning and implementation of urban (re)development projects were invited to join the pilot study in March 2005. All of them are building professionals and nearly 90% of them have worked in the construction industry for 10 years or above.

After the comprehensive literature review, 46 urban design considerations for building sustainable communities were selected to be included in the pilot study questionnaire. The target respondents were sent a copy of the questionnaire and they were asked to give comments on its delivery method and length, ease of reading and understanding, and vagueness of wordings in the spaces reserved in the questionnaire after completion of the first 3 parts. In the first section, the respondents were requested to

give a weighting between 0 and 1 to each of 3 aspects namely economic development, environmental quality and social equity. The weighting represents total contribution of each domain to the overall sustainability level of an urban renewal project conducted in the territory. In order to simplify the calculation processes, the sum of their weightings should be equal to 1. In the second section, the respondents were required to rate the importance of 46 urban design considerations to each of 3 sustainable development objectives for local renewal projects. In this survey, a Five-point Likert-type scale between 1 and 5 was used. "1" represents the least important design consideration while "5" represents the most important urban design consideration (Table 4.1).

Table 4.1 Five-point Likert-type Scale adopted in this Survey

	Least Important	Less Important	Average	More Important	Extremely Important
Scale	1	2	3	4	5

In the third section, the practitioners were asked to fill in some personal information such as "Gender", "Age", "Education Level" and "Average Monthly Personal Income". Table 4.2 summarizes the information of these 30 building professionals.

Table 4.2 Personal Information of the Respondents

	No. of Respondents	**Percentage (%)**
Gender		
Male	22	73
Female	8	27
Total	30	100
Age		
<30	3	10
30 – 39	12	40
40 – 49	14	47
≥ 50	1	3
Total	30	100
Education Level		
High Diploma	2	7
Bachelor Degree	15	50
≥ Master Degree	13	43
Total	30	100
Average Monthly Personal Income		
< HK$30,000	11	37
HK$30,000 – HK$69,999	15	50
≥ HK$70,000	4	13
Total	30	100

It was not surprising that more than 70% of respondents were male. In the construction industry, the population of male is always higher than that of female. Since most of the respondents had work experience of 10 years or more, it was reasonable to find that half of them were over age of 40. In addition, the respondents being surveyed generally achieved a higher education level. Half of them obtained a bachelor degree while 43 % of them attained master level or above. As many of the respondents were in managerial grades and senior positions, their incomes were relative higher than the public and 62% of them earned at least HK$30,000 per month.

After the pilot study, all respondents revealed that they were satisfied with the survey procedures in particular when the questionnaires were sent through email. It was because they could complete the questionnaire through internet quickly and conveniently, and receive quick responses to their queries from the researcher. However, some respondents have given the following comments on the questionnaire design:

a) It was very difficult for the respondents to give a general weighting to each of 3 sustainable development objectives as they believed that their importance to sustainable urban renewal varied between districts with their own characteristics, backgrounds, public needs and expectations, etc. However, it would be fine if the weightings were only used to expel irrelevant items from the original list.
b) Not all of the 46 urban design considerations shortlisted from previous studies were equally relevant to Hong Kong context. Therefore, several amendments to the list in the questionnaire should be made. Items that were not applicable to Hong Kong redevelopment should be removed and those in similar nature had to be grouped together. The order of the design considerations should also be rearranged so that related items could be put near one another.
c) The wording and the meaning of individual urban design considerations as stated in the questionnaire was not clear enough. Therefore, the respondents might have different interpretations of the same terms. In order to avoid misunderstanding of the terms and get representative survey results, the wordings of individual urban design considerations had to be refined and their definition had to be given in the questionnaire.
d) Completion of this questionnaire was very time consuming as the respondents

were required to click more than 130 boxes. Therefore, the incentives for the target respondents to fill in the questionnaire reduce. It was recommended that the list should be shortened and the total numbers of boxes should be minimized.

When looking at the data collected from the survey, some observations can be found. 5 out of 46 design considerations highlighted in Table 4.3 had a rating below "3". It implied that from the professionals' points of view, those items were not so important to achieve sustainable urban renewal in Hong Kong.

Table 4.3 Mean Scores obtained from Pilot Questionnaire Survey

Urban Design Considerations		Mean[#] (Descending Order)
D9.	Efficient use of land & space	3.87
D10.	Arrangements for maintenance & management of buildings, facilities & spaces	3.51
D6.	Provision of open spaces e.g. parks, seating areas	3.49
D8.	Adaptability of development to the changing needs	3.46
D31.	Convenience, efficiency & safety of public transport users	3.45
D19.	Waste management including waste collection, reduction & recycle	3.44
D1.	Mixed-use development	3.42
D11.	Provision of pollution control measures	3.41
D14.	Optimization of natural lighting & ventilation	3.41
D12.	Air quality & noise level	3.38
D13.	Installation of energy efficient devices	3.38
D4.	Provision of public facilities e.g. school, health care services, sports facilities	3.35
D2.	Establishment of local business activities e.g. retail shops, banks	3.31
D38.	Building design & overall appearance	3.31
D40.	Building density, height & mass	3.28
D43.	Provision of landscapes e.g. trees, planters	3.28
D16.	Use of recycled, recyclable or durable materials	3.27
D30.	Convenience, efficiency & safety of pedestrians	3.26
D23.	Availability of local employment	3.25
D18.	Installation of water saving devices	3.24
D28.	Security against crimes	3.23
D15.	Incorporation of environmental design e.g. sun shades, balcony	3.23
D29.	Convenience, efficiency & safety of drivers	3.16
D36.	Proximity to business activities	3.15
D34.	Access to open spaces	3.15
D3.	Variety of business activities	3.14
D26.	Community involvement in public decision making	3.14
D46.	Rehabilitation of repairable building structures	3.11
D22.	Preserving & facilitating social network	3.11
D27.	Sense of belongings on community	3.11

Urban Design Considerations		Mean# (Descending Order)
D20.	Preservation of historical structures & features	3.10
D35.	Access to work	3.08
D33.	Access to public facilities	3.07
D45.	Appearance of pedestrian routes & sidewalk	3.05
D21.	Promotion of local distinctiveness	3.04
D39.	Compatibility with neighborhood	3.03
D25.	Provision for basic needs of disabled, elderly or children	3.02
D24.	Provision of accommodation for different income groups	3.01
D32.	Access to provisions for disabled, elderly or children	3.01
D41.	Layout of buildings & streets	3.00
D42.	Design of open spaces e.g. appearance, location, shape & size	3.00
D5.	Diversity of public facilities	2.80
D7.	Presence of nightlife	2.78
D37.	Accessibility of the development	2.77
D44.	Appearance of street furniture e.g. street lamps, benches, signage, rubbish bins	2.67
D17.	Wildlife conservation	2.66

The mean of a particular urban design consideration is derived from the equation (4.1) & (4.2).

$$m_i = \frac{(Wec_i \times Fec_i + Wen_i \times Fen_i + Ws_i \times Fs_i)}{(Wec_i + Wen_i + Ws_i)} \quad \text{---- equation (4.1)}$$

$$M = (m_1 + m_2 + m_3 + \ldots + m_n) / n \quad \text{---- equation (4.2)}$$

where
- M = Mean of averaged scores given by 30 respondents towards the same design consideration
- m = Adding the weighting of each of 3 sustainable development objective times the rating of their corresponding design consideration together and dividing the total by the sum of all weightings given by a single respondent to form an averaged score
- i = Number of respondent i.e. 1,2, 3, 4, …., n
- Wec = Weighting to **economic development** for enhancement of the sustainability of local urban renewal project
- Wen = Weighting to **environmental quality** for the same
- Ws = Weighting to **social equity** for the same
- Fec = Importance rating of particular urban design consideration on improving **economic** sustainability
- Fen = Importance rating of particular urban design consideration on improving **environmental** sustainability
- Fs = Importance rating of particular urban design consideration on improving **social** sustainability
- n = Total sample size i.e. 30

Even though the respondents recognized the importance of providing public facilities in local urban renewal projects, they did not think that diversity of facilities (D5) was a necessity. Unlike commercial activities, choice is not a matter of concern for these provisions. Rather, facilities provided have to be genuinely required by the public. As said before, public facilities cater for different social needs of the citizens and

meeting their needs is the prerequisite for creating a sustainable community. It is meaningless to supply a great variety of facilities if the requests from the public are not properly addressed.

Presence of nightlife (D7) is a conspicuous feature in Hong Kong (Kaosa-ard, 2002) and nighttime activities can be found in different areas especially for those with a wide mix of uses. It seems that promoting nightlife through urban design is not strongly required here.

The majority of the respondents pinpointed that design consideration - Accessibility of the development (D37) was too general and therefore they had difficulties when ranking its importance towards sustainability of a renewal project in the survey. Since more specific design considerations (D29 - D36) have already been included in the list, it is pointless to keep this item.

The respondents also revealed that they concerned more with the layout and the design of streets instead of the appearance of individual street furniture (D44). Street furniture e.g. street lamps, benches, signage, rubbish bins are mainly for fulfilling functional requirement. The aesthetic appearances of the street furniture are relatively less important, provided that they are placed in order and match the overall appearance of the neighborhood. In view of this, it is not surprising that the respondents in general gave lower priority to this item.

The major purpose of wildlife conservation (D17) is to prevent unnecessary disruption of the ecosystem. Unlike new development, local urban renewal takes place in built-up areas rather than in virgin lands. Therefore, further damage caused by urban renewal to wildlife and natural habitat is limited. It appears that this item is more significant to attain sustainable development instead of sustainable urban renewal. In view of it, this item is suggested to be removed from the original list.

From Table 4.3, it is also found that more than 10 pairs of design considerations had correlation coefficient (r) > 0.7. That meant those items were strongly correlated and they should be combined in order to minimize the numbers of duplicate items in the latest version of questionnaire (Table 4.4 – 4.10).

Table 4.4 Correlation between Urban Design Considerations D2 & D3

		D2	D3
D2	Correlation Coefficient (r)	1	.769 *
	Sig. (2-tailed)		.000
D3	Correlation Coefficient (r)	.769 *	1
	Sig. (2-tailed)	.000	

* Correlation is significant at the 0.01 level (2-tailed).

Many respondents perceived that design consideration D2 had already contained the meaning of "variety" as stated in D3 since several examples of local business activities e.g. retail shops, banks, etc. were provided there. Therefore, it is redundant to have two items with similar meaning and it is preferable to combine them.

Table 4.5 Correlation between Urban Design Considerations D6 & D43

		D6	D43
D6	Correlation Coefficient (r)	1	.771 *
	Sig. (2-tailed)		.000
D43	Correlation Coefficient (r)	.771 *	1
	Sig. (2-tailed)	.000	

* Correlation is significant at the 0.01 level (2-tailed).

Lo et al. (2003) had conducted a questionnaire survey to identify critical design attributes for open spaces in Hong Kong. They found that natural landscape was one of the key elements of open space and local users treasured open space with plants. It is because urban areas available in the territory for planting are limited and the majority of greenery can only be found within open spaces. As the relationship between open spaces and natural landscape provisions is so close, the respondents viewed design considerations D6 and D43 as a group which should be considered as a whole.

Table 4.6 Correlation between Urban Design Considerations D10 & D19

		D10	D19
D10	Correlation Coefficient (r)	1	.727 *
	Sig. (2-tailed)		.000
D19	Correlation Coefficient (r)	.727 *	1
	Sig. (2-tailed)	.000	

* Correlation is significant at the 0.01 level (2-tailed).

According to Liu (1999) and Ho et al. (2004b), refuse disposal including waste collection and recycling is often regarded as one of the major tasks of building/

property management. Hence, it is not surprising that design considerations D10 and D19 are strongly correlated.

Table 4.7 Correlation between Urban Design Considerations D11 & D12

		D11	D12
D11	Correlation Coefficient (r)	1	.800 *
	Sig. (2-tailed)		.000
D12	Correlation Coefficient (r)	.800 *	1
	Sig. (2-tailed)	.000	

* Correlation is significant at the 0.01 level (2-tailed).

Air, water, noise and waste pollution problems are commonly observed in Hong Kong. In order to get rid of these problems and improve the quality of our built environment, pollution control measures should be provided. When filling the questionnaire, the respondents pinpointed that design consideration D12 was only a subset of D11 since proper pollution control could regulate the air quality and noise level. Hence, it is meaningless to mention D12 separately in the list.

Table 4.8 Correlation among Urban Design Considerations D13-D16 & D18

		D13	D14	D15	D16	D18
D13	Correlation Coefficient (r)	1			.770 *	
	Sig. (2-tailed)				.000	
D14	Correlation Coefficient (r)		1	.742 *		
	Sig. (2-tailed)			.000		
D15	Correlation Coefficient (r)		.742 *	1		
	Sig. (2-tailed)		.000			
D16	Correlation Coefficient (r)	.770 *			1	.716 *
	Sig. (2-tailed)	.000				.000
D18	Correlation Coefficient (r)				.716 *	1
	Sig. (2-tailed)				.000	

* Correlation is significant at the 0.01 level (2-tailed).

Obviously, all of the abovementioned items are belonged to green measures. Due to the continuous development of advance technology, green measures are not only limited to usage of recycled materials, provision of balcony and sunshade or installation of energy and water saving devices in the future. As a result, many respondents suggested replacing these specific items with more general titles. When looking at their correlation coefficients, it can be found that all of them were interrelated and they could be broadly divided into two groups i.e. design related (D14, D15 & D16) and construction related (D13 & D18).

Table 4.9 Correlation between Urban Design Considerations D38 & D40

		D38	D40
D38	Correlation Coefficient (r)	1	.782 *
	Sig. (2-tailed)		.000
D40	Correlation Coefficient (r)	.782 *	1
	Sig. (2-tailed)	.000	

* Correlation is significant at the 0.01 level (2-tailed).

It is reasonable to observe that the design considerations D38 and D40 are strongly correlated because appearance of the external façade, building density, height and mass are all under the influence of building design practices in Hong Kong. From the respondents' points of view, it is more appropriate to have an item relating to building design in the list.

Table 4.10 Correlation between Urban Design Considerations D42 & D45

		D42	D45
D42	Correlation Coefficient (r)	1	.748 *
	Sig. (2-tailed)		.000
D45	Correlation Coefficient (r)	.748 *	1
	Sig. (2-tailed)	.000	

* Correlation is significant at the 0.01 level (2-tailed).

There are different forms of open spaces. Parks, seating areas and promenade are typical examples of them. During the survey, certain amounts of respondents pinpointed that pedestrian walkway should also be regarded as open space because outdoor areas for enjoyment, venues for activities or places for walking or sitting-out are all categorized as open spaces in previous studies (Barnett, 1982; Lo et al., 2003; Hu et al., 2000). Since both design considerations D42 and D45 are related to open space design, the respondents recommended merging them into a single item.

With reference to the comments of the practitioners, the statistical results of the pilot questionnaire survey and the predetermined sustainable urban renewal design principles, the original list of design considerations is revised, and the structure of the questionnaire and some wordings inside are also amended for the main survey. In Table 4.11, 30 revised urban design considerations and their corresponding definitions are shown.

Table 4.11 Revised List of Urban Design Considerations for Hong Kong Context

Urban Design Considerations	
D_{rev} 1.	Mixed-use development It means a development consisting of one or more lots developed as a cohesive project and designed with a blend of multiple compatible land uses such as commercial, residential and institutional where no particular type of land use dominates. It also refers to the practice of allowing more than one type of uses located in the same building or in separate buildings within a neighborhood.
D_{rev} 2.	Adaptability of non-domestic development to the changing needs It refers to the non-residential development that is flexible enough to respond to future changes in use, lifestyle and demography without substantial alterations of building structures.
D_{rev} 3.	Efficient use of land & space It is about consumption of land and space available in a development in an economical and organized way with a minimum of waste, expense, or unnecessary effort.
D_{rev} 4.	Provisions facilitating establishment of different businesses It refers to the design arrangements that ease the setting up of various commercial enterprises in the form of shop, firm or company to conduct activities of buying and selling goods and services to earn a livelihood or make a profit.
D_{rev} 5.	Proximity to commercial establishments It concerns the distance between the places where the citizens work or live and the commercial establishments.
D_{rev} 6.	Availability of local employment The word “local employment” denotes job opportunities offered in an area to be developed being close to the place of residence of the citizens.
D_{rev} 7.	Access to work It focuses on the possibility of approaching the working places of the citizens by roads, streets or pedestrian walkways.
D_{rev} 8.	Convenient, efficient & safe environment for drivers It is related to the required quality of the transport network and associated facilities e.g. highways, carriageways, carparks, etc. for the drivers.
D_{rev} 9.	Convenient, efficient & safe environment for pedestrians & public transport users It is related to the required quality of the pedestrian walkways e.g. streets, pavements, footbridges, etc. and mass transport systems for the pedestrians & public transport users.

Urban Design Considerations
D_{rev} 10. Availability of housing for different income groups It refers to the buildings or shelters available for the inhabitants of a community having high, middle or low incomes.
D_{rev} 11. Provision of public facilities The word "public facilities" refers to the facilities that are essential to support the daily necessity of the community, and to enhance the overall quality of life of the public. Public facilities include, but are not limited to, public buildings, structures, or systems used for functional, institutional, educational, medical, recreational and cultural purposes e.g. food centres, markets, police offices, fire stations, schools, hospitals, sports and performing venues, etc.
D_{rev} 12. Access to public facilities It focuses on the possibility of approaching the places where the public facilities are located by roads, streets or pedestrian walkways.
D_{rev} 13. Provisions for meeting special needs of the disabled, elderly or children It concerns the facilities or buildings that are tailor-made for the people who are old, weak or with physical disabilities. Handrails, ramps and lifts are some typical examples of those facilities while elderly residential care homes, child care centres and disabilities treatment/ rehabilitation centres are properties constructed for those in need of help.
D_{rev} 14. Provision of open spaces The word "open spaces" refers to the public or private areas reserved/ designed for active and/ passive recreational uses, for conservation of the natural environment, or for amenity and visual purposes. Open spaces include, but are not limited to, plazas, gardens, parks, sitting-out areas, waterfront promenades, children's playgrounds, jogging and cycling circuits, etc.
D_{rev} 15. Design of open spaces It is about the physical/ aesthetic qualities of the open spaces that can be affected by the factors like location, size, spatial arrangement, color and material selection, and the mixture of natural and artificial features.
D_{rev} 16. Access to open spaces It focuses on the possibility of approaching the open spaces by roads, streets or pedestrian walkways.
D_{rev} 17. Ease of maintenance & management of buildings, facilities & open spaces It refers to the arrangements that facilitate the control and organization of buildings, facilities and open spaces, and keep them functioning and in good condition.

Urban Design Considerations
D_{rev} 18. Provisions to control pollution It is related to the designs/ installations minimizing the possibility of pollution or addressing the potential pollution problems. The major forms of pollution that can be commonly found in the urban environment include air pollution, water pollution, noise pollution, light pollution, etc. D_{rev} 19. Green design It refers to the passive design approach adopted to optimize the use of sunlight for lighting and heating, and air movement for ventilation and cooling of indoor spaces. Appropriate solar orientation, use of thermal mass, proper window placement, installation of wing walls, sunshades or balconies are some common examples of passive design. D_{rev} 20. Green construction It is related to the construction measures that minimize the consumption of energy and other natural resources or use them in an effective and efficient way. These include, but are not limited to, reuse and recycling of materials; use of renewable materials, durable products or products with a high content of recycled materials; installation of environmental benign equipment e.g. energy efficient components, water saving devices, storm/ grey water harvesting system, efficient waste recycling/ management system, etc. D_{rev} 21. Preservation of historical structures & features It is about the act of maintaining and repairing existing buildings, structures, objects or landmarks which are significant to their historical, architectural and cultural value, safeguarding their character-defining elements, retaining their forms evolved over time and extending their physical and useful life. D_{rev} 22. Rehabilitation of repairable properties It is about the act/ process of returning dilapidated but repairable buildings or structures to a state of utility, through repair, alterations and/ additions, renovations, in order to make possible a continuing use of existing properties and improve the health, safety and welfare in them. D_{rev} 23. Building form It concerns physical character and configuration of buildings including appearance, density, height, mass, etc. D_{rev} 24. Compatibility with neighborhood It refers to a new development designed in a manner that complements surrounding neighborhood, and blends in with the scale, architectural style, and other physical characters of the surrounding properties.

Urban Design Considerations
D_{rev} 25. Layout of buildings & streets It refers to the arrangement/ plan of how buildings and streets are mixed and set out. D_{rev} 26. Conservation/ improvement of local distinctiveness It is about the act of keeping and protecting/ enhancing the distinctive features of an area. The word "local distinctiveness" refers to the personality and identity of a place shaped by the combination of its characteristics and qualities, and determined by the perception of the people who live, work and visit such place. Local distinctiveness is not only about how a place looks and feels; what the people are and what they do; how they earn money and spend it, but also about its architecture, customs and traditions, and events and attractions. D_{rev} 27. Preserving & facilitating social networks It is related to the act of maintaining existing social networks or easing future development of social networks in a community. The word "social network" refers to a social structure made of nodes (individuals or organizations) that are tied by one or more specific types of relations such as kinship, friendship, love affair, business partnership, trade, exchange of ideas and knowledge, or share of values, visions, responsibility and opportunities. D_{rev} 28. Community involvement It concerns the opportunities enabling the members of a community to actively contribute to and influence the development process, and to share the fruits of the development. It also refers to the process of involving the community members in decision making about public affairs including political, economic, environmental and social issues related to their needs and aspirations. D_{rev} 29. Sense of community It is about a feeling of belonging that the community members have, a feeling that the members are important to one another and to the group, and a shared faith that members' needs can be met through their commitment to be together. D_{rev} 30. Provision of security measures It refers to the measures that reduce people's signs of fear, and protect people, buildings, and organizations in a community against danger/ loss arising from crime, attacks or trespass.

4.2.1.3 Main Study

The main study was conducted from May 2005 to July 2005. After the pilot study, 30 instead of 46 urban design considerations were contained in the final version of the questionnaire and they were repeated for each of 3 sustainable development objectives. A Five-point Likert-type scale used in the pilot study was retained for rating each of the considerations. Unlike the pilot study questionnaire, the questionnaire for the main study only consisted of 2 major parts. Part I required the respondents to rate the extent to which individual urban design consideration contributed to each of 3 sustainable development objectives of urban renewal projects. This part was followed by an open ended question asking the respondents whether they can think of other design considerations that might make the areas undergoing urban renewal more sustainable. Part II was made up of some general questions to identify the socioeconomic and demographic characteristics of the respondents i.e. gender, marital status, age, educational level, average monthly personal income, occupation and total work experience.

After finalization of the questionnaire, the immediate task should be to distribute them to the target respondents. Undoubtedly, it is ideal to study the entire population. However, it is not feasible and economical because the population size is too large (Brewerton and Millward, 2001). In the view of this, sampling technique is always adopted in the research study.

4.3 Sampling

Sampling is a process to select a workable number of cases from a large group for study in which the researcher can derive findings that are relevant to the entire group (Kerlinger and Lee, 2000; Monette et al., 2002). The validity and accuracy of the research findings depend heavily on how samples are drawn. A sample is a small reproduction of the population including all possible cases the researcher would be interested in. To ascertain that the data collected is reliable and useful to produce generalizing conclusions, a representative sample should be drawn from the target population to truly reflect the population's characteristics in all relevant and significant aspects (Brewerton and Millward, 2001; Monette et al., 2002).

4.3.1 Target Respondents

Before drawing a sample, the target population must be clearly identified. Since this study aims to identify the importance of urban design in the achievement of sustainable urban renewal in Hong Kong, research data from the parties playing a leading role in local urban design and urban renewal projects should be obtained. In Hong Kong, architects and planners are regarded as 2 major urban design professions in which architects focus on the design of buildings and their surroundings while planners concern with land use planning and development controls (Schurch, 1999; Ho, 2001; Fung, 2001a). The position of the architects and planners in the field of urban design is further reinforced after they have formed an Urban Design Alliance promoting urban design in sustainable development and enhancing the public understanding and awareness of the urban design concept. Apart from the urban design professionals, private developers also have a decisive role in local urban (re)development (Ng, 2002, Tang, 2002). Therefore, architects, planners and senior management representatives of the property development companies (so-called property development managers) were considered altogether as a target group of respondents in this study.

In order to find out whether the practitioners in Hong Kong have the holistic views on urban design comparable to those working in the international city, and ascertain the reliability and generality of the findings derived from the local data in subsequent analyses, the same parties in London were also included in the population. According to the third Policy Address announced by the Hong Kong Special Administrative Region (SAR) Chief Executive Tung Chee Hwa, the Government intended to turn Hong Kong into a world-class city comparable to London. In addition, the Panel on Planning, Lands and Works, a committee of the Legislative Council, had conducted a business visit to London that had relevant experiences on sustainable urban renewal for local reference in the future. The speech and the visit support that the Hong Kong Government regards London as a good example to be followed by Hong Kong. It is believed that the reliability, generality and representation of the local data can be proved once the perceptions of the design professions in both cities on the importance of different urban design considerations

are found similar after the survey. Apart from that, there were some other reasons for selecting London as a location from which a sample was drawn due to the following observations:

(i) The population size, Gross Domestic Product (GDP) and workforce of Hong Kong and London are almost identical and therefore, the experiences of (re)development of both cities are comparable (Table 4.12).

Table 4.12 Comparison of Hong Kong's & London's Characters

	Hong Kong	London
Areas (km^2)	1,100	1,600
Population (million)	6.9	7.2
Density (people/km^2)	6,273	4,500
GDP (US$ billion)	158	154
Workforce (million)	3.5	3.7

Sources: Brown and Loh, 2002; Census and Statistics Department, 2005

(ii) Under the influence of the UK governance, similar urban planning and (re)development objectives are found in both areas to deal with the urban demands and problems (Brown, 2005).

(iii) Hong Kong and London have similar statutory frameworks for building design and space planning (Chan et al., 2000; Wong, 2000).

(iv) Both locations have similar classification and discipline of building professionals engaged in urban (re)development (Chan, 2005).

(v) These professionals enjoy similar socio-economic status in both districts (Chan, 2005).

The target population further comprised the citizens living in the districts continuously affected by urban renewal in the territory. Sustainable community cannot be created unless the needs and aspirations of the community are met after urban renewal process. As local citizens have a clear and deep understanding of the built environment they would like to pursue, opinions from them, the ultimate users of the renewed community, should be taken into account. From Figure 3.2, it can be observed that a great portion of urban renewal projects had completed or were being implemented in Yau Tsim Mong, Sham Shui Po, Wan Chai, and Central & Western Districts. Therefore, these regions were selected for this research. In order to ensure that a representative sample can be drawn from this target group, only

residents who have lived in these districts for a continuous period of not less than 10 years, have been affected by local urban renewal projects and have a basic idea of the sustainability concept were selected.

In short, the population for this study consists of 3 target groups including London professionals in the field of urban design and urban (re)development, local experts in the same field and Hong Kong citizens living in the selected districts. As the design professionals, private developers and citizens have different concerns and expectations for the urban renewal schemes, considering their views not only prevents the needs of different group of people from being ignored but also helps to reach a general consensus on the goals of urban renewal policy.

4.3.2 Sampling Methods

In this study, both probability sampling and non-probability sampling techniques were employed to obtain a practical, effective and representative sample from the target population. Probability sampling technique was used to select samples from the target population of urban (re)development practitioners (i.e. architects, planners and property development managers). By making use of probability theory, the chance of getting representative sample increase and a researcher is allowed to estimate the difference between the values of a sample and those of the population i.e. sampling error more easily (Brewerton and Millward, 2001; Monette et al., 2002). To ensure that representative probability sample could be drawn for this research, stratified sampling method was adopted.

Stratified sampling divides the population into smaller subgroups i.e. strata before selecting the sample and then separate samples are drawn randomly from each of the strata (Scheaffer et al., 2006). This sampling method is chosen here because of the nature of this study and the strength of this method. Stratifying has the effect of decreasing some amounts of sampling error (Monette et al., 2002). Stratifying makes each stratum more homogeneous; therefore only a fewer samples from it could give a fairly accurate indication of the remainder of its contents. As mentioned by Kerlinger and Lee (2000), stratified sampling is particular useful when the population is composed of sets of dissimilar groups and the researcher would like to study strata

differences. Compared to other probability sampling methods, stratified sampling always reduces the time and cost required for data collection and analysis (Kerlinger and Lee, 2000; Scheaffer et al., 2006). The stratified sampling ascertains that urban (re)development practitioners in 2 locations are included. From Table 4.13, 2 strata are illustrated in which the urban (re)development practitioners are stratified according to their disciplines i.e. architects, planners and property development managers on the horizontal axis and their locations i.e. Hong Kong and London on the vertical axis.

Since there are great differences within the population sizes of various disciplines in 2 areas selected, disproportionate stratified sampling should be used to make sure that local urban (re)development practitioners are not ignored because of their sizes and at the same time they can be adequately represented in the sample. It is so called disproportionate stratified sampling because the strata are not sampled proportionately to their presence in the total population (Monette et al., 2002).

Table 4.13 Profile of the Target Population of Urban (Re)development Practitioners

	Target Population of the Practitioners			**Population Size**	**%**
	Architect	**Planner**	**Property Development Manager**		
Hong Kong	2,184	395	500	**3,079**	25.3
London	6,979	1,477	651	**9,107**	74.7
Total	**9,163**	**1,872**	**1,151**	**12,186**	
%	75.2	15.4	9.4		100

Note: Figures in above table are as at 31Mar 2005 and subject to change.

Sources: Hong Kong - Hong Kong Institute of Architects (HKIA), Hong Kong Institute of Planners (HKIP) and Real Estate Developers Association of Hong Kong (REDA)

London - Royal Institute of British Architects (RIBA), Royal Town Planning Institute (RTPI) and CRM Broker (an organization with international mailing lists for different fields of work)

As mentioned earlier, non-probability sample was also used in this research. Non-probability sampling technique was adopted here to draw a sample from the remaining portion of the target population i.e. Hong Kong citizens living in the selected districts. This sampling technique was chosen because of 2 main reasons. Firstly, a complete list of all elements contained in this target group is absent. Therefore, it is impossible to make sure that every element has a chance to appear in the sample. Secondly, this research only intends to develop an understanding of this

target group and explore their perceptions of sustainable urban renewal. The issue of generalizing the results beyond the sample to a larger population is not a major concern. In this regard, this study made use of a convenience sampling technique that is one of the most frequently used non-probability sampling forms to obtain the sample. The researcher takes available cases at hand and continues this process until the sample reaches a designated size (Judd et al., 1991).

4.3.3 Effective Sampling Size

An appropriate sample size is especially essential for quantitative research, which applies statistical tools to analyse the data. According to Brewerton and Millward (2001), total sample sizes would significantly affect the accuracy of results produced by the statistical tests because of the statistical power. The power of a statistical test is the probability that the test can yield statistically significant results (Cohen, 1988). In order to determine a minimum acceptable sample size with adequate statistical power, power analysis should be used. Since statistical power is a function of sample size, significance criterion and effect size, the sample size can be calculated when the power, significance criterion and effect size are specified by a researcher. As mentioned by Cohen (1988), 80% is a widely acceptable level of power for conducting a research; therefore, this study aims to secure a power of 0.8. For a medium effect size of 0.5, with a desired power level of 0.8 and a significance level of 0.05, a priori power analysis conducted by G*Power for Windows-based operating system indicated that at least 102 usable responses should be obtained for this research (Erdfelder et al., 1996).

To ensure that sufficient valid responses could be collected for subsequent analyses, and accurate results and precise conclusions would be drawn from the tests, the sample sizes were decided carefully beforehand. In this study, a sample size of 1,800 urban (re)development practitioners was determined and the details are shown in Table 4.14.

Assuming that 75% of the email addresses/ fax numbers of the target urban (re)development practitioners in both areas are valid and 10 – 15% of them are going to respond to the questionnaire in the survey, the effective sample size should be in the

range of 135 to 203 [1,800 x 75% x (10% to 15%)].

Table 4.14 Sample drawn from that Target Population

	Sample Size of Urban (Re)development Practitioners			Total Sample Size
	Architect	Planner	Property Development Manager	
Hong Kong	300	300	300	**900**
London	300	300	300	**900**
Total	**600**	**600**	**600**	**1,800**

In addition, a total of 900 local citizens met on street in 4 selected districts were invited to join the questionnaire survey. However, only the citizens who showed interest in this survey and fulfilled the following criteria were sampled for this research. Before completing the questionnaires, the interested citizens were requested to answer 4 questions: (i) Do you live in this district? (ii) How long have you lived here? (iii) Have you ever been affected by local urban renewal projects? and (iv) Have you heard of the concept of sustainability? If their answer for all questions except the second one is positive and that for the second question is more than 10 years, they would be selected as the target respondents. Since not all citizens were willing to spend time to respond to the questionnaire on street and met these criteria at the same time, this study assumed that about 1/5 i.e. 180 [900 x 20%] of the citizens met on street would like to engage in the survey, and 70% to 80% of them were eligible and completed the whole questionnaire simultaneously. That means the effective sample size of this target group should be in the range of 126 to 144 [180 x (70% to 80%)]. Based on the abovementioned assumptions, the overall effective sample size for this study should range from 261 (135 + 126) to 347 (203 + 144).

From Table 4.15, it can be observed that a total of 320 valid responses was collected in which 193 (73 + 120) of them came from the urban (re)development practitioners and 127 of them were received from the local citizens. The actual response rate as a whole is satisfactory because it is much higher than the sample size calculated by the power analysis and it is within the range of response rates generated under the assumptions of this research.

Table 4.15 Sample Size & Responses to the Survey

Target Respondent		Sample Size	No. of Response	Valid Response
London	Architect	300	26	24
	Planner	300	29	27
	Property Development Manager	300	23	22
Sub-total		*900*	*78*	*73*
Hong Kong	Architect	300	41	41
	Planner	300	42	41
	Property Development Manager	300	40	38
Sub-total		*900*	*123*	*120*
Hong Kong citizens living in	Sham Shui Po	225	42	34
	Yau Tsim Mong	225	41	30
	Wan Chai	225	47	31
	Central & Western	225	49	32
Sub-total		*900*	*179*	*127*
Total		**2,700**	**380**	**320**

4.3.4 Coding & Entry of Questionnaire Data

After the questionnaires were collected, data was converted into code before being entered into a database created in Statistical Package for Social Science (SPSS) for Windows version 12, which was also employed for subsequent data analyses. Attitudinal data was coded in line with the Likert-type scale that 1 stands for a “least important” response and 5 represents an “extremely important” response. Demographic data was given a numerical code ranging from 0 to 12, depending on how many alternatives were provided for each question. A codebook showing the interpretation of each coded data was kept and all data entry was verified independently to ascertain its accuracy.

4.4 Data Analysis Techniques

The data collected in this research was analyzed by a number of statistical techniques including descriptive statistics, correlation analysis, independent t-test, exploratory factor analysis, reliability analysis and analytic hierarchy process. SPSS for Windows version 12 was the primary tool employed for analyzing the raw data while

Expert Choice™ Decision Support Software (Expert Choice) was selected for analytic hierarchy process. By constructing a hierarchy in Expert Choice, the software can calculate priories, matrices and consistency automatically when the pairwise comparisons are made. Before presenting the results of the statistical analyses, the justifications for applying those tests are discussed in the following sections.

4.4.1 Descriptive Statistics

Useful information cannot be extracted unless raw data collected from various samples is well organized (Russo, 2003). Therefore, descriptive statistics that can organize, summarize, simplify and interpret data sets effectively should be used to analyze the sample data. In this research, descriptive statistical techniques were applied to both demographic and attitudinal data in order to identify the characteristics of particular groups, and describe the similarities and differences among variables.

4.4.2 Correlation Analysis

Correlation analysis can measure the magnitude and direction of the linear relationship between two variables. Correlations are generally measured in terms of correlation coefficients and Pearson's correlation coefficient (r) is the most frequently used one in the correlation analysis (Haslam and McGarty, 2003). The value of r that indicates how strong a correlation is varies between –1 (perfect negative correlation) and +1 (perfect positive correlation). A positive value indicates positive correlation, meaning that an increase (decrease) in the value of one variable is accompanied by an increase (decrease) in the value of the other, while a negative value indicates negative correlation, implying that an increase (decrease) in the value of one variable follows a decrease (increase) in the value of the other. The strength of the relationship increases when the absolute value of r approaches 1 and decreases when r approaches 0. If r is equal to 0, that means there is no correlation between variables (Kline, 1994). To assess the general patterns of the relationships among the demographic variables and the design considerations, Pearson's correlation coefficients were computed for this study.

4.4.3 Independent T-test

Independent t-test is one of the inferential statistical techniques which are used to study samples and then make generalizations about the populations. As the population is usually large in size, it is impossible to measure everyone in it and a sample has to be selected to represent the entire population. By applying inferential statistical techniques, a researcher is allowed to infer the characteristics of a population from sample data (Russo, 2003).

Independent t-test is a hypothesis testing procedure to evaluate the differences between 2 populations (Gravetter and Wallnau, 2005). Independent t-test tests the null hypothesis that the population means of a dependent variable are the same for 2 independent groups. If the result of the Independent t-test is significant, it indicates that the populations from which the samples are drawn are very likely to have different means (Sheskin, 2004). The mean difference is statistically significant at the 1% level when the corresponding *p*-value is less than or equal to 0.01. In this study, urban (re)development practitioners in London, local practitioners and citizens in the territory are considered as the independent groups while the importance of each of the 30 urban design considerations is regarded as dependent variable.

4.4.4 Exploratory Factor Analysis (EFA)

Factor analysis refers to a variety of statistical techniques whose common objective is to represent a set of variables in terms of a smaller number of hypothetical variables (Kim and Mueller, 1978). It simplifies a large matrix of correlations and identifies a small number of factors that can explain most of the variables observed (Kline, 1994). EFA is a commonly used form of factor analysis to identify the patterns of how the respondents reply to a set of questions, and to explore the underlying structure of the patterns of responses (De Vaus, 2001). EFA was adopted for this study because it could identify the latent factors that might make the renewed communities become more sustainable in terms of urban design considerations. In addition, the findings of EFA provided a base for this study to form a skeleton of the assessment model to be derived afterwards. In order to obtain reliable results from this analysis, 5 major steps should be followed (Comrey and Lee, 1992):

(i) Identify the variables;

(ii) Compute a correlation matrix for the variables;

(iii) Extract the unrotated factors to see whether the chosen model fits the data;

(iv) Rotate the factors to make them more interpretable; and

(v) Interpret and label the rotated factors.

In this study, principal axis factoring with promax (nonorthogonal) rotation was used to generate factor loadings for the extracted factors. The details of EFA are presented in Chapter 5.

4.4.5 Reliability Analysis

Reliability is concerned with the degree to which the results can be replicated. Reliability analysis is useful to measure the degree of stability or consistency of the measurement scales and the variables that make them up. A statistic called Cronbach's alpha (α) is the most widely used measure of reliability (Aron and Aron, 2002). According to Aron and Aron (2002), α in value from 0 to 1 was used to measure the internal consistency of the data collected. The greater the value (i.e. α closer to 1) is, the higher is the reliability of the data. Generally speaking, a α of at least 0.7 is the minimum requirement while a α closer to 0.9 is preferable (Aron and Aron, 2002). In this research, reliability analyses were performed to test whether the respondents responded to all variables in a consistent way and to evaluate the internal consistencies of the extracted factors.

4.4.6 Analytic Hierarchy Process (AHP)

AHP can be used for multi-criteria evaluation, ranking of alternatives and decision making that involves individual/ group choice (Banai, 2005). It is a kind of multi-criteria decision making (MCDM) methods which are valuable in reaching important decisions that cannot be determined straightforwardly. The underlying principle of MCDM is that these decisions have to be made on the basis of sets of criteria. By apply this principle, Saaty (1980) developed AHP which models a hierarchical decision problem framework that consists of multiple levels of criteria having unidirectional relationships. AHP works with such hierarchy that combines both subjective (intangible) and objective (tangible) criteria. AHP is a reliable tool

to determine the significance of a set of criteria and sub-criteria, and facilitate systematic and logical decision making processes. It is widely applied to the construction fields such as resources allocation, project design, planning for urban development, maintenance management, policy evaluation, etc. (Saaty, 1980; Cook et al., 1984; Shen et al., 1998; Banai, 2005). Saaty (1980) laid down the proof and the mathematical calculations of AHP but in this study, the complicated mathematical algorithm is skipped and only a brief description of this method is provided.

AHP is suitable for the decision problem that can be turned into a hierarchical decision model. A hierarchy structure formed for the decision problem consists of several levels and a focus in the topmost level is decomposed into criteria bearing on the focus in the second level followed by sub-criteria in the third level and so forth (Saaty, 1980). AHP solicits expert's judgments and therefore, only experts are eligible to be the raters who are responsible for making the decision. AHP determines the relative priorities of different criteria in every level of the hierarchy by employing a pairwise comparison. During the process, each expert is required to make judgments on the relative importance of the criteria with respect to the element in the level immediately above according to a nine-point scale as shown in Table 4.16.

Table 4.16 Nine-point Scale for Pairwise Comparisons in AHP

Intensity of Importance	Definition	Explanation
1	Equal Importance	2 criteria/ sub-criteria contribute equally to the level immediately above
3	Moderate Importance	Judgment slightly favours 1 criterion/ sub-criterion over another
5	Strong Importance	Judgment strongly favours 1 criterion/ sub-criterion over another
7	Very Strong Importance	1 criterion/ sub-criterion is favoured very strongly over another
9	Absolute/ Extreme Importance	There is evidence affirming that 1 criterion/ sub-criterion is favoured over another
2, 4, 6, 8	Immediate values between above scale values	Absolute judgment cannot be given and a compromise is required
Reciprocals of above	If element *i* has one of the above non-zero numbers assigned on it when compared with activity *j*, *j* has the reciprocal value when compared to *i*	A reasonable assumption

Source: Saaty, 1980

In order to calculate the priority weights of each criterion, each decomposed level with respect to a higher level forms a matrix and the pairwise comparison data are summarized in the absolute priority weights on the basis of Saaty's eigenvector procedure.

According to Saaty (1995), making group decision is preferable to single decision as brainstorming, ideas sharing and discussion within the group can improve the representation of the final results and reduce bias against/ towards particular group of criteria. However, conducing AHP in a group session is a hard task because it is difficult to minimize debate and reach consensus in a group of people with different preferences or levels of status and expertise in a short period of time. In order to get the benefits from group decision and smooth the flow of the judgment process, this study proposed to invite a group of experts to make judgments on the same hierarchy separately. After obtaining individual judgments of the experts, a single matrix containing the entries derived from the geometric mean of all judgments can be developed. The geometric mean for synthesizing individual judgments is expressed in equations (4.3) & (4.4).

$$(a_1, a_2, \ldots, a_n) \equiv \left(\prod_{i=1}^{n} a_i \right)^{1/n} \qquad \text{---- equation (4.3)}$$

Thus,

$$G\,(a_1, a_{2,}\, a_3) = (a_1 \times a_2 \times a_3)^{1/3} \qquad \text{---- equation (4.4)}$$

where G = Geometric mean
a = Pairwise comparison scale given by an expert
n = Number of experts

To assess the reliability of the experts' judgments, Saaty (1980) advised the users to validate the judgments by studying their consistency in rating the relative importance of the criteria. AHP does not demand perfect consistency but it provides a measure of inconsistency in each set of judgments in terms of Consistency Ratio (C.R.). A judgment is considered acceptable when its C.R. is 0.10 or less.

As all know, urban renewal is a complex social issue affecting a certain amount of people in the society. During the decision making process, it is necessary to make choices among alternatives after considering the needs of different concerned parties. Since reaching such decision is not an easy task, it is better to have a tool to ease the process. Therefore, AHP which has an excellent performance in dealing with interdependent criteria and the local problems involving tangible and intangible issues is therefore selected for this study. The results of AHP were are valuable in this research because the priorities calculated on the pairwise comparison scales not only highlight the relative importance of different criteria/ sub-criteria in the hierarchy but also form the skeleton of a model to be developed for assessing the sustainability level of local urban renewal projects.

4.4.7 Kendall's Coefficient of Concordance (Kendall's *W*)

Kendall's coefficient of concordance is a measure of correlation/ association employed for 3 or more sets of ranks (Sheskin, 2004). It evaluates the degree of agreement between *m* sets of ranks for *n* subjects/ objects (Sheskin, 2004). The possible value of Kendall's coefficient of concordance which is represented by the notation *W* ranges from 0 to 1. If the value of *W* is 1, it means that there is complete agreement among *m* sets of ranks. On the other hand, when there is an absence of agreement patterns among *m* sets of ranks, the value of *W* will equal 0. The value of *W* cannot be negative as it is impossible to have complete disagreement among all sets of ranks (Sheskin, 2004). As discussed by Sheskin (2004), the value of Kendall's *W* does not indicate whether the rankings are correct but it represents the degree of association/ agreement between *m* sets of ranks. In this study, Kendall's *W* was used to identify the pattern of agreement among various sets of ranks of the design criteria derived from 3 groupings of experts for sustainable urban renewal projects.

4.5 Evaluation Process

The SURPAM is the final output of this research upon completion of all data analyses as mentioned above. In order to examine the reliability and applicability of this

model, a comprehensive evaluation process was conducted. A number of questionnaire surveys, interviews, informal meetings and discussions were held in this study for evaluation of the major components of the model, and the experts from the industry and the academia were invited to join this process. They were asked to comment on the assessment tool that was made up of a number of qualitative and quantitative indicators with reference to their expertise, professional knowledge and work experiences. The details of the evaluation process are discussed in Chapter 7.

CHAPTER 5 DATA ANALYSES

5.0 Introduction

This chapter shows the results of the data analyses beginning with the descriptive analyses of the demographic characteristics of the respondents. Then, means, standard deviations and Cronbach's alpha coefficients (α) of all variables i.e. urban design considerations were calculated. Pearson's correlation analysis was conducted to evaluate the relationships between variables while independent t-test was used to determine whether the perception of the importance of individual urban design considerations differs between groups. Exploratory factor analysis was also carried out to identify the underlying factors that might contribute to local sustainable urban renewal. In order to develop an assessment model for examining the sustainability level of urban renewal projects, analytic hierarchy process was adopted to calculate a set of priority ratings of the extracted factors with respect to 3 sustainable development objectives. Kendall's *W* was also adopted in this study to confirm whether there was substantial agreement among the respondents on the rankings of the design criteria.

5.1 Descriptive Analysis

5.1.1 Background of the Respondents

A total of 2,700 questionnaires were distributed to the local citizens and the urban (re)development practitioners stationed in London and Hong Kong (Table 4.15). Altogether 380 responses were received but only 320 of them were valid, accounting for a response rate of 11.9%. A summary showing the response rates of this questionnaire survey is depicted in Table 5.1.

For the urban (re)development practitioners, a greater portion of responses were received from Hong Kong (13.3%), followed by London (8.1%). Among 3 professional disciplines, planner and architect had the highest response rate (13.7%),

followed by property development manager (12.7%). The response rates ranged from 12.7% to 13.7%, which was quite even. Of the replies collected from the local citizens, the response rate of Sham Shui Po district was the highest (15.1%), followed by Central & Western (14.2%), Wan Chai districts (13.8%), and Yau Tsim Mong (13.3%). It should be noted that the citizens living in London were not surveyed because the main focus of this study is sustainable urban renewal in Hong Kong. The data obtained from London practitioners was merely used to enhance the cogency of the findings.

Table 5.1 Response Rates of this Study

Target Respondents		**No. of Valid Reponses (%)**		
		London	**Hong Kong**	**Total**
Practitioners	Architect	24 (8.0)	41 (13.7)	65 (10.8)
	Planner	27 (9.0)	41 (13.7)	68 (11.3)
	Property Development Manager	22 (7.3)	38 (12.7)	60 (10.0)
	Sub-total	*73 (8.1)*	*120 (13.3)*	*193 (10.7)*
Citizens of	Sham Shui Po	--	34 (15.1)	34 (15.1)
	Yau Tsim Mong	--	30 (13.3)	30 (13.3)
	Wan Chai	--	31 (13.8)	31 (13.8)
	Central & Western	--	32 (14.2)	32 (14.2)
	Sub-total	--	*127 (14.1)*	*127 (14.1)*
No. of Valid Reponses (%)		**73 (8.1)**	**247 (13.7)**	**320 (11.9)**

Since the sample sizes for each discipline and every selected local district were too small to justify making intra-group and inter-groups comparisons, all valid responses were categorized into 3 main groups namely London's practitioners (LNp), Hong Kong's practitioners (HKp) and local citizens (HKc), and the data collected from these disciplines was analysed as a whole.

When looking into the demographic data, it was found that 65.5% were male and 34.5% were female (Figure 5.1). Although the numbers of responses from male and female citizens were similar, a large portion of replies came from male as the majority of urban (re)development practitioners are masculine.

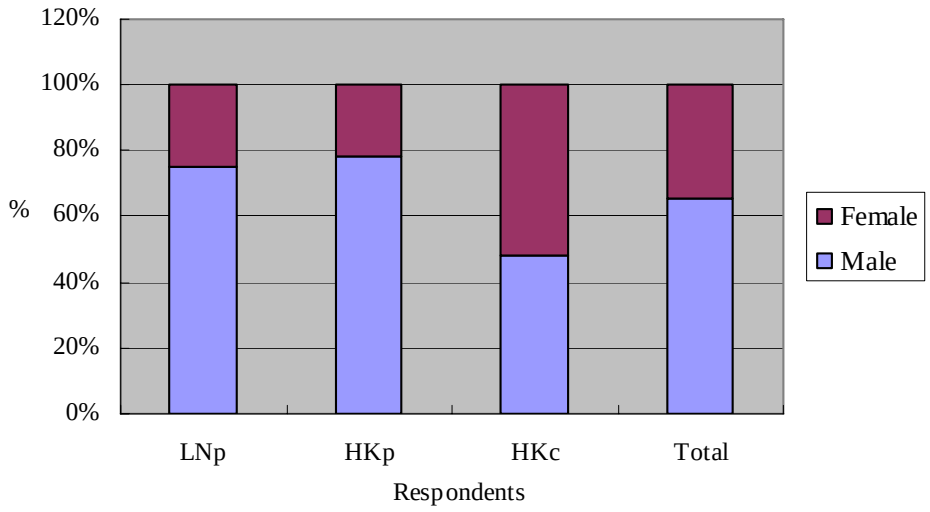


Figure 5.1 Gender of the Respondents

More than 60% of the respondents were married while less than 40% were single including those who were widowed or got divorced (Figure 5.2). Since most of the respondents are neither too young nor too old, it is not surprising that they have been married.

