

A REVIEW OF RECENT STUDIES ON SUSTAINABLE URBAN RENEWAL

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ABSTRACT

Urban renewal and sustainable development are two popular issues in both policy agenda and academia. Although their importance has been increasingly recognized, an integrated review covering sustainability, planning, and urban renewal has yet to be produced. Based on 81 journal papers, this paper presents a critical review of recent studies on sustainable urban renewal over the period 1990 to 2012. The review focuses on the planning sub-system and the social sub-system of urban renewal in terms of the evaluation of sustainability. The complexity of achieving sustainable urban renewal is emphasized and discussed. To better clarify the mechanism behind the urban renewal process and improve urban sustainability, recommendations of future research directions are also provided.

1. INTRODUCTION

Urban renewal has been regarded as a sound approach to promoting land values and improving environmental quality (Adams & Hastings, 2001); rectifying the urban decay problem and meeting various socioeconomic objectives (Lee & Chan, 2008a); and enhancing existing social networks, improving inclusion of vulnerable groups, and changing adverse impacts on the living environment (Chan & Yung, 2004). In order to help tackle these issues, many studies have been conducted in this field. As sustainable development corresponds to urban renewal in terms of social, economic and environmental sustainability, it has been recognized that urban renewal and sustainability should be combined together. The urban renewal process involves various planning issues and different stakeholders, the relationship between which complicates the process. In order to achieve effective and efficient sustainable urban renewal practice, it is first necessary to understand the mechanism behind it. Discussions by other researchers on these issues are scattered in different areas with an integrated review covering sustainability, planning, and urban renewal yet to be produced.

This paper therefore presents a critical review of recent studies on sustainable urban renewal. It starts with the background of sustainable urban renewal, followed by the research methodology and an overall picture of the research progress. Selected papers are then discussed from three aspects, namely planning sub-system in sustainable urban renewal, stakeholders and their engagement, and evaluation of sustainable urban renewal. Finally, the discussion section includes a summary the findings from this study and recommendations for future related research.

2. BACKGROUND OF SUSTAINABLE URBAN RENEWAL

Urban renewal has become a major element of urban policy in many countries and regions. Couch (1990) gave two reasons for its growing importance. Firstly, people increasingly moving to and living in urban areas, in particular old urban areas, give rise to the need for renewal of the urban fabric. Secondly, urban renewal responds to the concern of urban sprawl and large quantities of abandoned urban areas. Nowadays, it is closely involved with sustainable development.

Definition of Urban Renewal

Urban renewal, urban regeneration, urban redevelopment, and urban rehabilitation share similar meanings in the town planning field but are significantly different in terms of scale. Urban renewal and urban regeneration have very similar meanings and both involve work of a relatively large scale: urban renewal is defined as the process of slum clearance and physical redevelopment that takes account of other elements such as heritage preservation (Couch, Sykes, & Boerstinghaus, 2011); while urban regeneration is a comprehensive integration of vision and action aimed at resolving the multi-faceted problems of deprived urban areas to improve their economic, physical, social, and environmental conditions (Ercan, 2011). By comparison, urban redevelopment is more specific and on a smaller scale, being any new construction on a site that has pre-existing uses, such as the redevelopment of a block of townhouses into a large apartment building (De Sousa, 2008), and urban rehabilitation is restoring a building to good condition, operation, or capacity (Zuckerman, 1991). In summary, urban renewal (used interchangeably with urban regeneration throughout this paper), aims at improving the physical, social-economic and ecological aspects of urban areas through various actions including redevelopment, rehabilitation, and heritage preservation.

The Links between Urban Renewal and Sustainability

The term 'sustainable