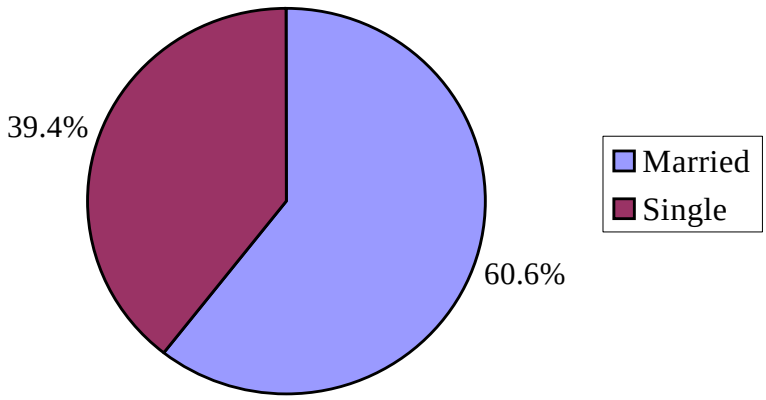


Figure 5.2 Marital Status of the Respondents

About 50% of respondents had children but less than 10% of them had more than 2 (Figure 5.3). This phenomenon can be explained by the fact that there is continuous decline in the birth rates of the developed countries in the past decades.

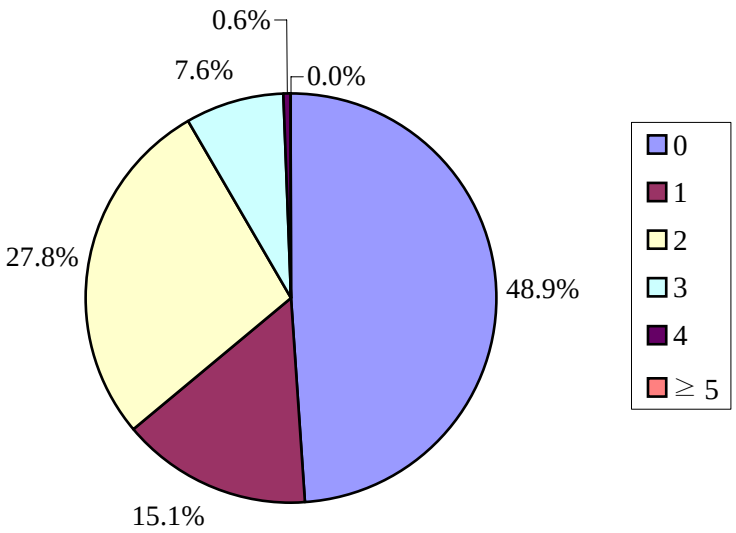


Figure 5.3 No. of Children the Respondents Have

From Figure 5.4, it could be noticed that over 60% of the respondents were between the ages of 30 and 49. Another third included those who were either between the ages of 20 and 29 or between the ages of 50 and 59. Only a small portion of them was below 20 or above 60. According to the Census and Statistics Department (2005), more than 1/3 of the total population in Hong Kong are in middle age i.e. between the ages of 30 and 49. Therefore, there is a large chance that the people in this age group have been surveyed.

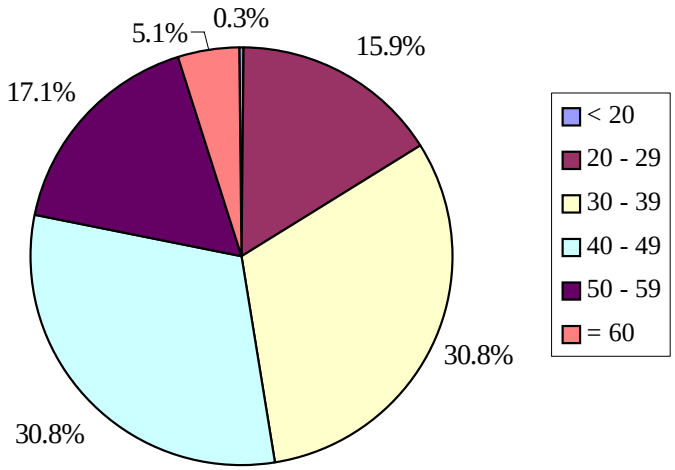


Figure 5.4 Age of the Respondents

It seems that the respondents have achieved a higher education level in general as about 68% of them got a bachelor degree or above (Figure 5.5). However, the finding does not reflect the truth as the education level of the practitioners significantly differs from that of the citizens. More than 95% of the practitioners

surveyed obtained a bachelor's degree or above while only 28% of the citizens surveyed had the same education level.

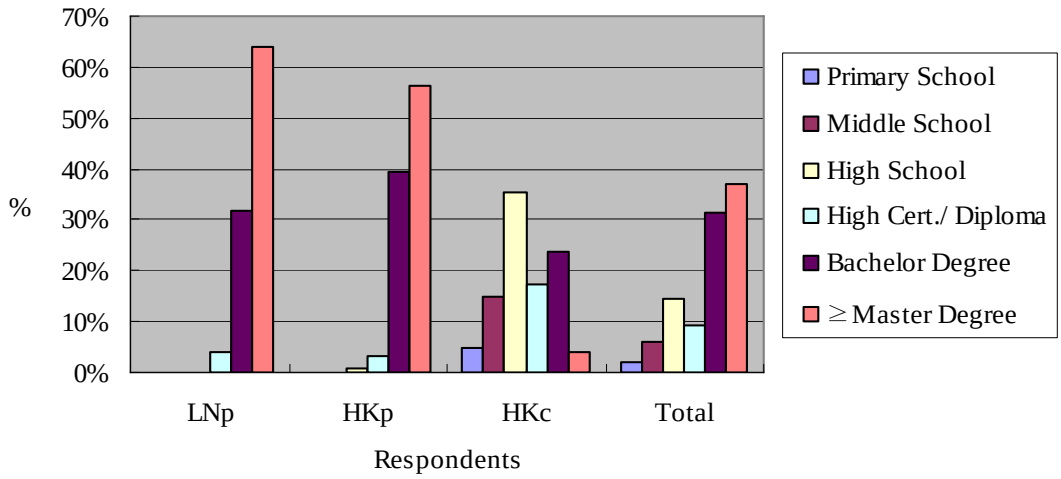


Figure 5.5 Education Level of the Respondents

More than half of the respondents (56.4%) earned less than HK$30,000 per month (Figure 5.6). The monthly personal income of the urban (re)development practitioners surveyed is much higher than that of the citizens because the former attains a higher education level which increases their bargaining powers in salary negotiations. The response rate for this item was slightly lower than the others as some respondents were reluctant to disclose such kind of sensitive issue.

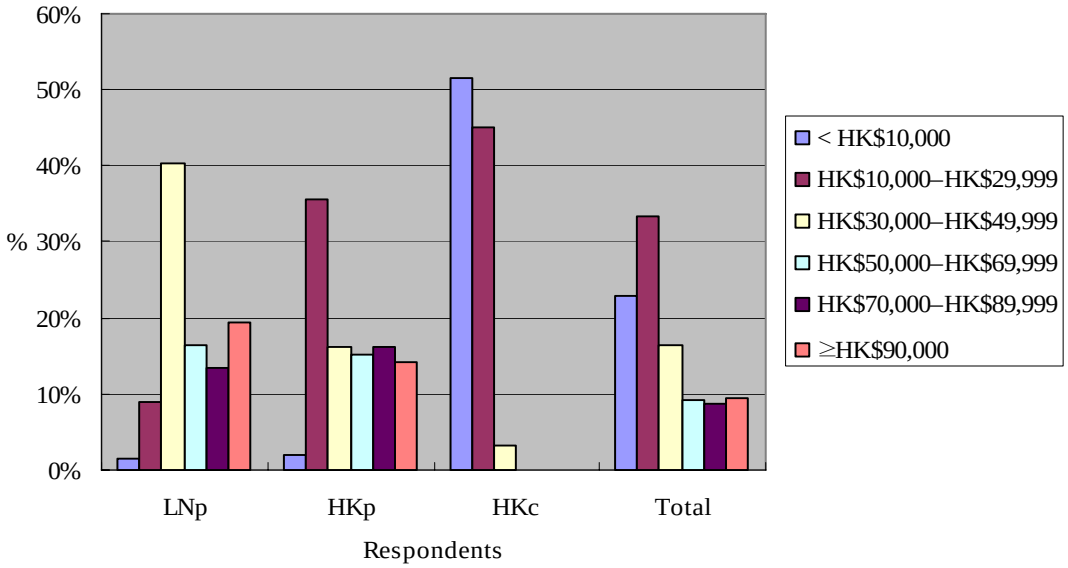


Figure 5.6 Average Monthly Personal Income of the Respondents

Nearly 80% of the respondents were belonged to white-collar as urban design professionals made up a major portion of the whole sample (Figure 5.7). After the

survey, it was found that many residents of the selected districts were doing manual works or working in the service sectors; therefore, the percentage of the blue-collar in the sample of local citizens was also high (40%).

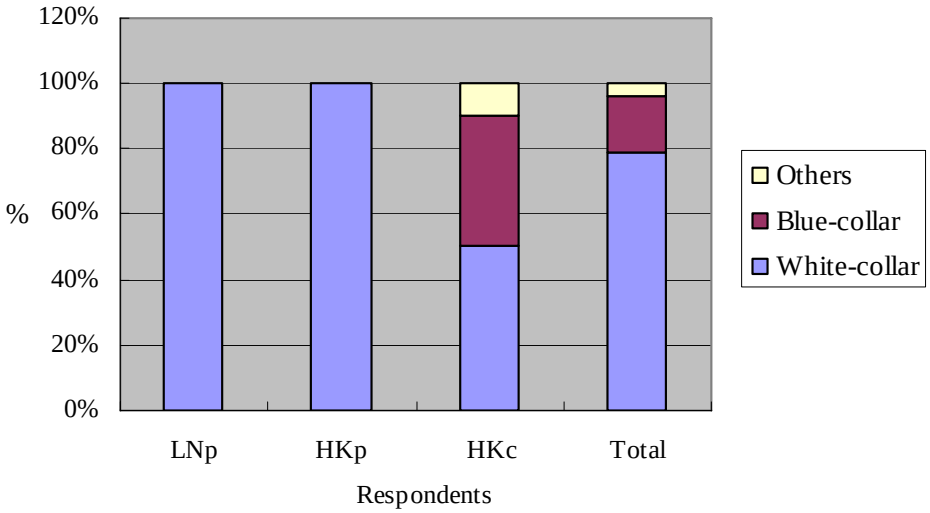


Figure 5.7 Occupation of the Respondents

About 57% of them had the work experience of more than 15 years (Figure 5.8). The respondents generally have plenty of work experience because of 2 reasons. Firstly, experienced urban design professionals form a major portion of the whole sample for this study. Secondly, many local citizens only achieve a lower education level; therefore, they have to work at early age.

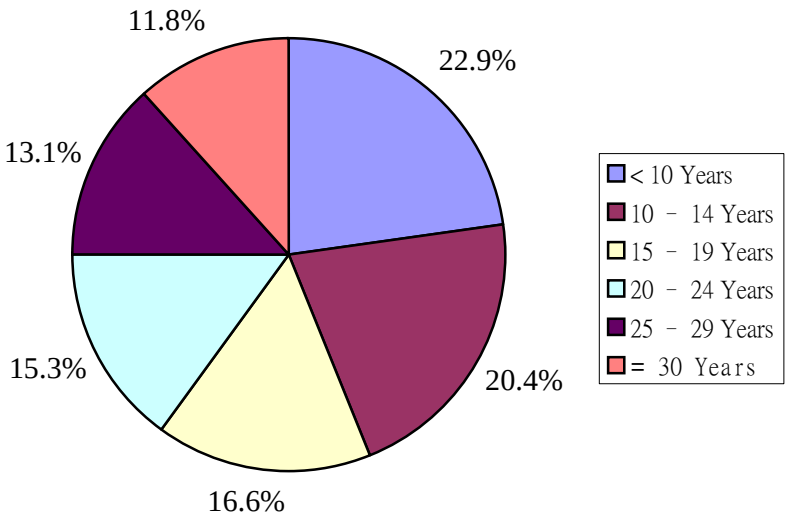


Figure 5.8 Work Experience of the Respondents

From Table 5.2, it could be observed that around 60% of the respondents had lived in the districts undergoing urban renewal before but the urban (re)development

practitioners only accounted for a small portion. 24% of the respondents had experience(s) in taking part in the urban renewal projects; however, none of them was local citizens. In other words, all citizens surveyed had never participated in planning or executing the urban renewal policies of the selected districts although they were currently living there. This finding supported the King's argument that community participation in urban policy decision was very limited in Hong Kong (King, 2004).

Table 5.2 Demographic Profile of the Respondents

	No. of Responses (Valid %)			
	London	Hong Kong		Total
	Practitioners	Practitioners	Citizens	
Gender				
Male	55 (75.3)	93 (78.2)	61 (48.0)	209 (65.5)
Female	18 (24.7)	26 (21.8)	66 (52.0)	110 (34.5)
Sub-total	73 (100.0)	119 (100.0)	127 (100.0)	319 (100.0)
Marital Status				
Married	54 (75.0)	71 (60.2)	67 (52.8)	192 (60.6)
Single	18 (25.0)	47 (39.8)	60 (47.2)	125 (39.4)
Sub-total	72 (100.0)	118 (100.0)	127 (100.0)	317 (100.0)
No. of Children				
0	30 (41.7)	57 (48.3)	68 (53.5)	155 (48.9)
1	11 (15.3)	19 (16.1)	18 (14.2)	48 (15.1)
2	22 (30.6)	35 (29.7)	31 (24.4)	88 (27.8)
3	8 (11.0)	6 (5.1)	10 (7.9)	24 (7.6)
4	1 (1.4)	1 (0.8)	0 (0.0)	2 (0.6)
≥ 5	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Sub-total	72 (100.0)	118 (100.0)	127 (100.0)	317 (100.0)
Age				
< 20	0 (0.0)	0 (0.0)	1 (0.8)	1 (0.3)
20 - 29	6 (8.3)	15 (12.9)	29 (22.8)	50 (15.9)
30 - 39	22 (30.6)	41 (35.3)	34 (26.8)	97 (30.8)
40 - 49	19 (26.4)	38 (32.8)	40 (31.5)	97 (30.8)
50 - 59	21 (29.2)	17 (14.7)	16 (12.6)	54 (17.1)
≥ 60	4 (5.5)	5 (4.3)	7 (5.5)	16 (5.1)
Sub-total	72 (100.0)	116 (100.0)	127 (100.0)	315 (100.0)
Education Level				
Primary School	0 (0.0)	0 (0.0)	6 (4.7)	6 (1.9)
Middle School	0 (0.0)	0 (0.0)	19 (15.0)	19 (6.0)
High School	0 (0.0)	1 (0.8)	45 (35.4)	46 (14.5)
High Cert./ Diploma	3 (4.2)	4 (3.4)	22 (17.3)	29 (9.1)
Bachelor Degree	23 (31.9)	47 (39.5)	30 (23.6)	100 (31.4)
≥ Master Degree	46 (63.9)	67 (56.3)	5 (3.9)	118 (37.1)
Sub-total	72 (100.0)	119 (100.0)	127 (100.0)	318 (100.0)

	No. of Responses (Valid %)			
	London	Hong Kong		Total
	Practitioners	Practitioners	Citizens	
Average Monthly Personal Income				
< HK$10,000	1 (1.5)	2 (2.0)	63 (51.6)	66 (23.0)
HK$10,000–HK$29,999	6 (9.0)	35 (35.7)	55 (45.1)	96 (33.4)
HK$30,000–HK$49,999	27 (40.3)	16 (16.3)	4 (3.3)	47 (16.4)
HK$50,000–HK$69,999	11 (16.4)	15 (15.3)	0 (0.0)	26 (9.1)
HK$70,000–HK$89,999	9 (13.4)	16 (16.3)	0 (0.0)	25 (8.7)
HK$90,000–HK$109,999	5 (7.5)	8 (8.2)	0 (0.0)	13 (4.5)
≥ HK$110,000	8 (11.9)	6 (6.1)	0 (0.0)	14 (4.9)
Sub-total	67 (100.0)	98 (100.0)	122 (100.0)	287 (100.0)
Occupation				
White-collar - Professionals & Associates - Managers - Employees in Administrative/ Clerical Positions	73 (100.0)	120 (100.0)	63 (50.4)	256 (80.5)
Blue-collar - Employees in Service Sectors - Craftsman - Employees in Factors/ Technical Trades - Unskilled Workers	0 (0.0)	0 (0.0)	50 (40.0)	50 (15.7)
Others	0 (0.0)	0 (0.0)	12 (9.6)	12 (3.8)
Sub-total	73 (100.0)	120 (100.0)	125 (100.0)	318 (100.0)
Work Experience				
< 10 Years	11 (15.3)	24 (20.7)	37 (29.4)	72 (22.9)
10 – 14 Years	15 (20.8)	28 (24.1)	21 (16.7)	64 (20.4)
15 – 19 Years	11 (15.3)	19 (16.4)	22 (17.5)	52 (16.6)
20 – 24 Years	8 (11.1)	18 (15.4)	22 (17.5)	48 (15.3)
25 – 29 Years	12 (16.7)	19 (16.4)	10 (7.9)	41 (13.1)
≥ 30 Years	15 (20.8)	8 (6.9)	14 (11.1)	37 (11.8)
Sub-total	72 (100.0)	116 (100.0)	126 (100.0)	314 (100.0)
Residence in Districts undergoing Urban Renewal				
Yes	23 (32.9)	33 (28.4)	127 (100.0)	183 (58.5)
No	47 (67.1)	83 (71.6)	0 (0.0)	130 (41.5)
Sub-total	70 (100.0)	116 (100.0)	127 (100.0)	313 (100.0)
Experience(s) in participating in Urban Renewal Projects				
With	43 (78.2)	29 (24.8)	0 (0.0)	72 (24.1)
Without	12 (21.8)	88 (75.2)	127 (100.0)	227 (75.9)
Sub-total	55 (100.0)	117 (100.0)	127 (100.0)	299 (100.0)

Note: The exchange rate referred here is 1 GBP (UK Pounds) = 13.8 HKD (Hong Kong Dollars).

5.1.2 Descriptive Statistics & Internal Consistencies of Individual Consideration

The means, standard deviations, Cronbach's alpha coefficients (α) and the ranks of all urban design considerations are shown in Table 5.3.

Table 5.3 Means, Standard Deviations, Internal Consistencies & Corresponding Rankings of Design Considerations

Urban Design Considerations	Economical Sustainability				Environmental Sustainability				Social Sustainability			
	Means	S. D.	α	Rank*	Means	S. D.	α	Rank*	Means	S. D.	α	Rank*
D_{rev}1.	3.70	.891	.914	6	3.12	.984	.917	20	3.35	1.003	.928	23
D_{rev} 2.	3.76	.821	.913	3	3.46	1.019	.916	15	3.31	.903	.928	25
D_{rev} 3.	3.99	.899	.913	1	3.71	1.013	.918	7	3.21	1.016	.928	28
D_{rev} 4.	3.90	.809	.912	2	2.84	.941	.916	27	3.46	.877	.926	19
D_{rev} 5.	3.70	.858	.912	5	2.76	.944	.916	29	3.27	.922	.925	26
D_{rev} 6.	3.71	.940	.912	4	2.77	1.007	.916	28	3.75	.989	.925	12
D_{rev} 7.	3.53	.933	.911	9	3.01	.998	.915	23	3.68	.962	.925	13
D_{rev} 8.	3.14	.989	.913	16	2.90	1.062	.922	26	3.10	1.093	.929	29
D_{rev} 9.	3.28	.929	.910	12	3.65	.965	.916	11	3.95	.884	.825	8
D_{rev} 10.	3.04	.983	.913	19	2.66	.877	.916	30	3.81	.949	.926	10
D_{rev} 11.	3.03	1.035	.911	20	3.16	1.046	.915	18	4.18	.730	.926	2
D_{rev} 12.	2.90	.878	.910	24	3.17	.909	.915	16	3.90	.863	.925	9
D_{rev} 13.	2.74	.919	.910	28	2.95	.970	.915	25	4.23	.719	.925	1
D_{rev} 14.	2.88	.866	.910	25	4.06	.856	.917	4	3.98	.849	.924	6
D_{rev} 15.	2.93	.881	.910	23	3.79	.954	.916	6	3.55	.969	.925	15
D_{rev} 16.	2.69	.769	.910	30	3.54	.884	.915	14	3.80	.880	.925	11
D_{rev} 17.	3.55	.936	.910	8	3.82	.847	.918	5	3.49	.885	.927	17
D_{rev} 18.	3.12	.939	.909	17	4.44	.669	.918	1	3.60	.928	.925	14
D_{rev} 19.	3.17	.899	.910	14	4.28	.717	.918	3	3.47	.989	.925	18
D_{rev} 20.	3.28	.929	.910	11	4.28	.735	.918	2	3.32	1.032	.926	24

Urban Design Considerations	Economical Sustainability				Environmental Sustainability				Social Sustainability			
	Means	**S. D.**	**α**	**Rank***	**Means**	**S. D.**	**α**	**Rank***	**Means**	**S. D.**	**α**	**Rank***
D_{rev} 21.	2.85	.954	.912	27	3.62	.973	.918	12	3.42	1.068	.927	21
D_{rev} 22.	3.15	.987	.912	15	3.71	.903	.918	8	3.08	1.108	.926	30
D_{rev} 23.	3.40	.925	.911	10	3.69	.879	.916	10	3.25	.977	.926	27
D_{rev} 24.	2.94	.840	.912	22	3.60	.932	.917	13	3.51	.966	.926	16
D_{rev} 25.	3.11	.885	.912	18	3.70	.915	.916	9	3.42	.963	.925	22
D_{rev} 26.	3.26	.901	.912	13	3.16	.930	.916	19	3.45	.997	.926	20
D_{rev} 27.	2.86	.909	.911	26	2.95	.887	.916	24	4.09	.821	.926	5
D_{rev} 28.	2.96	1.060	.912	21	3.17	.977	.917	17	3.97	.899	.927	7
D_{rev} 29.	2.73	.926	.911	29	3.03	.990	.915	22	4.1	.848	.926	4
D_{rev} 30.	3.55	.952	.911	7	3.05	1.057	.916	21	4.14	.833	.925	3

Note: S.D. is the abbreviation for Standard Deviation.
* The design considerations are ranked according to their means.

When looking into the means and corresponding rankings of individual design considerations under 3 main categories as shown in Table 5.3, it can be noticed that the item enhancing particular sustainable value may not improve other 2 values in the same way. Many design considerations to facilitate economic development are perceived to be less environmentally sustainable and the items that can preserve the environment probably generate financial burdens on the economy. In addition, design considerations effectively enhancing community well-being are not necessarily economically and/ environmentally sustainable. The above findings manifest an important fact that a sustainable community cannot be created by simply considering a single or a particular group of design variables. To work out the most appropriate development form for a dilapidated city and resolve the conflicts among economic, environmental and social domains, the objectives of renewing the urban areas, the characteristics of the region undergoing urban renewal, the site constraints, and the preference of affected residents have to be well-known before making a trade-off among different urban design considerations.

As mentioned before, 0.7 is minimum acceptable α coefficient for reliability analysis, the higher value the better. Since the α of all items in Table 5.3 were > 0.9, it could be confirmed that the reliability of the data was very high and the data could be used for subsequent analyses.

5.2 Pearson's Correlation Analysis

Table 5.4 depicts Pearson's correlations among demographic variables. From the table, some characteristics of the respondents can be highlighted. It was found that the marital status was negatively correlated with the number of children. This finding reflects the fact that many married couples are reluctant to have children nowadays. Even though some of the couples want to have children in their families, they only prefer to have fewer numbers of them. That's why the numbers of children do not increase with increasing numbers of the married respondents. However, the number of children and the age of the respondents were positively correlated because past generations preferred to have more children.

The education level and monthly personal income were positively correlated. Obviously, those who have achieved a higher education level tend to earn more income than the others because their education levels improve their levels of competence in fulfilling job requirements and increase their bargaining powers in salary negotiations.

Furthermore, it could be noticed that there was correlation between education level and occupation. Respondents with a lower education level tend to be engaged in manual, technical or unskilled works while well-educated people often act as a professional or work in administrative positions. Not surprisingly, the age was positively correlated with the work experience because elder people are very likely to work for a longer period than the younger ones.

Apart from identification of correlations among demographic variables, Pearson's correlation also plays an important role to ascertain non-occurrence of linear dependency before conducting factor analysis. As the factor analysis was planned to be derived from the opinions of local respondents only, 247 instead of 320 sets of survey data were analyzed to calculate the Pearson's correlations among all design considerations under each of 3 sustainable development objectives (Table D1 – D3 in Appendix D).

From the tables, it was found that correlations among all design considerations ranged from -0.09 to 0.78 for economic sustainability, -0.01 to 0.73 for environmental sustainability, and 0.03 to 0.79 for social sustainability. No item is highly correlated with the others (i.e. $r > 0.8$), which suggests that linear dependency does not exist among the variables and factor analysis can be proceeded in next stage (Pett et al., 2003).

Table 5.4 Pearson's Correlations among Demographic Variables

	Gender	Marital	Children	Age	Education Level	Monthly Income	Occupation	Experience	LivUR	WkUR
Gender										
Marital	.162 **									
Children	-.169 **	**-.617 ** **								
Age	-.218 **	-.445 **	**.552** **							
Education Level	-.147 **	.028	-.140 *	-.123 *						
Monthly Income	-.355 **	-.296 **	.295 **	.344 **	**.562 ** **					
Occupation	.063	.075	.065	-.016	**-.735 ** **	-.442 **				
Work Experience	-.254 **	-.438 **	.566 **	**.807** **	-.165 **	.360 **	.059			
Residence in Districts undergoing Urban Renewal (LivUR)	-.268 **	-.128 *	.082	.050	.515 **	.506 **	-.397 **	.048		
Experience(s) in participating in Urban Renewal Projects (WkUR)	.132 *	.138 *	-.119 *	-.116 *	-.410 **	-.456 **	.272 **	-.156 **	-.339 **	

** Correlation is statistically significant at the 0.01 level (2-tailed).

* Correlation is statistically significant at the 0.05 level (2-tailed).

5.3 Independent T-test

This section presents 2 dissimilar sets of independent t-test results. Different groups of survey data were undergone the same statistical process for various purposes. In order to verify the representation of the opinions of local practitioners, and the generality of the findings derived from that data, analysis of survey records collected from London's and Hong Kong's practitioners was conducted. By examining the data gathered from the local practitioners and the citizens, differences and similarities between their views about the significance of each urban design consideration to sustainable urban renewal were identified.

5.3.1 London's Practitioners VS Hong Kong's Practitioners

The independent t-test conducted here is to examine whether location factor affects the urban practitioners' perception patterns. Table 5.1 shows that a total of 193 valid responses from the urban practitioners were collected in which 73 of them came from London and the rest were received from the local industry. As mentioned before, independent t-test uses sample data to test hypotheses about the population means; therefore, null hypothesis (H_0) and alternative hypothesis (H_1) should be decided before undertaking this analysis. H_0 in this section states that location factor has no effect while H_1 says that location factor does affect the views of the respondents.

After the analysis, it can be noticed that the practitioners in both cities have similar views towards the significance of most of the design considerations to sustainable urban renewal (i.e. H_0 for most of the variables are accepted/ correct). However, when looking at the result in detail, it is found that there is discrepancy between their views on certain aspects (Table 5.5). London's practitioners gave higher average ratings than the locals when they were asked to rate the importance of the following design considerations: availability and accessibility of employment (D_{rev} 6 & 7); convenient, efficient & safe environment for pedestrians & public transport users (D_{rev} 9); availability of housing (D_{rev} 10); accessibility of public facilities (D_{rev} 12); accessibility of open spaces (D_{rev} 16); layout of buildings & streets (D_{rev} 25) and provision of security measures (D_{rev} 30). The ratings given to the abovementioned items by London's and Hong Kong's practitioners differed significantly because the

distinctive features in London as shown below have influenced the choices of its practitioners .

(i) Daily Mortality

London is infamous as a smog city. Throughout the years, it is continuously affected by severe air pollution. In the past, the air pollutants mainly came from burning of coal but nowadays the main sources are directly or indirectly contributed from motor vehicles. Previous studies revealed that traffic-initiated air pollution induces adverse health impacts and contributes to high daily mortality in London (Logan, 1953; Schwartz and Marcus, 1993; Anderson et al., 1996). A study conducted by Wong et al. (2002) indicated that both Hong Kong and London suffered serious air pollution and had high associated hospital admissions. However, the problem in London was even worse as the concentration of pollutants from traffic there was much higher than that in Hong Kong. In order to reduce traffic-initiated air pollution, and improve the air quality of the city and the citizens' health in London, it is necessary to minimize the traffic volume and control the emission of the toxic pollutants. Not surprisingly, the design professionals in London gave higher scores to access related items than the local practitioners because it is widely accepted that car dependency and pollution problems reduce with increasing accessibility via public transport.

(ii) Social Exclusion

Social exclusion is a concept implying that the people not only suffer a combination of problems such as unemployment, low income, substandard or inadequate housing, poor health or family breakdown but also lose the ability to connect with services and facilities. A significant amount of citizens living in London and Hong Kong experience social exclusion but the governments of 2 cities have different attitudes. The local government officials evade this problem and have not taken sufficient amounts of comprehensive actions against social exclusion (Yung, 2005). On the contrary, the UK government battles against social exclusion by studying its causes before defining area based

strategies (Armstrong, 2006). For instance, a Social Exclusion Unit was set up in 1997 and a new Taskforce was recently established for delivering a series of social exclusion policies in London (Armstrong, 2006).

Furthermore, many studies conducted in the past have showed that building new accommodation especially the affordable housing, improving transport access and increasing employment provision contribute positively to the reduction in social exclusion (Church et al., 2000, Royal Borough of Kingston upon Thames, 2005). London practitioners recognize the value of housing, integrated transport and employment provisions to social sustainability, and that explains why they put a high value on those items.

(iii) Crime Situation

According to the crime statistics released by AreaConnect (2006) in London and the Hong Kong Police Force (2006) in Hong Kong, the overall crime rate[2] of London is 3.5 times more than that of Hong Kong. Assaults, robberies, rapes, burglaries and theft are crimes commonly found in London, and all of them have adversely affected its public order (AreaConnect, 2006). It appears that the public order of London is poorer than that of Hong Kong. As mentioned by Alvarez (2002), the crime rate and the entrepreneurs' incentives to start business in a city are negatively related. The city with a low crime rate encourages entrepreneurship which promotes economic growth and improves overall performance of the economy. Corbett and Corbett (2000) also stated that the people prefer to invest in a safe place where thieves, burglars or vandals are absent, and the crime rate is low. In addition, crime and instability of an area can reduce local and foreign investment initiatives and retard economy development (Hatcher, 2004). Therefore, it is not surprising that London practitioners acknowledge crime control by providing appropriate security measures as a highly-placed design consideration for sustaining the economy of their city.

[2] The 2004 overall crime rate per 100,000 population in Hong Kong is 1,181.5 and that in London is 4,181.7.

(iv) Employment Level

As mentioned by Oktay (2004), employment can contribute to economic development of an urban area in various ways. For instance, availability of employment draws population which supports local economic activities. Positive outcomes to the economy are also generated when the employees provide and purchase a variety of goods and services, and pay taxes to the government. As employment plays an important role in sustaining the economy of an area, both Hong Kong's and London's government put forward various strategies to lower the unemployment rate and improve the employment level over the years. However, London practitioners give a greater rating to the availability and accessibility of employment than those in Hong Kong during the questionnaire survey, which could be due to the following reasons.

According to National Statistics Online (2007), London was the worst region in the UK as it had the highest unemployment rate (7.9%) at the regional level. Compared to London, the situation is much better in Hong Kong as its unemployment rate has remained at 4.3% for more than 6 months (Hong Kong Economic and Trade Office, 2007). Therefore, it is understandable that London practitioners ranked those employment-related items as significant design considerations. In addition, the survey was conducted immediately after the publication of an Economic Development Strategy which emphasized that increasing employment opportunities and promoting good access to employment are key elements to achieve sustainable economic development in London (London Development Agency, 2005).

(v) Relationship between Buildings and Streets

Numbers of urban design principles and guidelines were published in London by CABE and DETR highlighting that proper layout design, and mixture of buildings and streets are crucial to the development of economic and social activities in a region (DETR, 2000; CABE and DETR, 2001). For example, direct and regular access from streets to buildings accommodating economic activities like shops and restaurants can be provided to attract customers or

visitors, and building entrances and less private rooms can face the main streets directly to facilitate social interactions among people moving between public and private spaces (DETR, 2000). In Hong Kong, there are statutory requirements and urban design guidelines regulating building design and street provision but the interaction between them seems to be overlooked. Therefore, it is not surprising that the local practitioners gave a lower score to the item "layout of buildings & streets" than the practitioners practicing in London who are continuously under the influence of its urban design policies recognizing the importance of the relationship between buildings and streets.

As mentioned before, London and Hong Kong share similar demographic characteristics, and have similar urban renewal practices and directions. Therefore, the Hong Kong Government intends to learn how to achieve sustainable urban renewal through urban design from London's experiences (Legislative Council, 2002b). The independent t-test conducted here has provided scientific evidence that the data collected from local practitioners has high generality and representation because the practitioners in both cities have almost the same views towards the importance of the design considerations selected for this study. In addition, the analysis result has revealed a fact that distinctive features in a city can affect the significance of urban design considerations, the final design of urban renewal proposal and its effect. As London displays unique characteristics, some discrepancy between the views of London's practitioners and local practitioners on certain aspects can be observed.

5.3.2 Local Practitioners VS Citizens Affected by Urban Renewal Projects

The independent t-test conducted in this part is to determine whether people with different knowledge, concerns and expectations have the same views on the importance of various design considerations to sustainable urban renewal in Hong Kong. H_0 in this section states that the nature of people has no effect while H_1 says that the nature of people does affect their perceptions. A total of 120 and 127 valid responses were gathered from local practitioners and citizens respectively (Table 5.1). The independent t-test has indicated that local practitioners and citizens expressed similar views on the values of the majority of design considerations especially on the

social side. However, a diverse range of opinion on several items (i.e. H_0 for certain variables are rejected) can still be observed from Table 5.6.

Even though both practitioners and citizens acknowledge the value of certain items, it does not imply that they have the same view on their importance. Urban (re)development practitioners are generally equipped with better design knowledge and have more practical experiences than the citizens. Therefore, they are able to highlight those variables with significant impacts on sustainable development easily and affirmatively. That explains why the practitioners and citizens gave different ratings on average to the same items in the list of urban design considerations.

For example, both parties realized that property market plays an important role in stimulating the growth of local economy and property transaction price is one of the indicators reflecting the prosperity of the economy. Hence, it is expected that the items having potentials to add value to the property market can contribute to economic sustainability. However, the citizens might not know how efficient land use (D_{rev} 3), accessibility of public facilities (D_{rev} 12), design of open spaces (D_{rev} 15) or building form (D_{rev} 23) in particular for those incorporating green design features (D_{rev} 19) influence the rental prices and the property values. Therefore, the citizens gave lower ratings than the practitioners when they were asked to rank their importance to economic development. In fact, the literature has already suggested that an efficient use of land and space optimizes the value of scarce resources, and appropriate building disposition, density and configuration with good connection with services and facilities significantly increase the rental value and the sale price of the property (Li and Brown, 1980; Vandell et al., 1989; Lee, 2003). Furthermore, building and open space designs which can effectively improve the quality of the environment also have positive impacts on the property and land values (Diamond, 1980; Hanley and Spash, 1993).

In addition, it is widely recognized that provision of accessible and well-designed open space (D_{rev} 14, 15 & 16), proper pollution control (D_{rev} 18) and green design (D_{rev} 19) are good for the environment but the practitioners still gave higher ratings than the citizens. It is because urban (re)development practitioners are well aware that open spaces especially for those with vegetation can ameliorate overall

environmental quality. Open spaces in a dense city facilitate air flow between and within buildings, and minimize heat island effect while the plants inside the open spaces lower the ambient temperature, remove suspended particulates in air, and control the levels of greenhouse gas and oxygen (Cookson Smith, 2000; Corbett and Corbett, 2000; Nevter and Beser, 2003; Oktay, 2004). Their practical experiences have also verified that an effective pollution control can maintain the air quality and noise level to an acceptable standard, and proper design of the external façade and the building orientation can regulate the amount of natural lighting and ventilation, and reduce the dependence on the use of non-renewable resources. Therefore, it is not surprising that the practitioners emphasized the significance of those items to environmental sustainability and gave a greater rating to them.

From Table 5.6, it can also be noticed that local citizens gave higher ratings than the practitioners to the following design considerations: community involvement (D_{rev} 28); convenient, efficient & safe environment for drivers (D_{rev} 8) and green construction (D_{rev} 20). As the society is getting more democratic in nature, there is an increasing demand for a participatory culture in Hong Kong. Nowadays, the communities do not know much about the contents of the renewal project until an announcement is made (Ng, 2005). Community participation is limited as only public consultation is available in current urban renewal process. In order to ensure that their needs, interests and concerns are taken into account, more and more citizens pursue actively engagement in making choices and determining future development of Hong Kong. That explains why the citizens gave a higher rating to the item related to community involvement.

The citizens also believed that availability of convenient, efficient and safe transportation networks is necessary to increase their mobility and ease their daily life operation. However, they have neglected that spending too much time in driving and traffic congestion reduce the time available for social gathering, and the pollutants emitted from the vehicles are harmful to their health (Corbett and Corbett, 2000; Lee, 2003). Therefore, the practitioners who have considered the unfavorable outcome gave a relatively low rating to this item.

In recent years, the Hong Kong Government has spent a lot of resources to promote

green construction e.g. use of recyclable/ durable construction materials, installation of energy efficient/ water saving devices, etc. and to educate the public about its details and benefits. Green construction effectively minimizes the use of non-renewable building materials, and natural resources like energy and water. Such practice not only safeguards the environment but also increases social well-being as it provides a high quality of living environment for the citizens, saves their expenses of consuming resources, and reserves those scarce resources for the enjoyment of future generations. Owing to the benefits brought to the community, it is reasonable for the citizens to give higher ratings to this item.

After conducting the independent t-test, some minor variations in the views of local urban practitioners and the citizens could be observed. Both parties put emphasis on different aspects, and had dissimilar views on the significance of certain design considerations because their concerns, needs and desires about local urban renewal projects varied, and their levels of understanding of urban design and sustainability concept were different. It is highly expected that a research based on the specific views from a particular group of people is insufficient to draw a reliable and representative result. Therefore, the data collected from both parties is going to be analyzed together in this study in order to ascertain that the interests and opinions of the urban practitioners and the citizens in Hong Kong are considered as a whole, and the urban renewal strategies implemented in the future can satisfy various groups of stakeholders living and/ working in Hong Kong, and effectively contribute to sustainable development at local scale.

Table 5.5 Group Differences of Importance Rating across Location

Design Considerations	df	Economic Sustainability						Environmental Sustainability						Social Sustainability					
		Mean (HKp) n=120	Mean (LNp) n=73	SD (HKp) n=120	SD (LNp) n=73	t	*p*-value	Mean (HKp) n=120	Mean (LNp) n=73	SD (HKp) n=120	SD (LNp) n=73	t	*p*-value	Mean (HKp) n=120	Mean (LNp) n=73	SD (HKp) n=120	SD (LNp) n=73	t	*p*-value
D_{rev} 6.	191	3.49	4.22	1.037	.712	-5.282	.000*	2.54	3.27	1.060	1.121	-4.553	.000*	3.58	4.18	1.149	.822	-3.860	.000*
D_{rev} 7.	191	3.42	4.05	.940	.797	-4.836	.000*	2.89	3.52	1.083	.988	-4.042	.000*	3.49	4.00	1.100	.898	-3.330	.001*
D_{rev} 9.	191							3.57	4.11	1.059	.826	-3.741	.000*						
D_{rev} 10.	191													3.59	4.11	1.041	1.021	-3.375	.001*
D_{rev} 12.	191													3.92	4.37	.904	.635	-3.756	.000*
D_{rev} 16.	191													3.71	4.33	.974	.708	-4.734	.000*
D_{rev} 25.	191	3.13	3.55	.865	.958	-3.161	.002*							3.28	3.73	1.014	.902	-3.065	.002*
D_{rev} 30.	191	3.51	3.99	.987	.874	-3.403	.001*												

Note: HKp = Hong Kong's Practitioners; LNp = London's Practitioners

* The independent t-test is statistically significant at the 0.01 level (2-tailed).

Table 5.6 Group Differences of Importance Rating between Local Practitioners & Citizens

Design Considerations	df	Economic Sustainability						Environmental Sustainability						Social Sustainability					
		Mean (HKp) n=120	Mean (HKc) n=127	SD (HKp) n=120	SD (HKc) n=127	t	*p*-value	Mean (HKp) n=120	Mean (HKc) n=127	SD (HKp) n=120	SD (HKc) n=127	t	*p*-value	Mean (HKp) n=120	Mean (HKc) n=127	SD (HKp) n=120	SD (HKc) n=127	t	*p*-value
D_{rev} 3.	245	4.18	3.71	.860	.874	4.300	.000*												
D_{rev} 8.	245													2.91	3.42	1.181	.938	-3.761	.000*
D_{rev} 12	245	2.98	2.62	.930	.723	3.340	.001*												
D_{rev} 14.	245							4.20	3.80	.836	.829	3.818	.000*						
D_{rev} 15.	245	3.01	2.70	.930	.759	2.853	.005*	3.96	3.43	.911	.922	4.569	.000*						
D_{rev} 16.	245							3.67	3.23	.892	.818	4.028	.000*						
D_{rev} 18.	245							4.52	4.21	.710	.612	3.610	.000*						
D_{rev} 19.	245	3.35	3.00	.967	.826	3.064	.002*	4.43	4.07	.683	.692	4.141	.000*						
D_{rev} 20.	245													3.13	3.65	1.127	.850	-4.114	.000*
D_{rev} 23.	245	3.60	3.13	.920	.894	4.037	.000*												
D_{rev} 28.	245	2.76	3.20	1.063	.903	-3.553	.000*	2.97	3.32	1.037	.863	-2.941	.004*						

Note: HKp = Hong Kong's Practitioners; HKc = Hong Kong's Citizens

* The independent t-test is statistically significant at the 0.01 level (2-tailed)

5.4 Exploratory Factor Analysis (EFA)

This section is to conduct EFA on the relationship between various urban design considerations and triple sustainable development objectives i.e. Economic Development, Environmental Quality and Social Equity. As mentioned before, subsequent statistical analyses make the best use of the survey data collected from local urban practitioners and citizens. Hence, the following EFA were derived from 247 valid responses of the local respondents.

5.4.1 Relationship between Design Considerations & Economic Sustainability

5.4.1.1 Determinant of the Correlation Matrix

The correlations among all design considerations ranged from -0.09 to 0.78, which indicated that there was no linear dependency in the correlation matrix (Table D1). The value for the determinant of the matrix ranged between 0 and 1; therefore, it was wise to continue with a factor analysis.

5.4.1.2 Evaluation of the Matrix

In considering the use of factor analysis, it is necessary to conduct Kaiser-Meyer-Olkin Test (KMO) and Bartlett's Test of Sphericity to determine whether there are sufficient numbers of significant correlations among the variables. KMO is a measure of sampling adequacy that compares the magnitudes of the observed correlation coefficients to those of the partial correlation coefficients (Pett et al., 2003). KMO value ranges between 0 and 1, and a presence of small values indicates that the use of factor analysis is inappropriate. As recommended by Kaiser (1974), only the values of greater than 0.5 are acceptable. The level of acceptance for KMO is provided in Table 5.7.

Table 5.7 Acceptance Level of KMO Value

KMO Value	Comment
0.90 – 1.00	Marvelous
0.80 – 0.89	Meritorious
0.70 – 0.79	Middling
0.60 – 0.69	Mediocre
0.50 – 0.59	Miserable
0.00 - 0.49	Unacceptable

In addition, the matrix should have sufficient correlations to justify the application of a factor analysis. Hence, Bartlett's Test of Sphericity which can examine the correlations among the variables has to be conducted. Bartlett's Test of Sphericity is used to test the null hypothesis that the correlation matrix is an identity matrix (i.e. there is no relationship among the items) (Pett et al., 2003). A matrix can be factor analyzed if the null hypothesis is rejected and the Bartlett's Test of Sphericity is found to be significant.

As shown in Table 5.8, the KMO measure of sampling adequacy was 0.870 which is meritorious. Since the value of the Bartlett's Test of Sphericity was 3151.456 and the associated significance level was small, it was very likely that the correlation matrix was not an identity matrix. Based on these statistical results, it could be concluded that factor analysis was an appropriate statistical method to be adopted here.

Table 5.8 Results of KMO & Bartlett's Test for Economically Sustainable Urban Design Considerations

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.870
Bartlett's Test of Sphericity	Approx. Chi-Square	3151.456
	df	435
	Sig.	.000

5.4.1.3 Extraction of Factors

Principal axis factoring (PAF) was used to identify the underlying factors. PAF is also regarded as common factor analysis assuming that the variance in a given variable can be explained by a small number of underlying common factors and by the variance that is unique to the variable. The factors in PAF are not defined as linear combinations of the observed variables as they are generated from common variance instead of total variance (Pett et al., 2003). In order to determine how many factors should be extracted to represent the variables, 3 basic solutions i.e. (i) eigenvalues greater than 1.0; (ii) last factor accounting for only a small portion of the explained variance (< 5%); and (iii) examination of the extracted factors by means of a scree plot were adopted (Pett et al., 2003).

An eigenvalue (λ) in PAF represents the amount of common variance among the variables that are explained by a particular common factor (Pett et al., 2003). It can be negative and positive but in the factor analysis, all eigenvalues have to be greater than 0 as they represent the amount of explained variance in the variables associated with a common factor (Pett et al., 2003). The eigenvalue for each factor is presented in Table 5.9. Total variance explained by each factor and the percentage of total variance contribution to each of them are also listed. From the table, it could be noticed that the first 7 factors had eigenvalues greater than 1.0 and the seventh factor only accounted for less than 5% of the explained variance. It appears that 7 factors should be extracted to represent the data.

Table 5.9 Total Variance Explained for Economically Sustainable Factors

Factor	Initial Eigenvalues		
	Total	% of Variance	Cumulative %
1	8.707	29.024	29.024
2	2.555	8.518	37.543
3	2.125	7.082	44.625
4	1.590	5.300	49.924
5	1.254	4.179	54.103
6	1.193	3.977	58.080
7	1.024	3.413	61.493
8	.924	3.082	64.575
9	.865	2.882	67.457
10	.800	2.665	70.123
11	.700	2.334	72.456
12	.692	2.308	74.764
13	.680	2.267	77.031
14	.660	2.201	79.233
15	.646	2.152	81.385
16	.567	1.890	83.275
17	.561	1.870	85.145
18	.540	1.800	86.945
19	.506	1.688	88.633
20	.443	1.476	90.109
21	.416	1.386	91.495
22	.393	1.309	92.804
23	.365	1.217	94.021
24	.309	1.030	95.051
25	.300	1.000	96.051
26	.283	.942	96.993
27	.274	.915	97.908
28	.246	.819	98.726
29	.211	.704	99.430
30	.171	.570	100.000

However, when looking into the scree plot, a different result could be obtained (Figure 5.9). The scree plot is a graph plotting the extracted factors against their eigenvalues in descending order of magnitude to identify distinct breaks in the slope of the plot. Since the factor that appears prior to the beginning of a straight line through the lower values of the plotted eigenvlues is generally regarded as a cut-off factor, 6 instead of 7 factors were retained for further analyses.

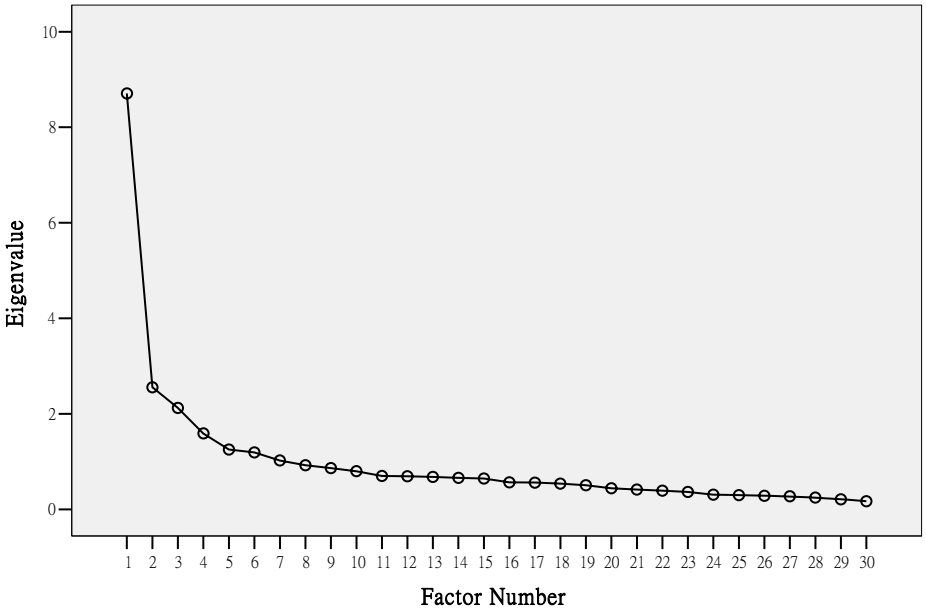


Figure 5.9 Scree Plot for Economically Sustainable Factors

5.4.1.4 Rotation of Factors

To achieve the simplest factor structure, and to obtain meaningful and more interpretable factors, Promax rotation with a power (Kappa) of 4 was used. Promax rotation allows for correlations among the extracted factors. Having correlated factors is a reasonable assumption in real life because different aspects of a dimension, although separated, are always correlated to some extent (Pett et al., 2003). Promax rotation raises the factor loadings to powers so that the moderate and low loadings reduce while the high loadings remain substantial (Pett et al., 2003). By maximizing the differences between the high and low loadings on a particular factor, the factor structure becomes more interpretable. As mentioned by Norušis (2004), Promax rotation can yield substantively meaningful factors; therefore, it has a reputation for quality. The factor matrix, pattern matrix and structure matrix generated from factor analysis are given in Table E1 – E3 in Appendix E.

5.4.1.5 Results

PAF with Promax rotation conducted on 30 variables has generated 6 underlying factors for achieving economic sustainability of urban renewal projects. Table 5.10 depicts the factor structure on economically sustainable urban design considerations. The total variance explained by each factor was listed in the column entitled "factor loading".

Table 5.10 Factor Structure on Economically Sustainable Urban Design Considerations

Urban Design Considerations		Factor Loadings (in descending order)
Factor 1: Quality Welfare Planning & Provisions		
D_{rev} 12.	Access to public facilities	0.711
D_{rev} 27.	Preserving & facilitating social networks	0.710
D_{rev} 16.	Access to open spaces	0.709
D_{rev} 13.	Provisions for meeting special needs of the disabled, elderly or children	0.707
D_{rev} 29.	Sense of community	0.693
D_{rev} 11.	Provision of public facilities	0.670
D_{rev} 14.	Provision of open spaces	0.662
Factor 2: Conservation & Preservation		
D_{rev} 19.	Green design	0.840
D_{rev} 20.	Green construction	0.833
D_{rev} 18.	Provisions to control pollution	0.707
D_{rev} 17.	Ease of maintenance & management of buildings, facilities & spaces	0.617
Factor 3: Land Strategic Utilization		
D_{rev} 4.	Provisions facilitating establishment of different businesses	0.657
D_{rev} 1.	Mixed-use development	0.612
D_{rev} 2.	Adaptability of non-domestic development to the changing needs	0.566
D_{rev} 3.	Efficient use of land & space	0.564
D_{rev} 6.	Availability of local employment	0.544
D_{rev} 5.	Proximity to commercial establishments	0.542
D_{rev} 7.	Access to work	0.442
D_{rev} 10.	Availability of housing for different income groups	0.408
Factor 4: Community Contributions		
D_{rev} 28.	Community involvement	0.619
D_{rev} 21.	Preservation of historical structures & features	0.615
D_{rev} 22.	Rehabilitation of repairable properties	0.480

Urban Design Considerations		Factor Loadings (in descending order)
Factor 5: Integrated Design		
D_{rev} 24.	Compatibility with neighborhood	0.626
D_{rev} 15.	Design of open spaces	0.601
D_{rev} 25.	Layout of buildings & streets	0.595
D_{rev} 26.	Conservation/ improvement of local distinctiveness	0.515
D_{rev} 23.	Building form	0.452
D_{rev} 30.	Provision of security measures	0.437
Factor 6: Transport Arrangement		
D_{rev} 9.	Convenient, efficient & safe environment for pedestrians & public transport users	0.703
D_{rev} 8.	Convenient, efficient & safe environment for drivers	0.689

Factor 1 includes 7 variables providing quality welfare to the citizens in order to satisfy their physical and psychological desires. Provisions of accessible open spaces and public facilities meet the physical needs of various groups of people while preserving social networks and enhancing sense of community fulfill the psychological needs of the public. Therefore, this factor is termed **Quality Welfare Planning & Provisions**.

Factor 2 contains 4 items related to the measures for resources preservation and environmental protection, including green design, green construction, provisions to control pollution and arrangements facilitating future maintenance and management. Hence, this factor is named **Conservation & Preservation**.

Factor 3 is composed of 8 variables concerning form and direction of development, and land use planning. This factor includes provisions facilitating establishment of businesses, mixed-use development, adaptable development, efficient land use, availability of employment, accessibility of commercial establishments and working places, and provision of different types of housing. As a result, this factor is called **Land Strategic Utilization**.

Factor 4 consists of 3 items requiring active involvement of the public. In Hong Kong, the citizens are given the chances to participate in making community-based

decisions on urban policies, and they are welcomed to take the initiatives in preserving historical structures and renewing dilapidating buildings. Therefore, this factor is labeled as **Community Contributions**.

Factor 5 is represented by 6 items, all relating to the design and integration of the public and private spaces such as open spaces, buildings, streets and other neighboring places in an urban area. Hence, the title of this factor is **Integrated Design**.

Factor 6 has 2 items: convenient, efficient & safe environment for pedestrians & public transport users, and that for drivers. These items are closely related as both of them reflect the quality of the transport network and make a major contribution to the accessibility of the city. In view of it, this factor is tagged **Transport Arrangement**.

5.4.1.6 Reliability Analysis

To evaluate the internal consistency of each factor, a set of α for various groups of items was generated. The reliability of the extracted factors ranged from 0.669 to 0.860, revealing moderate to strong correlations among items in the factors. The α of each factor is shown in Table 5.11.

Table 5.11 Reliability of the Extracted Factors for Economic Sustainability

Factor	No. of Item	α
Factor 1: Quality Welfare Planning & Provisions	7	0.860
Factor 2: Conservation & Preservation	4	0.839
Factor 3: Land Strategic Utilization	8	0.778
Factor 4: Community Contributions	3	0.669
Factor 5: Integrated Design	6	0.740
Factor 6: Transport Arrangement	2	0.730

5.4.2 Relationship between Design Considerations & Environmental Sustainability

5.4.2.1 Determinant of the Correlation Matrix

Factor analysis could also be used to identify the latent factors for achieving environmental sustainability because the correlations among all design considerations ranged from -0.01 to 0.73 and the value for the determinant of the matrix ranged

between 0 and 1 (Table D2).

5.4.2.2 Evaluation of the Matrix

Table 5.12 shows that the KMO measure of sampling adequacy was 0.883 which is meritorious. As the value of the Bartlett's Test of Sphericity was 3362.365 and the associated significance level was small, the correlation matrix probably was not an identity matrix. That meant factor analysis was wise to be conducted.

Table 5.12 Results of KMO & Bartlett's Test for Environmentally Sustainable Urban Design Considerations

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.883
Bartlett's Test of Sphericity	Approx. Chi-Square	3362.365
	df	435
	Sig.	.000

5.4.2.3 Extraction of Factors

Table 5.13 presents the eigenvalues for each factor, the total variance explained by each factor and the percentage of total variance contribution to each of them. Similar to previous case, only 6 factors were extracted. Although the first 7 factors had eigenvalues greater than 1.0 and the seventh factor accounted for less than 5% of the explained variance, scree plot in Figure 5.10 has confirmed that 6 factors were adequate to present the data.

Table 5.13 Total Variance Explained for Environmentally Sustainable Factors

Factor	Initial Eigenvalues		
	Total	% of Variance	Cumulative %
1	9.042	30.140	30.140
2	2.994	9.979	40.119
3	1.817	6.055	46.175
4	1.384	4.615	50.789
5	1.278	4.260	55.049
6	1.253	4.178	59.228
7	1.038	3.459	62.686
8	.975	3.248	65.935
9	.906	3.021	68.955
10	.817	2.722	71.677
11	.743	2.478	74.155
12	.707	2.356	76.512

Factor	Initial Eigenvalues		
	Total	% of Variance	Cumulative %
13	.679	2.262	78.774
14	.595	1.983	80.756
15	.538	1.793	82.549
16	.524	1.748	84.297
17	.505	1.682	85.978
18	.455	1.518	87.496
19	.438	1.458	88.955
20	.420	1.400	90.354
21	.394	1.312	91.666
22	.377	1.257	92.923
23	.341	1.137	94.060
24	.326	1.088	95.148
25	.321	1.071	96.220
26	.299	.996	97.215
27	.222	.741	97.956
28	.216	.720	98.677
29	.207	.691	99.368
30	.190	.632	100.000

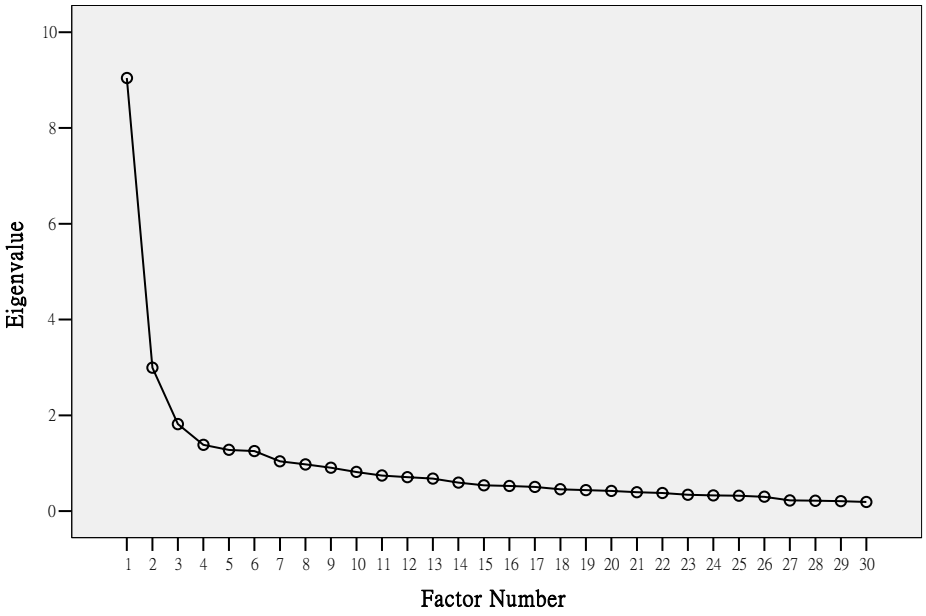


Figure 5.10 Scree Plot for Environmentally Sustainable Factors

5.4.2.4 Rotation of Factors

Promax rotation was also adopted here, and the factor matrix, pattern matrix and structure matrix before and after rotation can be found in Table E4 – E6 in Appendix E.

5.4.2.5 Results

PAF with Promax rotation also generated 6 latent factors for achieving environmental sustainability of urban renewal projects. Table 5.14 shows the factor structure on environmentally sustainable urban design considerations and their corresponding factor loadings.

Table 5.14 Factor Structure on Environmental Sustainable Urban Design Considerations

Urban Design Considerations		Factor Loadings (in descending order)
Factor 1: Land Use Planning		
D_{rev} 7.	Access to work	0.736
D_{rev} 6.	Availability of local employment	0.714
D_{rev} 5.	Proximity to commercial establishments	0.713
D_{rev} 4.	Provisions facilitating establishment of different businesses	0.671
D_{rev} 10.	Availability of housing for different income groups	0.584
D_{rev} 1.	Mixed-use development	0.505
Factor 2: Quality Living Condition		
D_{rev} 29.	Sense of community	0.821
D_{rev} 27.	Preserving & facilitating social networks	0.816
D_{rev} 30.	Provision of security measures	0.630
D_{rev} 26.	Conservation/ improvement of local distinctiveness	0.624
D_{rev} 28.	Community involvement	0.546
Factor 3: Conservation & Preservation		
D_{rev} 19.	Green design	0.824
D_{rev} 18.	Provisions to control pollution	0.789
D_{rev} 20.	Green construction	0.764
D_{rev} 2.	Adaptability of non-domestic development to the changing needs	0.532
D_{rev} 17.	Ease of maintenance & management of buildings, facilities & spaces	0.465
Factor 4: Integrated Design		
D_{rev} 23.	Building form	0.747
D_{rev} 25.	Layout of buildings & streets	0.633
D_{rev} 9.	Convenient, efficient & safe environment for pedestrians & public transport users	0.631
D_{rev} 24.	Compatibility with neighborhood	0.553
D_{rev} 15.	Design of open spaces	0.551
D_{rev} 3.	Efficient use of land & space	0.473
D_{rev} 8.	Convenient, efficient & safe environment for drivers	0.438

Urban Design Considerations		Factor Loadings (in descending order)
Factor 5: Provision of Welfare Facilities		
D_{rev} 14.	Provision of open spaces	0.872
D_{rev} 12.	Access to public facilities	0.677
D_{rev} 13.	Provisions for meeting special needs of the disabled, elderly or children	0.548
D_{rev} 16.	Access to open spaces	0.473
D_{rev} 11.	Provision of public facilities	0.464
Factor 6: Conservation of Existing Properties		
D_{rev} 22.	Rehabilitation of repairable properties	0.708
D_{rev} 21.	Preservation of historical structures & features	0.616

Factor 1 is represented by 6 items regarding land use planning. This factor includes availability of accessible working places and commercial establishments, provision of housing as well as mixed-use development. Since all items are related to the zoning and land-use distribution, this factor is termed **Land Use Planning**.

Factor 2 contains 5 variables in which all of them intend to create a living environment that meets the psychological and emotional needs of the public through urban design. Hence, this factor is named **Quality Living Condition**.

Factor 3 includes 5 items concerning preservation of scarce resources and quality of the living environment. Since environmentally friendly design, pollution control provisions, resources saving installations, adaptable development, and arrangement easing maintenance and management practices contained in this factor attempt to safeguard the natural environment, this factor is labeled as **Conservation & Preservation.**

Factor 4 consists of 7 variables pertaining to the design and integration of public and private spaces in a physical environment. This factor concerns layout of buildings & streets, building and open space design, transportation modes, and so forth. Therefore, the title of this factor is **Integrated Design**.

Factor 5 is composed of 5 variables including availability of accessible open spaces,

public facilities and provisions for the vulnerable groups e.g. the disabled, elderly or children. All provisions are related to social welfare of the citizens; thus this factor is tagged **Provision of Welfare Facilities**.

Factor 6 has 2 items: rehabilitation of repairable properties and preservation of historical structures & features. Both items have a common interest to maintain the conditions of existing properties to an acceptable standard. As a result, this factor is called **Conservation of Existing Properties**.

5.4.2.6 Reliability Analysis

All extracted factors had a α of at least 0.7, which implied that the reliability for these factors was quite high. The α of each factor is provided in Table 5.15.

Table 5.15 Reliability of the Extracted Factors for Environmental Sustainability

Factor	No. of Item	α
Factor 1: Land Use Planning	6	0.819
Factor 2: Quality Living Condition	5	0.810
Factor 3: Conservation & Preservation	5	0.776
Factor 4: Integrated Design	7	0.767
Factor 5: Provision of Welfare Facilities	5	0.798
Factor 6: Conservation of Existing Properties	2	0.712

5.4.3 Relationship between Design Considerations & Social Sustainability

5.4.3.1 Determinant of the Correlation Matrix

Similar to previous 2 correlation matrices, the value for the determinant of this matrix also ranged between 0 and 1 because correlations among all design considerations varied between 0.03 and 0.79 (Table D3). Therefore, factor analysis could also be used to identify the relationship between design considerations and social sustainability for this study.

5.4.3.2 Evaluation of the Matrix

From Table 5.16, it could be observed that the KMO measure of sampling adequacy was 0.912 which is marvelous. The correlation matrix seemed not to be an identity matrix because the value of the Bartlett's Test of Sphericity was 3673.162 and the

associated significance level was also small. The findings justified the application of factor analysis.

Table 5.16 Results of KMO & Bartlett's Test for Socially Sustainable Urban Design Considerations

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.912
Bartlett's Test of Sphericity	Approx. Chi-Square	3673.162
	df	435
	Sig.	.000

5.4.3.3 Extraction of Factors

Eigenvalues, total variance and the percentage of total variance contribution to each of the factors are listed in Table 5.17. A total of 6 factors were extracted here because only the first 6 factors had eigenvalues greater than 1.0 and the sixth factor accounted for less than 5% of the explained variance. This decision was further supported by the scree plot showing that the sixth factor appears prior to the beginning of a straight line through the lower values of the plotted eigenvlues (Figure 5.11).

Table 5.17 Total Variance Explained for Socially Sustainable Factors

Factor	Initial Eigenvalues		
	Total	% of Variance	Cumulative %
1	10.593	35.309	35.309
2	2.243	7.475	42.785
3	1.760	5.865	48.650
4	1.454	4.848	53.498
5	1.179	3.931	57.428
6	1.048	3.494	60.922
7	.918	3.060	63.982
8	.883	2.943	66.925
9	.847	2.823	69.748
10	.803	2.678	72.426
11	.774	2.579	75.005
12	.645	2.150	77.155
13	.609	2.029	79.184
14	.582	1.939	81.122
15	.556	1.853	82.975
16	.532	1.773	84.748
17	.502	1.674	86.422
18	.453	1.510	87.931
19	.436	1.452	89.384
20	.419	1.395	90.779
21	.376	1.255	92.033

Factor	Initial Eigenvalues		
	Total	% of Variance	Cumulative %
22	.359	1.197	93.231
23	.344	1.147	94.378
24	.319	1.062	95.440
25	.286	.953	96.393
26	.264	.880	97.273
27	.249	.831	98.104
28	.222	.741	98.845
29	.194	.646	99.491
30	.153	.509	100.000

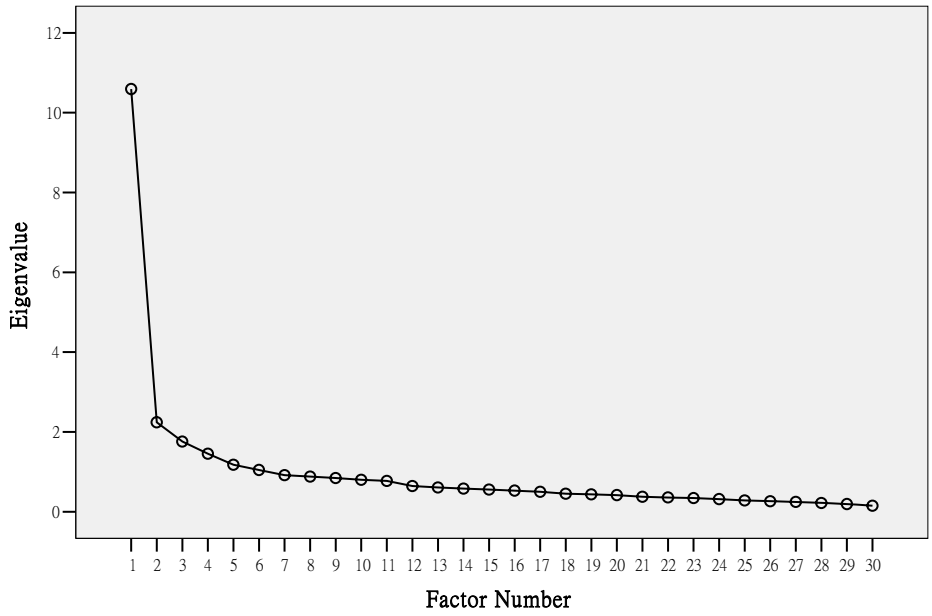


Figure 5.11 Scree Plot for Socially Sustainable Factors

5.4.3.4 Rotation of Factors

Table E7 – E9 in Appendix E presents the factor matrix, pattern matrix and structure matrix produced by factor analysis with Promax rotation.

5.4.3.5 Results

A total of 6 underlying factors for achieving social sustainability of urban renewal projects were generated by PAF with Promax rotation. Table 5.18 depicts the factor structure on socially sustainable urban design considerations and their corresponding factor loadings.

Table 5.18 Factor Structure on Social Sustainable Urban Design Considerations

Urban Design Considerations		Factor Loadings (in descending order)
Factor 1: Quality Welfare Planning & Provisions		
D_{rev} 13.	Provisions for meeting special needs of the disabled, elderly or children	0.756
D_{rev} 27.	Preserving & facilitating social networks	0.744
D_{rev} 29.	Sense of community	0.728
D_{rev} 11.	Provision of public facilities	0.692
D_{rev} 12.	Access to public facilities	0.668
D_{rev} 9.	Convenient, efficient & safe environment for pedestrians & public transport users	0.656
D_{rev} 10.	Availability of housing for different income groups	0.567
D_{rev} 30.	Provision of security measures	0.562
D_{rev} 28.	Community involvement	0.555
Factor 2: Conservation & Preservation		
D_{rev} 20.	Green construction	0.868
D_{rev} 19.	Green design	0.843
D_{rev} 18.	Provisions to control pollution	0.746
D_{rev} 17.	Ease of maintenance & management of buildings, facilities & spaces	0.583
Factor 3: Image Building		
D_{rev} 26.	Conservation/ improvement of local distinctiveness	0.753
D_{rev} 25.	Layout of buildings & streets	0.717
D_{rev} 24.	Compatibility with neighborhood	0.617
D_{rev} 22.	Rehabilitation of repairable properties	0.595
D_{rev} 21.	Preservation of historical structures & features	0.584
D_{rev} 23.	Building form	0.554
Factor 4: Daily Living Provisions		
D_{rev} 6.	Availability of local employment	0.782
D_{rev} 7.	Access to work	0.704
D_{rev} 5.	Proximity to commercial establishments	0.691
D_{rev} 4.	Provisions facilitating establishment of different businesses	0.644
D_{rev} 8.	Convenient, efficient & safe environment for drivers	0.534
Factor 5: Development Strategy		
D_{rev} 2.	Adaptability of non-domestic development to the changing needs	0.616
D_{rev} 3.	Efficient use of land & space	0.581
D_{rev}1.	Mixed-use development	0.568
Factor 6: Open Space Design & Provisions		
D_{rev} 16.	Access to open spaces	0.747
D_{rev} 15.	Design of open spaces	0.597
D_{rev} 14.	Provision of open spaces	0.427

Factor 1 consists of 9 variables, all relating to social welfare of the citizens. Provisions of urban infrastructure and public services such as pedestrian walkway, mass transport, houses, schools, care centres, hospitals and other amenities intend to meet the physical needs of various stakeholders in the community while the remaining items take into account of the psychological and emotional needs of the public. Therefore, the title of this factor is **Quality Welfare Planning & Provisions**.

Factor 2 has 4 items, which focus on the measures to conserve natural resources and provisions to create pollution-free environment for the enjoyment of present and future generations, such as green construction, green design, provision to control pollution and arrangements facilitating maintenance & management. Hence, this factor is termed **Conservation & Preservation**.

Factor 3 is composed of 6 variables concerning the quality of buildings and their neighborhood. This factor involves conservation/ improvement of local distinctiveness, layout of buildings & streets, compatibility with neighborhood, building form, and rehabilitation and preservation of existing properties. Since these items greatly influence the overall image of an area, this factor is tagged **Image Building**.

Factor 4 includes 5 items affecting the way of life of the citizens. As availability of employment, provisions facilitating establishment of businesses and accessibility of various provisions contained in this factor effectively ease the daily life operation of the citizens and contribute to their social well-being, this factor is named **Daily Living Provisions**.

Factor 5 is represented by 3 variables that pertain to the form and direction of the development, including adaptability of non-domestic development, efficient use of land & spaces, and mixed-use development. As a result, this factor is called **Development Strategy**.

Factor 6 contains 3 items in which all of them are related to open space. Hence, this factor is labeled as **Open Space Design & Provisions**.

5.4.3.6 Reliability Analysis

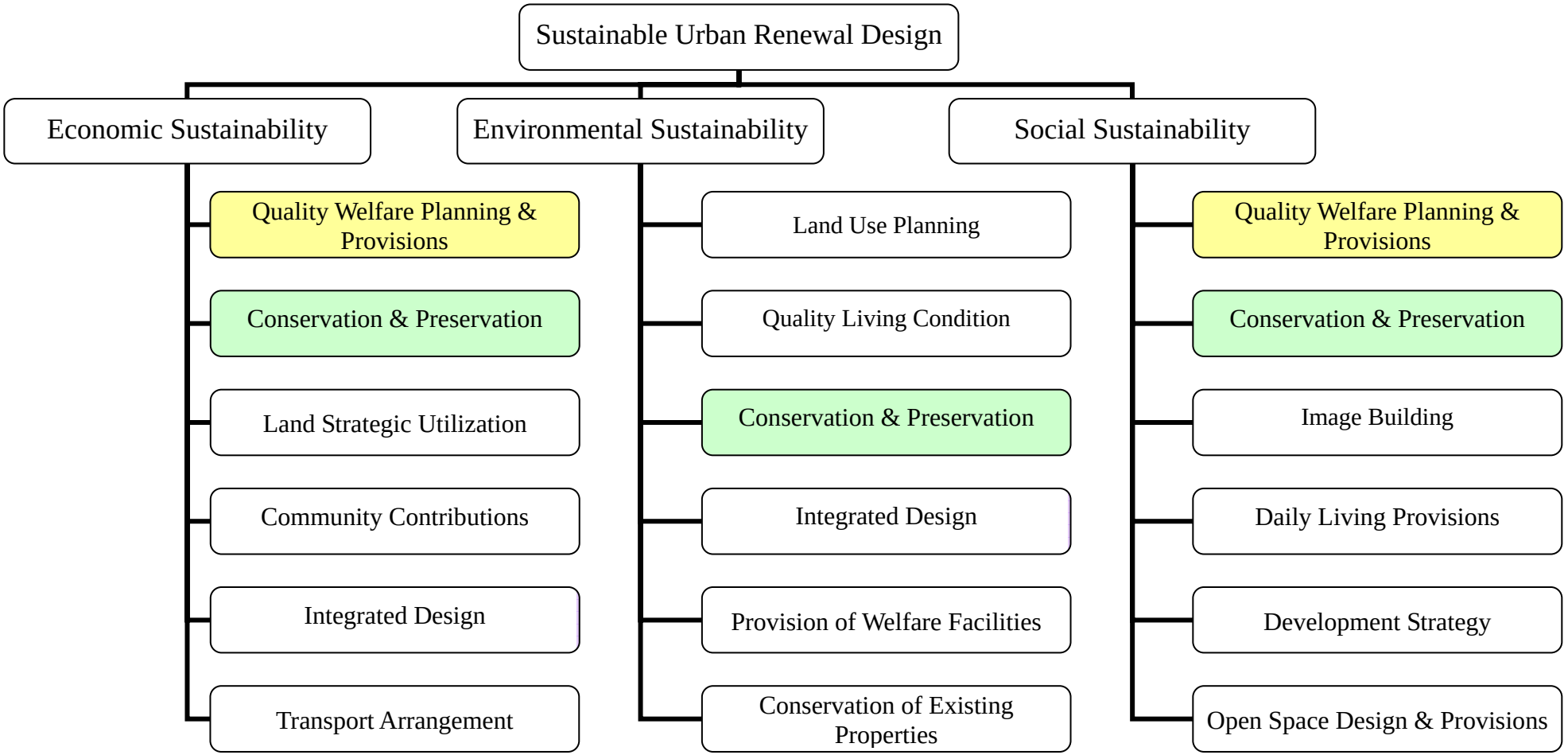
From Table 5.19, it could be seen that the α of the extracted factors ranged from 0.618 to 0.869, which indicated that moderate to strong correlations between items in the factors existed.

Table 5.19 Reliability of the Extracted Factors for Social Sustainability

Factor	No. of Item	α
Factor 1: Quality Welfare Planning & Provisions	9	0.869
Factor 2: Conservation & Preservation	4	0.848
Factor 3: Image Building	6	0.815
Factor 4: Daily Living Provisions	5	0.795
Factor 5: Development Strategy	3	0.618
Factor 6: Open Space Design & Provisions	3	0.755

5.4.4 Summary of Key Findings

By conducting EFA, a total of 6 underlying factors for each of 3 sustainable development objectives were identified and Figure 5.12 has summarized the findings. From the figure, it can be noticed that several factors are capable to meet more than one objective at the same time although their relative importance on each of them is not identical. The details of the discussion are highlighted in Chapter 6.



*Note: The factors having the same label and in the same color are consisted of similar numbers and combinations of urban design considerations.

Figure 5.12 Critical Factors Affecting Sustainability Level of Urban Renewal Projects

5.5 Analytic Hierarchy Process (AHP)

As mentioned before, AHP was adopted here to derive an assessment model for achieving sustainable urban renewal in Hong Kong. Before proceeding AHP, it is necessary to be aware of its distinct feature in order to ascertain the validity of the final results generated from the process. Pairwise comparisons play a crucial role in such process but it would be a disaster for application if a hierarchy is constructed of a large number of criteria. According to Triantaphyllou (2000), the number of pairwise comparisons increases with increasing numbers of criteria. If there are ***n*** criteria to be analysed, ***n* (*n*-1)/2** sets of pairwise comparisons should be made (Triantaphyllou, 2000). In this research, 30 urban design considerations were compiled for main survey. The survey revealed that all of the considerations could contribute to economic, environmental and social well-being; therefore, AHP model should build upon them. However, it is impossible for an expert to perform 435 [i.e. 30 (30-1)/2] pairwise comparisons in a reasonable amount of time in a conscientious and sincere manner. In this way, finding a method that can reduce the total number of criteria without sacrificing the underlying meanings of the 30 considerations is of great practical importance. In order to achieve this, factor analysis which can summarize 30 urban design considerations into a minimum number of factors while maintaining their original value was used. The procedures for conducting EFA and its results had already been presented in previous section. Based on the findings of EFA, a comprehensive hierarchy could be formed before conducting AHP. The hierarchy is made up of the urban design considerations with the highest factor loading in their corresponding factors under each of 3 categories.

The most highly loaded criterion was taken to represent its corresponding factor because it is very difficult for the experts to compare the significance of various factors consisting of different numbers and combinations of the design considerations in AHP. Redefining a particular consideration to represent the whole factor is also not recommended as it would be very confusing when it covers numbers of design focuses. Therefore, it would be better to take a design consideration within a factor to represent it. According to Tabachnick and Fidell (2007), factor loading is the

covariance/ correlation between the latent variable and the observed variables. The latent variable i.e. the design consideration with the highest factor loading would be the one that is the most highly related to its corresponding factor. In other words, that particular design consideration is capable to represent its factor to a larger extent. It is believed that the design criteria highlighted by this method are more understandable and comparable for further analyses.

The success of AHP depends heavily on the selection of the experts for joining this study. In order to have a representative result, a total of 40 experts were invited to participate in the judgment process. They can be divided into 2 groups with 20 experts each. Group 1 is composed of experienced urban design practitioners i.e. architects, town planners and property development managers having more than 10 years' working experiences in the construction industry, having current/ recent involvement in local urban renewal and concerning about the sustainable development in Hong Kong. Group 2 includes the people who are impartial and consider the benefits of the affected parties in urban renewal to be a priority e.g. local scholars at doctorial and professorial level with abundant publications related to the topics of urban renewal/ regeneration, sustainable planning and regional development; people working in non-government organizations (NGOs) and district council members who always stand by the local citizens especially the minority groups. Those parties know the needs and the expectations of the citizens well and therefore their views can represent the citizens' thinking to a large extent. After obtaining individual judgements from the experts, all judgments were synthesized into a single judgment through geometric mean in order to get an overall estimate of the priorities for each criterion in every level of hierarchy (Saaty, 1995).

The priorities produced by AHP not only reflected the relative importance of individual design criterion but also formed a skeleton of the Sustainable Urban Renewal Project Assessment Model (SURPAM) to be derived for assessing the economic sustainability, environmental sustainability, social sustainability and the overall sustainability level of local urban renewal projects. The details of the model are given in Chapter 6 and 7.

5.5.1 Formation of Hierarchy for Achieving Sustainable Urban Renewal

Figure 5.13 shows a hierarchy for producing sustainable urban renewal design in Hong Kong. It is broken into 3 major levels including *goal* level, *objectives* level and *design criteria* level. The goal level is the topmost level which describes the ultimate achievement of this study. This study attempts to work out the most sustainable urban renewal design for a renewed area and therefore, the topmost level is to produce a "sustainable urban renewal design". The second level is the objectives level comprised of 3 aspects: economic sustainability, environmental sustainability and social sustainability. At this level, pariwise comparisons were conducted to identify the priorities of 3 sustainable development objectives in urban renewal projects. The third level consists of various design criteria. They are the urban design considerations bearing the highest factor loadings in their corresponding factors extracted by the EFA. At this level, a series of pairwise comparisons were performed between all design criteria and they were weighted according to their relative importance.

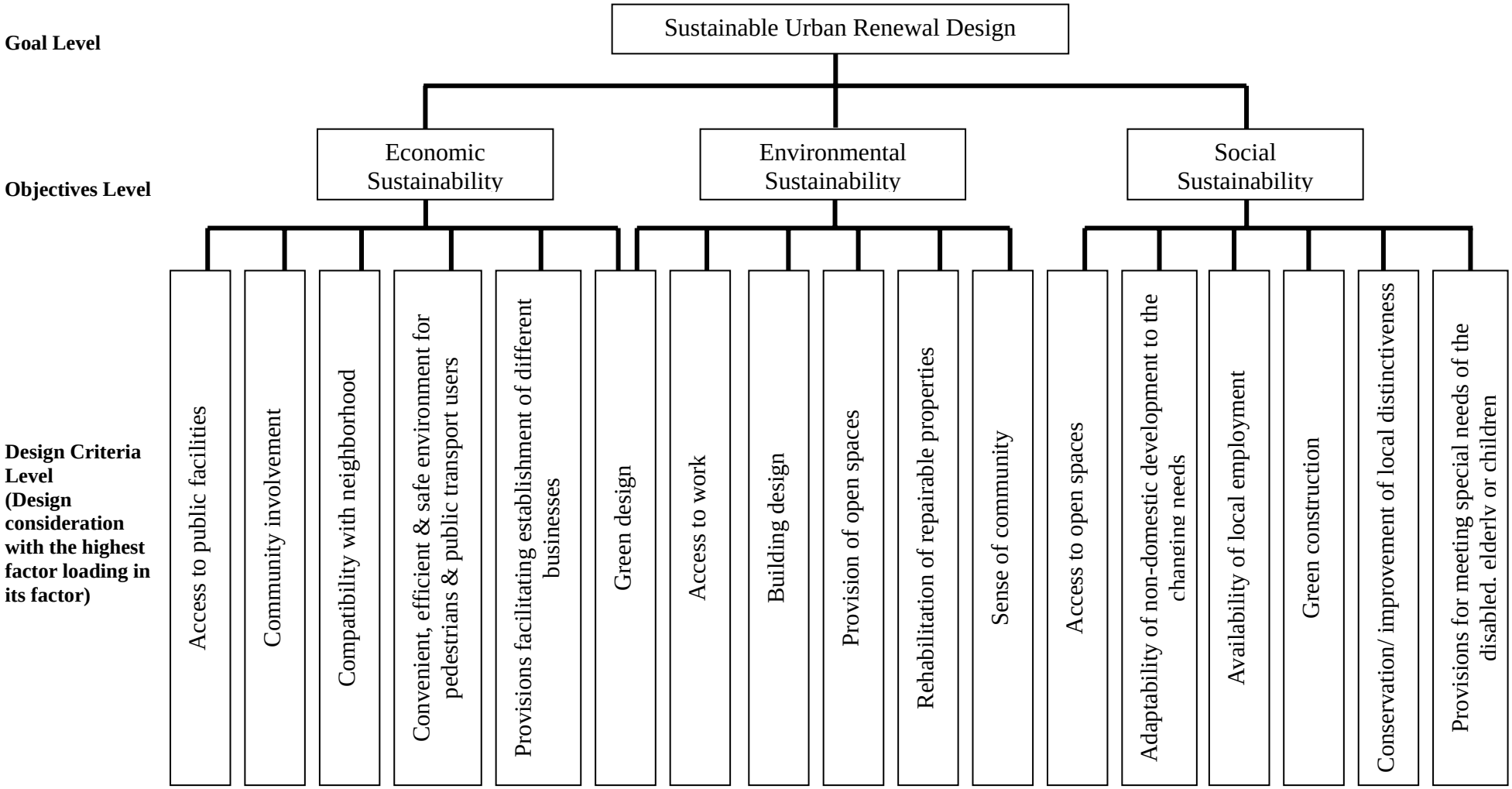


Figure 5.13 Hierarchy for Achieving Sustainable Urban Renewal

5.5.2 Priority Weights of Design Criteria

This study has invited 40 experts being divided into 2 major groups to make judgments on the same hierarchy separately. During individual interview, each expert is requested to take part in AHP judgment process with the aid of a computer software called Expert Choice. By using this software, the relative weights of the objectives and corresponding criteria, and the consistency ratios of the matrices can be calculated. If there is any matrix with an unacceptable C.R. value i.e. > 0.10, the expert is required to make judgement on that matrix again. In order to improve the consistency in ratings, the experts are explained the concept of pairwise comparison before commencement of the judgement process. Figures 5.14 – 5.17 show the relative weights and the C.R. values for the objective matrices and design criteria matrices. In Figures 5.14 and 5.16, 3 sustainable development objectives (level 2 of the hierarchy) were rated pair by pair with respect to the goal (the topmost level of the hierarchy). In Figures 5.15 and 5.17, the design criteria (level 3 of the hierarchy) were rated pair by pair in relation to their respective objective (level 2 of the hierarchy). However, Figures 5.14 and 5.15 are matrices synthesizing the judgments from individual experts in Group 1 while Figures 5.16 and 5.17 are the matrices containing the judgments from the experts in Group 2. The C.R. values of all matrices are less than 0.10 and therefore accepted. The last column of each matrix represents the eigenvectors that indicate the absolute priority weight of each rated criterion.

Matrix 1: Objectives with respect to the goal

	EcS	EnS	ScS	EV
EcS		1.08	1/1.11	0.329
EnS			1/1.44	0.285
ScS				0.387
			C.R.	0.000

Note: EcS = Economic Sustainability; EnS = Environmental Sustainability; ScS = Social Sustainability; EV = Eigenvector

Figure 5.14 Comparisons of 3 Sustainable Development Objectives for Group 1

Matrix 2: Design Criteria with respect to EcS

	APF	GBD	PEB	CYI	CWN	CST	EV
APF		1/1.39	1/2.54	1/1.24	1/2.30	1/2.14	0.094
GBD			1/2.19	1.16	1/1.68	1/1.53	0.128
PEB				2.08	1.28	1.26	0.256
CYI					1/1.66	1/1.42	0.122
CWN						1.05	0.207
CST							0.194
						C.R.	0.000

Note: APF = Access to public facilities; GBD = Green design; PEB = Provisions facilitating establishment of different businesses; CYI = Community involvement; CWN = Compatibility with neighborhood; CST = Convenient, efficient & safe environment for pedestrians & public transport users

Matrix 3: Design Criteria with respect to EnS

	ATW	SOC	GBD	BDF	POS	RRP	EV
ATW		1.26	1/1.15	1/1.21	1.45	1.20	0.175
SOC			1/1.60	1/1.56	1.33	1.13	0.143
GBD				1/1.16	1.82	1.57	0.209
BDF					2.07	1.35	0.220
POS						1/1.08	0.115
RRP							0.138
						C.R.	0.000

Note: ATW = Access to work; SOC = Sense of community; GBD = Green design; BDF = Building form; POS = Provisions of open spaces; RRP = Rehabilitation of repairable properties

Matrix 4: Design Criteria with respect to ScS

	PSN	GBC	CLD	ALE	ADN	AOS	EV
PSN		1.21	1/1.54	1/1.80	1/1.03	1.16	0.146
GBC			1/1.39	1/1.69	1/1.17	1/1.04	0.133
CLD				1/1.23	1.08	1.40	0.192
ALE					1.21	1.62	0.228
ADN						1.20	0.166
AOS							0.136
						C.R.	0.000

Note: PBN = Provisions for meeting special needs of the disabled, elderly or children; GBC = Green construction; CLD = Conservation/ improvement of local distinctiveness; ALE = Availability of local employments; ADN = Adaptability of non-domestic development to the changing needs; AOS = Access to open space

Figure 5.15 Comparisons of Design Criteria for Group 1

Matrix 5: Objectives with respect to the goal

	EcS	EnS	ScS	Eigenvector
EcS		1/1.31	1/1.53	0.261
EnS			1/1.09	0.349
ScS				0.390
			C.R.	0.000

Figure 5.16 Comparisons of 3 Sustainable Development Objectives for Group 2

Matrix 6: Design Criteria with respect to EcS

	APF	GBD	PEB	CYI	CWN	CST	EV
APF		1/1.37	1/2.14	1/1.46	1/1.38	1/1.70	0.109
GBD			1/1.80	1.09	1/1.16	1/1.63	0.141
PEB				1.69	1.57	1.24	0.245
CYI					1/1.13	1/1.52	0.141
CWN						1/1.25	0.158
CST							0.205
						C.R.	0.000

Matrix 7: Design Criteria with respect to EnS

	ATW	SOC	GBD	BDF	POS	RRP	EV
ATW		1.26	1/1.77	1/1.33	1.26	1/1.08	0.152
SOC			1/1.56	1/1.39	1.17	1/1.04	0.141
GBD				1.18	1.41	1.30	0.221
BDF					1.47	1.32	0.197
POS						1/1.04	0.135
RRP							0.153
						C.R.	0.000

Matrix 8: Design Criteria with respect to ScS

	PSN	GBC	CLD	ALE	ADN	AOS	EV
PSN		1.82	1.065	1.01	1.49	1.39	0.207
GBC			1/1.68	1/1.37	1/1.13	1.07	0.127
CLD				1.23	1.44	1.50	0.207
ALE					1.49	1.32	0.186
ADN						1.08	0.139
AOS							0.134
						C.R.	0.000

Figure 5.17 Comparisons of Design Criteria for Group 2

5.5.3 Consensus on Final Weights of Design Criteria

After synthesizing the experts' judgments in both groups separately, it is time to decide whether it is appropriate to combine these results to exhibit the final weights of the sustainable development objectives and the design criteria for the assessment model. In order to find out the answer, the Kendall's *W* was proposed to be generated. Converting the priority weights of individual design criteria ranks is a prerequisite for calculating the Kendall's *W*.

The Kendall's *W* for the rankings of individual design criteria among all respondents, and between 2 expert groups i.e. Group 1 and Group 2 was 0.261, 0.276 and 0.311 respectively (Table 5.20). The null hypothesis, the experts' ratings in a group are unrelated to each other, was rejected at a 0.05 significance level. That means there is substantial agreement among the experts in each of 3 groupings on the rankings of the design criteria for sustainable urban renewal projects.

Since the respondents having different background and expertise more or less agreed the priority weights of the design criteria generated from AHP, the judgments of 40 experts were combined to produce the final weights of the sustainable development objectives and the relative weights of the design criteria (Table 5.21). Then, the final weights of individual criteria could be calculated when the weight of a particular sustainable development objective was multiplied by the relative weights of its corresponding design criteria.

Table 5.20 Ranking & Kendall's *W* for Design Criteria

Design Criteria	All Respondents		Group 1		Group 2	
	FW	**Rank**	**FW**	**Rank**	**FW**	**Rank**
1. ADN	0.058	7	0.064	6	0.054	7
2. PEB	0.068	4	0.084	3	0.064	6
3. ALE	0.072	2	0.088	2	0.072	4
4. ATW	0.053	11	0.050	12	0.053	10
5. CST	0.058	8	0.064	7	0.054	8
6. APF	0.037	17	0.031	17	0.029	17
7. PSN	0.064	5	0.056	9	0.081	3
8. POS	0.045	15	0.052	10	0.047	14
9. AOS	0.054	10	0.033	16	0.052	11
10. GBD	0.109	1	0.101	1	0.114	1
11. GBC	0.053	12	0.051	11	0.050	12
12. RRP	0.049	13	0.039	15	0.054	9
13. BDF	0.063	6	0.063	8	0.069	5
14. CWN	0.055	9	0.068	5	0.041	15
15. CLD	0.070	3	0.074	4	0.081	2
16. CYI	0.044	16	0.040	14	0.037	16
17. SOC	0.048	14	0.041	13	0.049	13
Number (N)	40		20		20	
Kendall's *W*	0.261		0.276		0.311	
Level of Significance	0.000		0.000		0.000	

Where FW = Final weights of the design criteria
H_0 = The experts' ratings in a group are unrelated to each other

Table 5.21 Final Weights of Sustainable Development Objectives & Design Criteria

	Final Weights of Objective	Relative Weights of Criterion	Final Weights of Criterion
EcS	***0.307***		
APF		0.121	0.037
GBD		0.146	0.045
PEB		0.221	0.068
CYI		0.144	0.044
CWN		0.178	0.055
CST		0.190	0.058
EnS	***0.322***		
ATW		0.165	0.053
SOC		0.151	0.048
GBD		0.199	0.064
BDF		0.194	0.063
POS		0.138	0.045
RRP		0.153	0.049
ScS	***0.371***		
PSN		0.172	0.064
GBC		0.142	0.053
CLD		0.189	0.070
ALE		0.193	0.072
ADN		0.158	0.058
AOS		0.146	0.054

CHAPTER 6 DISCUSSION OF KEY FINDINGS

6.0 Introduction

This chapter intends to highlight the factors affecting the sustainability of the urban renewal projects significantly and explain how individual factors captured from the EFA could contribute to their corresponding sustainable development objectives. It also helps to construct a conceptual framework of the model for assessing various urban renewal projects in the future.

6.1 Factors Affecting Sustainability of Local Urban Renewal Projects

In the last chapter, a total of 6 underlying factors for each of 3 sustainable development objectives were identified through EFA while their importance was revealed after conducting AHP. A detailed discussion of how individual factors affect the sustainability of urban renewal projects and their relative importance is given in the following sections.

6.1.1 Factors enhancing Economic Sustainability

6.1.1.1 Quality Welfare Planning & Provisions (Factor 1)

This factor includes 7 variables providing quality welfare to the citizens and fulfilling various social needs of them. Provisions of accessible open spaces and public facilities meet the physical needs of different stakeholders while preserving social networks and enhancing sense of belongings fulfill the psychological needs of the public. According to Eberts (1986), investment in providing public infrastructure and social services is one of the means to promote economic development, and their existence is a precondition for economic growth. Developments proximity to open spaces, recreational areas and various types of public facilities attract buyers and investors because these provisions can improve their quality of life and facilitate their daily life operations. Rising demand for such developments tends to push the property prices up, which significantly stimulate the economic growth (Eberts, 1986).

Flow of money in local economy rises as investments from the investors and money generated from spin-off development also increase. Furthermore, work efficiency and productivity of the public would improve once their physical and psychological desires have been met.

6.1.1.2 Conservation &Preservation (Factor 2)

This factor contains 4 items regarding resources preservation and environmental protection, which includes green design, green construction, provisions to control pollution and facilitate effective maintenance and management. Green design and construction, and arrangement easing future maintenance and management not only benefit the physical environment but also save the expenses of consuming different renewable and non-renewable resources and materials (Corbett and Corbett, 2000). Provision of pollution control measures also plays an important role in economic sustainability. A recent study revealed that tangible health-care costs, productivity lost due to pollution-related illness, and intangible costs including the value of lost lives and the willingness to pay to avoid illness can be saved by reducing air pollution (Majithia, 2006). In addition, property and land values increase when the environmental quality is high and unfavorable externalities such as air and noise pollution are absent (Shultz and King, 2001).

6.1.1.3 Land Strategic Utilization (Factor 3)

This factor is composed of 8 variables concerning the form and direction of development, and land use planning. It includes provisions facilitating establishment of businesses, proximity to commercial establishments, mixed-use development, adaptable development, efficient land use, and availability of accessible working places and different types of housing. Accessible development with a wide variety of uses and businesses attracts visitors and consumers as their time for searching various products and services can be saved. A highly adaptable development and an efficient use of land and space maximize the economic gains by optimizing utility values of land or individual property and facility (Montgomery, 1998). Availability of employment and housing for different groups of people are also good for the economy as they draw population who can support local economic activities through

regular consumption and expenditure (Oktay, 2004).

6.1.1.4 Community Contributions (Factor 4)

This factor consists of 3 items requiring active engagement of the public i.e. community involvement, preservation of historical structures & features, and rehabilitation of repairable properties. When the degree of community involvement in construction and delivery of urban policy is high, more local interests and needs can be met, and thus more public funds and investments can be attracted. Preservation and rehabilitation of existing properties also have positive effect on the economy as the time and cost of the communities incurred in retaining or improving existing conditions are much lower than demolition and reconstruction (Pearce et al., 1996). In addition, prompt repair and regular improvement of deteriorating buildings enhance their market values as well as the neighboring property prices (Carmon and Moshe, 1988). Under the laisser-faire approach currently adopted by the Hong Kong Government, preservation of historical structure and features (except proposed or declared monuments), and rehabilitation of dilapidated properties strongly require the initiations of the private developers or property owners. The economic benefits from preservation and rehabilitation cannot be obtained unless there is support from the community.

6.1.1.5 Integrated Design (Factor 5)

This factor includes 6 variables relating to the design and integration of the public and private spaces such as open spaces, buildings, streets and other neighboring places in an urban area. According to Barnett (1982), attractively designed public spaces have positive effect on retailing. The appearance and setting of buildings and neighboring places also influence the property values and the transaction prices of the development. Buildings that are well-designed and properly combined with open areas and streets have higher rental and sale values because the occupants, potential owners and the investors are willing to pay more for the developments having harmonious and safe environment, and accentuating the characteristics of the community (Lee, 2003).

6.1.1.6 Transport Arrangement (Factor 6)

This factor involves 2 items that highlight the importance of having convenient, effective and safe pedestrian walkways and transportation networks in a community. It is widely recognized that transportation system contributes to the vibrancy of property market and economic prosperity because the values of lands and buildings along the transport routes are much higher than those apart (Lau and Sadowski, 2000). Areas that are easily accessible by road and rail attract investments from the entrepreneurs as transportation costs for production and delivery of goods and services can be greatly reduced (Eberts, 1986). The citizens also request a higher mobility as the time and cost spent for commuting from home to job and neighborhood can be saved for additional production and consumption.

6.1.2 Factors enhancing Environmental Sustainability

6.1.2.1 Land Use Planning (Factor 1)

This factor has 6 items related to zoning and land-use distribution. It includes availability and accessibility of employment and commercial establishments, availability of housing and mixed-use development. Land is a natural resource which is indispensable to the ecology as it supplies food, and supports construction of working places, shelters and other infrastructure. When a development exceeds the carrying capacity of a land, the ecology is harmed and environmental sustainability cannot be achieved (Tang and Lam, 2000). Hence, an efficient and effective use of land resources, and a proper integration of different land uses within a development are required to secure a long-term productivity of such rare resources.

6.1.2.2 Quality Living Condition (Factor 2)

This factor consists of 5 variables in which all of them intend to create a living environment that increase the feeling of psychological well-being of the public through urban design. It aims to enhance the sense of community of the citizens, preserve community ties, reduce crime, promote local distinctiveness, and facilitate public participation in policy-making. When the psychological needs of the citizens are gratified within their communities, they feel happy and their senses of civic pride

enhance (Inam, 2002). As mentioned by the Victorian Association for Environmental Education (2006), people having a strong sense of belonging to their community are more likely to develop a higher sense of responsibility to their living environment. Therefore, they are more willing to take actions to protect the urban ecology.

6.1.2.3 Conservation & Preservation (Factor 3)

This factor contains 5 items which concern preservation of scarce resources and quality of the built environment. It includes environmentally friendly design and installations, pollution control provisions, adaptable development and provisions easing effective maintenance and management. Undoubtedly, proper building deposition and design, provision of pollution control measures, installations of environmentally friendly devices, and measures for effective maintenance and management safeguard the environment as they optimize the use of natural resources available in a community, improve environmental quality of the city, and minimize the wastage of scarce resources. Adaptability of non-domestic development to the changing needs is also contained in this factor because a highly adaptable building and urban forms can cater for changing political environment, economic condition, technology level, and the demands of the citizens without leading to premature replacement and unnecessary consumption of resources.

6.1.2.4 Integrated Design (Factor 4)

This factor includes 7 variables pertaining to the design and integration of public and private spaces in a physical environment. Layout of buildings & streets, building and open space design, transportation modes, compatibility with neighborhood, and efficient use of land & space are included in this category. Buildings and streets should be of appropriate form, mix and position in order to ensure that the uses are compatible with the surrounding areas, disruption to the urban spaces and natural landscapes is minimized, and negative impacts on micro-climate are avoided. Convenient pedestrian passages and public transport networks, and efficient motor access reduce energy consumption and emission of pollutants (CABE and DETR, 2001). Well-located and properly designed open spaces with greenery mitigate the

harshness of the environment and enhance the aesthetic value of an urban area simultaneously (Ong and Zhang, 2004).

6.1.2.5 Provision of Welfare Facilities (Factor 5)

This factor is composed of 5 variables which include availability of accessible open spaces, public facilities and provisions for the vulnerable groups e.g. the disabled, elderly or children. Open spaces and the premises accommodating public facilities commonly have a lower density than the residential and commercial developments. They provide buffer zones in congested urban environment which improve the air flow between and within buildings, and minimize urban heat island effect (Lim and Leung, 2000). Access to opens spaces and public facilities are also included in this factor because the citizens have more incentives to travel on foot when the accessibility of social facilities increases. In this way, total vehicular movement reduces, and the pollutants emitted by vehicles and the associated traffic noise also diminish substantially.

6.1.2.6 Conservation of Existing Properties (Factor 6)

This factor involves 2 items showing the importance of building rehabilitation and heritage preservation in environmental sustainability of urban renewal projects. When the derelict properties are refurbished and the heritage is retained, generation of demolition and construction wastes is minimized (Jones and Clements-Croome, 2004). In addition, repairing and preserving existing structures consume fewer building materials and natural resources than new construction (Pearce et al., 1996). Therefore, more resources can be saved and used elsewhere.

6.1.3 Factors enhancing Social Sustainability

6.1.3.1 Quality Welfare Planning & Provisions (Factor 1)

This factor consists of 9 variables in which items D_{rev} 9 - D_{rev} 13 intend to fulfill the physical needs of various stakeholders in the community, and for the rest, psychological and emotional needs of the public are taken into account. It not only includes provisions of urban infrastructure and public services such as pedestrian

walkway, mass transport, houses, schools, care centres, hospitals and other amenities but also embraces the commitments to preserve social network, enhance citizens' sense of community, tighten security against crime and other threats, and facilitate community participation in policy-making. Provisions of various social infrastructure and public facilities are good for social well-being as they improve the public health and quality of life of different groups, meet their modes of living, reduce social inequality, and enhance civic pride (Rothenberg, 1969; Corbett and Corbett, 2000; Grange, 2004).

6.1.3.2 Conservation &Preservation (Factor 2)

This factor has 4 items regarding conservation of natural resources and provision of a high quality and pollution-free environment for the enjoyment of present and future generations. It includes proper building orientation and façade design, installations of environmentally friendly fittings, and provisions of pollution control measures, all of which can secure a comfort and quality living environment for the citizens. The item "Ease of maintenance & management of buildings, facilities & open spaces" is also contained in this factor because it facilitates and encourages routine maintenance and management works to be conducted in the future, which are essential to keep the conditions of the physical environment to an acceptable standard, prevent premature deterioration and reduce huge expenses for delayed repair.

6.1.3.3 Image Building (Factor 3)

This factor is composed of 6 variables concerning the quality of buildings and their surroundings. It involves conservation/ improvement of local distinctiveness, layout of buildings & streets, compatibility with neighborhood, building form, and rehabilitation of existing properties and preservation of historical structures. Buildings as well as the neighboring areas should be properly designed to create a comfort and compatible living environment, and well-maintained to improve the living standard of the citizens. In addition, the uniqueness of an area can be highlighted when the heritage and underlining distinctive characteristics of the local area are preserved. That explains why these 2 items are also included in this factor.

6.1.3.4 Daily Living Provisions (Factor 4)

This factor contains 5 items, including availability of employment, provisions facilitating establishment of businesses and accessibility of various provisions that affect the living standard and the way of life of the public. A community containing a significant amount of job opportunities and various commercial activities is welcomed by every citizen. Employment contributes to social well-being as the public can generate incomes from the works to support their life and the working place can offer an area for social contact and interaction (Omann and Spangenberg, 2002). In addition, poverty, social exclusion, welfare dependence, family problem and social disorder decrease with increasing employment rate (Stiglitz, 2001). The citizens demand different types of commercial establishments such as supermarkets, retail shops and cafés because these businesses support their daily life operations and provide gathering places for various social groups. Urban accessibility is also included in this factor because it attracts entrepreneurs in return for business opportunities, allows freedom of movement and facilitates social interactions.

6.1.3.5 Development Strategy (Factor 5)

This factor involves 3 variables which include adaptability of non-domestic development, efficient use of land & spaces, and mixed-use development. A flexible design allows a rapid response to the changing needs while an efficient land use meets various social objectives in a more economical and effective way. Proper control of the use of urban spaces also contributes to the social sustainability of cities. For instance, integration or segregation of uses helps to reduce social inequalities and prevent social exclusion.

6.1.3.6 Open Space Design & Provisions (Factor 6)

This factor includes 3 items in which all of them are related to open space. This factor explains that it is very important for the sustainable urban renewal projects to provide accessible and well-designed open spaces in the community. Open spaces provide a spacious zone in crowded urban areas for social gathering and interaction (Cuthbert and Dimitriou, 1992; Chui, 2003). The open space with greenery in particular is recognized as the major contributor to social well-being because they

effectively improve the physical health of the residents and reduce human stress (Morris, 2003).

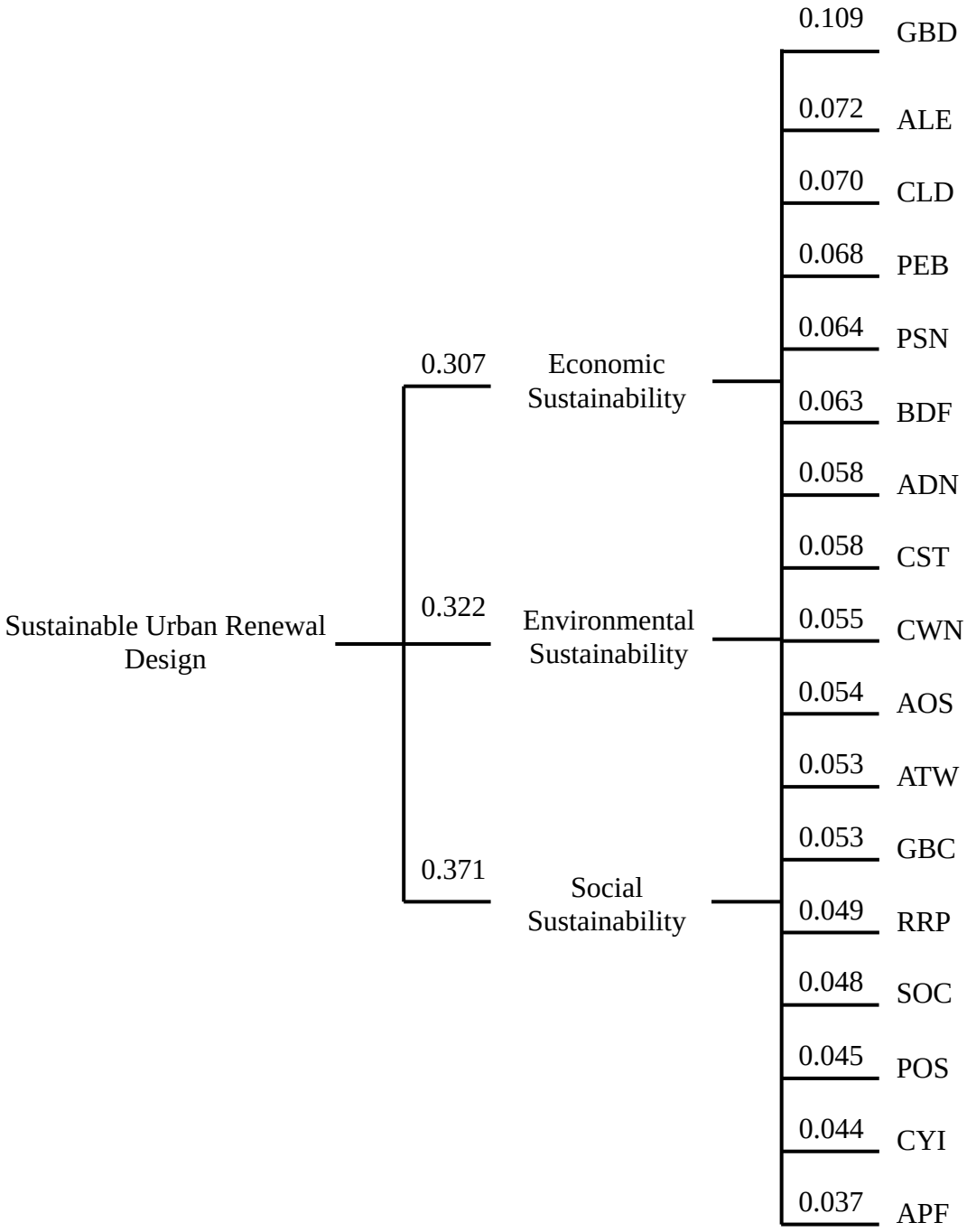
6.2 Conceptual Framework of Sustainable Urban Renewal Project Assessment Model (SURPAM)

6.2.1 Skeleton of the Assessment Model

In this study, the assessment model was planned to be developed by AHP. The AHP modeling is mainly composed of 3 key procedures namely decomposition, comparative judgments and synthesis of priorities (Saaty, 1980). Decomposition means that a complex issue is broken down into a set of manageable parts/ levels to form a hierarchy. After conducting pairwise comparisons of the relative importance of criteria in every level of the hierarchy with respect to the criteria in the level immediately above, the results of comparative judgments are presented in the matrices with corresponding C.R. value which should pass the acceptable level. The synthesis process weighs the criteria at the lowest level of the hierarchy and the sum of the weights across all criteria at that level should be equal to 1. Figure 6.1 provides a framework of SURPAM following the procedures of AHP modeling. The components of the framework are generated from the results of factor analysis and AHP which are clearly presented in Chapter 5.

6.2.2 Implication of Priority Weights Obtained

From Figure 6.1, it can be observed that the weights of 3 sustainable development objectives are similar, i.e. about 1/3 of the total sum of weights. The result indicates that the experts as a whole have not overemphasized/ ignored the significance of a particular aspect. All of these 3 sustainable development objectives have similar status in the model and none of them dominates. This finding confirms what the researchers have mentioned in their previous studies that economic development, environmental quality and social equity are important components of sustainable development, and these 3 components have to be properly integrated and balanced in order to create sustainable communities (Campbell, 1996; Berke and Conroy, 2000; Shearlock et al., 2000; Civic Exchange, 2002).



Note: GBD = Green design; ALE = Availability of local employments; CLD = Conservation/ improvement of local distinctiveness; PEB = Provisions facilitating establishment of different businesses; PSN = Provisions for meeting special needs of the disabled, elderly or children; BDF = Building form; ADN = Adaptability of non-domestic development to the changing needs; CST = Convenient, efficient & safe environment for pedestrians & public transport users; CWN = Compatibility with neighborhood; AOS = Access to open space; ATW = Access to work; GBC = Green construction; RRP = Rehabilitation of repairable properties; SOC = Sense of community; POS = Provisions of open spaces; CYI = Community involvement; APF = Access to public facilities

Figure 6.1 Framework of Sustainable Urban Renewal Project Assessment Model (SURPAM)

When looking at the objectives level, it can be observed that the weight of socially sustainable objective is slightly higher than the others. Not surprisingly, both expert groups emphasize a bit more on social sustainability because urban renewal is often beset with social problems such as destruction of existing social networks, expulsion of vulnerable groups and generation of adverse impacts on living environments (Rothenberg, 1969; Couch, 1990; Ng, 2002; Lee, 2003), which has instigated urgent need for substantial improvement in the performance of local urban renewal projects especially in social realm (Ng et al., 2001; Lai, 2002).

For the design criteria level, the absolute weight of the design criterion GBD is the highest because both expert groups believe that this criterion can significantly contribute to economic and environmental sustainability. This finding is in line with the view of Chartered Institute of Housing (2000), and Corbett and Corbett (2000) that green design can safeguard the natural environment by optimizing the use of natural resources, and at the same time save the expenses of consuming different renewable and non-renewable resources and materials.

Apart from the design criterion GBD, there is no big difference among the weights of the remaining design criteria. The difference between the weights of the design criterion ranked second i.e. ALE and the design criterion in the last place i.e. APF is only 0.035 while the maximum difference between the weights of 2 immediate intervals, say CYI and APF, is merely about 0.007. This result implies that almost all the design criteria have a balanced position in the assessment model and none of the design criteria included therein is overlooked.

CHAPTER 7 SUSTAINABLE URBAN RENEWAL PROJECT ASSESSMENT MODEL

7.0 Introduction

This chapter highlights the purposes, the values, the structure and the assessment mechanism of the Sustainable Urban Renewal Project Assessment Model in the first instance. Afterwards, it discusses the assessment indicators which play an important role in the model for evaluation of the urban renewal projects. It has mentioned the criteria for selection of indicators, the types of indicators available in the world, and the development of appropriate indicators to represent individual design criteria and their corresponding point scoring system. To ensure that the model is reliable and capable to assess the sustainability of the urban renewal projects in Hong Kong, the assessment tool has to undergo a comprehensive evaluation process. In the last section of this chapter, the implementation details of the assessment are also presented.

7.1 Purposes of this Model

This Sustainable Urban Renewal Project Assessment Model (SURPAM) intends to serve as a planning tool for the urban design professionals, developers and the officials working in URA as well as a participation tool for the local citizens. It is particularly applicable to assess comprehensive urban renewal projects containing a large scale and mixed-use development. Most often, when an urban renewal project is launched, positive and negative comments are attracted. However, the majority of the people cannot clearly pinpoint how good/ bad the projects are. Therefore, a systematic, practical, accountable and modifiable model that can verify the quality of the project is required. In view of it, this study makes a great effort to develop an assessment model to measure the project against a set of standards covering both intangible and tangible issues. This model derived here aims to measure the sustainability level of different urban renewal schemes for the selection of the most

appropriate design for an area undergoing urban renewal, and for the evaluation of the design quality of individual urban renewal projects. With the help of the model, the people can identify the capability of the renewal project to meet various sustainable development objectives, and recognize its deficiencies for subsequent adjustments. Once the deficiencies are noted, relevant parties can take immediate action to rectify and refine the design accordingly.

7.2 Values of Deriving the Model

The SURPAM can benefit the urban (re)development practitioners and local citizens who are the key stakeholders being involved in and affected by the urban renewal projects. Since this model requires considerable inputs from the citizens, the final outcome can reflect their degree of satisfaction and acceptance of a particular renewal proposal. According to the assessment result generated by the model, the practitioners can make necessary adjustments or clarifications in the design in order to reduce social opposition to and risk of failure of the project to be conducted afterwards. In addition, this model can distinguish good quality renewal project from the bad one in terms of sustainability level. It provides a positive recognition for the renewal projects with favorable assessment results and offers additional opportunity for the project initiator to promote those projects.

By using this model, the citizens have a chance to express their views on the design of the urban renewal proposal and influence the project development from an earlier stage. This model provides a systematic, transparent and traceable channel for the local authorities, urban (re)development practitioners and the local citizens to exchange their views and concerns regarding the preliminary design, which is crucial to the production of a mutually beneficial project. The citizens are better off when the renewal projects with favorable assessment results are conducted because those projects are likely to meet the sustainable development objectives especially the social needs of the present and future generations.

7.3 Structure & Assessment Mechanism of the Model

Figure 7.1 has clearly shown the structure of the SURPAM. In Chapter 3, 6 urban design principles had been identified for Hong Kong. Based on these principles and the results of the pilot study, 30 urban design considerations for improving local urban renewal practices were identified. Afterwards, EFA was conducted and a total of 6 factors had been extracted for each of 3 sustainable development dimensions. In order to form the hierarchy of the assessment model, the urban design considerations with the highest factor loading were extracted from each factor and 17 design criteria were therefore included. With the help of 2 groups of experts, AHP was successfully conducted. The relative importance of individual criterion in the hierarchy was identified and the skeleton of the SURPAM was derived.

One may query how SURPAM helps to select the most appropriate renewal design proposal for an urban area. Generally speaking, there would be one or more preliminary design proposals suggested for an area undergoing urban renewal. These urban renewal proposals can be assessed separately by the model against the same set of criteria in order to find out their ability to achieve the sustainable development objectives. The sustainability level of an urban renewal project is represented by an overall score which is equal to 10 or below, and it is calculated by multiplying the final weight of each design criterion and the score indicating the performance of the project with respect to individual criterion. The overall score of a project is calculated using the formula as shown in equation (7.1).

$$P_k = \sum_{j=1}^{17} W_j \times S_{kj} \qquad \text{---- equation (7.1)}$$

where P_k = Overall score of an urban renewal proposal k
W_j = Final weight of criterion j in 3rd level
S_{kj} = Score of proposal k on criterion j
j = 17 design criteria

By calculating the scores for each proposal, the best option for the area undergoing urban renewal can be easily identified. The strength and the weakness of each renewal proposal can clearly be observed when looking into the composition of their scores. The design criteria that have been overlooked in the best option can also be

highlighted, and further improvement can then be made.

An example shown below is used to illustrate the assessment mechanism of the SURPAM. Supposing there are 2 potential renewal proposals (A & B) for an area to be renewed. These proposals are included in an *alternative* level (the forth level), the lowest level added to the SURPAM. The final score of proposal A (P_A) is equal to $W_1 \times S_{A1} + W_2 \times S_{A2} + \ldots + W_{17} \times S_{A17}$ while that of proposal B (P_B) is equal to $W_1 \times S_{B1} + W_2 \times S_{B2} + \ldots + W_{17} \times S_{B17}$. Then, 2 final scores are compared and the one with a higher score can be regarded as a more sustainable urban renewal proposal for that particular area. In addition, this assessment mechanism is also applicable to evaluate sustainability level of the urban renewal projects. The implementation details are going to be shown in section 7.6.

In order to obtain the final output of the model i.e. the overall score of a project, it is necessary to identify the value of each component in the formula. The final weights of 17 design criteria (W_1 - W_{17}) have already been generated by AHP which is presented in Figure 6.1 but the scores of individual criteria (S_{k1} - S_{k17}) have not yet been confirmed as they vary from project to project depending on the quality of the project design. The quality of a renewal project in terms of 17 design criteria cannot be assessed unless a reliable assessment tool is also developed. In view of it, an assessment tool consisting of a set of performance indicators and a point scoring system is derived. However, establishing relevant and representative indicators for measuring 17 design criteria is not a simple and easy task. Therefore, this study has undergone a thorough investigation of the indicators and the details are presented in the following section.

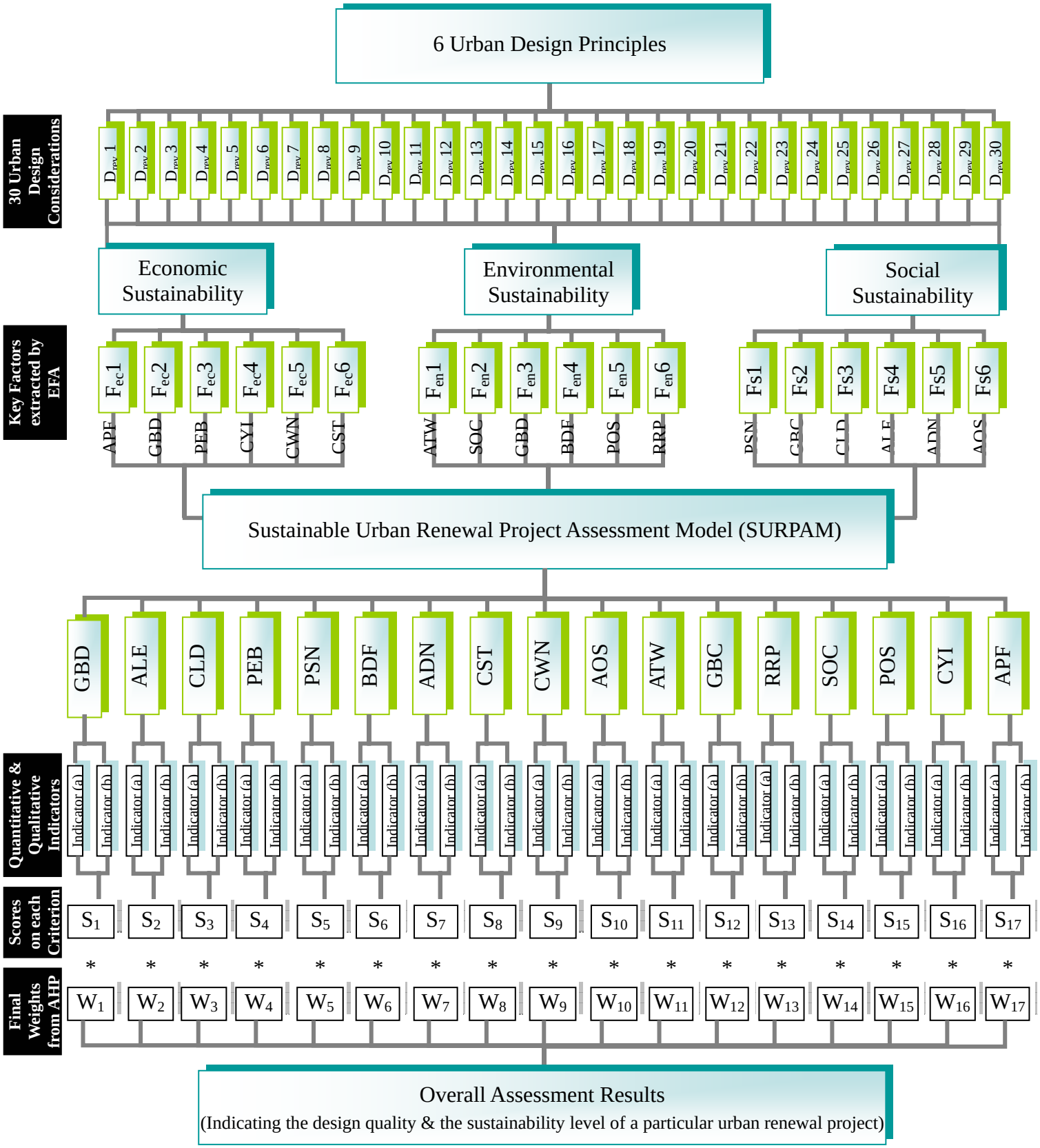


Figure 7.1 Structure of Sustainable Urban Renewal Project Assessment Model (SURPAM)

7.4 Indicators for the Model

7.4.1 Criteria for Selection of Indicators

An indicator is able to translate the complex data/ phenomenon into concise, understandable and manageable units of information which is measurable by different groups of people for assessing achievement, change and/ performance (Sors, 2000; Andresen et al., 2004). In this study, the indicators play an important role to identify the extent to which an urban renewal project being assessed achieves sustainable development in terms of various design criteria. They provide guidance for the decision makers concerning sustainable development to work out the most appropriate urban renewal proposal for a particular area and provide an early warning to the project designers to minimize/ prevent potential economic, environmental and social damages before project commencement.

In order to ensure that the appropriate indicators are developed, a number of requirements as shown below should be fulfilled (Sors, 2000; Blair et al., 2004; Häkkinen, 2006).

1. Significant – The indicators should be significant for evaluating sustainable development and reflecting the major characteristics of individual design criteria highlighted in this study.

2. Relevant – The indicators should be relevant to the local conditions, emphasizing the aspects related to urban renewal and sustainable development in Hong Kong.

3. Valid – The indicators should be meaningful, credible, conceptually sound and scientifically/ theoretically valid.

4. Representative – The indicators should be able to represent important concerns, and reflect the interests and views of different stakeholders.

5. Reliable – The indicators should provide information that can be trusted.

6. Understandable – The indicators should be clear, simple, unambiguous and easily and readily understandable to everyone including the layman without specific knowledge.

7. Measurable – The indicators even the qualitative ones should be able to be measured systemically with reference to an appropriate scale, and the measurements should be comparable and consistent over a certain period of time.

8. Convenient – The indicators should be based on the information of known quality which is readily available, easily accessible and technically feasible to collect, or can be obtained at a reasonable cost and in a fair period of time.

9. Flexible – The indicators should be adaptable to changes due to an alteration in political, economic, environmental, social conditions; advanced technology; new requirements/ standards of sustainable development, etc.

10. Consistent – The indicators representing each design criterion should be coherent and consistent with each other.

11. Repeatable – The way of measuring the indicators should be reproducible and the measurement results should be repeatable.

In fact, it is very difficult for every indicator to conform to all of the requirements as mentioned above. Therefore, when developing the indicators, it is only necessary to ensure that they are adhered to these requirements as much as possible.

7.4.2 Types of Indicators

In recent years, different sets of indicators have been developed worldwide for assessing sustainable development. A European research project entitled “Trends and Indicators for Monitoring the European Union Thematic Strategy on Sustainable Development of Urban Environment (TISSUE)” was carried out and a TISSUE

browser was produced thereafter. With the help of TISSUE browser, the way of how the European countries evaluate sustainable development is revealed (Häkkinen, 2006). There are 57 sets of indicators included in the TISSUE browser (Table 7.1) in which 42 of them emphasize on sustainable urban design, 39 of them monitor sustainable urban transport, 28 of them focus on sustainable urban construction while 26 of them concern sustainable urban management. As all of them are related to the quality of urban environment, each set has contained the indicators covering environmental issues, ecology, or natural landscape, etc. no matter whether they are developed at the international, national or regional level.

When looking at the details of those sets of indicators concerning the development on a local scale, it can be observed that many of them attempt to assess and monitor the environmental impacts of the building construction and occupation in terms of air quality, noise level, water and energy consumption, use of natural resources, wastes generation and refuse treatment. In addition, many assessment systems include the indicators highlighting the availability and accessibility of economic opportunities, employment, affordable and quality housings, green spaces, public facilities and services, pedestrian areas and public transport networks. Some of them even emphasize the urban structure, land use, public health and safety, public participation as well as user satisfaction.

Table 7.1 Sets of Indicators Listed in TISSUE Browser

List of Sets of Indicators
1. Adriatic Common Indicators (ACI)
2. Analyse Concerté des Transformations et des Equilibres URbains (ACTEUR)
3. Baden-Württemberg-Indicators in the framework of the Local Agenda 21
4. Catania – State of the Environment Report
5. Cercle Indicateurs (CI)
6. Cities Environmental Reporting on the Internet Indicator Database (CEROI)
7. Cities21®Assessing Mutual Progress Towards Sustainable Development
8. Core Indicator System of the cities Basel and Zürich
9. Czech Republic – Environmental indicator
10. Czech Republic –TransportYearbook 2002
11. Denmarks National Strategy for Sustainable Development
12. European Common Indicators – Towards a Local Sustainability Profile (ECI)
13. EcoBUDGET
14. Ecosistema Urbano
15. European Environment Agency (EEA) – Core set of environmental indicators
16. EEA – Environmental Indicators

List of Sets of Indicators
17. EEA – Europes Environment – The Dobris Assessment
18. EEA - Transport and Environment Reporting Mechanism (TERM)
19. Environment Explorer Amsterdam
20. Environment monitor Dordrecht
21. Environmental Data Compendium
22. EQUER: a life cycle simulation tool
23. Finnish Indicators to monitor sustainable development
24. Healthy Cities Project - European Office of World Health Organisation
25. Helsinki A-indicators
26. Hradec Kralove local indicators
27. IFEN – French national sustainable development indicators
28. Indicateurs du développement durable des villes de Midi-Pyrénées
29. Indicators for Sustainable Development in Scotland
30. Indicators for Sustainable Development inWales
31. Indicators For The Sustainable Development In The Mediterranean Region (ISD)
32. Indicators System to Assess New Urban Services (IANUS)
33. Indikatoren NRW – Indicators for a sustainable development in North Rhine-Westphalia
34. Key Environmental Indicators for Ireland
35. Key Issues and Sustainable Development Indicators System (ISDIS)
36. Local Indicator System for Sustainable Living Quality (LISL)
37. Local quality of life counts
38. Local Quality of Life Indicators – Carmarthenshire
39. MONET project – Swiss national sustainable development indicator system
40. Monitor Urban Renewal
41. Nature Balance
42. Nordic Larger Cities indicators
43. Pamplona –Agenda 21 sustainability indicators
44. Participatively developed indicators from Styria
45. PROPOLIS – Planning and research of policies for land use and transport for increasing urban sustainability
46. Quality of Life indicators – Audit Commission
47. Regional Sustainable Development Framework for the South-West
48. RESPECT – French communities
49. Sélection d Indicateurs du Transport – Région Nord-Pas de Calais
50. Sustainability Indicators Project – West Devon, UK
51. Sustainability Monitor Delft
52. The Integrated Regional Framework for the North East
53. The Xarxa – The Catalan Network of Cities and Towns towards Sustainability
54. The Yearbook PRAGUE–THE ENVIRONMENT
55. Trento – State of the Environment Report
56. Urban Audit – assessing the quality of life of Europes cities
57. Zukunftsfaehige Kommune

Apart from the TISSUE browser, the CRISP had also highlighted certain amounts of indicators related to sustainable construction and creation of sustainable cities (CRISP,

2001). The CRISP is a European Thematic Network which co-ordinates current research works defining and validating various indicators, and implementing them to measure the sustainability of construction projects in the European cities. It includes 40 sets of indicators covering 5 categories (Table 7.2) in which 26 of them assess sustainability performance of the buildings, 14 of them monitor the quality of the building products, 13 of them focus on urban development, 4 of them concern infrastructure provision, and 3 of them monitor construction process. More than 500 indicators were developed and validated under the CRISP. Similar to the TISSUE project, these indicators aims to address different economic, environmental and social issues within the urban built environment, but their emphases on various aspects have not been well-balanced. The indicators dealing with the environmental aspects make up a large proportion while not more than half of them have kept socio-economic criteria in mind.

Table 7.2 Sets of Indicators Listed in CRISP Website

List of Sets of Indicators	
1.	18-indicator system for CGSP and choice demolition or renovation
2.	Architectural quality (Success of principles of architecture)
3.	BECost – Life Cycle Assessment
4.	Bo01
5.	Building Research Establishment Environment Assessment Method (BREEAM)
6.	BUILDING DIAGNOSTICS
7.	Color quality - assessment of visual appearance, attractivity and usability of buildings
8.	Demolition or renovation in a social housing neighborhood : a 48 Pressure indicators system
9.	Ecodec
10.	EcoEffect
11.	Ecological performance of building products and structures
12.	EcoProP – Eco-efficiency indicators for buildings
13.	Eco-Quantum
14.	Ecosistema urbano - Urban Ecosystem
15.	ENVEST and ENVEST II
16.	French standard system XP P01-010 : environmental characteristics of building products
17.	Green Building Challenge (GBC)
18.	Green Guide to Specification; Green Guide to Housing Specification
19.	Hammarby Sjöstad
20.	Healthy Buildings
21.	INDI Model
22.	Indisputable Sustainable Development Indicators System (ISDIS)
23.	Leadership in Energy and Environmental Design (LEED)

List of Sets of Indicators
24. LifePlan
25. Monitor Urban Renewal
26. Movement for Innovation Environmental Performance Indicators
27. MRPI: Environmentally Relevant Product Information
28. Nordic set of environmental indicators for the property sector
29. PIMWAQ
30. PromisE
31. Quality Assurance in Construction
32. REKOS – Eco-efficiency indicators for residential buildings
33. RT Environmental declaration
34. SEA Danube corridor / SUP Donaukorridor
35. Spanish Urban sustainable indicators
36. Sustainability indicator set for the construction sector
37. Sustainable development monitoring indicators at the city scale for the Land Use Plan of Montauban
38. The European Common Indicators Set
39. Total Quality (TQ) Building Assessment System
40. Vlaamse Regionale Indicatoren (VRIND)

Furthermore, previous studies having discussed numbers of indicators were also reviewed here. For example, Andresen et al. (2004) provided a brief introduction to various sets of indicators namely United Nation Commission of Sustainable Development (UNCSD) list of indicators of sustainable development, Organization for Economic Co-operation and Development (OECD) indicators, Sustainability Indicators at European Environment Agency (EEA), Human Development Index (HDI) of United Nation Development Programme (UNDP), and Environmental Sustainability Index (ESI) in which all of them aim to achieve sustainable development at a national level. These lists of indicators claim to have considered different dimensions of sustainable development principles, but in actual fact they have not redressed the balance between economic, environmental and social objectives, and most of them put great emphasis on meeting environmental requirements. Andresen et al. (2004) have also discussed numbers of assessment schemes evaluating sustainable development in building sector like BREEAM in UK, LEED in US, Green Building Challenge (GBC) in Canada, Total Quality (TQ) System in Austria, Haute Qualité Environnementale (HQE) in France, Eco-profile in Norway, E-Audit in Poland, PromisE in Finland, Ecoeffect in Sweden, and Comprehensive Assessment System for Building Environmental Efficiency (CASBEE) in Japan. However, these systems mainly focus on the environmental performance of the

buildings and overlook their socio-economic performance.

According to Bentivegna et al. (2002), Curwell and Deakin (2002), and Hamilton et al. (2002), an international and multi-disciplinary network for urban sustainability had developed a decision support system called Building Environmental Quality Evaluation for Sustainability through Time (BEQUEST) Toolkit which aimed to support sustainability assessments and implementation of sustainable urban development for the benefit of present and future generations. The BEQUEST Toolkit is a system composed of 4 modules namely the Protocol module, the Assessment Methods module, the Advisors module and the Glossary. Among these modules, the Assessment Methods module is the most relevant one to this study. A total of 25 assessment methods are contained in that module (Table 7.3) in which 14 of them assess the environmental performance or impacts of the design, 7 of them evaluate financial viability and social impacts, and 5 of them relate to the methods facilitating the sustainability assessment process.

Table 7.3 Sets of Indicators Available in BEQUEST

List of Sets of Indicators
1. Analytic Hierarchy Process (AHP)
2. Building for Environmental and Economic Sustainability (BEES)
3. BREEAM
4. BRE Environmental Profiles
5. Community Impact Evaluation (CIE)
6. Contingent Valuation Method (CVM)
7. Ecopoint
8. Ecoprofile
9. EcoProP
10. Eco-Quantum
11. ENVEST
12. Environmental Appraisal of Development Plans
13. Environmental Impact Assessment (EIA)
14. Financial Evaluation of Sustainable Communities
15. GBC
16. The Green Guide
17. Impact matrix techniques
18. Managing Speeds of Traffic on European Roads (MASTER)
19. Net Annual Return Model
20. Office, Schools and Local Authority Toolkits
21. PIMWAQ
22. Social Cost-benefit Analysis (SCBA)
23. Social impact assessment (SIA)

List of Sets of Indicators	
24.	System for Planning and Research in Towns and Cities for Urban Sustainability (SPARTACUS)
25.	System Dynamic Approach

In addition to the overseas literature, this study also made reference to local standards and assessment models e.g. Hong Kong Planning Standards and Guidelines (HKPSG) for determining the scale, location and site requirements of various land uses and facilities; CASET for evaluating the implications of the policies and proposals on sustainable development in Hong Kong; Comprehensive Environmental Performance Assessment Scheme for Buildings (CEPAS) for examining the environmental performance of local buildings during the whole building cycle, from pre-design, design, construction and demolition stages, to the operation stage; Hong Kong Building Environmental Assessment Method (HKBEAM) for certifying and labelling local buildings according to their environmental performance to be assessed against numbers of predetermined practice standards, and Building Quality Index (BQI) or Voluntary Building Classification Scheme (VBCS) for categorizing the buildings into different classes with reference to their health and safety quality.

Although none of the above is fully applicable to assess the extent to which the urban renewal projects in the territory have achieved economic, environmental and social objectives simultaneously, these findings have laid the basis for the development of appropriate indicators for this study. During the literature review, it could also be found that the evaluation models available for assessing the effectiveness, achievement and impact of urban renewal/ regeneration policies and practices were relatively limited. The study carried out by Hemphill et al. (2004) seemed to be an important and the most relevant piece of reference for this research as they developed an assessment framework which contained certain amounts of key performance indicators addressing tangible and intangible issues. However, this framework could only be used for post-occupancy evaluation and could not be used to predict the sustainability performance of the urban renewal/ regeneration projects before commencement of works. In addition, this framework was derived on the basis of various UK studies which might not be totally relevant to local context. Therefore, instead of copying all indicators from that model, this study intends to take into account of all indicators shown in this section in order to generate tailor-made

indicators to represent 17 design criteria.

7.4.3 Development of Indicators Representing Individual Design Criteria

There is no absolute standard for determining the total number of indicators for a given purpose (Sors, 2000). A small set of indicators can be managed more easily while a large set can cover a wider range of important issues. To strike a balance between 2 benefits, a reasonable amount of indicators has to be identified. According to Sors (2000), it is justifiable to have 20 to 50 indicators. Therefore, this study intends to develop 34 indicators for 17 design criteria i.e. 2 indicators per each criterion in which both quantitative and qualitative indicators are included.

Both indicators are derived at the same time for the evaluation of urban renewal because it is possible to set the quantitative indicators for certain outputs such as numbers of job opportunities created, but it is difficult to use the same tactics for measuring more subjective sustainability criteria like quality of life and sense of community (Hemphill et al., 2004). In addition, a clearer picture of how the urban renewal projects being assessed have achieved sustainable development objectives can be provided when both types of indicators are developed. It is because the quantitative indicators can generate scientific and objective results while the qualitative indicators can measure the satisfaction of various aspects from the end users' point of view.

In this study, the indicators were developed by two means. They were either selected from the lists contained in the abovementioned assessment tools with/ without modifications or merely tailor-made for this study. Relevant indicators developed elsewhere at city/ regional scale were taken and further adjustments were made to suit the local conditions. If relevant indicators were not available, different sets of indicators in similar fields were investigated in order to ensure that appropriate indicators could be generated to assess the design criteria to be included in the model. Table 7.4 – 7.20 included in the following sections would illustrate what kinds of indicators that are capable to represent individual design criteria have been developed.

7.4.3.1 Green Design

Table 7.4 Indicators for Design Criterion GBD

Indicator 1	:	Incorporation of passive design
Description	:	This indicator enumerates a number of aspects having incorporated the principles of passive design in response to the natural environment. The aspects being highlighted include investigation of surrounding environment e.g. ventilation assessment, and sunlight and shadow studies; building orientation/ deposition; design of building envelop in terms of building shape, form and size of openings; selection of glazing/ building materials, and landscape design. These aspects are incorporated here because their influence over natural lighting and ventilation are widely recognized in the literature. It is believed that an optimum use of natural lighting and ventilation can be achieved effectively when the passive design principles are considered in various aspects. This indicator helps to measure the extent to which the passive design principles are met in the design of the urban renewal project.
Main reference(s)	:	US Green Building Council (1996); CEPAS
Indicator 2	:	Quality of passive design
Description	:	This indicator provides a qualitative evaluation on the effectiveness of the passive design in the renewal project. It aims to identify whether the design of new buildings to be constructed in the renewal site can effectively optimize the use of natural lighting and ventilation without imposing excessive heat gain and heat loss.
Main reference(s)	:	Blair et al. (2004)

7.4.3.2 Availability of Local Employment

Table 7.5 Indicators for Design Criterion ALE

Indicator 1	:	Number of jobs created per $1000m^2$
Description	:	Obviously, job counting is the most appropriate way to evaluate the captioned design criterion. This indicator estimates the total number of working opportunities tentatively created per $1000m^2$ of the renewal site by using the formula as shown below: $\frac{\text{Total area of employment land } (m^2) \text{ x 80\% take-up rate x 0.034 no. of worker/ } m^2}{\text{Total site area } (m^2)} \text{ x } 1000m^2$ where the employment land is defined as the non-residential designated land supporting private-sector employment e.g. commercial/ industrial uses; the take-up rate is regarded as the proportion of floor area of a planned use being utilized for the economic activities, and the worker density is known as the average number of workers employed by the economic establishments per unit of utilized floor area. The calculation method and the figures mentioned in the formula are in reference to a recent study conducted by the PD of Hong Kong. This indicator can help to determine how many jobs can be created per 1000 m^2 on average upon completion of the renewal project.
Main reference(s)	:	Hemphill et al. (2004); PD (2005); Demolition or renovation in a social housing neighbourhood: a 48 Pressure indicators system in CRISP
Indicator 2	:	Quality of jobs created
Description	:	This indicator evaluates the adequacy of the job opportunities available in the renewal site on the basis of the public's perception. It aims to ensure that the citizens living in the renewed area have chances to find job(s) near their place of residence after project completion.
Main reference(s)	:	Stubbs et al. (2005); Helsinki A-indicators & Monitor Urban Renewal in TISSUE

7.4.3.3 Conservation/ Improvement of Local Distinctiveness

Table 7.6 Indicators for Design Criterion CLD

Indicator 1	:	Appreciation of local characters
Description	:	This indicator examines the presence of certain characteristics that can define the distinctiveness of a renewal area. The characteristics refer to the presence of structures with special architectural features/ reflecting local culture and custom; operation of unique businesses/ industries; establishment of distinctive townscape; construction of attractive landmarks, and creation of distinctive but compatible image/ atmosphere. These characteristics are highlighted because they are known as the most common way to give a place an identity. By assessing the project against this indicator, the citizens can express their appreciation of the characters of their future community in a simple way.
Main reference(s)	:	Chester City Council (2002); Monitor Urban Renewal in TISSUE & CRISP
Indicator 2	:	Uniqueness of renewed area
Description	:	This indicator measures the extent to which the citizens in the community have a feeling that the area has its own characteristics and positive identity after urban renewal. This indicator intends to assess the success of urban renewal in creating a distinguishable and differentiable place from the citizens' point of view.
Main reference(s)	:	Chester City Council (2002)

7.4.3.4 Provision Facilitating Establishment of Different Businesses

Table 7.7 Indicators for Design Criterion PEB

Indicator 1	:	Types of business premises
Description	:	This indicator assesses the availability of different types of business premises in the design of the urban renewal project. Shopping mall/ centre/ arcade; detached department store; business premise at street level/ inside a building, and trader's stall in the square/ flea market are included here as they are common provisions for setting up businesses in different countries. This indicator aims to find out whether a variety of facilities for the entrepreneurs to start their businesses is provided.
Main reference(s)	:	Audit Commission (2002); Local quality of life counts in TISSUE
Indicator 2	:	Quality of shops & services
Description	:	This indicator identifies the extent to which the people who may live/ work in the renewal area are satisfied with the range/ mix of shops and services available in their community in the future. It is a qualitative evaluation that aims to ascertain that the provisions available in the renewal site are adequate to facilitate the establishment of a wide range of high quality local businesses for serving the daily operation of the citizens and attracting the customers outside the renewed area.
Main reference(s)	:	Chester City Council (2002); Hemphill et al. (2004); Stubbs et al. (2005)

7.4.3.5 Provisions for Meeting Special Needs of the Disabled, Elderly or Children

Table 7.8 Indicators for Design Criterion PSN

Indicator 1	:	Types of provisions for disabled, elderly & children
Description	:	This indicator attempts to find out what kinds of provisions have been provided for the dependent groups including the disabled, elderly and children in the design of the urban renewal project. They include provisions facilitating barrier free access in the public areas for the disabled; provisions specially for the children/ elderly in the public spaces, and establishment of the special needs facilities e.g. child care centre, residential care home for the elderly or rehabilitation centre for the people with disabilities. These provisions are included here as it is a common practice to incorporate them in local developments for the disabled, elderly and children if required. This indicator helps to ensure that special needs of the dependent groups with a relatively low mobility can be met within their community if necessary.
Main reference(s)	:	HKBEAM
Indicator 2	:	Adequacy of accessible design & special facilities
Description	:	This indicator evaluates the adequacy of accessible design and special provisions for the dependent groups available in the renewal site from the citizens' point of view. It aims to ensure that various kinds of physical supports are provided to meet the needs of the disabled, elderly and children living in the community after urban renewal.
Main reference(s)	:	LEED in CRISP

7.4.3.6 Building Form

Table 7.9 Indicators for Design Criterion BDF

Indicator 1	:	Density of development within renewal site
Description	:	This indicator calculates the density of the use of buildable areas within the renewal area after project completion. The calculation is based on a ratio of total gross building floor area to total site area to be renewed. The calculation method is borrowed from that adopted by the HKHA for measuring the development density of a public housing estate. This ratio is also found to be used in the private sector as a statutory guide for the density control over the developments in Hong Kong This indicator intends to measure the development density which is a critical element in shaping the building form and has a crucial effect on the sustainability from different perspectives.
Main reference(s)	:	Fung (2001b); Legislative Council (2002a); Hemphill et al. (2004); Indikatoren NRW & Monitor Urban Renewal in TISSUE; 18-indicator system for CGSP and choice demolition or renovation in CRISP
Indicator 2	:	Quality of building development
Description	:	This indicator offers a qualitative evaluation on the quality of the building development in terms of visual appropriateness, height, bulk and density. It helps to find out whether the building form meets an acceptable standard and is designed to the satisfaction of the inhabitants through a perception study.
Main reference(s)	:	Hemphill et al. (2004); Color quality - assessment of visual appearance, attractivity and usability of buildings in CRISP

7.4.3.7 Adaptability of Non-domestic Development to the Changing Needs

Table 7.10 Indicators for Design Criterion ADN

Indicator 1	:	Capability to cope with future changes
Description	:	This indicator assesses the design capacity of the building and its immediate surrounding area within the non-residential development to permit an acceptable level of flexibility adapting to future changes of layout and uses. Such flexibility can be optimized through open plan internal design; provision of demountable/ non-load bearing partition; construction of structural framing building; flexible design of building services system, and reservation of outdoor space, which are the easiest way to be incorporated into a development to cater for the needs of future changes. This indicator aims to highlight the adaptability of the non-domestic portion of the development in terms of building layout, structural grid and immediate outdoor space.
Main reference(s)	:	EcoProP & GBC in CRISP & BEQUEST
Indicator 2	:	Degree of adaptability
Description	:	This indicator measures the extent of flexibility in the non-residential development of the renewal project to allow future expansion, improvement and modification. The measurement is based on the perception of the people with the knowledge regarding structural and non-structural alterations. This indicator can identify the possibility of extending the building life and its utility value by rearranging/ reusing the indoor and outdoor spaces in the future.
Main reference(s)	:	Blair et al. (2004)

7.4.3.8 Convenient, Efficient & Safe Environment for Pedestrians & Public Transport Users

Table 7.11 Indicators for Design Criterion CST

Indicator 1	:	Frequent means of travel (except for work)
Description	:	This indicator identifies the means of travel that will be taken by the citizens frequently when going in and out the renewed community apart from work. The citizens can select either by public transport or on foot as the corresponding design criterion is merely related to the accessible design for the pedestrians and public transport users. This indicator highlights the mobility of the citizens in the renewal area, and shows the linkage between the renewed site and its surrounding areas. It is believed that the mobility of the citizens reduces with increasing numbers of transits or walking distance. The mobility of the citizens and the physical linkage between areas identified by this indicator can determine whether a convenient and efficient environment will be provided for the end users after urban renewal.
Main reference(s)	:	European Common Indicators – Towards a Local Sustainability Profile & ISDIS in TISSUE
Indicator 2	:	Quality of pedestrian walkways & public transport facilities
Description	:	This indicator investigates the extent to which the potential inhabitants in the community are satisfied with the quality of the pedestrian walkways and public transport systems available for them upon project completion. The convenience, efficiency and safety of relevant provisions are the primary quality commonly required by the end users. This indicator has offered a qualitative means to evaluate whether a convenient and safe pedestrian passage, and an efficient, convenient and safe public transport network are provided in the development to increase the mobility of the citizens.
Main reference(s)	:	Demolition or renovation in a social housing neighborhood : a 48 Pressure indicators system in CRISP; CEPAS

7.4.3.9 Compatibility with Neighborhood

Table 7.12 Indicators for Design Criterion CWN

Indicator 1	:	Harmonious environment
Description	:	This indicator intends to identify whether the development of the renewal project is compatible with surrounding areas in terms of use of color, texture and construction materials; physical design of individual buildings; spatial arrangement of streets and buildings; scale and form of development, and land use zoning. These aspects are highlighted here because they can shape the character of an area in a significant way. When measuring the compatibility of the project against this indicator, the environment of the development after urban renewal and that of the neighborhood can be compared, and whether a harmonious environment is created for the citizens can be identified.
Main reference(s)	:	Delgado Rodrigues and Grossi (2007)
Indicator 2	:	Impact of development
Description	:	This indicator provides a qualitative assessment on the compatibility of the renewal project by identifying the perceived impacts of the development on the surrounding areas. Based on the citizens' perception, it can identify whether the development of the renewal site in general has positive impacts on the view and micro-climate for the neighboring properties after urban renewal.
Main reference(s)	:	Hemphill et al. (2004); HKBEAM

7.4.3.10 Access to Open Spaces

Table 7.13 Indicators for Design Criterion AOS

Indicator 1	:	Average walking distance to the nearest open space
Description	:	The easiest way to assess the accessibility to a place is to measure its direct distance from a reference point. This indicator measures the average distance that has to be spent by the citizens for walking from their residence to the nearest open space. The average walking distance increases when the nearest open space is located far from the citizens' home. The longer the average walking distance is, the lower is the accessibility of their residence to the open space.
Main reference(s)	:	ACI & EEA – Europes Environment – The Dobris Assessment in TISSUE; The European Common Indicators Set & LEED in CRISP
Indicator 2	:	Ease of access to open spaces
Description	:	This indicator assesses the extent to which the citizens are satisfied with the level of access to the open spaces. It intends to find out whether the citizens can access to the nearby open spaces they are likely to go with ease in the future after considering the factors like distance, comfort and safety.
Main reference(s)	:	Stubbs et al. (2005); Ecosistema Urbano in TISSUE

7.4.3.11 Access to Work

Table 7.14 Indicators for Design Criterion ATW

Indicator 1	:	Work traveling habits
Description	:	This indicator aims to identify the main mode of transport that will be selected by the citizens regularly when they travel to work after urban renewal. It has highlighted the most common types of transport mode in Hong Kong e.g. by private transport including automobile and motor cycle; by light public transport including minibus; by mass transport including MTR, bus and coach; by cycling and on foot for their consideration. It is believed that their selection can fully reflect the accessibility of the renewed area to their working places, as well as the potential environmental impacts that would be induced from their work traveling habits.
Main reference(s)	:	Hemphill et al. (2004); ACTEUR, Local quality of life counts, Sustainability Indicators Project – West Devon, UK & Urban Audit – assessing the quality of life of Europes cities in TISSUE
Indicator 2	:	Average journey time for the citizens to get to work
Description	:	This indicator measures the duration of each journey on average has to be taken by the citizens for traveling from their home to work by means of various types of transport excluding cycling/ walking. The average journey time increases with increasing distance between renewal area and the working places of the citizens. The longer the average journey time is, the lower is the accessibility of their residence to work and the greater is the negative impacts on the environment.
Main reference(s)	:	Hemphill et al. (2004); EEA – Europes Environment – The Dobris Assessment & Sustainability Indicators Project – West Devon, UK in TISSUE; LEED & Sustainability indicator set for the construction sector in CRISP

7.4.3.12 Green Construction

Table 7.15 Indicators for Design Criterion GBC

Indicator 1	:	Incorporation of environmentally friendly practices
Description	:	This indicator enumerates a number of environmentally friendly practices that have been incorporated in the design of the renewal project. The practices being highlighted include installation of provisions for reducing consumption of non-renewable energy and fresh water; adoption of measures for minimizing consumption of non-green construction materials and generation of wastes; usage of environmentally friendly/ pollution free materials, products, equipments/ construction methods, and construction of prefabricated/ pre-casting structural elements. These practices are commonly adopted in the construction industry of Hong Kong and elsewhere. They can effectively reduce the use and waste of the natural resources and their values are widely recognized in the literature. This indicator aims to ascertain that the consumption of the limited natural resources can be optimized in the urban renewal process.
Main reference(s)	:	18-indicator system for CGSP and choice demolition or renovation, BREEAM; LEED & Sustainable development monitoring indicators at the city scale for the Land Use Plan of Montauban in CRISP; HKBEAM
Indicator 2	:	Quality of environmentally friendly practices
Description	:	This indicator provides a qualitative evaluation on the effectiveness of the environmentally friendly practices in the renewal project. It tends to find out whether the construction practices adopted in the whole renewal process can effectively minimize the consumption of natural resources, and use them in an efficient way from the citizens' point of view.
Main reference(s)	:	Blair et al. (2004)

7.4.3.13 Rehabilitation of Repairable Properties

Table 7.16 Indicators for Design Criterion RRP

Indicator 1	:	Percentage of existing properties being retained
Description	:	This indicator estimates the total percentage of the existing properties being retained in the renewal area. The estimation is based on the following formula: $\frac{\text{Total construction area of the property to be retained } (m^2)}{\text{Total construction area of existing properties in the subject site } (m^2)} \times 100\%$ This indicator measures the extent of rehabilitation work in the urban renewal project in a quantitative way which is capable to show the role of rehabilitation played in the renewal process.
Main reference(s)	:	Chester City Council (2002); Hemphill et al. (2004); ISDIS in TISSUE
Indicator 2	:	Degree of rehabilitation
Description	:	This indicator measures the extent to which the citizens in the community think that the properties being repairable and having their utility values are properly retained and rehabilitated in urban renewal process. It is measured on the basis of the citizens' perception. This indicator aims to ascertain that the service life of existing properties can be lengthened and premature replacement can be minimized in the renewal process.
Main reference(s)	:	CEPAS

7.4.3.14 Sense of Community

Table 7.17 Indicators for Design Criterion SOC

Indicator 1	:	Social cohesion
Description	:	It is difficult to establish an indicator to measure the sense of community, but it is believed that it can be represented by social cohesion to a certain extent. The sense of community increases when the citizens are able to maintain their social network and retain their social membership within their neighborhood. This indicator offers a qualitative means to evaluate the degree of community integration in the society. It intends to examine whether the citizens after urban renewal can maintain close relationship with their old neighbors, and simultaneously they can make new friends in their new community.
Main reference(s)	:	Hemphill et al. (2004); Stubbs et al. (2005)
Indicator 2	:	Citizens' satisfaction with the local community
Description	:	It is expected that there is close relationship between the sense of community and the citizens' satisfaction. This indicator identifies the level of satisfaction of the people who may live/ work/ visit in the renewal area in regard to the economic, environmental and social well-being of the community. It aims to find out whether the local area is a good place to stay after urban renewal from the citizens' point of view.
Main reference(s)	:	Audit Commission (2002); Blair et al. (2004); Local quality of life counts & Monitor Urban Renewal in TISSUE; The European Common Indicators Set in CRISP

7.4.3.15 Provision of Open Spaces

Table 7.18 Indicators for Design Criterion POS

Indicator 1	:	Percentage of open spaces being provided
Description	:	This indicator calculates the total percentage of the open spaces being provided in the renewal area. The calculation is done by using the following formula: $\frac{\text{Total area of private \& public open spaces being provided } (m^2)}{\text{Total site area } (m^2)} \times 100\%$ This indicator can clearly indicate the availability of the open spaces in the renewed site and its proportion to the whole development.
Main reference(s)	:	Chester City Council (2002); HKPSG
Indicator 2	:	Quality of open spaces
Description	:	This indicator attempts to find out whether the open spaces provided by the renewal project are adequate and properly located. It is a qualitative measurement ascertaining that the open spaces of acceptable quality and to the satisfaction of the citizens are provided after urban renewal.
Main reference(s)	:	Hemphill et al. (2004); Stubbs et al. (2005); HKBEAM

7.4.3.16 Community Involvement

Table 7.19 Indicators for Design Criterion CYI

Indicator 1	:	Form of involvement
Description	:	This indicator identifies numbers of activities the citizens can participate in during urban renewal. These activities are commonly arranged in the foreign countries to encourage the community involvement in decision making process and increase the participation rate of the citizens. The citizens have an opportunity to contribute themselves when the project makers hold meeting(s) with the immediate neighbors and local public officials to solicit inputs before conceptual design; collect views from the community meeting, workshop, forum, exhibition, etc. held during the design stage; modify project design by incorporating community inputs and explain why their inputs have not been considered if necessary; work directly with the community associations/ social networks to advertise public comments and generate comments on project design and renewal process, and establish channels for ongoing communication between the developer and the community. This indicator tends to indicate how the general public can be involved in different ways/ forms of community participation.
Main reference(s)	:	CEROI & Local quality of life counts in TISSUE; LEED & Spanish Urban sustainable indicators in CRISP; CEPAS
Indicator 2	:	Degree of participation
Description	:	This indicator examines the adequacy of the community participation opportunities and the weight of the public views. It aims to identify from the citizens' point of view whether the residents/ shop owners and adjacent neighborhood affected by the renewal project have sufficient opportunities to participate in decision making process, their concerns and opinions about renewal of particular area for the benefit of the community are clearly heard and considered, and their comments are properly addressed.
Main reference(s)	:	Audit Commission (2002); Hemphill et al. (2004); Stubbs et al. (2005); Indicateurs du développement durable des villes de Midi-Pyrénées & Local quality of life counts in TISSUE

7.4.3.17 Access to Public Facilities

Table 7.20 Indicators for Design Criterion APF

Indicator 1	:	Public facilities within 500m of accommodation
Description	:	Undoubtedly, the citizens would consider the public facilities accessible when they can get there within a fair walking distance. This indicator attempts to find out what kinds of public facilities have been provided for the citizens within 500m of their residence in the renewal area. The facilities highlighted include food centre; market; clinic/ medical centre/ hospital; school/ college; library; community centre; cultural centre/ museum; sport complex; swimming pool; social services centre; postal facility; police office/ fire station, etc. Only public facilities within 500m radius of the residence of the citizens are counted because 500m is the upper limit of the walking distance being accepted. The literature has specified that people on average have to spend 15 minutes to take a 500m walk and the majority of the people are not willing to walk more than 15 minutes each time. By assessing the project against this indicator, it can determine how easy the citizens living in the renewal area can gain access to the basic services serving their daily life operation from their home.
Main reference(s)	:	Audit Commission (2002); Local quality of life counts & The Xarxa – The Catalan Network of Cities and Towns towards Sustainability in TISSUE; The European Common Indicators Set in CRISP
Indicator 2	:	Ease of access to public facilities
Description	:	This indicator evaluates the extent to which the citizens are satisfied with the level of access to the public facilities after urban renewal. It tends to find out whether the citizens can access to different types of public facilities they have to go as usual with ease in the future after considering the factors like distance, comfort and safety.
Main reference(s)	:	Stubbs et al. (2005); EEA – Environmental Indicators in TISSUE

7.4.4 Allocation of Points

In previous section, a set of indicators for 17 design criteria has been developed. However, it was inadequate and meaningless to have the indicators without deriving a scoring system. It is because the performance of a renewal project had to be evaluated against the benchmarks established by scoring individual assessment indicators (Hemphill et al., 2004). To facilitate the assessment process to be carried out in the future, a series of points have to be allocated to each indicator for measuring the performance of the projects in terms of urban design. As mentioned by Horn (1993), allocation of points for the measurement could be founded either on a single characteristic e.g. frequency, weight and value or on a multi-dimensional concept e.g. health and welfare replying on an ad hoc scale of adequacy/ satisfaction. These 2 forms of measurement can be described in practical terms as cardinal and ordinal scales where the former is based on the numbers, types, percentages or special categories and codes, and the latter is based on a subjective ordering of the items ranging from good to bad, adequate to inadequate, important to unimportant, and so on (Horn, 1993). In this research, both cardinal and ordinal scales are considered when devising the scoring system for the quantitative and qualitative indicators.

A scale of 1 - 5 was used in this study, where 1 represented the “minimum” level of contribution to sustainable urban renewal in respect of a particular design aspect while 5 represented the “optimum” level of contribution. No point would be awarded to a particular indicator if the project fails to meet its corresponding assessment requirements. After the review of previous publications and the discussions with a number of scholars, the point allocation framework for each of the 34 indicators was established. A total of 5 different scales namely counting-based scale, measurement-based scale, Likert-type scale, Likert-type scale PLUS, and scenario-based scale were developed from the principles of both cardinal and ordinal scales, and the details of these scales are discussed as follows.

(1) Counting-based Scale

The indicators adopting this scale include GBD(a), CLD(a), PEB(a), PSN(a), ADN(a), CWN(a), GBC(a), CYI(a) and APF(a). Under this scale, the points are allocated by

counting the total number of a particular subject available in the urban renewal project being assessed. The subject that has been stated in the captioned indicators mainly refers to a specific group of aspects, statements, provisions, designs, practices, activities and facilities. The more the number of a particular subject is, the higher is the point allocated. For instance, 5 provisions are highlighted under PEB(a). The project being assessed can only get 1 point if merely 1 out of 5 provisions can be found in the design of the renewal project, but it would be awarded 5 points if all of them are incorporated. A renewal project can obtain a higher point when a greater amount of aspects given under GBD(a) and CWN(a) respectively can be observed therein. Under CYI(a), there are 5 activities aiming to increase the community participation in the urban renewal process. The point allocated to a project increases when more activities have been arranged. This scale is relatively simple because only physical counting of the number of a particular subject is required during the assessment.

(2) Measurement-based Scale

Compared to the counting-based scale, the form of measurement of this scale is more complex. This scale is mainly developed for the quantitative indicators in which calculation and direct measurement are involved. Among 34 indicators, 5 indicators namely ALE(a), BDF(a), AOS(a), RRP(a) and POS(a) have used this scale. For the indicators ALE(a) and BDF(a), the range of scale is developed with reference to the past experiences of the quasi-government bodies i.e. the LDC and the URA in Hong Kong. After undertaking the calculations on all projects previously conducted by these organizations, the lower and the upper limits, and the remaining parameters of the point scoring system for these indicators can be properly set. In order to promote good practices such as rehabilitation of repairable buildings and provision of open spaces in the urban renewal project, more points would be awarded under RRP(a) and POS(a) when a higher percentage is calculated. The percentage contained in the point allocation framework for these indicators ranges from >0% to 100%. A minimum and an optimum percentage are not specified here because the incentive to rehabilitate the properties and provide open spaces probably reduces when a limited range of scale is derived, and a general consensus on setting a suitable benchmark for these indicators has not yet been reached. For the indicator AOS(a), the assessment

is based on the direct measurement rather than calculation. The points allocated to a renewal project increase with decreasing walking distance between the nearest open space and the place of residence of the citizens within the site. The lowest end of the point scoring system for this indicator is set at a distance of 250m or below because the people on average take 5 minutes to complete a 250m journey, and a 5-minutes walk is the optimum level of the accessibility widely recognized in the overseas studies. Based on the pre-determined point scoring system, the urban renewal project can get at least 4 points when the walking distance is 500m or below, which is a distance generally accepted by the majority of people.

(3) Likert-type Scale

This scale is widely adopted for the qualitative indicators. Therefore, it is not surprising that the indicators GBD(b), ALE(b), CLD(b), PEB(b), PSN(b), ADN(b), CWN(b), GBC(b), RRP(b), SOC(b) and POS(b) have made use of this scale. In this study, a Five-point Likert-type scale between 1 and 5 was used in which "1" represents "strongly disagree" while "5" represents "strongly agree". All of them are described by a single sentence indicating the most appropriate way to achieve sustainable development, and the assessors have to rate their degree of agreement on the sentence in accordance with the Likert-type scale during the assessment. For instance, when assessing a particular project against the indicators CLD(b), PEB(b), PSN(b), RRP(b) and SOC(b), the assessors have to rate the extent to which they agree that the renewed area has its own characteristics and positive identity; there is adequate accessible design and special provisions for the dependent groups; there is a wide and good range/ mix of shops and services available in their community; the repairable properties are properly retained and rehabilitated, and the renewed area is a good place to stay.

(4) Likert-type Scale PLUS

Similar to the Likert-type scale as mentioned above, the form of measurement for this scale is also based on the same Five-point Likert-type scale in which "1" represents "strongly disagree" and "5" represents "strongly agree". However, the major difference between 2 scales is that every indicator using this scale is represented by at

least 3 statements instead of a single sentence. This scale is particular suitable to the indicators containing a rich content e.g. BDF(b), CST(b) and CYI(b). During the project assessment, the assessors have to rate their degree of agreement on each sentence under the same indicator, and then their views will be added together to form a sum. The range of scale for individual indicators varies depending on the total numbers of statements being included. For example, a renewal project can get 1 point when the sum is less than 4 and get 5 points when the sum is greater than 12 under CYI(b) which is described by 3 sentences only while the project can only obtain 1 point when the sum is less than 5 and get 5 points when the sum is more than 16 under BDF(b) and CST(b) which are represented by 4 statements.

(5) Scenario-based Scale

The indicators CST(a), AOS(b), ATW(a), ATW(b), SOC(a) and APF(b) have adopted the scenario-based scale. Under the indicators AOS(b), SOC(a) and APF(b), the assessors have to pick a sentence best describes their situation during the assessment while for the indicators CST(a), ATW(a) and ATW(b), the assessors only have to select the most appropriate item based on their experiences and expectations. A total of 5 options are provided under each of these indicators and the option making a major contribution to the achievement of various sustainable development objectives can score a higher point than the others.

The details of the point scoring system for 34 indicators representing 17 design criteria are presented in Table 7.21. From the table, it can be observed that each indicator is capable of scoring a maximum of 5 points and a design criterion containing 2 indicators can score a maximum of 10 points. A grand total representing the sustainability level of a particular urban renewal proposal/ project can be generated when the points obtained under individual design criteria are multiplied by their corresponding final weight as shown in Table 5.21, and their totals are added together. The grant total can be used to compare the performance of a design proposal/ renewal project with a pre-determined benchmark or another proposal/ project.

Table 7.21 Point Scoring System for Individual Indicators

Description of Indicators	Points Allocation
1. Green Design	
(a) Incorporation of passive design Which aspect(s) shown below has/ have incorporated the principles of passive design in response to the natural environment? (i) Investigation of surrounding environment e.g. ventilation assessment & sunlight/ shadow studies (ii) Building orientation/ disposition (iii) Design of building envelop e.g. building shape, & form & size of openings [other than (iv)] (iv) Selection of glazing/ building materials (in terms of insulation level & thermal mass requirement) (v) Landscape design	Either 1 aspect = 1 point Any 2 aspects = 2 points Any 3 aspects = 3 points Any 4 aspects = 4 points All or above = 5 points
(b) Quality of passive design What do you think about this sentence "In response to the existing site environment, the new buildings in the redevelopment can effectively maximize the use of natural lighting & ventilation while controlling excessive heat gain & loss."?	Points allocated on a scale of 1 – 5 (1-strongly disagree; 5-strongly agree)
2. Availability of Local Employment	
(a) Number of jobs created per 1000m^2	>0 - 100nos. = 1 point >100 - 200nos. = 2 points >200 - 300nos. = 3 points >300 - 400nos. = 4 points >400nos. = 5 points

	Description of Indicators	Points Allocation
(b)	Quality of jobs created What do you think about this sentence "There are adequate working opportunities provided in the local area after urban renewal."?	Points allocated on a scale of 1 – 5 (1-strongly disagree; 5-strongly agree)
3.	Conservation/ Improvement of Local Distinctiveness	
(a)	Appreciation of local characters Thinking about the area after urban renewal, which statement(s) as shown below can describe your feeling? (only consider the positive aspects) (i) Structures with special architectural features/ reflecting local culture/ characteristics are retained (ii) Unique businesses/ industries are conserved (iii) Distinctive townscape is reinforced (iv) New attractive landmarks are built (v) New distinctive image/ atmosphere is created in harmony with the surrounding environment	Either 1 statement = 1 point Any 2 statements = 2 points Any 3 statements = 3 points Any 4 statements = 4 points All or above = 5 points
(b)	Uniqueness of renewed area What do you think about this sentence "The area after urban renewal has its own characteristics & positive identity."?	Points allocated on a scale of 1 – 5 (1-strongly disagree; 5-strongly agree)

	Description of Indicators	Points Allocation
4.	Provision Facilitating Establishment of Different Businesses	
(a)	Types of business premises Which provision(s) as shown below is/ are available in the renewal project for establishing a variety of business environments? (i) Provision of shopping mall(s)/ centre(s)/ arcade(s) (ii) Provision of detached department store(s) (iii) Provision of business premise(s) at street level only (iv) Provision of business premise(s) inside a building [other than (i) - (iii)] (v) Provision of traders' stall(s) in the public place	Either 1 provision = 1 point Any 2 provisions = 2 points Any 3 provisions = 3 points Any 4 provisions = 4 points All or above = 5 points
(b)	Quality of shops & services What do you think about this sentence "The renewed area provides a good mix & wide range of shops & services after urban renewal."?	Points allocated on a scale of 1 – 5 (1-strongly disagree; 5-strongly agree)
5.	Provisions for Meeting Special Needs of the Disabled, Elderly or Children	
(a)	Types of provisions for disabled, elderly & children Which design(s) as shown below is/ are incorporated in the renewal project? (i) Public areas providing enhanced provisions for access for the disabled persons (ii) Public areas with provisions specially designed for the children/ the elderly (iii) Provision specially for children [other than (ii)] e.g. child care centre (iv) Provision specially for the elderly [other than (ii)] e.g. residential care home for the elderly (v) Provision specially for the disabled persons [other than (i)] e.g. rehabilitation centre for people with disabilities	Either 1 design = 1 point Any 2 designs = 2 points Any 3 designs = 3 points Any 4 designs = 4 points All or above = 5 points
(b)	Adequacy of accessible design & special facilities What do you think about this sentence "Accessible design & adequate facilities are provided for the people, regardless of age & physical abilities after urban renewal."?	Points allocated on a scale of 1 – 5 (1-strongly disagree; 5-strongly agree)

	Description of Indicators	Points Allocation
6.	Building Form	
(a)	Density of development within renewal site	Plot Ratio (PR) ≥15 = 1 point 12≤ PR <15 = 2 points 9≤ PR <12 = 3 points 5≤ PR <9 = 4 points PR <5 = 5 points
(b)	Quality of building development What do you think about the following sentences? o The visual appearance of the properties is satisfactory. (1-strongly disagree; 5-strongly agree) o The height of individual buildings is appropriate. (1-strongly disagree; 5-strongly agree) o The bulk of individual buildings is appropriate. (1-strongly disagree; 5-strongly agree) o The density of development is acceptable. (1-strongly disagree; 5-strongly agree)	Sum <5 = 1 point 5≤ Sum ≤8 = 2 points 8< Sum ≤12 = 3 points 12< Sum ≤16 = 4 points Sum >16 = 5 points
7.	Adaptability of Non-domestic Development to the Changing Needs	
(a)	Capability to cope with future changes Which design(s) as shown below is/ are incorporated in the renewal project? (i) Open plan internal design (ii) Demountable system partition/ non-load bearing internal partition (iii) Structural framing building with minimum load bearing wall (iv) Flexible design of building services provisions/ availability of standby public utilities (v) Outdoor spaces reserved for multi-functional purposes	Either 1 design = 1 point Any 2 designs = 2 points Any 3 designs = 3 points Any 4 designs = 4 points All or above = 5 points

	Description of Indicators	Points Allocation
(b)	Degree of adaptability What do you think about this sentence "The non-residential portion of the redevelopment is easily/ readily allowed for future expansion, improvement & modification involving structural & non-structural alterations."?	Points allocated on a scale of 1 – 5 (1-strongly disagree; 5-strongly agree)
8.	Convenient, Efficient & Safe Environment for Pedestrians & Public Transport Users	
(a)	Frequent means of travel (except for work) - either by public transport or on foot	Public transport via ≥2 transits = 1 point Public transport via 1 transit = 2 points Public transport via 0 transit = 3 points On foot [>15mins] = 4 points On foot [≤15mins] = 5 points
(b)	Quality of pedestrian walkways & public transport facilities What do you think about the following sentences? o It is convenient & safe for the citizens to walk in pedestrian walkways within the renewed area. (1-strongly disagree; 5-strongly agree) o It is convenient & safe for the citizens to walk to the nearest public transport facilities. (1-strongly disagree; 5-strongly agree) o The physical design of the pedestrian walkways & pedestrian passages to public transport facilities in terms of location, width & material used is appropriate. (1-strongly disagree; 5-strongly agree) o The public transport system is safe & efficient. (1-strongly disagree; 5-strongly agree)	Sum <5 = 1 point 5≤ Sum ≤8 = 2 points 8< Sum ≤12 = 3 points 12< Sum ≤16 = 4 points Sum >16 = 5 points

	Description of Indicators	Points Allocation
9.	Compatibility with Neighborhood	
(a)	Harmonious environment Which aspect(s) of the renewal project as shown below is/ are compatible with the surrounding areas? (i) Use of color, texture & construction materials (ii) Physical design of individual buildings [other than (i)] (iii) Spatial arrangement of streets & buildings (iv) Scale & form of development (v) Land use zoning	Either 1 aspect = 1 point Any 2 aspects = 2 points Any 3 aspects = 3 points Any 4 aspects = 4 points All or above = 5 points
(b)	Impact of development What do you think about this sentence “The development of the renewal site has positive impacts on the view and micro-climate for the neighboring properties after urban renewal.”?	Points allocated on a scale of 1 – 5 (1-strongly disagree; 5-strongly agree)
10.	Access to Open Spaces	
(a)	Average walking distance to the nearest open space	>1000m = 1 point >750 - 1000m = 2 points >500 - 750m = 3 points >250 - 500m = 4 points ≤250m = 5 points

Description of Indicators		Points Allocation
(b)	Ease of access to open spaces Thinking about the nearby open spaces you are LIKELY to go & considering the factors like distance, comfort & safety, which statement shown below best describes your situation? (i) I have considerable difficulty gaining access to all places. (ii) I have difficulty gaining access to most places. (iii) Occasionally, I have difficulty gaining access to some places. (iv) It is relatively easy for me to gain access to most places. (v) I can easily gain access to all places.	Select (i) = 1 point Select (ii) = 2 points Select (iii) = 3 points Select (iv) = 4 points Select (v) = 5 points
11.	Access to Work	
(a)	Work traveling habits - MAIN mode of transport as usual	By private transport = 1 point By light public transport = 2 points By mass transport = 3 points By cycling/ on foot = 4 points Working in renewed site = 5 points
(b)	Average journey time for the citizens to get to work - travel by means of cycling/ walking excluded	>60mins = 1 point >45-60mins = 2 points >30-45mins = 3 points >15-30mins = 4 points ≤15mins = 5 points

	Description of Indicators	Points Allocation
12.	Green Construction	
(a)	Incorporation of environmentally friendly practices Which practice(s) as shown below is/ are incorporated in the renewal project? (i) Providing device(s) to reduce consumption of non-renewable energy (ii) Providing device(s) to reduce consumption of fresh water (iii) Adopting measure(s) to reduce consumption of non-green construction materials (iv) Adopting measure(s) to reduce generation of solid/ liquid wastes (v) Using environmentally friendly/ pollution free material(s), product(s)/ equipment(s)/ construction methods (vi) Using prefabricated/ pre-casting or off-site construction element(s)	Either 1 practice = 1 point Any 2 practices = 2 points Any 3 practices = 3 points Any 4 practices = 4 points Any 5 practices or above = 5 points
(b)	Quality of environmentally friendly practices What do you think about this sentence "The construction practices adopted in the whole renewal process can effectively minimize the consumption of natural resources, & use them in an efficient way."?	Points allocated on a scale of 1 – 5 (1-strongly disagree; 5-strongly agree)
13.	Rehabilitation of Repairable Properties	
(a)	Percentage of existing properties being retained	>0 – 20% = 1 point >20 – 40% = 2 points >40 – 60% = 3 points >60 – 80% = 4 points >80 – 100% = 5 points
b)	Degree of rehabilitation What do you think about this sentence "The repairable properties & those having their utility values are properly retained & rehabilitated during urban renewal."?	Points allocated on a scale of 1 – 5 (1-strongly disagree; 5-strongly agree)

Description of Indicators		Points Allocation
14.	Sense of Community	
(a)	Social cohesion Thinking about the community after urban renewal, which statement best describes your feeling? (i) I have considerable difficulty maintaining relationship with my old neighbors & making new friends here. (ii) I have difficulty maintaining close relationship with my old neighbors but I can make some new friends here. (iii) I can maintain close relationship with my old neighbors but I have difficulty making new friends here. (iv) I can maintain close relationship with my old neighbors, & make some new friends here. (v) I can maintain very close relationship with most of my old neighbors, & make a lot of new friends here.	Select (i) = 1 point Select (ii) = 2 points Select (iii) = 3 points Select (iv) = 4 points Select (v) = 5 points
(b)	Citizens' satisfaction with the local community What do you think about this sentence "The renewed area is a good place to live/ work/ visit after project completion."?	Points allocated on a scale of 1 – 5 (1-strongly disagree; 5-strongly agree)
15.	Provision of Open Spaces	
(a)	Percentage of open spaces being provided	>0 – 20% = 1 point >20 – 40% = 2 points >40 – 60% = 3 points >60 – 80% = 4 points >80 – 100% = 5 points
(b)	Quality of open spaces What do you think about this sentence "The open spaces provided within the renewed area are adequate & properly located."?	Points allocated on a scale of 1 – 5 (1-strongly disagree; 5-strongly agree)

Description of Indicators	Points Allocation
16. Community Involvement	
(a) Form of involvement Thinking about the availability of participation opportunity, which activity/ activities is/ are conducted during the renewal process? (i) Holding meeting(s) with immediate neighbors & local public officials to solicit input before conceptual design (ii) Collecting views from community meeting, workshop, forum, exhibition, etc. held during design stage (iii) Modifying project design by incorporating community input, & explaining why their input is not incorporated if no modification is made (iv) Working directly with community associations/ social networks to advertise public comments & generate comments on project design (v) Establishing channels for ongoing communication between the developer & the community	Either 1 activity = 1 point Any 2 activities = 2 points Any 3 activities = 3 points Any 4 activities = 4 points All or above = 5 points
(b) Degree of participation What do you think about the following sentences? o The residents/ shop owners & adjacent neighborhood affected by urban renewal have adequate opportunities to raise their concerns. (1-strongly disagree; 5-strongly agree) o Their concerns & opinions for the benefit of the renewed area & the community are taken into account. (1-strongly disagree; 5-strongly agree) o Their comments on the project are well-addressed. (1-strongly disagree; 5-strongly agree)	Sum <4 = 1 point 4≤ Sum ≤6 = 2 points 6< Sum ≤9 = 3 points 9< Sum ≤12 = 4 points Sum >12 = 5 points

Description of Indicators		Points Allocation
17.	Access to Public Facilities	
(a)	Public facilities within 500m of accommodation Which facility/ facilities can be found within 500m from the entrances of the residential development in the renewal project? (i) Food centre (ii) Market (iii) Clinic/ medical centre/ hospital (iv) School/ college (v) Library (vi) Community centre (vii) Cultural centre/ museum (viii) Sport complex (ix) Swimming pool (x) Social services centre (xi) Postal facility (xii) Police office/ fire stations (xiii) Others	Either 1 facility = 1 point Any 2 facilities = 2 points Any 3 facilities = 3 points Any 4 facilities = 4 points Any 5 facilities or above = 5 points
(b)	Ease of access to public facilities Thinking about the public facilities you OFTEN go & considering the factors like distance, comfort & safety, which statement best describes your situation? (ii) I have considerable difficulty gaining access to all facilities. (iii) I have difficulty gaining access to most facilities. (iv) Occasionally, I have difficulty gaining access to some facilities. (v) It is relatively easy for me to gain access to most facilities. (vi) I can easily gain access to all facilities.	Select (i) = 1 point Select (ii) = 2 points Select (iii) = 3 points Select (iv) = 4 points Select (v) = 5 points

7.5 Evaluation of the Assessment Tool

A set of tailor-made indicators and a scoring framework developed in section 7.4 have formed an assessment tool for the SURPAM. In order to justify the acceptability, reliability and usefulness of the assessment tool to be used in the real world to evaluate the sustainability level of the urban renewal projects in the future, an evaluation process should be carried out before implementation. This research tends to collect the professional views of the design practitioners on the quality of the assessment tool. Therefore, the same group of the experienced urban design practitioners as stated in section 5.5 was invited to take part in the evaluation process. Unfortunately, only half of them were available to join the process at that moment. To increase the representation of the views being collected from the group of urban design practitioners and ascertain the quality of the whole evaluation process, 10 other practitioners with similar professional trainings and working backgrounds who were willing to be engaged in this process were also invited as a supplement. This arrangement brings an additional benefit to this study because the newly invited practitioners have not been involved in any stage of this research and therefore, they can provide impartial advices/ comments on the tool during the evaluation process. In addition, 10 local scholars who have joined the AHP process for this study, and have research interests or publications in the areas of urban renewal/ regeneration, sustainable development, and establishment of indicators and benchmarks were also invited because they have a better understanding of the topic and the flow of this research, and are more familiar with the general research process, standard and requirement. It is believed that the assessment tools can address both practical and academic concerns, and can be fine-tuned with the aid of the professional knowledge and working experiences of the experts upon completion of the evaluation process.

7.5.1 Evaluation Process

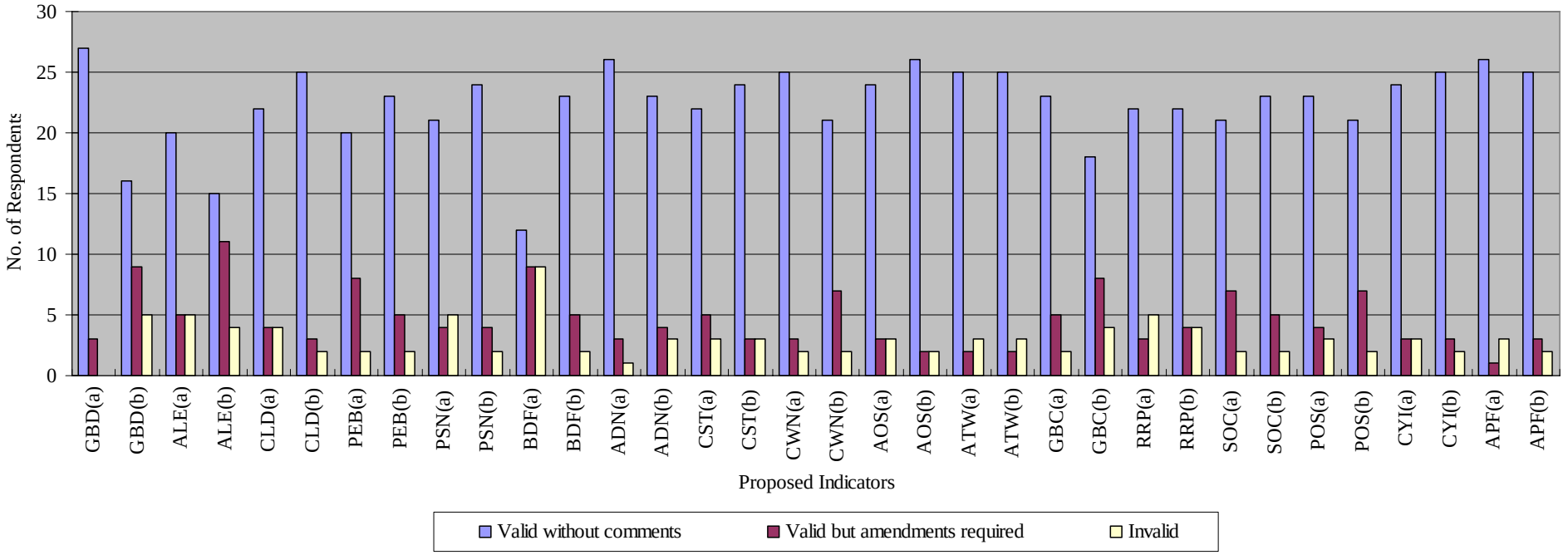
To facilitate the evaluation process, a questionnaire had been designed for 30 target respondents. A sample of the questionnaire for the evaluation of the assessment tool is given in Appendix F. The questionnaires were sent directly to the target

respondents through email and they were asked to determine whether the proposed indicators were valid to represent individual design criteria, and give suggestions under the open ended questions when they were considered inappropriate. The respondents were also encouraged to provide some comments on the content of the proposed indicators and their corresponding point scoring system.

The comments made on the basis of their expertise were adequate to highlight the deficiencies of the assessment tool, thereby facilitating the creation of an evaluation model that could measure the extent to which the urban renewal project met various sustainable development objectives after subsequent refinements. In order to ensure that no comments/ criticisms were raised due to the misunderstanding or misinterpretation of individual design criteria and indicators, follow-up calls and semi-structured interviews were arranged for each of the respondents especially for the newcomers to explain the details of the evaluation process, answer their enquiries, and clarify vague points of the questionnaire if any.

7.5.2 Evaluation Results

All target respondents have filled in the questionnaires and sent them back to the researcher for further analysis and consolidation after the receipt of a number of email reminders and follow-up calls. After a preliminary scan of the data collected, it is found that none of the respondents have made suggestions to the proposed indicators in addition to comments. Figure 7.2 summarizes the results of the evaluation process. It could be noticed that each indicator attracted comments or even criticisms during evaluation. It is neither a surprising nor an abnormal phenomenon because there is no perfect indicator available in the world (Hemphill et al., 2004). Instead of developing the indicators with zero shortcomings, this study attempted to derive the most appropriate set of indicators for the model. This research would accept the indicators to represent their corresponding design criteria when the majority of the respondents reached a consensus on their validity. Undoubtedly, the 34 indicators developed for this study were considered appropriate as more than 70% of the respondents had confirmed their validity no matter whether the comments were given to the individuals.



Note: (1) GBD = Green design; ALE = Availability of local employments; CLD = Conservation/ improvement of local distinctiveness; PEB = Provisions facilitating establishment of different businesses; PSN = Provisions for meeting special needs of the disabled, elderly or children; BDF = Building form; ADN = Adaptability of non-domestic development to the changing needs; CST = Convenient, efficient & safe environment for pedestrians & public transport users; CWN = Compatibility with neighbourhood; AOS = Access to open space; ATW = Access to work; GBC = Green construction; RRP = Rehabilitation of repairable properties; SOC = Sense of community; POS = Provisions of open spaces; CYI = Community involvement; APF = Access to public facilities

(2) The first indicator of a particular design criterion is represented by (a) while the second one is represented by (b).

Figure 7.2 Validity of the Proposed Indicators & Point Scoring System

Although the indicators were found valid to represent individual design criteria, the comments/ criticisms raised by the respondents should be properly addressed. In addition, a special attention should be paid to several indicators e.g. GBD(b), ALE(b), PEB(a), BDF(a), CWN(b),GBC(b), SOC(a) and POS(b) which had attracted a certain amount of criticisms (Figure 7.2). The comments/ criticisms were summarized with the associated defences or follow-up actions in the section below.

7.5.2.1 Responses to Comments/ Criticisms

(1) Green Design

A few respondents commented that the aspects mentioned under the first indicator were not well-defined, and difficulties/ uncertainty might be encountered when conducting the assessment process. In fact, this indicator had already highlighted the most common and the easiest ways to incorporate the principles of passive design in a renewal project, and provided examples to indicate how individual aspects could be interpreted. Even though a renewal project had adopted the measures which were not stated under this indicator, the points would still be awarded to that particular project when the project designer could show how the measures could be categorized under 5 aspects and contribute to passive design during the assessment process. However, a minor amendment was made to this indicator as some respondents had suggested a better and clearer term for option (i) without affecting its original meaning.

A certain amount of respondents claimed that it was not appropriate for the second indicator to ask for the comments on the availability of natural lighting and natural ventilation at the same time because those who satisfied with the amount of natural lighting might not be satisfied with that of natural ventilation to the same degree. In addition, they pinpointed that assessing whether the use of natural lighting and natural ventilation was optimized was a technical issue and therefore this indicator should be assessed on the basis of physical measurement rather than personal perception. However, this study insisted to keep this qualitative indicator in order to ascertain that the citizens were satisfied with the passive design of the renewal projects. Even

though the physical measurements were conducted and the results indicated that a reasonable amount of natural lighting and natural ventilation was available within the renewal sites, it did not necessarily mean that the citizens living there were satisfied. After taking into account of these comments, this study proposed to amend this indicator by separating 2 issues, and the assessors would be asked to rate the extent to which the use of natural lighting and natural ventilation was effectively maximized in accordance with the preliminary design of the renewal project. In view of this amendment, the point scoring system for the indicator had also changed from the Likert-type scale to the Likert-type scale PLUS.

(2) Availability of Local Employment

For the first indicator, some respondents revealed that it was unreasonable to focus on private-sector employment only as non private-sector e.g. public community facilities and social enterprises could also offer job opportunities to the citizens. However, in actual fact the working opportunities offered by non private-sector were comparatively limited. Many of these posts were filled by the in-house staff upon completion of the project, and no new recruitment would be arranged. Since this indicator attempted to provide a number of job opportunities for the residents of the renewed area, the major focus was put on the non-residential private-sector employment which was capable to support a greater amount of population. In addition, a few respondents doubted the reliability of the take-up rate and worker density pre-assumed by this study. In fact, this study was aware of this potential problem and therefore, it had already made reference to a comprehensive survey conducted by the PD and developed the point scoring system catering for their inaccuracy. As this indicator merely aimed to calculate the approximate number of jobs created by the renewal projects through a brief estimation, the absolute accuracy of the figure was not a major concern.

The second indicator was proposed to supplement the first indicator in order to identify whether the citizens living in the renewed area were satisfied with the adequacy of working opportunities available in the community after urban renewal. However, a significant amount of respondents argued that this indicator was too vague and subjective as it was so difficult to define the term “adequate”. They also argued

that this indicator had not taken into account of some important aspects like job nature and salary. It was believed that the total number of working opportunities could not be the only concern as the citizens would not be better off when the jobs created in the renewed area were not suitable for them. In view of it, this study decided to replace the second indicator by a more comprehensive form of qualitative assessment bearing various qualities of jobs in mind. After the amendment, this indicator would be represented by 4 statements to cover a wider range of qualities and the point scoring system for the indicator had also changed from the Likert-type scale to the Likert-type scale PLUS.

(3) Conservation/ Improvement of Local Distinctiveness

Both indicators for this design criterion were commented to be subjective. It was agreed that this criticism was relevant but it was the best way of assessing this criterion. It was because evaluating the distinctiveness of an area basically was a subjective topic. It was impossible to have a quantitative assessment indicator for measuring such abstract issue. In order to minimize the adverse impact induced by these subjective indicators, this study tended to accomplish such assessment by the assessors who were impartial, objective, and able to identify the own characteristics and the positive identity of the renewed area if available.

(4) Provision Facilitating Establishment of Different Businesses

Numbers of respondents pinpointed that the provisions stated under the first indicator were not clearly defined. For instance, they could not identify the differences between shopping mall/ centre/ arcade and department store, and they were not sure whether the shops/ offices/ social enterprises found in the residential blocks and the office buildings would be counted. In response to their queries, this study had revised the options given under this indicator in order to elaborate this indicator in a clearer way. Although some respondents suggested counting the total number of business premises available in the community after urban renewal, it was still believed that counting how many types of business premises was more appropriate for this design criterion. It was because this indicator only aimed to identify whether a variety of business environment would be provided upon completion of the renewal

project. In addition, it was difficult to estimate the accurate number of the commercial enterprises to be established in the future as setting up a business is a commercial decision that can be affected by many factors such as time, cost and economic condition. It was also a hard task to determine the optimum number of business premises when developing corresponding point scoring system.

For the second indicator, several respondents gave the same comment to it stating that the assessment based on personal judgment was highly subjective. In fact, this study purposely developed a qualitative indicator here to supplement the first indicator as mentioned above. Even though a variety of business premises was provided, the citizens were not satisfied unless there was a good mix and wide range of shops and services provided in their community. Therefore, their views on this area should be taken into account.

(5) Provisions for Meeting Special Needs of the Disabled, Elderly or Children

A few respondents commented that provisions (iii) – (v) under the first indicator were irrelevant. They claimed that special needs facilities like child care centre and residential care home for the elderly were not required for every urban renewal project and therefore it was not fair to give more points to those projects having more provisions. It was agreed that provision of special needs facilities should depend on needs and they were not required if there was no demand/ request in the renewed areas. However, this study intended to emphasize that the majority of urban renewal projects being assessed under SURPAM would have such needs. It was because most of the renewal projects were conducted in the old districts containing a wide mix of population. In order to meet the needs of different citizens especially for the dependent groups, providing a variety of special facilities was highly recommended. In addition, several respondents advised that they could not see any differences between items (ii) and (iii), items (ii) and (iv) as well as items (i) and (v). To ensure that these items became more distinguishable, their wordings were slightly changed.
Even though the facilities provided in the renewed area could not be found under the first indicator, the points would still be awarded to the project when the project designer could indicate how the children, the elderly and the disabled persons had benefited from these provisions.

Once again, the second indicator was commented to be subjective. Similar to the second indicator of the design criterion (4), this study attempted to develop a qualitative indicator in order to find out whether the citizens especially for those who had special needs were satisfied with the provisions available for them.

(6) Building Form

Among all indicators developed for the SURPAM, the first indicator for the captioned design criterion attracted the greatest amount of criticisms. The major reason was that most of the respondents had queries about the definition of the plot ratio stipulated in this study, and its validity in assessing a renewal project in terns of development density. They were not sure what kinds of buildings were going to be counted when calculating the total gross floor area, and they did not know whether the exempted/ non-accountable gross floor area of the buildings would be counted. Therefore, they believed that the plot ratio might not be an appropriate/ effective means to evaluate the density of a development. In order to address those queries and avoid further confusion, this study proposed to derive a new ratio called development density ratio (DDR) that was tailor-made for the assessment process. DDR was clearly defined here as a ratio of total above-ground construction area of all types of buildings in the site to total site area to be renewed. Unlike the plot ratio stipulated in the BO, the DDR only took into account of the above-ground developments and included those elements of the building bulk that might be non-accountable/ exempted under the BO. Apart from this comment, the respondents also criticized the corresponding point scoring system. They argued that low density was not necessarily good and high density was not necessarily bad. Therefore, it was unreasonable to give more points to the projects with a lower density. However, it should be noticed that the captioned design criterion was highlighted in the EFA of this study as a critical factor making a major contribution to the environmental sustainability. Past studies mentioned in previous chapters had clearly revealed that the adverse impacts on the environment decrease with decreasing density of the development. Therefore, it was justifiable to have a preference for the low density projects. In view of it, this study insisted to keep the proposed point scoring system for this indicator.

Compared with the first indicator, the comments given to the second one were more general. Some respondents conveyed that the visual appearance was a very subjective issue and therefore it was difficult to have an objective judgment. This study recognized this problem and thus it had already included other more concrete aspects e.g. height, bulk and density in this indicator to reduce the subjective effect.

(7) Adaptability of Non-domestic Development to the Changing Needs

Several respondents commented that the designs mentioned under the first indicator was not flexible at all as most of the provisions only allowed small scale internal alterations. This study was also aware of this concern but it could not do more than that because flexibility was basically a constraint of urban renewal. This study had already tried its best to incorporate the most possible ways to cope with future changes in this indicator and it could be found that most of the respondents were satisfied with such arrangement.

Some respondents doubted the value of developing the second indicator. They argued that expansion, improvement and modification were usually permitted provided that the legislative requirements were met, and therefore the answer to this indicator should obviously be “strongly agree”. However, this study disagreed with this comment. The major focus of this indicator was to identify whether the non-domestic portion of the development in the renewal project could address the future changes with ease. If the development had to undergo a complicated, lengthy and cost intensive process when conducting alterations and additions, such project could not be claimed to have a high adaptability.

(8) Convenient, Efficient & Safe Environment for Pedestrians & Public Transport Users

A few respondents pointed out that the purpose of the trip implied under the first indicator was unclear. Except for work, the citizens would go to so many places in their daily life and each trip might require different means of travel. Therefore, it is very difficult for the assessors to make a choice among the options given under the indicator during the project assessment. In fact, this study recognized this concern

and therefore, this indicator only aimed to identify the mobility of the citizens living in the renewed area by reviewing their most frequent means of travel to the places they would often go in order to simplify the assessment process. It was also believed that the citizens would not find it difficult to travel to most of the urban places if the pedestrian walkways and public transport systems of the renewed area were well-established.

Although some respondents commented that the second indicator was subjective, this study still insisted to keep this indicator because assessing whether the pedestrian walkways and public transport systems were convenient, efficient and safe was a subjective issue in which personal judgments from the citizens i.e. the end users should be obtained to generate a reliable result. However, a minor amendment to the wordings of the last statement was made after considering the comments of a respondent.

(9) Compatibility with Neighborhood

Several respondents were concerned that some people might confuse the term "compatibility" with "similarity" or "homogeneity"; therefore, a lower point might be awarded under the first indicator to a renewal project when its design was found different from that of the surrounding areas. In order to address this concern, this study decided to engage the assessors who understood the meaning of "compatibility" to complete the assessment. The assessors had to realize that it was possible for a renewal project to be compatible with the surrounding environment even though their details were not the same. Furthermore, a few respondents commented that it was difficult to distinguish item (i) from item (ii) when conducting the assessment. Therefore, the wordings of either item should be changed in order to ensure that these items could be differentiated between one another. In response to this comment, the wordings of item (ii) had been amended to highlight the impact of the design style of individual buildings on the compatibility of the development.

A certain amount of respondents argued that the second indicator was too general to assess the impact of the development in the urban renewal project on the neighborhood and it failed to consider some important aspects e.g. its impact on the

way of living of the residents nearby, the value of the neighboring properties and the future development of the surrounding areas. This study accepted their opinion that a development could affect the neighborhood in different ways and various significant issues influencing the economic, environmental and social domains of the community nearby should not be overlooked. Therefore, in addition to the impact of the development on the view and micro-climate, this study also incorporated those aspects being suggested in the indicator. After the revision, the second indicator would be represented by 5 statements and its point scoring system would be changed from the Likert-type scale to the Likert-type scale PLUS.

In addition, numbers of respondents pinpointed that both indicators for this design criterion were subjective. It was agreed that these indicators were subjective but this arrangement was inevitable because assessing the compatibility of the development required personal judgment from the citizens. Having the qualitative indicators here was very useful as the citizens' views could reflect whether the area undergoing urban renewal was developed in harmony with the surrounding areas and positive impacts were imposed on the neighboring properties.

(10) Access to Open Spaces

Some respondents queried why the first indicator was assessed in meters rather than in minutes. This study assessed this indicator in meters because it was a more accurate measurement unit for the accessibility of open spaces. Assessing the walking distance in minutes was relatively simple, but the results might vary greatly as the walking speed of different people was not the same.

Similar to other qualitative indicators, the second indicator for this design criterion was commented to be subjective by a few respondents. Even though an open space was provided proximity to the place of residence of the citizens, they would not go there if they did not consider the open space easily accessible after taking into account of the factors like distance, comfort and safety. Therefore, this study proposed to develop a qualitative indicator to identify whether the citizens were satisfied with the level of access to the nearby open spaces they were likely to go.

(11) Access to Work

Several respondents argued that item (v) under the first indicator was redundant because the main mode of transport which imposed different impacts on the environment had already been included in items (i) – (iv), and local employment was not so important in Hong Kong as the mobility of the citizens in general was high. However, the EFA of this study had highlighted the significance of local employment for a community, and previous literature and studies had also shown its benefits to the citizens. Not surprisingly, most of the people preferred to work near their place of residence. Therefore, it was reasonable for this study to include item (v) in this indicator and award higher points to the renewal projects having local employment. Some respondents also commented that the citizens probably had difficulty distinguishing light public transport from mass transport in the assessment process. Instead of using the vague terms in the point scoring system of this indicator, this study had accepted a constructive suggestion made by the respondents to change the terms from light public transport and mass transport to road based public transport and rail based mass transport respectively. The former refers to minibus, bus and coach while the latter is mainly regarded as MTR.

A number of respondents asked why the scale for measuring this second indicator differed from that of the first indicator of design criterion (10). Unlike measuring the accessibility of the nearest open space, this study could only collect relevant information by asking the citizens. Therefore, it was necessary for this study to develop a simple means to capture the citizens' views. It was expected that measuring their average journey time in minutes was easier than getting a figure that indicated the accurate distance between the work place and the place of residence of the citizens.

(12) Green Construction

Some respondents doubted the value of developing the first indicator. They pinpointed that the HKBEAM had already done the job and this study could make use of that scheme to assess the captioned design criterion. This study realized that the HKBEAM had created a comprehensive framework for evaluation of the

environmental performance of individual buildings. Therefore, it had made reference to that scheme when developing this indicator. However, this study had no intention to borrow the whole HKBEAM because it only intended to identify whether the green construction practices widely recognized in the industry were adopted in the urban renewal projects, and the detailed assessment for individual buildings which was a key objective of the HKBEAM was not the major target of the SURPAM. Several respondents also commented that current design of the first indicator could not prevent the renewal project that only used a small amount of green products/ a few prefabricated elements in the construction process from getting a higher point. In order to establish a fair assessment environment for different urban renewal projects, this study decided to amend the wordings of items (v) and (vi) of this indicator.

A certain amount of respondents criticized that the second indicator was too simple and general to cover such a broad topic. They found it difficult for the people even the professionals to conduct the assessment as they might have different interpretations of the term “whole renewal process” and might not know all bolts and nuts of a renewal project. The respondents thought that it was really a hard task for this study to select the right person to give a good and valid answer. In response to this comment, this study decided to revise this indicator. After the revision, the assessors were asked to compare the renewal project being assessed to other project(s) in similar scale and rate the accuracy of 6 statements in relation to the consumption of non-renewable energy, fresh water, renewable natural resources, environmentally friendly products and prefabricated construction elements as well as the generation of demolition and construction wastes. To simplify the assessment process, the measurement for this indicator was only based on a 2-point scale in which “1” represented “Yes” and “0” represented “No”. After the assessment, their views on each of 6 statements would be added to form a sum and the points allocated to the project under this indicator increased when the total sum increased.

(13) Rehabilitation of Repairable Properties

Several respondents gave the comments on the point scoring system of the first indicator. They conveyed that it was not a common practice in Hong Kong to rehabilitate and retain the existing properties during urban renewal. It seemed that

most of the local renewal projects could not get a high point under this indicator during the assessment. This study understood their concern, but it still insisted to keep this point scoring system. Numbers of studies mentioned in previous chapters had already identified the close relationship between rehabilitation and sustainability; therefore, this study attempted to promote this practice in the urban renewal projects through the SURPAM.

Although some respondents pointed out that the second indicator was subjective, this study tended to retain it because this qualitative indicator was very useful to supplement the first indicator as mentioned above. Even a certain percentage of existing properties was retained and rehabilitated, the citizens were not satisfied if they found that some repairable properties with their utility values had been demolished during urban renewal. To find out whether the right property had been kept, a proper means to collect the citizens' views was required.

(14) Sense of Community

Most of the respondents agreed that social cohesion was a valid indicator for assessing the sense of community of the citizens. However, some of them had commented that it was insufficient to focus only on the relationship of the citizens with the old neighbors and their ability to make new friends when evaluating social cohesion. They pinpointed that whether the citizens could maintain close relationship with their old friends and existing social groups, and whether they were willing to contribute themselves to local community works after urban renewal were also important to determine the level of sense of community in a society. After considering the advice of the respondents, this study proposed to replace the first indicator with a more comprehensive form of qualitative assessment addressing various important issues. The revised indicator was now represented by 5 sentences and its point scoring system had also changed from the scenario-based scale to the Likert-type scale PLUS.

In addition, this study had slightly amended the wordings of the second indicator as some respondents advised that whether the renewed area was a good place to visit was not a contributory factor in the sense of community of the citizens. Similar to design criterion (3), a number of respondents had commented that both indicators for this

design criterion were subjective. However, this arrangement could not be avoided as it was impossible to develop relevant quantitative indicators to measure such a subjective topic. Therefore, this study had proposed 2 qualitative indicators accordingly. It was expected that it was the best way to assess the renewal projects against this subjective design criterion.

(15) Provision of Open Spaces

A few respondents were dissatisfied with the point scoring system of the first indicator. They revealed that based on their past experiences, having the open spaces over 25% of the site area was very rare and it appeared that most of the local renewal projects could not get a high point under this indicator. This study was aware of their concern, but it had no intention to change this scale. It was because open space was widely recognized as a significant provision to achieve sustainable development, and it was believed that creating more open spaces in a development was achievable. In order to ensure that more open spaces would be provided in the renewal projects in the future, this study intended to retain the proposed point scoring system for this indicator.

The second indicator was proposed to supplement the first indicator in order to find out whether the citizens living in the renewed area were satisfied with the numbers and the location of the open spaces after urban renewal. However, a significant amount of respondents criticized that this indicator had overlooked the design of open spaces which was an important aspect to be considered when judging their quality. In view of this comment, the study decided to amend the second indicator and then the design of the open spaces became one of the assessment criteria. After the amendment, this indicator would be represented by 3 statements and the point scoring system for it would be changed from the Likert-type scale to the Likert-type scale PLUS.

(16) Community Involvement

Some respondents argued that conducting all activities stipulated under the first indicator did not necessarily mean the citizens would be actively involved in the urban

renewal process. Therefore, it would be better if a qualitative indicator was provided. This study was aware of their concern and therefore, a qualitative indicator that would be discussed below had already been incorporated for the captioned design criterion. However, this study still considered the first indicator useful because it helped to determine how many opportunities/ channels were available in the renewal process for different stakeholders to raise their views and concerns in various stages of the urban renewal.

Numbers of respondents pinpointed that it was very difficult to find a right person to respond to the second indicator. They doubted whether a reliable result could be obtained after the assessment. They conveyed that most people were concerned more for their own benefits than for the neighborhood. People who could not get what they wanted might comment that they did not have adequate opportunities to express their views, and their concerns and opinions had not been properly addressed. This study also realized that a selection of appropriate person was extremely important for the success of the assessment. Therefore, this study attempted to engage the assessors who were impartial, objective, and able to identify whether the views of the citizens for the benefit of the whole community were considered when assessing the renewal projects against this indicator.

(17) Access to Public Facilities

Only a few respondents had the comments on the facilities included under the first indicator. They advised that more provisions could be stated here. However, this study tended to keep that list because the most common types of public facilities had already been incorporated and an additional category “Others” had been given to capture some minor items that might be left out.

This study agreed with some of the respondents that the second indicator was subjective. It proposed to develop a qualitative indicator here because assessing whether the public facilities provided nearby were adequate to meet the citizens’ needs required personal judgment. By adopting this qualitative indicator, it could be identified whether the citizens could easily gain access to the public facilities they had to go very often.

7.5.2.2 Refinement of Indicators

As mentioned, a number of minor or substantial amendments had to be made in response to the comments/ criticisms collected from 30 respondents. The revised version of the assessment tool was then scanned by these respondents and no adverse comment had been received. The validity and reliability of the revised version were further verified and confirmed by 3 urban design practitioners who have not been involved in any stages of this research in several interviews/ discussions conducted thereafter. It is expected that the indicators built from the literature, validated by the experts and finalized by the researcher are valuable, reliable and capable to evaluate the sustainability performance of the urban renewal projects in respect of urban design. The final version of 34 indicators established for the SURPAM is presented in Table 7.22.

Table 7.22 Final Version of 34 Indicators & their Corresponding Point Scoring System

Description of Indicators	Points Allocation
1. Green Design	
(a) Incorporation of passive design Which aspect(s) shown below has/ have incorporated the principles of passive design in response to the natural environment? (i) Micro-climate study e.g. ventilation assessment & sunlight/ shadow studies (ii) Building orientation/ disposition (iii) Design of building envelop e.g. building shape, & form & size of openings [other than (iv)] (iv) Selection of glazing/ building materials (in terms of insulation level & thermal mass requirement) (v) Landscape design	Either 1 aspect = 1 point Any 2 aspects = 2 points Any 3 aspects = 3 points Any 4 aspects = 4 points All or above = 5 points
(b) Quality of passive design Based on the preliminary design of the renewal project, what do you think about the following sentences? o Maximum amount of natural lighting is available at the street level and for the buildings to be constructed in the renewed site. (1-strongly disagree; 5-strongly agree) o Maximum amount of natural ventilation is available at the street level and for the buildings to be constructed in the renewed site. (1-strongly disagree; 5-strongly agree)	Sum <3 = 1 point 3≤ Sum ≤4 = 2 points 4< Sum ≤6 = 3 points 6< Sum ≤8 = 4 points Sum >8 = 5 points
2. Availability of Local Employment	
(a) Number of jobs created per 1000m^2	>0 - 100nos. = 1 point >100 - 200nos. = 2 points >200 - 300nos. = 3 points >300 - 400nos. = 4 points >400nos. = 5 points

Description of Indicators		Points Allocation
(b)	Quality of jobs created What do you think about the following sentences? o Adequate numbers of working opportunities are created after urban renewal. (1-strongly disagree; 5-strongly agree) o There is a proper mix of low value & high value jobs. (1-strongly disagree; 5-strongly agree) o There is a proper mix of temporary & permanent jobs. (1-strongly disagree; 5-strongly agree) o The salary of the jobs is reasonable/ acceptable. (1-strongly disagree; 5-strongly agree)	Sum <5 = 1 point 5≤ Sum ≤8 = 2 points 8< Sum ≤12 = 3 points 12< Sum ≤16 = 4 points Sum >16 = 5 points
3.	Conservation/ Improvement of Local Distinctiveness	
(a)	Appreciation of local characters Thinking about the area after urban renewal, which statement(s) as shown below can describe your feeling? (only consider the positive aspects) (i) Structures with special architectural features/ reflecting local culture/ characteristics are retained (ii) Unique businesses/ industries are conserved (iii) Distinctive townscape is reinforced (iv) New attractive landmarks are built (v) New distinctive image/ atmosphere is created in harmony with the surrounding environment	Either 1 statement = 1 point Any 2 statements = 2 points Any 3 statements = 3 points Any 4 statements = 4 points All or above = 5 points
(b)	Uniqueness of renewed area What do you think about this sentence “The area after urban renewal has its own characteristics & positive identity.”?	Points allocated on a scale of 1 – 5 (1-strongly disagree; 5-strongly agree)

Description of Indicators	Points Allocation
4. Provision Facilitating Establishment of Different Businesses	
(a) Types of business premises Which provision(s) as shown below is/ are available in the renewal project for establishing a variety of business environments? (i) Provision of shopping mall(s)/ centre(s)/ arcade(s) (ii) Provision of business premise(s) at street level only (iii) Provision of business premise(s) at/ below podium level of a residential block [other than (i)-(ii)] (iv) Provision of business premise(s) inside a non-domestic building [other than (i)-(iii)] (v) Provision of traders' stall(s) in the public place	Either 1 provision = 1 point Any 2 provisions = 2 points Any 3 provisions = 3 points Any 4 provisions = 4 points All or above = 5 points
(b) Quality of shops & services What do you think about this sentence "The renewed area provides a good mix & wide range of shops & services after urban renewal."?	Points allocated on a scale of 1 – 5 (1-strongly disagree; 5-strongly agree)
5. Provisions for Meeting Special Needs of the Disabled, Elderly or Children	
(a) Types of provisions for disabled, elderly & children Which design(s) as shown below is/ are incorporated in the renewal project? (i) Public areas providing enhanced provisions for access for the disabled persons (ii) Public areas with provisions specially designed for the children/ the elderly (iii) Provision, other than in public areas, specially for children e.g. child care centre (iv) Provision, other than in public areas, specially for the elderly e.g. residential care home for the elderly (v) Provision, other than in public areas, specially for the disabled persons e.g. rehabilitation centre for people with disabilities	Either 1 design = 1 point Any 2 designs = 2 points Any 3 designs = 3 points Any 4 designs = 4 points All or above = 5 points

	Description of Indicators	Points Allocation
(b)	Adequacy of accessible design & special facilities What do you think about this sentence "Accessible design & adequate facilities are provided for the people, regardless of age & physical abilities after urban renewal."?	Points allocated on a scale of 1 – 5 (1-strongly disagree; 5-strongly agree)
6.	Building Form	
(a)	Density of development within renewal site – measure in terms of development density ratio (DDR)	DDR ≥ 15 = 1 point 12≤ DDR <15 = 2 points 9≤ DDR <12 = 3 points 5≤ DDR <9 = 4 points DDR <5 = 5 points
(b)	Quality of building development What do you think about the following sentences? o The visual appearance of the properties is satisfactory. (1-strongly disagree; 5-strongly agree) o The height of individual buildings is appropriate. (1-strongly disagree; 5-strongly agree) o The bulk of individual buildings is appropriate. (1-strongly disagree; 5-strongly agree) o The density of development is acceptable. (1-strongly disagree; 5-strongly agree)	Sum <5 = 1 point 5≤ Sum ≤8 = 2 points 8< Sum ≤12 = 3 points 12< Sum ≤16 = 4 points Sum >16 = 5 points
7.	Adaptability of Non-domestic Development to the Changing Needs	
(a)	Capability to cope with future changes Which design(s) as shown below is/ are incorporated in the renewal project? (i) Open plan internal design (ii) Demountable system partition/ non-load bearing internal partition (iii) Structural framing building with minimum load bearing wall (iv) Flexible design of building services provisions/ availability of standby public utilities (v) Outdoor spaces reserved for multi-functional purposes	Either 1 design = 1 point Any 2 designs = 2 points Any 3 designs = 3 points Any 4 designs = 4 points All or above = 5 points

	Description of Indicators	Points Allocation
(b)	Degree of adaptability What do you think about this sentence "The non-residential portion of the redevelopment is easily/ readily allowed for future expansion, improvement & modification involving structural & non-structural alterations."?	Points allocated on a scale of 1 – 5 (1-strongly disagree; 5-strongly agree)
8.	Convenient, Efficient & Safe Environment for Pedestrians & Public Transport Users	
(a)	Frequent means of travel (except for work) - either by public transport or on foot	Public transport via ≥2 transits = 1 point Public transport via 1 transit = 2 points Public transport via 0 transit = 3 points On foot [>15mins] = 4 points On foot [≤15mins] = 5 points
(b)	Quality of pedestrian walkways & public transport facilities What do you think about the following sentences? o It is convenient & safe for the citizens to walk in pedestrian walkways within the renewed area. (1-strongly disagree; 5-strongly agree) o It is convenient & safe for the citizens to walk to the nearest public transport facilities. (1-strongly disagree; 5-strongly agree) o The physical design of the pedestrian walkways & pedestrian passages to public transport facilities in terms of location, width & material used is appropriate. (1-strongly disagree; 5-strongly agree) o The public transport system nearby is safe & efficient. (1-strongly disagree; 5-strongly agree)	Sum <5 = 1 point 5≤ Sum ≤8 = 2 points 8< Sum ≤12 = 3 points 12< Sum ≤16 = 4 points Sum >16 = 5 points

Description of Indicators	Points Allocation
9. Compatibility with Neighborhood	
(a) Harmonious environment Which aspect(s) of the renewal project as shown below is/ are compatible with the surrounding areas? (i) Use of color, texture & construction materials (ii) Design style of individual buildings (iii) Spatial arrangement of streets & buildings (iv) Scale & form of development (v) Land use zoning	Either 1 aspect = 1 point Any 2 aspects = 2 points Any 3 aspects = 3 points Any 4 aspects = 4 points All or above = 5 points
(b) Impact of development Thinking about the surrounding areas after urban renewal, what do you think about the following sentences? o The redevelopment has positive impacts on the view for the neighboring properties. (1-strongly disagree; 5-strongly agree) o The redevelopment has positive impacts on the micro-climate for the neighboring properties. (1-strongly disagree; 5-strongly agree) o The redevelopment has positive impacts on the way of living of the citizens living in the neighboring properties. (1-strongly disagree; 5-strongly agree) o The redevelopment has positive impacts on the value of the neighboring properties. (1-strongly disagree; 5-strongly agree) o The redevelopment has positive impacts on the future development of the neighborhood. (1-strongly disagree; 5-strongly agree)	Sum <6 = 1 point 6≤ Sum ≤10 = 2 points 10< Sum ≤15 = 3 points 15< Sum ≤20 = 4 points Sum >20 = 5 points

Description of Indicators	Points Allocation
10. Access to Open Spaces	
(a) Average walking distance to the nearest open space	>1000m = 1 point >750 - 1000m = 2 points >500 - 750m = 3 points >250 - 500m = 4 points ≤250m = 5 points
(b) Ease of access to open spaces Thinking about the nearby open spaces you are LIKELY to go & considering the factors like distance, comfort & safety, which statement shown below best describes your situation? (i) I have considerable difficulty gaining access to all places. (ii) I have difficulty gaining access to most places. (iii) Occasionally, I have difficulty gaining access to some places. (iv) It is relatively easy for me to gain access to most places. (v) I can easily gain access to all places.	Select (i) = 1 point Select (ii) = 2 points Select (iii) = 3 points Select (iv) = 4 points Select (v) = 5 points
11. Access to Work	
(a) Work traveling habits - MAIN mode of transport as usual	By private transport = 1 point By road based transport = 2 points By rail based transport = 3 points By cycling/ on foot = 4 points Working in renewed site = 5 points

Description of Indicators	Points Allocation
(b) Average journey time for the citizens to get to work - travel by means of cycling/ walking excluded	>60mins = 1 point >45-60mins = 2 points >30-45mins = 3 points >15-30mins = 4 points ≤15mins = 5 points
12. Green Construction	
(a) Incorporation of environmentally friendly practices Which practice(s) as shown below is/ are incorporated in the renewal project? (i) Providing device(s) to reduce consumption of non-renewable energy (ii) Providing device(s) to reduce consumption of fresh water (iii) Adopting measure(s) to reduce consumption of non-green construction materials (iv) Adopting measure(s) to reduce generation of solid/ liquid wastes (v) Using environmentally friendly/ pollution free material(s), product(s)/ equipment(s)/ construction methods generally (vi) Using prefabricated/ pre-casting or off-site construction element(s) in substantial amount	Either 1 practice = 1 point Any 2 practices = 2 points Any 3 practices = 3 points Any 4 practices = 4 points Any 5 practices or above = 5 points
(b) Quality of environmentally friendly practices When comparing this renewal project to other project(s) in similar scale, what do you think about the following sentences? o Less non-renewable energy is consumed here. (Yes =1 & No = 0) o Less fresh water is consumed here. (Yes =1 & No = 0) o Less demolition & construction wastes are generated here. (Yes =1 & No = 0) o More renewable natural resources are used here. (Yes =1 & No = 0) o More environmentally friendly/ pollution free construction materials/ products are chosen here. (Yes =1 & No = 0) o More prefabricated/ pre-casting or off-site construction elements are used. (Yes =1 & No = 0)	Sum =1 = 1 point Sum = 2 = 2 points Sum = 3 = 3 points Sum = 4 = 4 points Sum ≥ 5 = 5 points

	Description of Indicators	Points Allocation
13.	Rehabilitation of Repairable Properties	
(a)	Percentage of existing properties being retained	>0 - 20% = 1 point >20 - 40% = 2 points >40 - 60% = 3 points >60 - 80% = 4 points >80 - 100% = 5 points
(b)	Degree of rehabilitation What do you think about this sentence “The repairable properties & those having their utility values are properly retained & rehabilitated during urban renewal."?	Points allocated on a scale of 1 – 5 (1-strongly disagree; 5-strongly agree)
14.	Sense of Community	
(a)	Social cohesion Thinking about the community after urban renewal, what do you think about the following sentences? o I can maintain close relationship with my old neighbors (1-strongly disagree; 5-strongly agree) o I can maintain close relationship with my old friends including schoolmates & colleagues. (1-strongly disagree; 5-strongly agree) o I can maintain close relationship with existing social groups. (1-strongly disagree; 5-strongly agree) o I can make new friends easily. (1-strongly disagree; 5-strongly agree) o I am willing to contribute myself to local community works. (1-strongly disagree; 5-strongly agree)	Sum <6 = 1 point 6≤ Sum ≤10 = 2 points 10< Sum ≤15 = 3 points 15< Sum ≤20 = 4 points Sum >20 = 5 points

	Description of Indicators	Points Allocation
(b)	Citizens' satisfaction with the local community What do you think about this sentence "The renewed area is a good place to live/ work after project completion."?	Points allocated on a scale of 1 – 5 (1-strongly disagree; 5-strongly agree)
15.	Provision of Open Spaces	
(a)	Percentage of open spaces being provided	>0 – 20% = 1 point >20 – 40% = 2 points >40 – 60% = 3 points >60 – 80% = 4 points >80 – 100% = 5 points
(b)	Quality of open spaces What do you think about the following sentences? o Adequate numbers of open spaces are provided in the renewed area. (1-strongly disagree; 5-strongly agree) o The location of open spaces is appropriate. (1-strongly disagree; 5-strongly agree) o The design of the open spaces in terms of size, material used, facilities provided & vegetation growth is satisfactory. (1-strongly disagree; 5-strongly agree)	Sum <4 = 1 point 4≤ Sum ≤6 = 2 points 6< Sum ≤9 = 3 points 9< Sum ≤12 = 4 points Sum >12 = 5 points

Description of Indicators		Points Allocation
16.	Community Involvement	
(a)	Form of involvement Thinking about the availability of participation opportunity, which activity/ activities is/ are conducted during the renewal process? (i) Holding meeting(s) with immediate neighbors & local public officials to solicit input before conceptual design (ii) Collecting views from community meeting, workshop, forum, exhibition, etc. held during design stage (iii) Modifying project design by incorporating community input, & explaining why their input is not incorporated if no modification is made (iv) Working directly with community associations/ social networks to advertise public comments & generate comments on project design (v) Establishing channels for ongoing communication between the developer & the community	Either 1 activity = 1 point Any 2 activities = 2 points Any 3 activities = 3 points Any 4 activities = 4 points All or above = 5 points
(b)	Degree of participation What do you think about the following sentences? o The residents/ shop owners & adjacent neighborhood affected by urban renewal have adequate opportunities to raise their concerns. (1-strongly disagree; 5-strongly agree) o Their concerns & opinions for the benefit of the renewed area & the community are taken into account. (1-strongly disagree; 5-strongly agree) o Their comments on the project are well-addressed. (1-strongly disagree; 5-strongly agree)	Sum <4 = 1 point 4≤ Sum ≤6 = 2 points 6< Sum ≤9 = 3 points 9< Sum ≤12 = 4 points Sum >12 = 5 points

	Description of Indicators	Points Allocation
17.	Access to Public Facilities	
(a)	Public facilities within 500m of accommodation Which facility/ facilities can be found within 500m from the entrances of the residential development in the renewal project? (i) Food centre (ii) Market (iii) Clinic/ medical centre/ hospital (iv) School/ college (v) Library (vi) Community centre (vii) Cultural centre/ museum (viii) Sport complex (ix) Swimming pool (x) Social services centre (xi) Postal facility (xii) Police office/ fire stations (xiii) Others	Either 1 facility = 1 point Any 2 facilities = 2 points Any 3 facilities = 3 points Any 4 facilities = 4 points Any 5 facilities or above = 5 points
(b)	Ease of access to public facilities Thinking about the public facilities you OFTEN go & considering the factors like distance, comfort & safety, which statement best describes your situation? (i) I have considerable difficulty gaining access to all facilities. (ii) I have difficulty gaining access to most facilities. (iii) Occasionally, I have difficulty gaining access to some facilities. (iv) It is relatively easy for me to gain access to most facilities. (v) I can easily gain access to all facilities.	Select (i) = 1 point Select (ii) = 2 points Select (iii) = 3 points Select (iv) = 4 points Select (v) = 5 points

7.6 Implementation of the Assessment Model

As discussed in section 7.3, apart from the selection of an appropriate proposal for a renewal site, the SURPAM is also useful to assess the design quality and the sustainability level of an urban renewal project.

7.6.1 Process of Assessing Individual Projects

In order to facilitate the project assessment, multiple sources of evidence including both qualitative and quantitative forms of data have to be gathered. For example, record photos should be taken, relevant documents and archival records such as notional master layout plans of a renewal site or building plans of the renewal project have to be collected and analyzed, and direct observations through site visits and interviews or questionnaire surveys have to be arranged. Various sources complement each other and therefore, a more reliable, convincing and accurate outcome can be produced when the assessment is conducted on the basis of multiple sources of information/ evidence.

The assessment of individual urban renewal project on the basis of 34 indicators has to be facilitated by 3 major groups of people i.e. the researcher of this study, the designer/ person in charge of the projects, and the representatives of the citizens/ the residents of the area to be/ has been renewed. The assessors engaged in the evaluation of the renewal projects against individual indicators are shown in Table 7.23. After gathering all relevant information of the development schemes from the statutory plans, written reports, press releases and information contained in the official website, newspaper clippings, etc., I, as the sole researcher of this study can conduct the desktop study. Based on the actual facts, some of the indicators can be assessed objectively. Since not all details of the projects are accessible for public inspection, the designer/ person in charge of the projects should be contacted in order to identify the missing link and verify the preliminary assessment results.

For the indicators requiring citizens' inputs especially for the qualitative ones,

interviews or questionnaire surveys with the local citizens and the residents' representatives e.g. district council members should be arranged accordingly. The extent of investigation depends heavily on the availability of the research resources. The ideal would be to have a full survey that involves all of the affected persons, groups and interested parties in expressing their views about the renewal projects with respect to individual design criteria. To ensure that the responses of all assessors reflect the truth, the point scoring system of the indicators will not be disclosed to them throughout the assessment. Since these respondents can only assess the renewal project based on their knowledge which would be significantly influenced by the amount and quality of the information available for them, a briefing on the project being assessed, relevant information about the renewal scheme and a channel for addressing queries should be provided to them beforehand in order to ascertain the quality of the assessment results.

Table 7.23 Assessors for Evaluation of Individual Indicators

Indicators / **Design Criteria**	(a)	(b)
GBD	R & P	CR & C
ALE	R	CR & C
CLD	R & P	CR & C
PEB	R & P	CR & C
PSN	R & P	CR & C
BDF	R	CR & C
ADN	P	P
CST	CR & C	CR & C
CWN	P & CR	CR & C
AOS	R	CR & C
ATW	CR & C	CR & C
GBC	P	P
RRP	R	CR & C
SOC	CR & C	CR & C
POS	R	CR & C
CYI	R & P	CR & C
APF	R	CR & C

Note: R = Researcher of this study; P = Project designer/ person in charge e.g. project manager / the developer's representative; CR = Citizens' representatives e.g. district council members; C = Local citizens

7.6.2 Value of the Assessment results

Upon completion of the assessment process, a set of points will be awarded to an urban renewal project under each indicator of individual design criteria. As mentioned before, each indicator is capable of scoring a maximum of 5 points and a design criterion containing 2 indicators can score a maximum of 10 points. When all of these points are put into the equation (7.1) which is provided under section 7.3, an overall score of a renewal project can be calculated. The grand total represents the sustainability level of a particular urban renewal project and its performance in meeting the sustainable development objectives during urban renewal, the higher the better. If more than a single project is assessed, the final scores of different projects can be compared and a more sustainable urban renewal project can be identified.

In addition to the assessment of the overall performance, the SURPAM also helps to evaluate the strength and the weakness of a particular project. When looking at the individual scores generated by the assessment model, the design criteria that have been stressed/ overlooked during urban renewal can be easily found. Some sorts of adjustments and amendments can be then made to improve the quality of the renewal projects. Furthermore, the model is capable not only to assess the design quality of an urban renewal project but also to reflect the level of satisfaction of the affected persons and the concerned parties with the renewal projects being assessed. It is expected that the renewal project with a better assessment result can attract a higher level of satisfaction from the citizens.

CHAPTER 8 RESEARCH HIGHLIGHT

8.0 Introduction

This chapter begins with a brief overview of the study. It summarizes the major findings presented in previous chapters, and shows how the aim and objectives of this research have been met. It also identifies the implications and the limitations of this study. Then, it concludes the study with the suggestions for future research.

8.1 Overview of the Study

Urban areas experience different levels of decay when their planning and design fail to meet changing needs. To address urban decay problems, introduction of urban redevelopment projects seems to be inevitable. Yet, instead of adopting the bulldozer approach, urban redevelopment with due considerations to economic, environmental and social well-being of the community was regarded as a more appropriate means to revitalize an urban area in this study. It found that urban renewal could provide a stepping stone for achieving sustainability at the community level. Still, identifying how to deliver sustainable outcomes through urban renewal was a critical research question. Scholars, professionals, policy makers and other concerned groups around the world had made a great effort to seek practical ways to implement the idea of sustainable development. Agenda 21 developed at the Earth Summit in 1992 was the first attempt at the international level. Throughout the years, the sustainability concept has been gradually incorporated into global planning and development strategies, but there are constant debates on how to achieve sustainable development at the local level, how to transfer such an abstract concept into planning practices and how to measure their actual performance.

During the preliminary stage of the research process, this study found that urban design was probably a suitable means to achieve sustainable development at the local level. Therefore, it made an attempt to explore the theories of urban design,

investigate its relationship with sustainability concept and urban renewal, identify relevant design principles and highlight the design considerations that should be taken into account in the urban renewal projects in order to create a sustainable neighborhood. Even though a list of urban design considerations was identified, it did not necessarily mean that sustainable urban renewal could be achieved in the same way in Hong Kong. Hence, the second attempt of this study was to examine the applicability of these considerations to the local context by means of a perception survey. After analyzing the data collected through different statistical tests, numbers of critical factors for achieving economic, environmental and social sustainability in Hong Kong were highlighted. To examine the capability of local urban renewal projects to meet various sustainable development objectives, this study made the best use of the extracted factors to develop a theoretical framework of an assessment model called SURPAM. Then, this study defined the assessment mechanism and derived an assessment tool to complete the model. By discussing the project assessment details, this study has demonstrated how the SURPAM is able to measure the design quality and the sustainability level of individual urban renewal project in real life context.

8.2 Summary of Research Findings

As mentioned in Chapter 1, this research aims to achieve sustainable urban renewal in Hong Kong by developing a yardstick to measure and evaluate the design quality and performance of different urban renewal projects throughout the study. Apart from Chapter 8, this study has spent 6 chapters i.e. Chapter 2 – Chapter 7 to complete this mission. These chapters altogether have played a significant role in meeting the research objectives and addressing individual queries as stated in Chapter 1. By drawing together the theories on urban renewal, sustainability and urban design in Chapter 2, the importance of achieving sustainability in urban areas through the urban renewal process is highlighted, the role of urban design in implementing the principles and concepts of sustainable urban renewal is revealed, and a theoretical framework of sustainable urban renewal approach is built. These aspects are very important to this research as they help to address the queries (i) and (ii).

During the literature review, this study mainly made reference to the theories, practices and models in the Western context. However, there is a doubt about their application to the key study area selected by this research i.e. Hong Kong. In order to respond to this query, a detailed investigation has to be conducted. It is believed that a valid and reliable investigation result cannot be obtained unless there is a full understanding of the redevelopment culture in Hong Kong. That explains why Chapter 3 is found here. It examines the characteristics of the urban redevelopment in Hong Kong by looking into the past and current controls and practices, their impacts as well as the recent urban (re)development issues including the trend of sustainable development. When investigating the Hong Kong context with reference to the analytical framework stipulated in Chapter 2, numbers of tailor-made urban design principles for achieving sustainable urban renewal in Hong Kong are generated.

After being familiar with the local context, it is time to address the query (iii) by formulating an appropriate research approach. Chapters 4 to 6 as a whole act like a system in which 3 major components namely input, process and output have been clearly presented therein. In Chapter 4, the way of conducting research, and the methods of collecting, analyzing and validating the data are laid. Based on the research methodology highlighted in Chapter 4, a set of relevant, representative and reliable data can be collected. These inputs then undergo a series of statistical analyses to produce valuable outputs that are shown in Chapter 5. Chapter 5 has analyzed the demographic characteristics of the respondents, evaluated the relationships between different urban design considerations, indicated the similarity and the difference between the views of local stakeholders including design professions, private developers and the general public on the importance of various considerations, and identified the results of the EFA as well as the AHP. Unlike Chapter 5, Chapter 6 does not involve any statistical analysis process. It only put its focus on the interpretation of 2 primary outputs i.e. 18 critical design factors for achieving sustainable urban renewal in Hong Kong and the priority ratings of the topmost urban design considerations for individual factors, and on the development of a conceptual framework of the SURPAM for this study. It is believed that the query (iii) is properly addressed after a detailed discussion of different research findings has been conducted in Chapter 5 and 6.

In order to ascertain that the urban renewal strategies in Hong Kong to be established in the long run can fulfill long term sustainability objectives from economic, environmental and social perspectives, a major concern raised in the query (iv), this study has derived a feasible, practical and reliable assessment model for evaluating the design quality and sustainability performance of the renewal projects to be implemented in the near future. The framework of the SURPAM is founded on the findings of the literature review, perception surveys, expert judgments and statistical analyses highlighted in previous chapters, and all details related to the SURPAM including its purposes, values, structure, assessment mechanism, assessment indicators and their corresponding point scoring system are presented in Chapter 7. Since the assessment tool composed of a set of performance indicators and their point scoring system is one of the most important parts of the model, it has to undergo a proper evaluation process to justify its appropriateness for project assessment. That explains why Chapter 7 contains a section showing the evaluation process. To conclude, this research has successfully met the aim and specific objectives stipulated at the beginning of the study, and it has also fully addressed the research questions in various chapters in detail.

8.3 Implications of the Research

This study has clearly indicated that sustainable urban renewal approach should take root at the local level in particular when the traditional urban renewal practices fail to improve the built environment and the living quality of the citizens. Hong Kong which is well known for its high density of development has conducted numerous redevelopment projects in the past decades but many of them have attracted criticism. In order to ensure that Hong Kong can meet the global trend towards sustainable development and the local redevelopment projects can effectively achieve the economic goals without sacrificing the environmental and social needs of the community, such approach should be adopted in the territory. This research founded on the Hong Kong context is an exemplary study showing how urban renewal can meet the sustainable development objectives through good urban design. It has formed a research platform for those who would like to adopt the same approach in

their regions in the future.

Good urban design cannot be achieved unless the urban areas are planned in accordance with a number of thoughtful design principles. These principles which aim to meet certain amounts of pre-determined objectives and benefit the citizens from different dimensions have to be transformed into feasible design options and practical design considerations in order to ease the design process. In this study, the urban design principles and corresponding design considerations for Hong Kong context have been successfully identified. Through a series of perception surveys, and a number of interviews and discussions with the experts from various fields, it can be observed that the significance of individual design considerations to urban renewal would be greatly influenced by the local characters of an urban area, the expectations of the general public, and the overall political, social-economic and cultural environment. Therefore, a full understanding of the region and the people inside is required in order to prepare an appropriate design for the area undergoing urban renewal.

To examine whether important design considerations and critical design factors extracted here have been taken into account when planning urban renewal in Hong Kong, this study has made an effort to search for a practical, systematic, flexible and reliable measurement tool. However, it is found that none of the models readily available in the world are developed for assessing the extent to which the urban renewal projects meet the sustainable development objectives from the design perspectives. Therefore, this study has been initiated to make its own. The SURPAM is the assessment model derived in this study to serve such purpose. Through assessing the renewal projects against a number of quantitative and qualitative indicators, a clear picture of the project details can be shown and the potential impacts of the projects on the community as well as on sustainable development can be revealed. Based on the assessment results, necessary adjustments and amendments to the renewal schemes can be made before implementation to optimize its positive impacts and mitigate its adverse effects.

The assessment model is also valuable for the evaluation of the urban renewal projects. The model is capable to distinguish more sustainable project from less

sustainable one, reveal the design quality of individual projects, and reflect the level of satisfaction of the citizens with the project design. The assessment process has given sufficient opportunities for the key stakeholders including the design professionals, the concerned groups, the citizens, etc. to raise their concerns and express their views on the project design. In addition, the deficiencies of an urban renewal project can be easily identified during the assessment. The strength and the weakness of a particular project can be observed and its effectiveness in sustaining the renewed area from different domains can be evaluated. All concerned parties especially the policy makers can make reference to the assessment results in order to find out whether the objectives of an urban renewal project stated beforehand have been achieved and a sustainable project has been implemented for the benefit of the community. In this way, a systematic and effective review of existing urban renewal policy can be facilitated from time to time, and a more sustainable urban renewal strategy can be generated for Hong Kong in the near future.

8.4 Limitations of the Study

8.4.1 Comments on Research Methods

8.4.1.1 Questionnaire Survey

Questionnaire survey is a primary research method for this study. It had been used for 2 times throughout the whole research process. The first survey aimed to collect the views from the urban design practitioners and the public on the importance of various urban design considerations in sustainable urban renewal in Hong Kong. The second survey intended to validate the assessment tool of the SURPAM consisting of 34 performance indicators and a point scoring system by asking the comments from the experts in the industry and academia. Of course, both surveys have different focuses and purposes, and of different scales. However, the majority of the targeted respondents in these surveys were limited to those having electronic mail accounts/ fax numbers. It is argued that the use of a specific population i.e. the internet/ fax machine users may adversely affect the generalizability and validity of the findings.

Difficult to secure a high response rate in the questionnaire surveys is another limitation for this study. It was agreed that the response rate of the surveys was rather low to draw conclusions, but it was the best rate that could be obtained in this study under certain constraints in relation to time, cost, manpower and other technical difficulties. As too many surveys have been conducted in Hong Kong, many people are reluctant to join the survey in particular when it is done on a voluntary basis.

In order to increase the representativeness of the sample and ascertain the reliability of the survey findings, this study had maximized the total sampling size under limited research resources for the first survey. For the second survey, information obtained from the filled questionnaires was not the only source of evidence for drawing the conclusions. Other forms of data collection methods e.g. semi-structured interviews, informal meetings and discussions were also arranged to complement the survey results. In addition, the data collected in the surveys would undergo various statistical analyses to ensure that the data was adequate to generate significant results.

8.4.1.2 Independent t-test

In this study, 2 sets of independent t-test were conducted. The first one was to examine the survey records collected from London's and Hong Kong's practitioners in order to verify, through comparison with London's samples, the representation and the generality of the findings generated from the views of local practitioners. The second one was to investigate the differences and similarities between the views collected from the local practitioners and the citizens about the significance of each urban design consideration to sustainable urban renewal. In order to ensure that generalizations about the populations can be made after studying the sample data, t-test requires probability sampling. However, the samples taken from the populations of practitioners and citizens for this study were not totally random, that might adversely affect the result generated by the test. It is recognized that there is no guarantee of randomness in the sampling process. The population size of the practitioners groups in Hong Kong and London could be identified but not all of them could be reached as many of their contacts were not disclosed. Therefore, a random sample of the practitioners could only be obtained with the help of various

professional institutions i.e. HKIA, HKIP, REDA, RIBA, RTPI and CRM Broker. Due to the limited research resources and contact information, it is impossible to identify a complete list of population contained in the citizen group and obtain a random sample. Hence, only convenience sampling technique was adopted in this study. The result of the t-test was only used to provide an indication of how the practitioners' views differ from those of the residents. In view of it, the independent t-test was still worth to be conducted.

In addition, one may argue that the dependent variable i.e. design criteria was of ordinal instead of interval/ ratio level of measurement which might not fulfill the requirement of the t-test. However, this may not be the case. It should be noticed that the position of ordinal variables in the quantitative and qualitative classification is not clear. Although a definite answer is not yet available, numbers of scholars have agreed that ordinal variables can be treated as interval/ ratio variables when the underlying continuous distribution is thought to be present (Agresti, 1984; Hatch, 1991; Tabachnick & Fidell, 2007). In this study, a Five-point Likert-type scale was used. Even though the magnitude of the differences between numerical scales could not be measured, it is believed that an underlying variable existed as the scale was expected to be continuous. Therefore, ordinal variables could be treated as interval/ ratio variables and the requirement for conducting the t-test regarding the level of measurement had not been violated.

8.4.1.3 AHP

Similar to other data analysis techniques, the AHP has its own limitations. The limitations of the AHP are specifically highlighted here because it has produced the priority weights of various sustainable development objectives and design criteria which are the key components of the SURPAM. The AHP is a research methodology with a theory for decision making by drawing on personal experience and knowledge, intuitive judgment and understanding, and consensus building (Banai, 2005). Although it has been developed and used for more than 20 years, some people still question the theoretical basis underlying the AHP and doubt the representativeness of the results generated. According to Harker and Vargas (1987), the AHP has its axiomatic foundation, the measurement of preferences can be fully

represented by the eigenvector method, and the principles of hierarchical composition and the scales for eliciting judgments from the experts are proved valid in a number of studies. Therefore, the value of the AHP and the reliability of its results should not be doubted when it is properly adopted. It is believed that the subjectivity of the AHP is particularly useful for solving the problems that involve the subjective criteria and require the measurement of human values such as land use planning and built environment design being emphasized in this study (Banai, 2005).

Apart from the theoretical foundation, the procedures of the AHP also attract criticisms. Pairwise comparison is an important step in the AHP to be completed by the experts. However, this step is widely criticized as it is a tedious process especially when there is a large number of decision hierarchy levels, criteria or alternatives involved. One may doubt the reliability of the expert judgments because people are very likely to feel tired and lose patience during this process and therefore, they may not make their judgments conscientiously. They may change their minds from time to time in order to ascertain the acceptance of the C.R. value and shorten the whole judgment process. To avoid such drawback, only a reasonable and manageable amount of criteria are contained in the SURPAM and the researcher of this study has acted as a facilitator to take over the judgment process.

Although the AHP is subject to criticisms, it is regarded as the most appropriate method for this study. It is because this method is very suitable for the complex social issues such as urban renewal in Hong Kong in which intangible and tangible factors cannot be separated (De Montis et al., 2000). Pairwise comparison form of data input is straightforward and convenient for the users. Even the hierarchy has not yet been completed, i.e. an element at the upper level do not function as a criterion for all elements at the lower level, the value of the final output will not be adversely affected (De Montis et al., 2000). In addition, the AHP is flexible to allow revision. The decision makers can expand the hierarchy by increasing the numbers of levels or injecting additional criteria/ sub-criteria at individual levels to meet their needs.

8.4.2 Comments on Research Outputs

In additional to the research methods, the product of this study i.e. the SURPAM may

also attract criticisms. One may query that the SURPAM is only developed at projet level; thus its value on sustainable development at national and global scales is doubted. Further study should be conducted at national and global levels to confirm its value. However, this model can contribute to national and global sustainability to a certain extent. In Hong Kong, fewer and fewer virgin lands are available for new development; therefore, urban renewal would become a major source of land supply in coming decades. It is expected that promoting sustainable urban renewal practices through the SURPAM is able to contribute towards sustainability at city level effectively. If different sectors are brought together to make contributions at city/ regional level, sustainable development can be delivered at national or even at global scales. When all parties are willing to act individually and collectively, many environmental and social problems confronting us can be solved and a better world can be built in the future.

One may also argue that the SURPAM derived in this study on the basis of urban design is inadequate to achieve sustainable urban renewal. It may be queried that meeting sustainable development objectives cannot only reply on land use planning and physical design. On top of the tangible values of land (re)development, some intangible values especially for those making a major contribution to social sustainability should be addressed. Although it is agreed that physical design of an urban area is not a panacea to tackle all intangible issues, it can be a facilitator for improving the well-being of the society. At this moment, the current urban renewal system in Hong Kong is merely about the satisfaction of land use demands and the achievement of financial goals. It is expected that it would be very difficult to change the mentality of the policy makers or the profit makers completely within a short period of time. In view of it, the development of the SURPAM in this study is very useful as both tangible and intangible values have been considered. Even though the main focus of the model is still put on the physical built environment design within the renewal sites, it can increase the awareness of other intangible but important aspects that should be taken into account during the renewal process. It would be a big step forward for achieving sustainable urban renewal when the SURPAM is put forward.

It is also recognized that the SURPPAM is based on the subjective data which may

vary from time to time and place to place. Hence, the applicability of the model may not be long-lasting. The SURPAM is founded on subjective views because urban renewal is a social issue in which different parties are involved. The views of the key stakeholders should be considered to make sure that their needs can be met to a certain extent. To improve the reliability of the research findings and avoid the drawbacks of having a subjective model, only appropriate respondents are selected in the research process. Since people's views and preferences change over time, regular reviews are required to ensure that the model can reflect how the people think in a particular period of time. In addition, the research findings only show the snapshots of the views collected from a particular group of people living and/ practising in Hong Kong at a time, which may limit the application of the model. It should be clarified that this research does not aim to find out a definite solution to solve the global problems and tackle all urban renewal deficiencies in the territory. It only attempts to suggest a practical and systematic way to achieve sustainable development at a project level. The importance of this study is that the research process in developing the SURPAM is valid and can be replicated. It is still believed that this study can provide some valuable information for those who would like to improve sustainability at the city scale. To ascertain the representation of the model, the same research process can be conducted again when there are significant changes in the economic, political, environmental, social and cultural conditions.

The scope of the SURPAM may also attract criticisms as only 17 design criteria and 34 indicators are included. Due to the limited research resources, it is impossible to develop a very large model covering all relevant design criteria and their corresponding indicators. As a result, only the most important design criteria for Hong Kong urban renewal are included, and a reasonable and manageable amount of criteria and indicators is finally selected. Further study should be conducted to extend the scope of study, and increase the total numbers of criteria and indicators in the model when more resources are available. However, it is strongly believed that the design criteria and indicators highlighted in this study would dominate as this study is backed up by a comprehensive literature review, a series of statistical analyses, and a number of in-depth discussions, meetings and interviews with various experts.

8.5 Recommendations for Future Research

The findings of this research have stimulated some interesting areas for future investigations. Very often, there is some discrepancy between theoretical knowledge and actual practice. Therefore, it is not surprising to notice that some conceptual models developed elsewhere are not very practical at all. To ensure that the SURPAM derived here is theoretically and practically feasible, case study should be conducted to validate the applicability of the SURPAM in Hong Kong. Case study is a useful method to bridge the gap between abstract research/ theory and concrete practice by comparing the intuitive views of the respondents with the results obtained from the SURPAM. Validation through case study is able to present the assessment mechanism of the SURPAM in a clear and simple way, and illustrate how the SURPAM works in real life to evaluate the sustainability performance of local projects. The case study process can serve as a pilot test to identify the potential difficulties encountered in the assessment process. Further investigation and refinement of the model can then be made on the basis of the results before it is extensively applied in the future.

In order to ascertain the quality of the validation through case study, a lot of research resources should be ready for the study, a large pool of government projects should be available for assessment, and an in-depth investigation of a wide variety of urban renewal projects should be conducted to even out the impacts of different paratmeters other than urban design. Otherwise, the representation of the validation result would be doubted and the result is very likely to subject to criticisms. In addition, validation of the SURPAM through limited numbers of cases is not recommended as the assessment findings may be distorted by the distinctive features of a project and the value of the assessment model may be underrated. At that time, the conclusion drawn by the assessment findings would not be convincing.

Furthermore, a research comparing the assessment results generated before the commencement of the renewal project and in the post occupancy evaluation stage for the same project can be carried out to check whether the SURPAM can effectively ascertain the ultimate design quality of the renewal projects through pre-project

assessments. An assessment of all private and quasi-governmental urban renewal projects that have completed, are in progress or newly announced is also recommended to form a complete database for future analyses. A full survey of these projects helps to establish a calibrated system for measuring their sustainability level and differentiating between sustainable and unsustainable projects.

Since the SURPAM was founded on the key stakeholders' perceptions that may change from time to time, the major components of the model including the priority weights, the performance indicators and their corresponding point scoring system should come up for review regularly once changes in economic condition, environmental needs, social expectation, technology, policy, etc. are observed. It would be worthwhile repeating the research process adopted in this study every 5 years to identify any changes that may take place in the interim, and to check the continuity in the responses of various stakeholders. However, the sample size for the surveys to be carried out, the total numbers of experts from various fields to be contacted, and the total amounts of the design criteria and indicators to be included in the future should increase if more research resources are available. In addition, more professional disciplines like surveyors, engineers, builders and social workers who have actively taken part in the urban renewal process have to be engaged in order to enrich the content of future studies.

Apart from that, the applicability of the SURPAM in other countries having similar urban renewal directions and practices is also a field worth thorough research. High density and early developed cities like Sydney, London, New York and Singapore can be included in the future research to examine whether the research process adopted in this study can be applied to other nations, and to determine how an all-round sustainable urban renewal project assessment framework can be derived and implemented worldwide. Although the SURPAM is developed on the basis of local context, it forms a platform to help the local and foreign researchers navigate through a transition to sustainability. The framework of the SURPAM is so flexible that specific design criteria and indicators can be introduced or removed, and the prorities ranking of individual sustainable development objectives and design criteria can be adjusted to suit the needs from time to time without affecting the reliability and validity of the whole assessment model. It is believed that the assessment

framework generated from this study can also be modified in the future research for the sustainability evaluation of different new development projects to be conducted thereafter.

As discussed, this study has successfully identified a list of critical urban design considerations and developed a design based assessment model – SURPAM. However, it is only the first step for achieving sustainable urban renewal in Hong Kong. More in-depth research has to be conducted to meet such a long term goal in the territory. The agenda for future research may include (i) political, cultural and other barriers to meeting the sustainable development objectives in Hong Kong, and associated solutions; (ii) possible ways to smooth and shorten the whole urban renewal process; (iii) measures, policies and strategies for facilitating good urban planning and urban design; or (iv) incentives for promoting project assessment exercises in the future.

8.6 Conclusion

The importance of urban renewal in settlement of the urban decay problems, the value of sustainability concept on urban renewal and the significance of urban design in achievement of the sustainable development objectives are widely recognized in the literature. However, it is surprising that a holistic research studying the interaction of sustainable development, urban renewal and urban design is absent. Therefore, this study which intends to investigate those issues and their interface in details has been initiated.

Throughout the research process, it is confirmed that sustainable development is the most appropriate direction for planning urban renewal nowadays to meet the needs of present and future generations. As more and more urban renewal projects are expected to be implemented in Hong Kong in the future, the approach of sustainable urban renewal should be established here through in-depth research. Even though the findings of this study are only generated from the Hong Kong context with the help of various groups of local stakeholders, they have made a substantial contribution to the existing knowledge about the achievement of sustainable urban

renewal. In addition, this study has enhanced the understanding on the role of urban design in urban renewal leading to sustainable outcomes, and highlighted numbers of important urban design considerations that should be taken into account in project planning.

This study has clearly explored the relationship between sustainable urban renewal approach and urban design but its task has not yet been fulfilled unless a proper measure for assessing the extent to which these concepts are applied to local urban renewal practices is developed. Hence, this study has made a great effort to establish an appropriate assessment model for Hong Kong. The development of the SURPAM can be regarded as the greatest achievement of this study because it provides a simple and clear means for the industry to evaluate the design quality and the performance of the urban renewal projects, and produces an effective alert system for the decision makers to review and reform the urban renewal policies or strategies from time to time. The model can be used either for selection of appropriate proposal for a site undergoing urban renewal or for evaluation of the renewal projects before and/ after implementation. It is believed that the economic, environmental and social well-being of the community can be optimized when individual urban renewal schemes have been thoughtfully assessed against a set of indicators contained in the model.

In additional to the physical research outputs, this study has also benefited the academia by producing a sound foundation for further studies and arousing an interest among local and foreign scholars in exploring relevant research topics. The research process of this study can be served as a starting point/ a preliminary guide for the people in different parts of the world who would like to derive their own list of urban design considerations or a tailor-made assessment model.

APPENDICES

Appendix A Covering Letter for Questionnaire Survey

THE HONG KONG POLYTECHNIC UNIVERSITY 香港理工大學

Dear Sir/ Madam,

A Questionnaire Survey for Sustainable Urban Renewal in Hong Kong

I am a PhD candidate in the Department of Building and Real Estate of the Hong Kong Polytechnic University. I would like to thank you in advance for your involvement in this survey. This survey is part of my PhD study entitled "Sustainable Urban Renewal Model for A High Density City - Hong Kong" that attempts to incorporate concept of sustainability into urban renewal process by means of urban design. Such information is vital to local urban (re)development in the future as it helps to rectify the deficiencies of current urban renewal practices and create sustainable communities in the territory. In order to identify the views of different stakeholders on significance of urban design considerations towards sustainable urban renewal, the attached questionnaire is designed to collect your valuable views.

I would appreciate it if you could spend about **10 minutes** to complete the attached questionnaire. After completing this questionnaire, please send it to me via **email: 0490** or by **fax: (852) 2766 7806** on or before **13 May 2005.** All your responses will be kept strictly confidential and used for academic purposes only.

I really hope that you can complete this questionnaire for me as it will form the most important part of the data collection process in my study. If you have any queries about the questionnaire or my research, please contact the undersigned through email: 0490 or tel.: (852) 2766 7807.

Thank you for your participation and I look forward to your reply.

Yours faithfully,

Lee Ka Lee Grace
PhD Candidate
Encl.

Appendix B Sample of Questionnaire for Urban Practitioners

(1) For Pilot Study

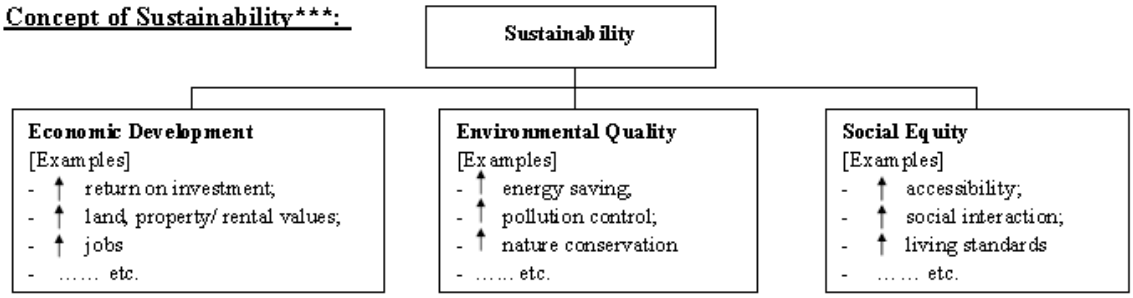
THE HONG KONG POLYTECHNIC UNIVERSITY
香港理工大學

Thank you for your participation in this questionnaire survey. This survey is to find out the importance of different urban design considerations* in improving the sustainability of urban renewal projects. Based on the literature review**, the terms "urban renewal", "sustainability" & "sustainable urban renewal" adopted in this study are defined exclusively as follow:

Urban Renewal covers:

~ Slum clearance;
~ Urban redevelopment;
~ Building rehabilitation;
~ Presevation & conservation;
~ …… etc.

Concept of Sustainability*:**



Sustainable Urban Renewal

~ A concept to increase the sustainability of urban renewal projects

PART I. RELATIVE WEIGHTINGS OF 3 SUSTAINABLE DEVELOPMENT OBJECTIVES

[EXAMPLE]

If you think that the relative weightings of 3 sustainable development objectives i.e.**economic development**, **environmental quality** and **social equity** are **0.3**, **0.3** and **0.4**, please fill in the table below:

Sustainability	Economic Development	Environmental Quality	Social Equity
	0.3*	0.3*	0.4*

**0.3+0.3+0.4 = 1*

Sustainability	Economic Development	Environmental Quality	Social Equity

PART II. THE IMPORTANCE OF URBAN DESIGN CONSIDERATIONS

(a) Suppose there is an Urban Renewal Project, please rate the importance of the following urban design considerations on the fundamental elements of sustianability

[EXAMPLE]

Design considerations	Sustainable Urban Renewal					
Provision of recreational centre	Economic development	☐1	☑2	☐3	☐4	☐5
	Environmental quality	☐1	☐2	☑3	☐4	☐5
	Social equity	☐1	☐2	☐3	☑4	☐5

It imples:

The named design consideration is { **Less Important** / **Average** / **More Important** } in achieving { **Economic** / **Environmental** / **Social** } objectives of urban renewal project

* Those considerations are sorted from various literature e.g. Montgomery, 1998; Rowley,1998; Couch and Dennemann, 2000; DETR, 2000; Lee, 2003; ... etc.

** The literature includes Choo, 1988; Ng, 1998; WCED, 1987; Earth Summit +5, 1997; Planning Department, 2000b; Ng et al., 2001; ... etc.

*** The examples are sorted from various literature e.g. Couch, 1990; Shearlock et al., 2000; Pincetl, 2001; Berke, 2002; Lee, 2003; ... etc.

Page 1

Scale for Rating the Importance of Different Design Considerations

	Least Important	**Less** Important	Average	**More** Important	**Extremely** Important
Scale	1	2	3	4	5

Design Considerations	Sustainable Urban Renewal						
1. Mixed-use development	Economic development	☐1	☐2	☐3	☐4	☐5
	Environmental quality	☐1	☐2	☐3	☐4	☐5
	Social equity	☐1	☐2	☐3	☐4	☐5
2. Establishment of local business activities e.g. retail shops, banks	Economic development	☐1	☐2	☐3	☐4	☐5
	Environmental quality	☐1	☐2	☐3	☐4	☐5
	Social equity	☐1	☐2	☐3	☐4	☐5
3. Variety of business activities	Economic development	☐1	☐2	☐3	☐4	☐5
	Environmental quality	☐1	☐2	☐3	☐4	☐5
	Social equity	☐1	☐2	☐3	☐4	☐5
4. Provision of public facilities e.g. school, health care services, sports facilities	Economic development	☐1	☐2	☐3	☐4	☐5
	Environmental quality	☐1	☐2	☐3	☐4	☐5
	Social equity	☐1	☐2	☐3	☐4	☐5
5. Diversity of public facilities	Economic development	☐1	☐2	☐3	☐4	☐5
	Environmental quality	☐1	☐2	☐3	☐4	☐5
	Social equity	☐1	☐2	☐3	☐4	☐5
6. Provision of open spaces e.g. parks, seating areas	Economic development	☐1	☐2	☐3	☐4	☐5
	Environmental quality	☐1	☐2	☐3	☐4	☐5
	Social equity	☐1	☐2	☐3	☐4	☐5
7. Presence of nightlife	Economic development	☐1	☐2	☐3	☐4	☐5
	Environmental quality	☐1	☐2	☐3	☐4	☐5
	Social equity	☐1	☐2	☐3	☐4	☐5
8. Adaptability of development to the changing needs	Economic development	☐1	☐2	☐3	☐4	☐5
	Environmental quality	☐1	☐2	☐3	☐4	☐5
	Social equity	☐1	☐2	☐3	☐4	☐5
9. Efficient use of land & space	Economic development	☐1	☐2	☐3	☐4	☐5
	Environmental quality	☐1	☐2	☐3	☐4	☐5
	Social equity	☐1	☐2	☐3	☐4	☐5
10. Arrangements for maintenance & management of buildings, facilities & spaces	Economic development	☐1	☐2	☐3	☐4	☐5
	Environmental quality	☐1	☐2	☐3	☐4	☐5
	Social equity	☐1	☐2	☐3	☐4	☐5
11. Provision of pollution control measures	Economic development	☐1	☐2	☐3	☐4	☐5
	Environmental quality	☐1	☐2	☐3	☐4	☐5
	Social equity	☐1	☐2	☐3	☐4	☐5
12. Air quality & noise level	Economic development	☐1	☐2	☐3	☐4	☐5
	Environmental quality	☐1	☐2	☐3	☐4	☐5
	Social equity	☐1	☐2	☐3	☐4	☐5
13. Installation of energy efficient devices	Economic development	☐1	☐2	☐3	☐4	☐5
	Environmental quality	☐1	☐2	☐3	☐4	☐5
	Social equity	☐1	☐2	☐3	☐4	☐5
14. Optimization of natural lighting & ventilation	Economic development	☐1	☐2	☐3	☐4	☐5
	Environmental quality	☐1	☐2	☐3	☐4	☐5
	Social equity	☐1	☐2	☐3	☐4	☐5
15. Incorporation of environmental design e.g. sun shades, balcony	Economic development	☐1	☐2	☐3	☐4	☐5
	Environmental quality	☐1	☐2	☐3	☐4	☐5
	Social equity	☐1	☐2	☐3	☐4	☐5

Page 2

Scale for Rating the Importance of Different Design Considerations

	Least Important	**Less** Important	Average	**More** Important	**Extremely** Important
Scale	1	2	3	4	5

Design Considerations	Sustainable Urban Renewal						
16. Use of recycled, recyclable or durable materials	Economic development	☐1	☐2	☐3	☐4	☐5
	Environmental quality	☐1	☐2	☐3	☐4	☐5
	Social equity	☐1	☐2	☐3	☐4	☐5
17. Wildlife conservation	Economic development	☐1	☐2	☐3	☐4	☐5
	Environmental quality	☐1	☐2	☐3	☐4	☐5
	Social equity	☐1	☐2	☐3	☐4	☐5
18. Installation of water saving devices	Economic development	☐1	☐2	☐3	☐4	☐5
	Environmental quality	☐1	☐2	☐3	☐4	☐5
	Social equity	☐1	☐2	☐3	☐4	☐5
19. Waste management including waste collection, reduction & recycle	Economic development	☐1	☐2	☐3	☐4	☐5
	Environmental quality	☐1	☐2	☐3	☐4	☐5
	Social equity	☐1	☐2	☐3	☐4	☐5
20. Preservation of historical structures & features	Economic development	☐1	☐2	☐3	☐4	☐5
	Environmental quality	☐1	☐2	☐3	☐4	☐5
	Social equity	☐1	☐2	☐3	☐4	☐5
21. Promotion of local distinctiveness	Economic development	☐1	☐2	☐3	☐4	☐5
	Environmental quality	☐1	☐2	☐3	☐4	☐5
	Social equity	☐1	☐2	☐3	☐4	☐5
22. Preserving & facilitating social network	Economic development	☐1	☐2	☐3	☐4	☐5
	Environmental quality	☐1	☐2	☐3	☐4	☐5
	Social equity	☐1	☐2	☐3	☐4	☐5
23. Availability of local employment	Economic development	☐1	☐2	☐3	☐4	☐5
	Environmental quality	☐1	☐2	☐3	☐4	☐5
	Social equity	☐1	☐2	☐3	☐4	☐5
24. Provision of accommodations for different income groups	Economic development	☐1	☐2	☐3	☐4	☐5
	Environmental quality	☐1	☐2	☐3	☐4	☐5
	Social equity	☐1	☐2	☐3	☐4	☐5
25. Provision for basic needs of disabled, elderly or children	Economic development	☐1	☐2	☐3	☐4	☐5
	Environmental quality	☐1	☐2	☐3	☐4	☐5
	Social equity	☐1	☐2	☐3	☐4	☐5
26. Community involvement in public decision making	Economic development	☐1	☐2	☐3	☐4	☐5
	Environmental quality	☐1	☐2	☐3	☐4	☐5
	Social equity	☐1	☐2	☐3	☐4	☐5
27. Sense of belongings on community	Economic development	☐1	☐2	☐3	☐4	☐5
	Environmental quality	☐1	☐2	☐3	☐4	☐5
	Social equity	☐1	☐2	☐3	☐4	☐5
28. Security against crimes	Economic development	☐1	☐2	☐3	☐4	☐5
	Environmental quality	☐1	☐2	☐3	☐4	☐5
	Social equity	☐1	☐2	☐3	☐4	☐5
29. Convenience, efficiency & safety of **drivers**	Economic development	☐1	☐2	☐3	☐4	☐5
	Environmental quality	☐1	☐2	☐3	☐4	☐5
	Social equity	☐1	☐2	☐3	☐4	☐5
30. Convenience, efficiency & safety of **pedestrians**	Economic development	☐1	☐2	☐3	☐4	☐5
	Environmental quality	☐1	☐2	☐3	☐4	☐5
	Social equity	☐1	☐2	☐3	☐4	☐5

Scale for Rating the Importance of Different Design Considerations

	Least Important	**Less** Important	Average	**More** Important	**Extremely** Important
Scale	1	2	3	4	5

Design Considerations	Sustainable Urban Renewal						
31. Convenience, efficiency & safety of **public transport users**	Economic development	☐1	☐2	☐3	☐4	☐5
	Environmental quality	☐1	☐2	☐3	☐4	☐5
	Social equity	☐1	☐2	☐3	☐4	☐5
32. Access to provisions for disabled, elderly or children	Economic development	☐1	☐2	☐3	☐4	☐5
	Environmental quality	☐1	☐2	☐3	☐4	☐5
	Social equity	☐1	☐2	☐3	☐4	☐5
33. Access to public facilities	Economic development	☐1	☐2	☐3	☐4	☐5
	Environmental quality	☐1	☐2	☐3	☐4	☐5
	Social equity	☐1	☐2	☐3	☐4	☐5
34. Access to open spaces	Economic development	☐1	☐2	☐3	☐4	☐5
	Environmental quality	☐1	☐2	☐3	☐4	☐5
	Social equity	☐1	☐2	☐3	☐4	☐5
35. Access to work	Economic development	☐1	☐2	☐3	☐4	☐5
	Environmental quality	☐1	☐2	☐3	☐4	☐5
	Social equity	☐1	☐2	☐3	☐4	☐5
36. Proximity to business activities	Economic development	☐1	☐2	☐3	☐4	☐5
	Environmental quality	☐1	☐2	☐3	☐4	☐5
	Social equity	☐1	☐2	☐3	☐4	☐5
37. Accessibility of the development	Economic development	☐1	☐2	☐3	☐4	☐5
	Environmental quality	☐1	☐2	☐3	☐4	☐5
	Social equity	☐1	☐2	☐3	☐4	☐5
38. Building design & overall appearance	Economic development	☐1	☐2	☐3	☐4	☐5
	Environmental quality	☐1	☐2	☐3	☐4	☐5
	Social equity	☐1	☐2	☐3	☐4	☐5
39. Compatibility with neighborhood	Economic development	☐1	☐2	☐3	☐4	☐5
	Environmental quality	☐1	☐2	☐3	☐4	☐5
	Social equity	☐1	☐2	☐3	☐4	☐5
40. Building density, height & mass	Economic development	☐1	☐2	☐3	☐4	☐5
	Environmental quality	☐1	☐2	☐3	☐4	☐5
	Social equity	☐1	☐2	☐3	☐4	☐5
41. Layout of buildings & streets	Economic development	☐1	☐2	☐3	☐4	☐5
	Environmental quality	☐1	☐2	☐3	☐4	☐5
	Social equity	☐1	☐2	☐3	☐4	☐5
42. Design of open spaces e.g. appearance, location, shape & size	Economic development	☐1	☐2	☐3	☐4	☐5
	Environmental quality	☐1	☐2	☐3	☐4	☐5
	Social equity	☐1	☐2	☐3	☐4	☐5
43. Provision of landscapes e.g. trees, planters	Economic development	☐1	☐2	☐3	☐4	☐5
	Environmental quality	☐1	☐2	☐3	☐4	☐5
	Social equity	☐1	☐2	☐3	☐4	☐5
44. Appearance of street furniture e.g. street lamps, benches, signage, rubbish bins	Economic development	☐1	☐2	☐3	☐4	☐5
	Environmental quality	☐1	☐2	☐3	☐4	☐5
	Social equity	☐1	☐2	☐3	☐4	☐5
45. Appearance of pedestrian routes & sidewalk	Economic development	☐1	☐2	☐3	☐4	☐5
	Environmental quality	☐1	☐2	☐3	☐4	☐5
	Social equity	☐1	☐2	☐3	☐4	☐5

Scale for Rating the Importance of Different Design Considerations

	Least Important	**Less** Important	Average	**More** Important	**Extremely** Important
Scale	1	2	3	4	5

Design Considerations	Sustainable Urban Renewal						
46. Rehabilitation of repairable building structures	Economic development	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
	Environmental quality	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
	Social equity	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

(b) Can you suggest other design considerations excluded from the above list?

☐ Yes _____ ☐ No

_____

PART III. PERSONAL INFORMATION

(a) Gender:

☐ Male ☐ Female

(b) Age:

☐ < 20 ☐ 20 - 29 ☐ 30 - 39 ☐ 40 - 49 ☐ 50 - 59 ☐ ≥60

(c) Educational Level:

☐ Primary School (P1 - P6) or below ☐ Middle School/ Form1 - Form 3 ☐ High School/ Form 4 - Form 7

☐ High Cert./ Diploma ☐ Bachelor Degree ☐ Master Degree or above

(d) Average Monthly Personal Income:

☐ <HK$10,000 ☐ HK$10,000 - HK$29,999 ☐ HK$30,000 - HK$49,999 ☐ HK$50,000 - HK$69,999

☐ HK$70,000 - HK$89,999 ☐ HK$90,000 - HK$109,999 ☐ ≥HK$110,000

(e) Nature of Work:

☐ Property Development ☐ Archtectural Design ☐ Town Planning

(f) Total Working Experiences in Property/Construction Industry:

☐ < 10 years ☐ 10 - 14 years ☐ 15 - 19 years ☐ 20 - 24 years

☐ 25 - 29 years ☐ ≥ 30 years

(g) Would you be interested in participating in future surveys related to this topic?

☐ Yes [Please answer (h)] ☐ No

(h) Contact:

Name: _____ Email: _____

Tel: _____ Fax: _____

Please give some comments on the survey procedure & questionnaire design in the following section.

(1) Would you like to receive and answer the quesitonnaire through email ?

☐ Yes [Please go to (3)] ☐ No [Please answer (2)]

(2) Which method of questionnaire delivery do you prefer?

☐ by post ☐ by fax ☐ by direct contact ☐ Others: _____

(3) Length of the questionnaire

☐ Too short ☐ Averge ☐ Too long

(4) General comments on the content

Ease of reading & understand: _____

Vagueness of wordings: _____

Others: _____

That is the end of the questionnaire. Thank you for your participation.

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(2) For Main Study

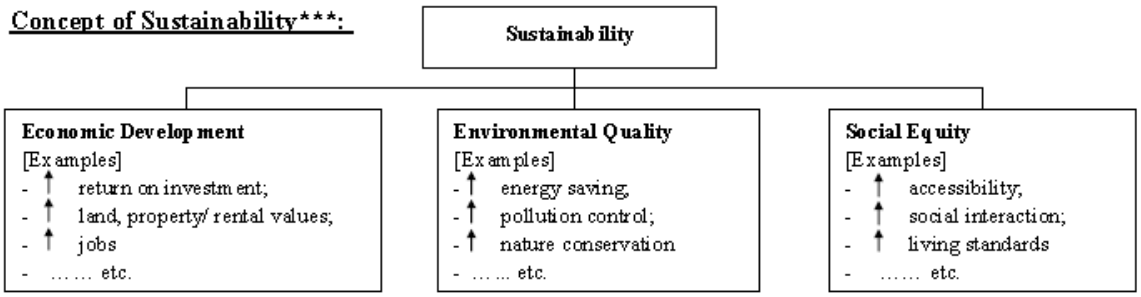
THE HONG KONG POLYTECHNIC UNIVERSITY
香港理工大學

Thank you for your participation in this questionnaire survey. This survey is to find out the importance of different urban design considerations* in improving the sustainability of urban renewal projects. Based on the literature review**, the terms "urban renewal", "sustainability" & "sustainable urban renewal" adopted in this study are defined exclusively as follow:

Urban Renewal covers:

~ Slum clearance;
~ Urban redevelopment;
~ Building rehabilitation;
~ Presevation & conservation;
~ …... etc.

Concept of Sustainability*:**



Sustainable Urban Renewal

~ A concept to increase the sustainability of urban renewal projects

PART I. THE IMPORTANCE OF URBAN DESIGN CONSIDERATIONS

Scale for Rating the Importance of Different Design Considerations

	Least Important	**Less** Important	Average	**More** Important	**Extremely** Important
Scale	1	2	3	4	5

(a) Suppose there is an Urban Renewal Project, please rate the importance of the following urban design considerations on the fundamental elements of sustianability i.e. economic development, environmental quality & social equity

[EXAMPLE]

Design Considerations	**Sustainable Urban Renewal**					
Provision of recreational centre	Economic development	☐1	☑2	☐3	☐4	☐5
	Environmental quality	☐1	☐2	☑3	☐4	☐5
	Social equity	☐1	☐2	☐3	☑4	☐5

It imples:

The named design consideration is { **Less Important** / **Average** / **More Important** } in achieving { **Economic** / **Environmental** / **Social** } objectives of urban renewal project

* Those considerations are sorted from various literature e.g. Montgomery, 1998; Rowley,1998; Couch and Dennemann, 2000; DETR, 2000; Lee, 2003; ... etc. The definition of individual considerations is given in Annex 1

** The literature includes Choo, 1988; Ng, 1998; WCED, 1987; Earth Summit +5, 1997; Planning Department, 2000b; Ng et al., 2001; ... etc.

*** The examples are sorted from various literature e.g. Couch, 1990; Shearlock et al., 2000; Pincetl, 2001; Berke, 2002; Lee, 2003; ... etc.

Page 1

Scale for Rating the Importance of Different Design Considerations

	Least Important	**Less** Important	Average	**More** Important	**Extremely** Important
Scale	1	2	3	4	5

Design Considerations	Sustainable Urban Renewal						
1. Mixed-use development	Economic development	☐1	☐2	☐3	☐4	☐5
	Environmental quality	☐1	☐2	☐3	☐4	☐5
	Social equity	☐1	☐2	☐3	☐4	☐5
2. Adaptability of non-domestic development to the changing needs	Economic development	☐1	☐2	☐3	☐4	☐5
	Environmental quality	☐1	☐2	☐3	☐4	☐5
	Social equity	☐1	☐2	☐3	☐4	☐5
3. Efficient use of land & space	Economic development	☐1	☐2	☐3	☐4	☐5
	Environmental quality	☐1	☐2	☐3	☐4	☐5
	Social equity	☐1	☐2	☐3	☐4	☐5
4. Provisions facilitating establishment of different businesses	Economic development	☐1	☐2	☐3	☐4	☐5
	Environmental quality	☐1	☐2	☐3	☐4	☐5
	Social equity	☐1	☐2	☐3	☐4	☐5
5. Proximity to commercial establishments	Economic development	☐1	☐2	☐3	☐4	☐5
	Environmental quality	☐1	☐2	☐3	☐4	☐5
	Social equity	☐1	☐2	☐3	☐4	☐5
6. Availability of local employment	Economic development	☐1	☐2	☐3	☐4	☐5
	Environmental quality	☐1	☐2	☐3	☐4	☐5
	Social equity	☐1	☐2	☐3	☐4	☐5
7. Access to work	Economic development	☐1	☐2	☐3	☐4	☐5
	Environmental quality	☐1	☐2	☐3	☐4	☐5
	Social equity	☐1	☐2	☐3	☐4	☐5
8. Convenient, efficient & safe environment for **drivers**	Economic development	☐1	☐2	☐3	☐4	☐5
	Environmental quality	☐1	☐2	☐3	☐4	☐5
	Social equity	☐1	☐2	☐3	☐4	☐5
9. Convenient, efficient & safe environment for **pedestrians & public transport users**	Economic development	☐1	☐2	☐3	☐4	☐5
	Environmental quality	☐1	☐2	☐3	☐4	☐5
	Social equity	☐1	☐2	☐3	☐4	☐5
10. Availability of housing for different income groups	Economic development	☐1	☐2	☐3	☐4	☐5
	Environmental quality	☐1	☐2	☐3	☐4	☐5
	Social equity	☐1	☐2	☐3	☐4	☐5
11. Provision of public facilities	Economic development	☐1	☐2	☐3	☐4	☐5
	Environmental quality	☐1	☐2	☐3	☐4	☐5
	Social equity	☐1	☐2	☐3	☐4	☐5
12. Access to public facilities	Economic development	☐1	☐2	☐3	☐4	☐5
	Environmental quality	☐1	☐2	☐3	☐4	☐5
	Social equity	☐1	☐2	☐3	☐4	☐5
13. Provisions for meeting special needs of the disabled, elderly or children	Economic development	☐1	☐2	☐3	☐4	☐5
	Environmental quality	☐1	☐2	☐3	☐4	☐5
	Social equity	☐1	☐2	☐3	☐4	☐5
14. Provision of open spaces	Economic development	☐1	☐2	☐3	☐4	☐5
	Environmental quality	☐1	☐2	☐3	☐4	☐5
	Social equity	☐1	☐2	☐3	☐4	☐5
15. Design of open spaces	Economic development	☐1	☐2	☐3	☐4	☐5
	Environmental quality	☐1	☐2	☐3	☐4	☐5
	Social equity	☐1	☐2	☐3	☐4	☐5

Page 2

Scale for Rating the Importance of Different Design Considerations

	Least Important	**Less** Important	Average	**More** Important	**Extremely** Important
Scale	1	2	3	4	5

Design Considerations	Sustainable Urban Renewal						
16. Access to open spaces	Economic development	☐1	☐2	☐3	☐4	☐5
	Environmental quality	☐1	☐2	☐3	☐4	☐5
	Social equity	☐1	☐2	☐3	☐4	☐5
17. Ease of maintenance & management of buildings, facilities & open spaces	Economic development	☐1	☐2	☐3	☐4	☐5
	Environmental quality	☐1	☐2	☐3	☐4	☐5
	Social equity	☐1	☐2	☐3	☐4	☐5
18. Provisions to control pollution	Economic development	☐1	☐2	☐3	☐4	☐5
	Environmental quality	☐1	☐2	☐3	☐4	☐5
	Social equity	☐1	☐2	☐3	☐4	☐5
19. Green design	Economic development	☐1	☐2	☐3	☐4	☐5
	Environmental quality	☐1	☐2	☐3	☐4	☐5
	Social equity	☐1	☐2	☐3	☐4	☐5
20. Green construction	Economic development	☐1	☐2	☐3	☐4	☐5
	Environmental quality	☐1	☐2	☐3	☐4	☐5
	Social equity	☐1	☐2	☐3	☐4	☐5
21. Preservation of historical structures & features	Economic development	☐1	☐2	☐3	☐4	☐5
	Environmental quality	☐1	☐2	☐3	☐4	☐5
	Social equity	☐1	☐2	☐3	☐4	☐5
22. Rehabilitation of repairable properties	Economic development	☐1	☐2	☐3	☐4	☐5
	Environmental quality	☐1	☐2	☐3	☐4	☐5
	Social equity	☐1	☐2	☐3	☐4	☐5
23. Building form	Economic development	☐1	☐2	☐3	☐4	☐5
	Environmental quality	☐1	☐2	☐3	☐4	☐5
	Social equity	☐1	☐2	☐3	☐4	☐5
24. Compatibility with neighborhood	Economic development	☐1	☐2	☐3	☐4	☐5
	Environmental quality	☐1	☐2	☐3	☐4	☐5
	Social equity	☐1	☐2	☐3	☐4	☐5
25. Layout of buildings & streets	Economic development	☐1	☐2	☐3	☐4	☐5
	Environmental quality	☐1	☐2	☐3	☐4	☐5
	Social equity	☐1	☐2	☐3	☐4	☐5
26. Conservation/ improvement of local distinctiveness	Economic development	☐1	☐2	☐3	☐4	☐5
	Environmental quality	☐1	☐2	☐3	☐4	☐5
	Social equity	☐1	☐2	☐3	☐4	☐5
27. Preserving & facilitating social networks	Economic development	☐1	☐2	☐3	☐4	☐5
	Environmental quality	☐1	☐2	☐3	☐4	☐5
	Social equity	☐1	☐2	☐3	☐4	☐5
28. Community involvement	Economic development	☐1	☐2	☐3	☐4	☐5
	Environmental quality	☐1	☐2	☐3	☐4	☐5
	Social equity	☐1	☐2	☐3	☐4	☐5
29. Sense of community	Economic development	☐1	☐2	☐3	☐4	☐5
	Environmental quality	☐1	☐2	☐3	☐4	☐5
	Social equity	☐1	☐2	☐3	☐4	☐5
30. Provision of security measures	Economic development	☐1	☐2	☐3	☐4	☐5
	Environmental quality	☐1	☐2	☐3	☐4	☐5
	Social equity	☐1	☐2	☐3	☐4	☐5

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(b) Can you suggest other design considerations excluded from the above list?

☐ Yes _____ ☐ No

_____

PART II. PERSONAL INFORMATION

(a) Gender:

☐ Male ☐ Female

(b) Marital Status:

☐ Married ☐ Single (including divorced or widowed)

(c) How many children do you have?

☐ 0 ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ ≥5

(d) Age:

☐ < 20 ☐ 20 - 29 ☐ 30 - 39 ☐ 40 - 49 ☐ 50 - 59 ☐ ≥ 60

(e) Educational Level:

☐ Primary School (P1 - P6) or below ☐ Middle School/ Form1 - Form 3 ☐ High School/ Form 4 - Form 7

☐ High Cert./ Diploma ☐ Bachelor Degree ☐ Master Degree or above

(f) Average Monthly Personal Income: *The exchange rate referred is 1 HKD (Hong Kong Dollars)= 0.724 GBP (UK Pounds)

☐ <HK$10,000 ☐ HK$10,000 - HK$29,999 ☐ HK$30,000 - HK$49,999 ☐ HK$50,000 - HK$69,999

☐ HK$70,000 - HK$89,999 ☐ HK$90,000 - HK$109,999 ☐ ≥HK$110,000

(g) Nature of Work:

☐ Property Development ☐ Archtectural Design ☐ Town Planning

(h) Total Working Experiences in Property/Construction Industry:

☐ < 10 years ☐ 10 - 14 years ☐ 15 - 19 years

☐ 20 - 24 years ☐ 25 - 29 years ☐ ≥ 30 years

(i) Have you lived in any district undergoing urban renewal before?

☐ Yes (Please specify the district): _____ ☐ No

(j) Have you participated in any urban renewal project?

☐ Yes (Please specify the project) _____ ☐ No

(k) Would you be interested in receiving preliminary results of this study, and participating in future surveys related to this topic?

☐ Yes [Please answer (l)] ☐ No

(l) Contact:

Name: _____ Email: _____

Tel: _____ Fax: _____

That is the end of the questionnaire. Thank you for your participation.

ANNEX 1

Definition of Urban Design Considerations	
1.	Mixed-use development It means a development consisting of one or more lots developed as a cohesive project and designed with a blend of multiple compatible land uses such as commercial, residential and institutional where no particular type of land use dominates. It also refers to the practice of allowing more than one type of uses located in the same building or in separate buildings within a neighborhood.
2.	Adaptability of non-domestic development to the changing needs It refers to the non-residential development that is flexible enough to respond to future changes in use, lifestyle and demography without substantial alterations of building structures.
3.	Efficient use of land & space It is about consumption of land and space available in a development in an economical and organized way with a minimum of waste, expense, or unnecessary effort.
4.	Provisions facilitating establishment of different businesses It refers to the design arrangements that ease the setting up of various commercial enterprises in the form of shop, firm or company to conduct activities of buying and selling goods and services to earn a livelihood or make a profit.
5.	Proximity to commercial establishments It concerns the distance between the places where the citizens work or live and the commercial establishments.
6.	Availability of local employment The word "local employment" denotes job opportunities offered in an area to be developed being close to the place of residence of the citizens.
7.	Access to work It focuses on the possibility of approaching the working places of the citizens by roads, streets or pedestrian walkways.
8.	Convenient, efficient & safe environment for drivers It is related to the required quality of the transport network and associated facilities e.g. highways, carriageways, carparks, etc. for the drivers.
9.	Convenient, efficient & safe environment for pedestrians & public transport users It is related to the required quality of the pedestrian walkways e.g. streets, pavements, footbridges, etc. and mass transport systems for the pedestrians & public transport users.

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Definition of Urban Design Considerations
10. Availability of housing for different income groups It refers to the buildings or shelters available for the inhabitants of a community having high, middle or low incomes.
11. Provision of public facilities The word "public facilities" refers to the facilities that are essential to support the daily necessity of the community, and to enhance the overall quality of life of the public. Public facilities include, but are not limited to, public buildings, structures, or systems used for functional, institutional, educational, medical, recreational and cultural purposes e.g. food centers, markets, police offices, fire stations, schools, hospitals, sports and performing venues, etc.
12. Access to public facilities It focuses on the possibility of approaching the places where the public facilities are located by roads, streets or pedestrian walkways.
13. Provisions for meeting special needs of the disabled, elderly or children It concerns the facilities or buildings that are tailor-made for the people who are old, weak or with physical disabilities. Handrails, ramps and lifts are some typical examples of those facilities while elderly residential care homes, child care centers and disabilities treatment/ rehabilitation centers are properties constructed for those in need of help.
14. Provision of open spaces The word "open spaces" refers to the public or private areas reserved/ designed for active and/ passive recreational uses, for conservation of the natural environment, or for amenity and visual purposes. Open spaces include, but are not limited to, plazas, gardens, parks, sitting-out areas, waterfront promenades, children's playgrounds, jogging and cycling circuits, etc.
15. Design of open spaces It is about the physical/ aesthetic qualities of the open spaces that can be affected by the factors like location, size, spatial arrangement, color and material selection, and the mixture of natural and artificial features.
16. Access to open spaces It focuses on the possibility of approaching the open spaces by roads, streets or pedestrian walkways.
17. Ease of maintenance & management of buildings, facilities & open spaces It refers to the arrangements that facilitate the control and organization of buildings, facilities and open spaces, and keep them functioning and in good condition.

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Definition of Urban Design Considerations

18. Provisions to control pollution

It is related to the designs/ installations minimizing the possibility of pollution or addressing the potential pollution problems. The major forms of pollution that can be commonly found in the urban environment include air pollution, water pollution, noise pollution, light pollution, etc.

19. Green design

It refers to the passive design approach adopted to optimize the use of sunlight for lighting and heating, and air movement for ventilation and cooling of indoor spaces. Appropriate solar orientation, use of thermal mass, proper window placement, installation of wing walls, sunshades or balconies are some common examples of passive design.

20. Green construction

It is related to the construction measures that minimize the consumption of energy and other natural resources or use them in an effective and efficient way. These include, but are not limited to, reuse and recycling of materials; use of renewable materials, durable products or products with a high content of recycled materials; installation of environmental benign equipment e.g. energy efficient components, water saving devices, storm/ grey water harvesting system, efficient waste recycling/ management system, etc.

21. Preservation of historical structures & features

It is about the act of maintaining and repairing existing buildings, structures, objects or landmarks which are significant to their historical, architectural and cultural value, safeguarding their character-defining elements, retaining their forms evolved over time and extending their physical and useful life.

22. Rehabilitation of repairable properties

It is about the act/ process of returning dilapidated but repairable buildings or structures to a state of utility, through repair, alterations and/ additions, renovations, in order to make possible a continuing use of existing properties and improve the health, safety and welfare in them.

23. Building form

It concerns physical character and configuration of buildings including appearance, density, height, mass, etc.

24. Compatibility with neighborhood

It refers to a new development designed in a manner that complements surrounding neighborhood, and blends in with the scale, architectural style, and other physical characters of the surrounding properties.

25. Layout of buildings & streets

It refers to the arrangement/ plan of how buildings and streets are mixed and set out.

Definition of Urban Design Considerations	
26.	Conservation/ improvement of local distinctiveness It is about the act of keeping and protecting/ enhancing the distinctive features of an area. The word "local distinctiveness" refers to the personality and identity of a place shaped by the combination of its characteristics and qualities, and determined by the perception of the people who live, work and visit such place. Local distinctiveness is not only about how a place looks and feels; what the people are and what they do; how they earn money and spend it, but also about its architecture, customs and traditions, and events and attractions.
27.	Preserving & facilitating social networks It is related to the act of maintaining existing social networks or easing future development of social networks in a community. The word "social network" refers to a social structure made of nodes (individuals or organizations) that are tied by one or more specific types of relations such as kinship, friendship, love affair, business partnership, trade, exchange of ideas and knowledge, or share of values, visions, responsibility and opportunities.
28.	Community involvement It concerns the opportunities enabling the members of a community to actively contribute to and influence the development process, and to share the fruits of the development. It also refers to the process of involving the community members in decision making about public affairs including political, economic, environmental and social issues related to their needs and aspirations.
29.	Sense of community It is about a feeling of belonging that the community members have, a feeling that the members are important to one another and to the group, and a shared faith that members' needs can be met through their commitment to be together.
30.	Provision of security measures It refers to the measures that reduce people's signs of fear, and protect people, buildings, and organizations in a community against danger/ loss arising from crime, attack or trespass.

Appendix C Sample of Questionnaire for Local Citizens (Chinese Version)

THE HONG KONG POLYTECHNIC UNIVERSITY
香港理工大學

多謝大家參與是次問卷調查。希望透過是次調查，本人能夠找出不同城市設計的考慮對於推行可持續市區重建的重要性。爲了令大家更加明白是次調查的重點，以下本人就"市區重建", "可持續發展" & "可持續市區重建" 等名詞作出簡略的解釋:

市區重建包括:

~ 清除貧民窟;
~ 重建發展;
~ 樓宇復修;
~ 保存及保育;
~ ..... 等等。

可持續發展概念:

可持續發展

經濟發展	環境保護	改善社會民生
[例子] - ↑ 投資回報; - ↑ 土地, 物業價值/ 租金收益; - ↑ 就業機會 - ..... 等等。	[例子] - ↑ 節省能源; - ↑ 污染管制; - ↑ 自然保育 - ..... 等等。	[例子] - ↑ 可達度; - ↑ 社會融洽及和諧性; - ↑ 生活水平; - ..... 等等。

可持續市區重建

~ 將可持續發展概念注入市區重建發展項目內

第一部份 各種城市設計的考慮的重要性

評分指標

	非常不重要	頗不重要	中立	頗重要	非常重要
尺度	1	2	3	4	5

(甲) 試評估以下各項城市設計的考慮在經濟發展，環境保護，改善社會民生三方面對推行可持續市區重建項目的重要性

[例子]

設計考慮	可持續市區重建					
提供康樂文娛中心	經濟發展	☐1	☑2	☐3	☐4	☐5
	環境保護	☐1	☐2	☑3	☐4	☐5
	改善社會民生	☐1	☐2	☐3	☑4	☐5

此例子說明：

是項設計考慮在 { 經濟發展 / 環境保護 / 改善社會民生 } 三方面對推行可持續市區重建項目起了 { 頗不重要 / 中立 / 頗重要 } 的作用。

第1頁

評分指標

	非常不重要	頗不重要	中立	頗重要	非常重要
尺度	1	2	3	4	5

設計考慮	可持續市區重建						
1. 混合發展（在同一樓宇或地區內有不同的用途）	經濟發展	☐1	☐2	☐3	☐4	☐5
	環境保護	☐1	☐2	☐3	☐4	☐5
	改善社會民生	☐1	☐2	☐3	☐4	☐5
2. 有可塑性的發展（樓宇用途或地方設施可以應付不時轉變的需要）	經濟發展	☐1	☐2	☐3	☐4	☐5
	環境保護	☐1	☐2	☐3	☐4	☐5
	改善社會民生	☐1	☐2	☐3	☐4	☐5
3. 有效地運用土地及空間	經濟發展	☐1	☐2	☐3	☐4	☐5
	環境保護	☐1	☐2	☐3	☐4	☐5
	改善社會民生	☐1	☐2	☐3	☐4	☐5
4. 促進不同商業活動，例如：零售商店、銀行等的經營設施	經濟發展	☐1	☐2	☐3	☐4	☐5
	環境保護	☐1	☐2	☐3	☐4	☐5
	改善社會民生	☐1	☐2	☐3	☐4	☐5
5. 與商業活動的接近程度	經濟發展	☐1	☐2	☐3	☐4	☐5
	環境保護	☐1	☐2	☐3	☐4	☐5
	改善社會民生	☐1	☐2	☐3	☐4	☐5
6. 提供本區就業機會	經濟發展	☐1	☐2	☐3	☐4	☐5
	環境保護	☐1	☐2	☐3	☐4	☐5
	改善社會民生	☐1	☐2	☐3	☐4	☐5
7. 上班地點的可達度（考慮因素包括花在上班的時間）	經濟發展	☐1	☐2	☐3	☐4	☐5
	環境保護	☐1	☐2	☐3	☐4	☐5
	改善社會民生	☐1	☐2	☐3	☐4	☐5
8. 提供方便及安全的環境予**駕駛者**	經濟發展	☐1	☐2	☐3	☐4	☐5
	環境保護	☐1	☐2	☐3	☐4	☐5
	改善社會民生	☐1	☐2	☐3	☐4	☐5
9. 提供方便及安全的環境予**行人和公共交通車輛使用者**	經濟發展	☐1	☐2	☐3	☐4	☐5
	環境保護	☐1	☐2	☐3	☐4	☐5
	改善社會民生	☐1	☐2	☐3	☐4	☐5
10. 供應不同種類的房屋予不同入息的人士	經濟發展	☐1	☐2	☐3	☐4	☐5
	環境保護	☐1	☐2	☐3	☐4	☐5
	改善社會民生	☐1	☐2	☐3	☐4	☐5
11. 提供公共設施，例如：學校、醫療服務、運動設施等	經濟發展	☐1	☐2	☐3	☐4	☐5
	環境保護	☐1	☐2	☐3	☐4	☐5
	改善社會民生	☐1	☐2	☐3	☐4	☐5
12.公共設施地點的可達度（考慮因素包括去公共設施所需要的時間）	經濟發展	☐1	☐2	☐3	☐4	☐5
	環境保護	☐1	☐2	☐3	☐4	☐5
	改善社會民生	☐1	☐2	☐3	☐4	☐5
13. 提供不同設施予殘障人士、老人家或小孩子以應付他們特別的需要	經濟發展	☐1	☐2	☐3	☐4	☐5
	環境保護	☐1	☐2	☐3	☐4	☐5
	改善社會民生	☐1	☐2	☐3	☐4	☐5
14. 空地的供應，例如：公園、休憩設施、海濱長廊等	經濟發展	☐1	☐2	☐3	☐4	☐5
	環境保護	☐1	☐2	☐3	☐4	☐5
	改善社會民生	☐1	☐2	☐3	☐4	☐5
15. 空地的設計（考慮包括外貌、位置、大小、用料等）	經濟發展	☐1	☐2	☐3	☐4	☐5
	環境保護	☐1	☐2	☐3	☐4	☐5
	改善社會民生	☐1	☐2	☐3	☐4	☐5

評分指標

	非常不重要	頗不重要	中立	頗重要	非常重要
尺度	1	2	3	4	5

設計考慮	可持續市區重建						
16. 空地地點的可達度（考慮因素包括去空地設施所需要的時間）	經濟發展	☐1	☐2	☐3	☐4	☐5
	環境保護	☐1	☐2	☐3	☐4	☐5
	改善社會民生	☐1	☐2	☐3	☐4	☐5
17. 促進樓宇，設備及空地管理 的措施	經濟發展	☐1	☐2	☐3	☐4	☐5
	環境保護	☐1	☐2	☐3	☐4	☐5
	改善社會民生	☐1	☐2	☐3	☐4	☐5
18. 空氣，噪音等污染管制的措施	經濟發展	☐1	☐2	☐3	☐4	☐5
	環境保護	☐1	☐2	☐3	☐4	☐5
	改善社會民生	☐1	☐2	☐3	☐4	☐5
19. 環保設計， 例如：充分利用天然光線及通風、提供太陽擋，露台等	經濟發展	☐1	☐2	☐3	☐4	☐5
	環境保護	☐1	☐2	☐3	☐4	☐5
	改善社會民生	☐1	☐2	☐3	☐4	☐5
20. 環保建築，例如：安裝能源效益／節約用水的設備、使用可循環利用的／耐用的建築物料	經濟發展	☐1	☐2	☐3	☐4	☐5
	環境保護	☐1	☐2	☐3	☐4	☐5
	改善社會民生	☐1	☐2	☐3	☐4	☐5
21. 保存具有歷史價值的建築及特徵	經濟發展	☐1	☐2	☐3	☐4	☐5
	環境保護	☐1	☐2	☐3	☐4	☐5
	改善社會民生	☐1	☐2	☐3	☐4	☐5
22. 復修可修補的建築物	經濟發展	☐1	☐2	☐3	☐4	☐5
	環境保護	☐1	☐2	☐3	☐4	☐5
	改善社會民生	☐1	☐2	☐3	☐4	☐5
23.樓宇設計（考慮包括外貌、密度及體積）	經濟發展	☐1	☐2	☐3	☐4	☐5
	環境保護	☐1	☐2	☐3	☐4	☐5
	改善社會民生	☐1	☐2	☐3	☐4	☐5
24. 與鄰近環境的相容性	經濟發展	☐1	☐2	☐3	☐4	☐5
	環境保護	☐1	☐2	☐3	☐4	☐5
	改善社會民生	☐1	☐2	☐3	☐4	☐5
25. 樓宇及街道的陳設	經濟發展	☐1	☐2	☐3	☐4	☐5
	環境保護	☐1	☐2	☐3	☐4	☐5
	改善社會民生	☐1	☐2	☐3	☐4	☐5
26. 保存／改善本區特質	經濟發展	☐1	☐2	☐3	☐4	☐5
	環境保護	☐1	☐2	☐3	☐4	☐5
	改善社會民生	☐1	☐2	☐3	☐4	☐5
27. 保存及促進社區網絡	經濟發展	☐1	☐2	☐3	☐4	☐5
	環境保護	☐1	☐2	☐3	☐4	☐5
	改善社會民生	☐1	☐2	☐3	☐4	☐5
28. 社區參與	經濟發展	☐1	☐2	☐3	☐4	☐5
	環境保護	☐1	☐2	☐3	☐4	☐5
	改善社會民生	☐1	☐2	☐3	☐4	☐5
29. 對社區的歸屬感	經濟發展	☐1	☐2	☐3	☐4	☐5
	環境保護	☐1	☐2	☐3	☐4	☐5
	改善社會民生	☐1	☐2	☐3	☐4	☐5
30. 提供保安措施	經濟發展	☐1	☐2	☐3	☐4	☐5
	環境保護	☐1	☐2	☐3	☐4	☐5
	改善社會民生	☐1	☐2	☐3	☐4	☐5

(乙) 你能夠提供其他不包含在以上表格內的設計考慮嗎?

☐ 能夠 _____ ☐ 不能夠

_____

第二部份 個人資料

(1) 性別:

☐ 男 ☐ 女

(2) 婚姻狀況:

☐ 已婚 ☐ 單身

(3) 育有多少個小孩?

☐ 0 ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ ≥5

(4) 年齡:

☐ < 20 歲 ☐ 20 - 29 歲 ☐ 30 - 39 歲 ☐ 40 - 49 歲 ☐ 50 - 59 歲 ☐ ≥60 歲

(5) 教育程度:

☐ 小學l (小1 -小6) 或以下 ☐ 初中(中1 - 中3) ☐ 高中(中4 - 中7)

☐ 高級證書/ 文憑 ☐ 學士學位 ☐ 碩士學位或以上

(6) 每月平均個人總入息:

☐ <$5,000 港元 ☐ $5,000 - $9,999 港元 ☐ $10,000 - $14,999 港元 ☐ $15,000 - $19,999 港元

☐ $20,000 - $24,999 港元 ☐ $25,000 - $29,999 港元 ☐ $30,000 - $34,999 港元 ☐ $35,000 - $39,999 港元

☐ ≥$40,000 港元

(7) 職業:

☐ 行政人員 ☐ 專業人士 ☐ 輔助專業人員 ☐ 文員 ☐ 服務工作及商店銷售人員

☐ 工藝及有關人員 ☐ 機台及機器操作員及裝配員 ☐ 非技術工人 ☐ 其他 (請註明): _____

(8) 工作經驗:

☐ < 10 年 ☐ 10 - 14 年 ☐ 15 - 19 年 ☐ 20 - 24 年

☐ 25 - 29 年 ☐ ≥ 30 年

(9) 有沒有曾經居住在受市區重建影響的樓宇中?

☐ 有 (請註明區分或樓宇名稱): _____ ☐ 沒有

(10) 有沒有曾經參與過市區重建項目的策劃或推行?

☐ 有 (請註明區分或樓宇名稱): _____ ☐ 沒有

(11) 有沒有興趣收到此項問卷調查的初步結果及參與將來有關此項研究的

☐ 有興趣 [請填寫 (12)項] ☐ 沒有興趣

(12) 聯絡方法:

姓名: _____ 電郵: _____

聯絡電話: _____ 傳真號碼: _____

多謝參與是次問卷調查。

Appendix D Correlations among Variables

Table D1 Correlations among Design Considerations under Economical Sustainability

	D_{rev} 1.	D_{rev} 2.	D_{rev} 3.	D_{rev} 4.	D_{rev} 5.	D_{rev} 6.	D_{rev} 7.	D_{rev} 8.	D_{rev} 9.	D_{rev} 10.	D_{rev} 11.	D_{rev} 12.	D_{rev} 13.	D_{rev} 14.	D_{rev} 15.	D_{rev} 16.	D_{rev} 17.	D_{rev} 18.	D_{rev} 19.	D_{rev} 20.	D_{rev} 21.	D_{rev} 22.	D_{rev} 23.	D_{rev} 24.	D_{rev} 25.	D_{rev} 26.	D_{rev} 27.	D_{rev} 28.	D_{rev} 29.	D_{rev} 30.
D_{rev} 1.																														
D_{rev} 2.	.42**																													
D_{rev} 3.	.28**	.35**																												
D_{rev} 4.	.41**	.29**	.40**																											
D_{rev} 5.	.30**	.30**	.30**	.41**																										
D_{rev} 6.	.27**	.35**	.24**	.43**	.27**																									
D_{rev} 7.	.26**	.18**	.34**	.30**	.37**	.46**																								
D_{rev} 8.	.23**	.30**	.23**	.28**	.34**	.32**	.34**																							
D_{rev} 9.	.18**	.29**	.27**	.28**	.24**	.30**	.41**	.58**																						
D_{rev} 10.	.27**	.17**	.07	.21**	.28**	.36**	.32**	.23**	.18**																					
D_{rev} 11.	.20**	.20**	.09	.18**	.13*	.19**	.23**	.15*	.29**	.32**																				
D_{rev} 12.	.10	.22*	.18**	.16*	.22**	.22**	.37**	.22**	.38**	.23**	.53**																			
D_{rev} 13.	.21**	.13*	.06	.16*	.12	.16*	.26**	.17**	.30**	.29**	.51**	.51**																		
D_{rev} 14.	.17**	.16*	.20**	.28**	.21**	.10	.20**	.18**	.38**	.21**	.42**	.48**	.51**																	
D_{rev} 15.	.19**	.17**	.26**	.23**	.15*	.13*	.23**	.15*	.31**	.08	.35**	.41**	.30**	.49**																
D_{rev} 16.	.16*	.18**	.22**	.32**	.23**	.19**	.40**	.28**	43**	.14*	.46**	.67**	.47**	.56**	.52**															
D_{rev} 17.	.19**	.29**	.40**	.28**	.32**	.21**	.24**	.24**	.34**	.17**	.23**	.27**	.18**	.34**	.34**	.39**														
D_{rev} 18.	.25**	.23**	.19**	.30**	.15*	.13*	.19**	.33*	.44**	.12	.35**	.34**	.35**	.43**	.43**	.43**	.47**													
D_{rev} 19.	.14*	.20**	.26**	.18**	.18**	.07	.19**	.22**	.40**	.19**	.24**	.34**	.33**	.47**	.45**	.40**	.46**	.61**												
D_{rev} 20.	.20**	.14*	.31**	20**	.19**	.08	.22**	.22**	.33**	.26**	.28**	.31**	.34**	.40**	.44**	.36**	.46**	.61**	**.78****											
D_{rev} 21.	.12	.05	-.02	.12	.13*	.26**	.23**	.12	.18**	.24**	.27**	.17**	.25**	.18**	.23**	.23**	.24**	.38**	.33**	.40**										
D_{rev} 22.	.16*	.17**	.12	.17**	.07	.27**	.19**	.12	.07	.32**	.21**	.28**	.21**	.23**	.23**	.23**	.27**	.28**	.26**	.32**	.46**									
D_{rev} 23.	.25**	.24**	.40**	.31**	.29**	.11	.13*	.15*	.24**	.14*	.24**	.26**	.21**	.33**	.38**	.33**	.47**	.37**	.42**	.37**	.17**	.22**								
D_{rev} 24.	.17**	.12	.08	.14*	.07	.07	.15*	.14*	.24**	.07	.27**	.28**	.30**	.23**	.42**	.35**	.28**	.36**	.35**	.33**	.35**	.21**	.30**							
D_{rev} 25.	.19**	.16*	.20**	.14*	.25**	.14*	.26**	.23**	.30**	-.02	.09	.27**	.18**	.34**	.37**	.27**	.31**	.30**	.38**	.32**	.20**	.14*	.30**	.43**						
D_{rev} 26.	.25**	.24**	.16*	.25**	.19**	.14*	.10	.17**	.21**	.01	.19**	.16*	.18**	.29**	.33**	.31**	.28**	.30**	.30**	.29**	.17**	.11	.28**	.33**	.28**					
D_{rev} 27.	.06	.06	-.04	.23**	.16*	.23**	.21**	.13*	.25**	.30**	.42**	.44**	.50**	.43**	.30**	.44**	.12	.31**	.25**	.26**	.34**	.26**	.22**	.30**	.16*	.29**				
D_{rev} 28.	.18**	.06	-.00	.12	.08	.19**	.14*	.21**	.14**	.34**	.27**	.19**	.30**	.17**	.19**	.22**	.22**	.25**	.23**	.27**	.41**	.35**	.04	.27**	.24**	.17**	.37**			
D_{rev} 29.	.08	.07	**-.09**	.11	.11	.20**	.14*	.12	.18**	.37**	.44**	.37**	.45**	.34**	.32**	.36**	.07	.23**	.20**	.22**	.33**	.21**	.21**	.36**	.14*	.23**	.64**	.48**		
D_{rev} 30.	.23**	.18**	.17**	.26**	.09	.17**	.19**	.18**	.21**	.11	.28**	.31**	28**	.33**	.29**	.34**	.30**	.48**	.41**	.39**	.27**	.20**	.27**	.29**	.29**	.31**	.28**	.21**	.28**	

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Table D2 Correlations among Design Considerations under Environmental Sustainability

	D_{rev} 1.	D_{rev} 2.	D_{rev} 3.	D_{rev} 4.	D_{rev} 5.	D_{rev} 6.	D_{rev} 7.	D_{rev} 8.	D_{rev} 9.	D_{rev} 10.	D_{rev} 11.	D_{rev} 12.	D_{rev} 13.	D_{rev} 14.	D_{rev} 15.	D_{rev} 16.	D_{rev} 17.	D_{rev} 18.	D_{rev} 19.	D_{rev} 20.	D_{rev} 21.	D_{rev} 22.	D_{rev} 23.	D_{rev} 24.	D_{rev} 25.	D_{rev} 26.	D_{rev} 27.	D_{rev} 28.	D_{rev} 29.	D_{rev} 30.
D_{rev} 1.																														
D_{rev} 2.	.25**																													
D_{rev} 3.	.18**	.40**																												
D_{rev} 4.	.49**	.42**	.29**																											
D_{rev} 5.	.37**	.32**	.25**	.45**																										
D_{rev} 6.	.30**	.23**	.19**	.45**	.50**																									
D_{rev} 7.	.33**	.27**	.26**	.40**	.58**	.59**																								
D_{rev} 8.	.22**	.06	.31**	.19**	.23**	.09	.20**																							
D_{rev} 9.	.26**	.38**	.32**	.36**	.38**	.36**	.45**	.33**																						
D_{rev} 10.	.28**	.22**	.17**	.42**	.36**	.47**	.49**	.17**	.35**																					
D_{rev} 11.	.38**	.24**	.15*	.41**	.24**	.35**	.37**	.22**	.34**	.56**																				
D_{rev} 12.	.28**	.27**	.23**	.39**	.38**	.35**	.40**	.30**	.31**	.43**	.50**																			
D_{rev} 13.	.34**	.29**	.19**	.44**	.29**	.32**	.41**	.24**	.42**	.44**	.58**	.58**																		
D_{rev} 14.	.06	.27**	.29**	.09	.13*	.12	.22**	.09	.32**	.17**	.38**	.26**	.28**																	
D_{rev} 15.	.11	.28**	.21**	.15*	.14*	.08	.27**	.21**	.33**	.18**	.33**	.34**	.35**	.47**																
D_{rev} 16.	.19**	.29**	.16*	.28**	.25**	.19**	.30**	.13*	.33**	.30**	.37**	.63**	.45**	.39**	.54**															
D_{rev} 17.	.20**	.37**	.21**	.14*	.20**	.04	.22**	.20**	.36**	.20**	.20**	.19**	.17**	.25**	.27**	.36**														
D_{rev} 18.	.08	.31**	.28**	.03	.04	**-.01**	.11	.08	.20**	.00	.19**	.12	.15*	.44**	.38**	.33**	.39**													
D_{rev} 19.	.11	.35**	.27**	.10	.05	.05	.12	.17**	.27**	.07	.24**	.15*	.19**	.45**	.40**	.31**	.30**	.65**												
D_{rev} 20.	.07	.37**	.21**	.07	.14*	.07	.19**	.09	.30**	.11	.22**	.10	.18**	.37**	.35**	.21**	.32**	.57**	**.73****											
D_{rev} 21.	.18**	.22**	.15*	.24**	.22**	.25**	.28**	.09	.27**	.28**	.19**	.21**	.25**	.18**	.29**	.28**	.21**	.26**	.31**	.36**										
D_{rev} 22.	.11	.24**	.11	.11	.17**	.16*	.26**	.10	.28**	.24**	.19**	.21**	.17**	.21**	.39**	.26**	.21**	.22**	.36**	.40**	.55**									
D_{rev} 23.	.14*	.32**	.24**	.25**	.27**	.18**	.31**	.20**	.48**	.34**	.31**	.41**	.37**	.29**	.45**	.45**	.31**	.21**	.35**	.32**	.31**	.36**								
D_{rev} 24.	.21**	.22**	.14*	.24**	.18**	.09	.17**	.19**	.27**	.31**	.33**	.28**	.24**	.18**	.30**	.25**	.14*	.14*	.28**	.23**	.27**	.26**	.41**							
D_{rev} 25.	.29**	.30**	.33**	.26**	.29**	.15*	.27**	.29**	.46**	.28**	.24**	.28**	.34**	.31**	.44**	.26**	.25**	.21**	.24**	.24**	.24**	.22**	.44**	.47**						
D_{rev} 26.	.22**	.34**	.18**	.28**	.17**	.15*	.16*	.18**	.28**	.28**	.26**	.37**	.34**	.19**	.30**	.39**	.32**	.23**	.21**	.20**	.29**	.17**	.34**	.32**	.32**					
D_{rev} 27.	.27**	.27**	.08	.32**	.29**	.32**	.29**	.09	.29**	.32**	.38**	.43**	.51**	.19**	.28**	33**	.16*	.13*	.19**	.14*	.37**	.23**	.32**	.30**	.25**	.53**				
D_{rev} 28.	.26**	.21**	.18**	.31**	.28**	.38**	.28**	.31**	.32**	.37**	.29**	.35**	.37**	.18**	.13*	.20**	.13*	.05	.17**	.12	.26**	.16**	.24**	.25**	.19**	.39**	.43**			
D_{rev} 29.	.28**	.28**	.09	.29**	.21**	.25**	.24**	.15*	.24**	.33**	.37**	.47**	.50**	.17**	.22**	.32**	.12	.07	.19**	.11	.30**	.18**	.28**	.36**	.25**	.45**	.73**	.45**		
D_{rev} 30.	.31**	.20**	.02	.39**	.24**	.30**	.33**	.16*	.26**	.41**	.42**	.41**	.62**	.13*	.20**	.34**	.14*	.05	.13*	.09	.27**	.19**	.21**	.28**	.18**	.30**	.50**	.34**	.53**	

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Table D3 Correlations among Design Considerations under Social Sustainability

	D_{rev} 1.	D_{rev} 2.	D_{rev} 3.	D_{rev} 4.	D_{rev} 5.	D_{rev} 6.	D_{rev} 7.	D_{rev} 8.	D_{rev} 9.	D_{rev} 10.	D_{rev} 11.	D_{rev} 12.	D_{rev} 13.	D_{rev} 14.	D_{rev} 15.	D_{rev} 16.	D_{rev} 17.	D_{rev} 18.	D_{rev} 19.	D_{rev} 20.	D_{rev} 21.	D_{rev} 22.	D_{rev} 23.	D_{rev} 24.	D_{rev} 25.	D_{rev} 26.	D_{rev} 27.	D_{rev} 28.	D_{rev} 29.	D_{rev} 30.
D_{rev} 1.																														
D_{rev} 2.	.36**																													
D_{rev} 3.	.35**	.35**																												
D_{rev} 4.	.36**	.35**	.35**																											
D_{rev} 5.	.36**	.31**	.26**	.54**																										
D_{rev} 6.	.28**	.38**	.31**	.50**	.47**																									
D_{rev} 7.	.23**	.21**	.31**	.48**	.53**	.61**																								
D_{rev} 8.	.12	.16*	.33**	.31**	.45**	.25**	.33**																							
D_{rev} 9.	.25**	.35**	.32**	.39**	.41**	.53**	.51**	.42**																						
D_{rev} 10.	.21**	.19**	.18**	.35**	.32**	.46**	.38**	.29**	.49**																					
D_{rev} 11.	.24**	.30**	.34**	.33**	.24**	.36**	.37**	.30**	.52**	.46**																				
D_{rev} 12.	.26**	.35**	.26**	.29**	.29**	.41**	.41**	.18**	.46**	.29**	.52**																			
D_{rev} 13.	.28**	.23**	.24**	.31**	.21**	.36**	.35**	.22**	.49**	.43**	.55**	.49**																		
D_{rev} 14.	.33**	.29**	.31**	.39**	.33**	.34**	.34**	.28**	.53**	.36**	.48**	.44**	.51**																	
D_{rev} 15.	.25**	.22**	.31**	.31**	.36**	.29**	.33**	.18**	.37**	.23**	.30**	.44**	.38**	.52**																
D_{rev} 16.	.24**	.26**	.21**	.33**	.36**	.43**	.50**	.17**	.41**	.29**	.37**	.61**	.45**	.47**	.54**															
D_{rev} 17.	.21**	.27**	.35**	.30**	.31**	.18**	.23**	.38**	.28**	.23**	.25**	.25**	.24**	.37**	.29**	.23**														
D_{rev} 18.	.28**	.30**	.32**	.33**	.28**	.30**	.24**	.30**	.29**	.23**	.39**	.41**	.43**	.51**	.43**	.39**	.46**													
D_{rev} 19.	.26**	.20**	.39**	.37**	.33**	.30**	.29**	.32**	.34**	.23**	.29**	.31**	.36**	.45**	.48**	.34**	.43**	.69**												
D_{rev} 20.	.14*	.18**	.37**	.34**	.34**	.22**	.27**	.40**	.28**	.24**	.28**	.23**	.35**	.41**	.37**	.26**	.49**	.61**	**.79****											
D_{rev} 21.	.21**	.24**	.13*	.30**	.28**	.30**	.27**	.25**	.40**	.28**	.24**	.36**	.39**	.36**	.36**	.39**	.22**	.37**	.35**	.31**										
D_{rev} 22.	.27**	.24**	.23**	.27**	.31**	.30**	.22**	.23**	.38**	.25**	.24**	.35**	.31**	.45**	.45**	.35**	.32**	.37**	.46**	.42**	.52**									
D_{rev} 23.	.26**	.30**	.24**	.24**	.36**	.27**	.31**	.26**	.32**	.22**	.29**	.29**	.24**	.38**	.40**	.38**	.39**	.42**	.44**	.41**	.29**	.42**								
D_{rev} 24.	.20**	.27**	.15*	.27**	.27**	.32**	.21**	**.03**	.27**	.30**	.23**	.29**	.23**	.37**	.39**	.37**	.26**	.34**	.29**	.19**	.45**	.39**	.40**							
D_{rev} 25.	.33**	.28**	.19**	.29**	.40**	.32**	.28**	.21**	.40**	.34**	.22**	.22**	.26**	.48**	.43**	.39**	.36**	.33**	.33**	.28**	.34**	.42**	.47**	.58**						
D_{rev} 26.	.22**	.24**	.12	.33**	.26**	.35**	.28**	.17**	.31**	.33**	.26**	.28**	.37*	.36**	.29**	.34**	.23**	.29**	.34**	.29**	.49**	.37**	.37**	.48**	.37**					
D_{rev} 27.	.28**	.26**	.12	.24**	.25**	.38**	.30**	.10	.45**	.40**	.42**	.52**	.48**	.44**	.33**	.41**	.18**	.23**	.20**	.12	.29**	.30**	.29**	.39**	.32**	.39**				
D_{rev} 28.	.19**	.20**	.22**	.22**	.16*	.30**	.35**	.25**	.29**	.28**	.35**	.35**	.42**	.30**	.19**	.34**	.25**	.31**	.20**	.16*	.28**	.25**	.21**	.21**	.23**	.33**	.45**			
D_{rev} 29.	.25**	.23**	.12	.22**	.29**	.38**	.29**	.10	.39**	.33**	.38**	.51**	.53**	.42**	.34**	.50**	.11	.25**	.21**	.12	.35**	.33**	.28**	.40**	.38**	.38**	.75**	.46**		
D_{rev} 30.	.26**	.33**	.09	.34**	.29**	.33**	.29**	.26**	.42**	.28**	.41**	.37**	.47**	.44**	.36**	.38**	.22**	.42**	.36**	.26**	.29**	.35**	.39**	.29**	.28**	.27**	.41**	.31**	.41**	

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Appendix E Factor, Pattern & Structure Matrices

Table E1 Factor Matrix for Economic Sustainability

	Factor					
	1	2	3	4	5	6
D_{rev} 1.						
D_{rev} 2.						
D_{rev} 3.		.541				
D_{rev} 4.	.464					
D_{rev} 5.						
D_{rev} 6.			.484			
D_{rev} 7.	.479					
D_{rev} 8.	.440					
D_{rev} 9.	.582					
D_{rev} 10.			.461			
D_{rev} 11.	.557					
D_{rev} 12.	.632					
D_{rev} 13.	.577					
D_{rev} 14.	.641					
D_{rev} 15.	.608					
D_{rev} 16.	.702					
D_{rev} 17.	.571					
D_{rev} 18.	.676					
D_{rev} 19.	.670		-.448			
D_{rev} 20.	.669					
D_{rev} 21.	.470			.434		
D_{rev} 22.	.425					
D_{rev} 23.	.521					
D_{rev} 24.	.506					
D_{rev} 25.	.469					
D_{rev} 26.	.442					
D_{rev} 27.	.555	-.431				
D_{rev} 28.	.425					
D_{rev} 29.	.506	-.514				
D_{rev} 30.	.518					

Note: Factor loading below 0.4 is excluded

Table E2 Pattern Matrix for Economic Sustainability

	Factor					
	1	2	3	4	5	6
D_{rev} 1.			.656			
D_{rev} 2.			.557			
D_{rev} 3.			.503			
D_{rev} 4.			.637			
D_{rev} 5.			.465			
D_{rev} 6.			.412			
D_{rev} 7.						
D_{rev} 8.						.645
D_{rev} 9.						.658
D_{rev} 10.					-.477	
D_{rev} 11.	.688					
D_{rev} 12.	.754					
D_{rev} 13.	.712					
D_{rev} 14.	.620					
D_{rev} 15.						
D_{rev} 16.	.634					
D_{rev} 17.		.426				
D_{rev} 18.		.623				
D_{rev} 19.		.891				
D_{rev} 20.		.936				
D_{rev} 21.				.722		
D_{rev} 22.				.573		
D_{rev} 23.						
D_{rev} 24.					.605	
D_{rev} 25.					.573	
D_{rev} 26.					.449	
D_{rev} 27.	.634					
D_{rev} 28.				.574		
D_{rev} 29.	.595					
D_{rev} 30.						

Note: Factor loading below 0.4 is excluded

Table E3 Structure Matrix for Economic Sustainability

	Factor					
	1	2	3	4	5	6
D_{rev} 1.			.612			
D_{rev} 2.			.566			
D_{rev} 3.		.420	.564			
D_{rev} 4.			.657			
D_{rev} 5.			.542			
D_{rev} 6.			.544			
D_{rev} 7.			.442			
D_{rev} 8.			.427			.689
D_{rev} 9.	.411	.432				.703
D_{rev} 10.			.408	.557		
D_{rev} 11.	.670					
D_{rev} 12.	.711					
D_{rev} 13.	.707					
D_{rev} 14.	.662	.526			.444	
D_{rev} 15.	.520	.534			.601	
D_{rev} 16.	.709	.485			.538	
D_{rev} 17.		.617	.467		.437	
D_{rev} 18.	.476	.707			.520	
D_{rev} 19.	.430	.840			.500	
D_{rev} 20.	.412	.833			.427	
D_{rev} 21.				.615		
D_{rev} 22.				.480		
D_{rev} 23.		.536	.467		.452	
D_{rev} 24.	.415				.626	
D_{rev} 25.		.415			.595	
D_{rev} 26.					.515	
D_{rev} 27.	.710			.492		
D_{rev} 28.				.619		
D_{rev} 29.	.693			.584		
D_{rev} 30.	.409	.453			.437	

Note: Factor loading below 0.4 is excluded

Table E4 Factor Matrix for Environmental Sustainability

	Factor					
	1	2	3	4	5	6
D_{rev} 1.	.449					
D_{rev} 2.	.536					
D_{rev} 3.						
D_{rev} 4.	.557					
D_{rev} 5.	.514		.403			
D_{rev} 6.	.485					
D_{rev} 7.	.594					
D_{rev} 8.						
D_{rev} 9.	.623					
D_{rev} 10.	.581					
D_{rev} 11.	.634					
D_{rev} 12.	.658					
D_{rev} 13.	.687					
D_{rev} 14.	.632					
D_{rev} 15.	.556					
D_{rev} 16.	.461					
D_{rev} 17.	.420					
D_{rev} 18.		.634				
D_{rev} 19.	.484	.636				
D_{rev} 20.	.448	.598				
D_{rev} 21.	.500					
D_{rev} 22.	.446					-.422
D_{rev} 23.	.550				.426	
D_{rev} 24.	.486					
D_{rev} 25.	.603					
D_{rev} 26.	.548					
D_{rev} 27.	.622		-.414			
D_{rev} 28.	.504					
D_{rev} 29.	.590		-.467			
D_{rev} 30.	.550					

Note: Factor loading below 0.4 is excluded

Table E5 Pattern Matrix for Environmental Sustainability

	Factor					
	1	2	3	4	5	6
D_{rev} 1.						
D_{rev} 2.			.401			
D_{rev} 3.						
D_{rev} 4.	.550					
D_{rev} 5.	.750					
D_{rev} 6.	.821					
D_{rev} 7.	.760					
D_{rev} 8.				.501		
D_{rev} 9.				.415		
D_{rev} 10.	.407					
D_{rev} 11.						
D_{rev} 12.					.518	
D_{rev} 13.						
D_{rev} 14.			.943			
D_{rev} 15.					.450	
D_{rev} 16.					.434	
D_{rev} 17.						
D_{rev} 18.			.855			
D_{rev} 19.			.860			
D_{rev} 20.			.776			
D_{rev} 21.						.571
D_{rev} 22.						.672
D_{rev} 23.				.857		
D_{rev} 24.				.589		
D_{rev} 25.				.439		
D_{rev} 26.		.592				
D_{rev} 27.		.830				
D_{rev} 28.		.424				
D_{rev} 29.		.862				
D_{rev} 30.		.482				

Note: Factor loading below 0.4 is excluded

Table E6 Structure Matrix for Environmental Sustainability

	Factor					
	1	2	3	4	5	6
D_{rev} 1.	.505					
D_{rev} 2.	.465		.532	.464		
D_{rev} 3.			.411	.473		
D_{rev} 4.	.671	.475		.413		
D_{rev} 5.	.713					
D_{rev} 6.	.714					
D_{rev} 7.	.736				.401	
D_{rev} 8.				.438		
D_{rev} 9.	.556			.631	.447	
D_{rev} 10.	.584	.444		.411		
D_{rev} 11.	.472	.470		.427	.464	
D_{rev} 12.	.517	.553		.468	.677	
D_{rev} 13.	.511	.628		.466	.548	
D_{rev} 14.			.532	.445	.872	
D_{rev} 15.			.483	.551	.635	.413
D_{rev} 16.		.429		.405	.473	
D_{rev} 17.			.465	.412	.401	
D_{rev} 18.			.789			
D_{rev} 19.			.824	.412		
D_{rev} 20.			.764			.472
D_{rev} 21.						.616
D_{rev} 22.						.708
D_{rev} 23.				.747	.413	.411
D_{rev} 24.		.413		.553		
D_{rev} 25.				.633	.561	
D_{rev} 26.		.624		.468	.451	
D_{rev} 27.		.816			.411	
D_{rev} 28.	.445	.546				
D_{rev} 29.		.821				
D_{rev} 30.	.413	.630				

Note: Factor loading below 0.4 is excluded

Table E7 Factor Matrix for Social Sustainability

	Factor					
	1	2	3	4	5	6
D_{rev} 1.	.447					
D_{rev} 2.	.469					
D_{rev} 3.	.446					
D_{rev} 4.	.579					
D_{rev} 5.	.575					
D_{rev} 6.	.603		.443			
D_{rev} 7.	.621					
D_{rev} 8.	.434					
D_{rev} 9.	.682					
D_{rev} 10.	.539					
D_{rev} 11.	.607					
D_{rev} 12.	.645					
D_{rev} 13.	.649					
D_{rev} 14.	.706					
D_{rev} 15.	.620					
D_{rev} 16.	.665					
D_{rev} 17.	.493					
D_{rev} 18.	.644					
D_{rev} 19.	.640	.511				
D_{rev} 20.	.569	.610				
D_{rev} 21.	.562					
D_{rev} 22.	.587					
D_{rev} 23.	.571					
D_{rev} 24.	.546					
D_{rev} 25.	.592					
D_{rev} 26.	.546					
D_{rev} 27.	.600	-.480				
D_{rev} 28.	.483					
D_{rev} 29.	.604	-.485				
D_{rev} 30.	.577					

Note: Factor loading below 0.4 is excluded

Table E8 Pattern Matrix for Social Sustainability

	Factor					
	1	2	3	4	5	6
D_{rev} 1.					.531	
D_{rev} 2.					.599	
D_{rev} 3.					.477	
D_{rev} 4.				.502		
D_{rev} 5.				.651		
D_{rev} 6.				.859		
D_{rev} 7.				.617		
D_{rev} 8.				.417		
D_{rev} 9.	.413					
D_{rev} 10.	.451					
D_{rev} 11.	.691					
D_{rev} 12.	.480					.449
D_{rev} 13.	.775					
D_{rev} 14.						
D_{rev} 15.						.411
D_{rev} 16.						.622
D_{rev} 17.		.461				
D_{rev} 18.		.663				
D_{rev} 19.		.845				
D_{rev} 20.		.963				
D_{rev} 21.			.439			
D_{rev} 22.			.431			
D_{rev} 23.						
D_{rev} 24.			.540			
D_{rev} 25.			.683			
D_{rev} 26.			.775			
D_{rev} 27.	.736					
D_{rev} 28.	.529					
D_{rev} 29.	.673					
D_{rev} 30.						

Note: Factor loading below 0.4 is excluded

Table E9 Structure Matrix for Social Sustainability

	Factor					
	1	2	3	4	5	6
D_{rev} 1.					.568	
D_{rev} 2.					.616	
D_{rev} 3.		.470		.413	.581	
D_{rev} 4.		.426		.644	.523	
D_{rev} 5.		.402	.440	.691	.486	
D_{rev} 6.	.473			.782		
D_{rev} 7.	.527		.423	.704	.453	
D_{rev} 8.		.487		.534		
D_{rev} 9.	.656	.420	.437	.659	.456	
D_{rev} 10.	.567			.547		
D_{rev} 11.	.692	.406		.461	.466	
D_{rev} 12.	.668			.406	.456	.638
D_{rev} 13.	.756	.438		.403		
D_{rev} 14.	.618	.554	.536	.442	.516	.427
D_{rev} 15.	.431	.505	.525		.435	.597
D_{rev} 16.	.570		.507	.462		.747
D_{rev} 17.		.583			.453	
D_{rev} 18.	.461	.746	.423		.498	.410
D_{rev} 19.		.843	.437		.419	
D_{rev} 20.		.868				
D_{rev} 21.	.457	.403	.584			
D_{rev} 22.	.417	.504	.595			
D_{rev} 23.		.502	.554		.440	
D_{rev} 24.			.617			
D_{rev} 25.			.717	.403	.447	
D_{rev} 26.	.466		.753			
D_{rev} 27.	.744		.527			.421
D_{rev} 28.	.555					
D_{rev} 29.	.728		.558			.502
D_{rev} 30.	.562		.421			

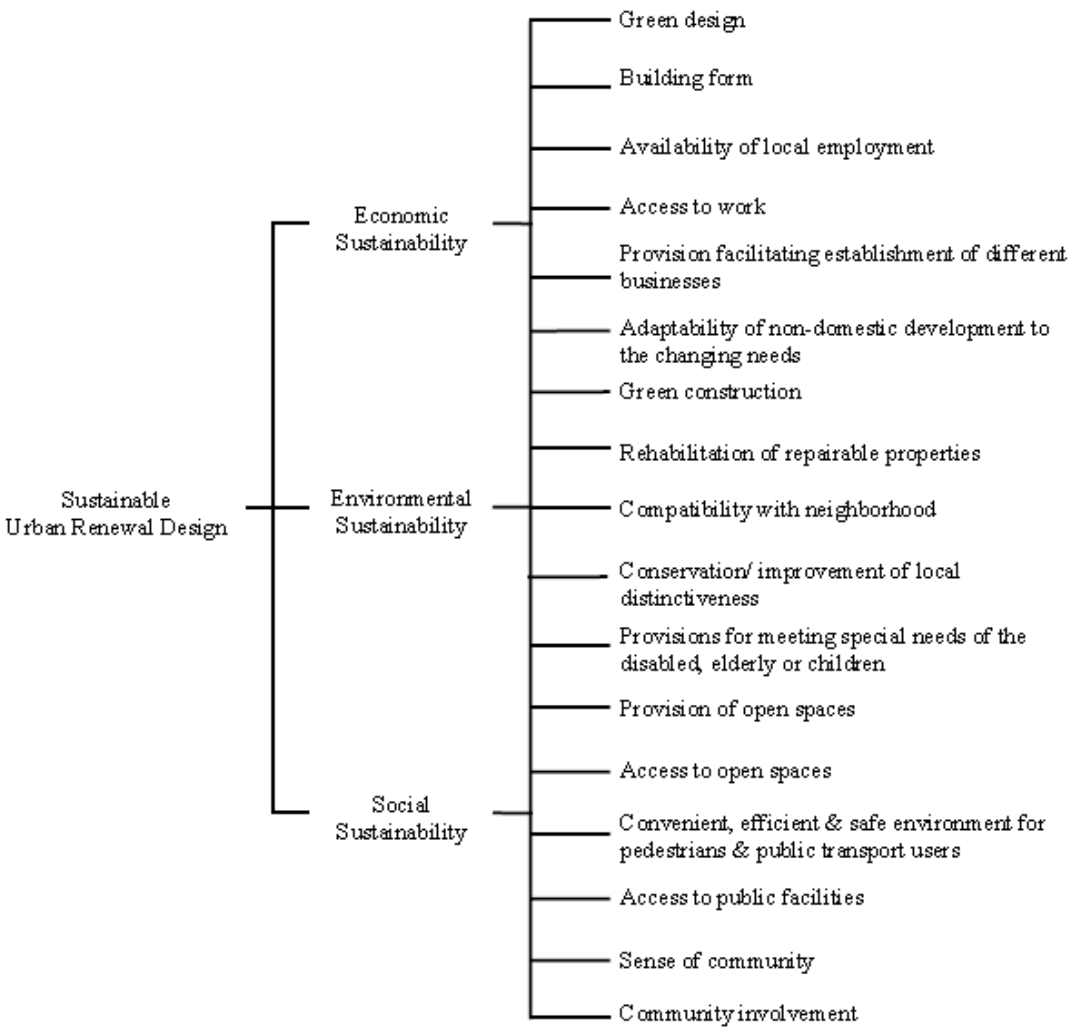
Note: Factor loading below 0.4 is excluded.

Appendix F Sample of Questionnaire for Evaluation of Assessment Tool

THE HONG KONG POLYTECHNIC UNIVERSITY
香港理工大學

Thank you for your participation in this questionnaire survey. This survey is to verify the representation & validity of individual indicators for each design criterion which will then be used to assess the performance of renewal projects selected as case study. Please note that both quantitative (objective) & qualitative (subjective) indicators are established for the same design criterion. The assessment model containing 17 design criteria as shown below is derived by Exploratory Factor Analysis & Analytic Hierarchy Process conducted from late 2005 to mid 2007. During the research process, the most significant aspects contributing to sustainable urban renewal are identified to be considered when planning local renewal projects in future.

Model for Assessment of Urban Renewal Proposal



1

PART I. PLEASE COMMENT ON THE VALIDITY OF THE CORRESPONDING INDICATORS OF THE FOLLOWING DESIGN CRITERIA

1. Green Design
It refers to the passive design approach adopted to optimize the use of sunlight for lighting and heating, and air movement for ventilation and cooling of indoor spaces.

(a) Which aspect(s) shown below has/ have incorporated the principles of passive design in response to the natural environment?
(i) Investigation of surrounding environment e.g. ventilation assessment, and sunlight and shadow studies
(ii) Building orientation/ disposition
(iii) Design of building envelop e.g. building shape, & form & size of openings [other than (iv)]
(iv) Selection of glazing/ building materials (in terms of insulation level & thermal mass requirement)
(v) Landscape design/ vegetation

Either 1 of the above (1pts); any 2 (2pts); any 3 (3pts); any 4 (4pts); all or more (5pts)

Comments:
Whether (a) is a valid indicator?
☐ Yes, NO comment
☐ Yes with comments on indicator/ marking scheme, i.e._____
☐ No, Reason:_____

(b) What do you think about this sentence "In response to the existing site environment, the new buildings in the redevelopment can effectively maximize the use of natural lighting & ventilation while controlling excessive heat gain & loss."?

(1-strongly disagree; 5-strongly agree)

Comments:
Whether (b) is a valid indicator?
☐ Yes, NO comment
☐ Yes with comments on indicator/ marking scheme, i.e._____
☐ No, Reason:_____

(c) Other suggestions: _____

2. Building form
It concerns physical character and configuration of buildings including appearance, density, height, mass, etc.

(a) Density of development within renewal site in terms of plot ratio (PR)?
[PR = Total gross building floor area/ total site area to be renewed]

PR ≥15(1pts), 12≤ PR <15(2pts), 9≤ PR <12(3pts), 5≤ PR <9(4pts), PR <5(5pts)

Comments:
Whether (a) is a valid indicator?
☐ Yes, NO comment
☐ Yes with comments on indicator/ marking scheme, i.e._____
☐ No, Reason:_____

(b) What do you think about the following sentences?
- The visual appearance of the properties is satisfactory. (1-strongly disagree; 5-strongly agree)
- The height of individual buildings is appropriate. (1-strongly disagree; 5-strongly agree)
- The bulk of individual buildings is appropriate. (1-strongly disagree; 5-strongly agree)
- The density of development is acceptable. (1-strongly disagree; 5-strongly agree)

Sum <5(1pts), 5≤ Sum ≤8(2pts), 8< Sum ≤12(3pts), 12< Sum ≤16(4pts), Sum >16(5pts)

Comments:
Whether (b) is a valid indicator?
☐ Yes, NO comment
☐ Yes with comments on indicator/ marking scheme, i.e._____
☐ No, Reason:_____

(c) Other suggestions: _____

3. Availability of local employment
The word "local employment" denotes job opportunities offered in an area to be developed being close to the place of residence of the citizens.

(a) Number of jobs created per 1000m^2
[(Total area of employment land^ x 80% take-up rate x 0.034 no. of worker/m^2)/ total site area x 1000m^2]
[^Employment land is defined as non-residential designated land supporting private-sector employment e.g. industrial use & commercial use (Office/Retail)]

>0-100nos. (1pts); >100-200nos. (2pts); >200-300nos. (3pts); >300-400nos. (4pts); >400nos. (5pts)

Comments:
Whether (a) is a valid indicator?
☐ Yes, NO comment
☐ Yes with comments on indicator/ marking scheme, i.e._____
☐ No, Reason:_____

(b) What do you think about this sentence "There are adequate working opportunities provided in the local area after urban renewal."?

(1-strongly disagree; 5-strongly agree)

Comments:
Whether (b) is a valid indicator?
☐ Yes, NO comment
☐ Yes with comments on indicator/ marking scheme, i.e._____
☐ No, Reason:_____

(c) Other suggestions: _____

4. Access to work
It focuses on the possibility of approaching the working places of the citizens by roads, streets or pedestrian walkways.

(a) Work traveling habits - MAIN mode of transport as usual
(i) By private transport e.g. automobile & motor cycle (1pts)
(ii) By light public transport e.g. minibus (2pts)
(iii) By mass transport e.g. MTR, bus & coach (3pts)
(iv) By cycling/ on foot [working outside the renewed site] (4pts)
(v) By cycling/ on foot [working within the renewed site] (5pts)

Comments:
Whether (a) is a valid indicator?
☐ Yes, NO comment
☐ Yes with comments on indicator/ marking scheme, i.e._____
☐ No, Reason:_____

(b) Average journey time for the citizens to get to work - travel by means of cycling/ walking excluded

>60mins (1pts); >45-60mins (2pts); >30-45mins (3pts); >15-30mins (4pts); ≤15mins (5pts)

Comments:
Whether (b) is a valid indicator?
☐ Yes, NO comment
☐ Yes with comments on indicator/ marking scheme, i.e._____
☐ No, Reason:_____

(c) Other suggestions: _____

5. Provision facilitating establishment of different businesses
It refers to the design arrangements that ease the setting up of various commercial enterprises in the form of shop, firm or company to conduct activities of buying and selling goods and services to earn a livelihood or make a profit.

(a) Which provision(s) as shown below is/ are available in the renewal project for establishing a variety of business environments?
(i) Provision of shopping mall(s)/ centre(s)/ arcade(s)
(ii) Provision of detached department store(s)
(iii) Provision of business premise(s) at street level only
(iv) Provision of business premise(s) inside a building [other than (i) - (iii)]
(v) Provision of traders' stall(s) in the public place

Either 1 of the above (1pts); any 2 (2pts); any 3 (3pts); any 4 (4pts); all or more (5pts)

Comments:
Whether (a) is a valid indicator?
☐ Yes, NO comment
☐ Yes with comments on indicator/ marking scheme, i.e. _____
☐ No, Reason: _____

(b) What do you think about this sentence "The renewed area provides a good mix & wide range of shops & services after urban renewal."?

(1-strongly disagree; 5-strongly agree)

Comments:
Whether (b) is a valid indicator?
☐ Yes, NO comment
☐ Yes with comments on indicator/ marking scheme, i.e. _____
☐ No, Reason: _____

(c) Other suggestions: _____

6. Adaptability of non-domestic development to the changing needs
It refers to the non-residential development that is flexible enough to respond to future changes in use, lifestyle and demography without substantial alterations of building structures.

(a) Which design(s) as shown below is/ are incorporated in the renewal project?
(i) Open plan internal design
(ii) Demountable system partition/ non-load bearing internal partition
(iii) Structural framing building with minimum load bearing wall
(iv) Flexible design of building services provisions/ availability of standby public utilities
(v) Outdoor spaces reserved for multi-functional purposes

Either 1 of the above (1pts); any 2 (2pts); any 3 (3pts); any 4 (4pts); all or more (5pts)

Comments:
Whether (a) is a valid indicator?
☐ Yes, NO comment
☐ Yes with comments on indicator/ marking scheme, i.e. _____
☐ No, Reason: _____

(b) What do you think about this sentence "The non-residential portion of the redevelopment is easily/ readily allowed for future expansion, improvement & modification involving structural & non-structural alterations."?

(1-strongly disagree; 5-strongly agree)

Comments:
Whether (b) is a valid indicator?
☐ Yes, NO comment
☐ Yes with comments on indicator/ marking scheme, i.e. _____
☐ No, Reason: _____

(c) Other suggestions: _____

7. Green construction
It is related to the construction measures that minimize the consumption of energy, water and other natural resources or use them in an effective and efficient way.

(a) Which practice(s) as shown below is/ are incorporated in the renewal project?
(i) Providing device(s) to reduce consumption of non-renewable energy
(ii) Providing device(s) to reduce consumption of fresh water
(iii) Adopting measure(s) to reduce consumption of non-green construction materials
(iv) Adopting measure(s) to reduce generation of solid/ liquid wastes
(v) Using environmentally friendly/ pollution free material(s), product(s)/ equipment(s)/ construction methods
(vi) Using prefabricated/ pre-casting or off-site construction element(s)

Either 1 of the above (1pts); any 2 (2pts); any 3 (3pts); any 4 (4pts); 5 or more (5pts)

Comments:
Whether (a) is a valid indicator?
☐ Yes, NO comment
☐ Yes with comments on indicator/ marking scheme, i.e._____
☐ No, Reason:_____

(b) What do you think about this sentence "The construction practices adopted in the whole renewal process can effectively minimize the consumption of natural resources, & use them in an efficient way."?

(1-strongly disagree; 5-strongly agree)

Comments:
Whether (b) is a valid indicator?
☐ Yes, NO comment
☐ Yes with comments on indicator/ marking scheme, i.e._____
☐ No, Reason:_____

(c) Other suggestions: _____

8. Rehabilitation of repairable properties
It is about the act/ process of returning dilapidated buildings or structures that are able to be repaired to a state of utility, through repair, alterations and/ additions, and renovations.

(a) Percentage of existing properties being retained
[Total property area to be retained/ total construction area of existing properties in the subject site x 100%]

>0-20% (1pts); >20-40% (2pts); >40-60% (3pts); >60-80% (4pts); >80-100% (5pts)

Comments:
Whether (a) is a valid indicator?
☐ Yes, NO comment
☐ Yes with comments on indicator/ marking scheme, i.e._____
☐ No, Reason:_____

(b) What do you think about this sentence "The repairable properties & those having their utility values are properly retained & rehabilitated during urban renewal."?

(1-strongly disagree; 5-strongly agree)

Comments:
Whether (b) is a valid indicator?
☐ Yes, NO comment
☐ Yes with comments on indicator/ marking scheme, i.e._____
☐ No, Reason:_____

(c) Other suggestions: _____

9. Compatibility with neighborhood
It refers to a new development that complements surrounding neighborhood, and blends in with the scale, architectural style, and other physical characters of the surrounding properties.

(a) Which aspect(s) of the renewal project as shown below is/ are compatible with the surrounding areas?
(i) Use of color, texture & construction materials
(ii) Design of individual buildings [other than (i)]
(iii) Spatial arrangement of streets & buildings
(iv) Scale & form of development
(v) Land use zoning

Either 1 of the above (1pts); any 2 (2pts); any 3 (3pts); any 4 (4pts); all or more (5pts)

Comments:
Whether (a) is a valid indicator?
☐ Yes, NO comment
☐ Yes with comments on indicator/ marking scheme, i.e._____
☐ No, Reason:_____

(b) What do you think about this sentence "The development of the renewal site has positive impacts on the view and micro-climate for the neighboring properties after urban renewal."?

(1-strongly disagree; 5-strongly agree)

Comments:
Whether (b) is a valid indicator?
☐ Yes, NO comment
☐ Yes with comments on indicator/ marking scheme, i.e._____
☐ No, Reason:_____

(c) Other suggestions: _____

10. Conservation/ improvement of local distinctiveness
It is about the act of keeping and protecting/ enhancing the distinctive features of an area shaped by the combination of its characteristics and qualities, and determined by the perception of the people who live, work and visit such place.

(a) Thinking about the area after urban renewal, which statement(s) as shown below can describe your feeling? (only consider the positive aspects)
(i) Structures with special architectural features/ reflecting local culture/ characteristics are retained
(ii) Unique businesses/ industries are conserved
(iii) Distinctive townscape is reinforced
(iv) New attractive landmarks are built
(v) New distinctive image/ atmosphere is created in harmony with the surrounding environment

Either 1 of the above (1pts); any 2 (2pts); any 3 (3pts); any 4 (4pts); all or more (5pts)

Comments:
Whether (a) is a valid indicator?
☐ Yes, NO comment
☐ Yes with comments on indicator/ marking scheme, i.e._____
☐ No, Reason:_____

(b) What do you think about this sentence "The area after urban renewal has its own characteristics & positive identity."?

(1-strongly disagree; 5-strongly agree)

Comments:
Whether (b) is a valid indicator?
☐ Yes, NO comment
☐ Yes with comments on indicator/ marking scheme, i.e._____
☐ No, Reason:_____

(c) Other suggestions: _____

11. Provisions for meeting special needs of the disabled, elderly or children
It concerns the facilities or buildings that are tailor-made for the people who are old, weak or with physical disabilities.

(a) Which design(s) as shown below is/ are incorporated in the renewal project?
(i) Public areas providing enhanced provisions for access for the disabled persons
(ii) Public areas with provisions specially designed for the children/ the elderly
(iii) Provision specially for children [other than (ii)] e.g. child care centre
(iv) Provision specially for the elderly [other than (ii)] e.g. residential care home for the elderly
(v) Provision specially for the disabled persons [other than (i)] e.g. rehabilitation centre for people with disabilities

Either 1 of the above (1pts); any 2 (2pts); any 3 (3pts); any 4 (4pts); all or more (5pts)

Comments:
Whether (a) is a valid indicator?
☐ Yes, NO comment
☐ Yes with comments on indicator/ marking scheme, i.e._____
☐ No, Reason:_____

(b) What do you think about this sentence "Accessible design & adequate facilities are provided for the people, regardless of age & physical abilities after urban renewal."?

(1-strongly disagree; 5-strongly agree)

Comments:
Whether (b) is a valid indicator?
☐ Yes, NO comment
☐ Yes with comments on indicator/ marking scheme, i.e._____
☐ No, Reason:_____

(c) Other suggestions: _____

12. Provision of open spaces
The word "open spaces" refers to the public/ private areas designed for active and/ passive recreational uses, for conservation of the natural environment, or for amenity and visual purposes.

(a) Percentage of open spaces being provided
[Total area of private & public open spaces/ total site area x 100%]

>0-20% (1pts); >20-40% (2pts); >40-60% (3pts); >60-80% (4pts); >80-100% (5pts)

Comments:
Whether (a) is a valid indicator?
☐ Yes, NO comment
☐ Yes with comments on indicator/ marking scheme, i.e._____
☐ No, Reason:_____

(b) What do you think about this sentence "The open spaces provided within the renewed area are adequate & properly located."?

(1-strongly disagree; 5-strongly agree)

Comments:
Whether (b) is a valid indicator?
☐ Yes, NO comment
☐ Yes with comments on indicator/ marking scheme, i.e._____
☐ No, Reason:_____

(c) Other suggestions: _____

13. Access to open spaces
It focuses on the possibility of approaching the open spaces by roads, streets or pedestrian walkways.

(a) Average walking distance to get to the nearest open space from the entrances of the residential development

>1000m (1pts); >750-1000m (2pts); >500-750m (3pts); >250-500m (4pts); ≤250m (5 pts)

Comments:
Whether (a) is a valid indicator?
☐ Yes, NO comment
☐ Yes with comments on indicator/ marking scheme, i.e._____
☐ No, Reason:_____

(b) Thinking about the open spaces you are LIKELY to go & considering the factors like distance, comfort & safety, which statement shown below best describes your situation?
(i) I have considerable difficulty gaining access to all places (1pts)
(ii) I have difficulties gaining access to most places (2pts)
(iii) Occasionally, I have difficulty gaining access to some places (3pts)
(iv) It is relatively easy for me to gain access to most places (4pts)
(v) I can easily gain access to all places (5pts)

Comments:
Whether (b) is a valid indicator?
☐ Yes, NO comment
☐ Yes with comments on indicator/ marking scheme, i.e._____
☐ No, Reason:_____

(c) Other suggestions: _____

14. Convenient, efficient & safe environment for pedestrians & public transport users
It is related to the required quality of the pedestrian walkways e.g. streets, pavements, footbridges, etc. and mass transport systems for the pedestrians & public transport users.

(a) Frequent means of travel (except for work) - either by public transport or on foot
(i) Public transport via ≥ 2 transit (1pts)
(ii) Public transport via 1 transit (2pts)
(iii) Public transport without transit requirement (3pts)
(iv) On foot [> 15minutes] (4pts)
(v) On foot [≤ 15minutes] (5pts)

Comments:
Whether (a) is a valid indicator?
☐ Yes, NO comment
☐ Yes with comments on indicator/ marking scheme, i.e._____
☐ No, Reason:_____

(b) What do you think about the following sentences?
- It is convenient & safe for the citizens to walk in pedestrian walkways within the renewed area. (1-strongly disagree; 5-strongly agree)
- It is convenient & safe for the citizens to walk to the nearest public transport facilities. (1-strongly disagree; 5-strongly agree)
- The physical design of the pedestrian walkways & pedestrian passages to public transport facilities in terms of location, width & material used is appropriate. (1-strongly disagree; 5-strongly agree)
- The public transport system is safe & efficient. (1-strongly disagree; 5-strongly agree)

Sum <5(1pts), 5≤ Sum ≤8(2pts), 8< Sum ≤12(3pts), 12< Sum ≤16(4pts), Sum >16(5pts)

Comments:
Whether (b) is a valid indicator?
☐ Yes, NO comment
☐ Yes with comments on indicator/ marking scheme, i.e._____
☐ No, Reason:_____

(c) Other suggestions: _____

15. Access to public facilities

It focuses on the possibility of approaching the places where the public facilities are located by roads, streets or pedestrian walkways. The word "public facilities" refers to the facilities that are essential to support the daily necessity of the community, and to enhance the overall quality of life of the public. It can include public buildings, structures/ systems used for functional, institutional, educational, medical, recreational and cultural purposes.

(a) Which facility/ facilities can be found within 500m from the entrances of the residential development in the renewal project?

(i) Food centre (ii) Market (iii) Clinic/ medical centre/ hospital; (iv) School/ college; (v) Library; (vi) Community centre; (vii) Cultural centre/ museum; (viii) Sport complex; (ix) Swimming pool; (x) Social services centre; (xi) Postal facility; (xii)Police office/ Fire stations; (xiii) Others

Either 1 of the above (1pts); any 2 (2pts); any 3 (3pts); any 4 (4pts); any 5 or more (5pts)

Comments:

Whether (a) is a valid indicator?

☐ Yes, NO comment

☐ Yes with comments on indicator/ marking scheme, i.e._____

☐ No, Reason:_____

(b) Thinking about the public facilities you OFTEN go & considering the factors like distance, comfort & safety, which statement best describes your situation?

(i) I have considerable difficulty gaining access to all facilities (1pts)
(ii) I have difficulties gaining access to most facilities (2pts)
(iii) Occasionally, I have difficulty gaining access to some facilities (3pts)
(iv) It is relatively easy for me to gain access to most facilities (4pts)
(v) I can easily gain access to all facilities (5pts)

Comments:

Whether (b) is a valid indicator?

☐ Yes, NO comment

☐ Yes with comments on indicator/ marking scheme, i.e._____

☐ No, Reason:_____

(c) Other suggestions: _____

16. Sense of community

It is about a feeling of belonging that the community members have, a feeling that the members are important to one another and to the group, and a shared faith that members' needs can be met through their commitment to be together.

(a) Thinking about the community after urban renewal, which statement best describes your feeling?

(i) I have considerable difficulty maintaining relationship with my old neighbors & making new friends here (1pts)
(ii) I have difficulties maintaining close relationship with my old neighbors but I can make new friends here (2pts)
(iii) I can maintain close relationship with my old neighbors but I have difficulties making new friends here (3pts)
(iv) I can maintain close relationship with my old neighbors, & make some new friends here (4pts)
(v) I can maintain very close relationship with most of my old neighbors, & make a lot of new friends here (5pts)

Comments:

Whether (a) is a valid indicator?

☐ Yes, NO comment

☐ Yes with comments on indicator/ marking scheme, i.e._____

☐ No, Reason:_____

(b) What do you think about this sentence "The renewed area is a good place to live/ work/ visit after project completion"?

(1-strongly disagree; 5-strongly agree)

Comments:

Whether (b) is a valid indicator?

☐ Yes, NO comment

☐ Yes with comments on indicator/ marking scheme, i.e._____

☐ No, Reason:_____

(c) Other suggestions: _____

17. Community involvement
It concerns the opportunities enabling the members of a community to actively contribute to and influence the development process, and to share the fruits of the development.

(a) Thinking about the availability of participation opportunity, which activity/ activities is/ are conducted during the renewal process?

(i) Holding meeting(s) with immediate neighbors & local public officials to solicit input before conceptual design
(ii) Collecting views from community meeting, workshop, forum, exhibition, etc. held during design stage
(iii) Modifying project design by incorporating community input, & explaining why their input is not incorporated if no modification is made
(iv) Working directly with community associations/ social networks to advertise public comments & generate comments on project design
(v) Establishing channels for ongoing communication between the developer & the community

Either 1 of the above (1pts); any 2 (2pts); any 3 (3pts); any 4 (4pts); all or more (5pts)

Comments:
Whether (a) is a valid indicator?
☐ Yes, NO comment
☐ Yes with comments on indicator/ marking scheme, i.e._____
☐ No, Reason:_____

(b) What do you think about the following sentences?

- The residents/ shop owners & adjacent neighborhood affected by urban renewal have adequate opportunities to raise their concerns. (1-strongly disagree; 5-strongly agree)
- Their concerns & opinions for the benefit of the renewed area & the community are taken into account. (1-strongly disagree; 5-strongly agree)
- Their comments on the project are well-addressed. (1-strongly disagree; 5-strongly agree)

Sum <4(1pts), 4≤ Sum ≤6(2pts), 6< Sum ≤9(3pts), 9< Sum ≤12(4pts), Sum >12(5pts)

Comments:
Whether (b) is a valid indicator?
☐ Yes, NO comment
☐ Yes with comments on indicator/ marking scheme, i.e._____
☐ No, Reason:_____

(c) Other suggestions: _____

PART II. PLEASE PROVIDE YOUR PERSONAL INFORMATION

(a) Gender
☐Male ☐Female

(b) Age
☐<20 ☐20-29 ☐30-39 ☐40-49 ☐50-59 ☐≥60

(c) Target Group
☐Urban design practitioner i.e. architect, planner & property development manager ☐Scholar

(d) Would you interested in receiving g preliminary results of this study, and participating in future surveys related to this topic?
☐Yes [Please answer (e)] ☐No

(e) Contact
Name: _____ Email: _____
Tel: _____ Fax: _____

That is the end of the questionnaire. Thank you for your participation.

10

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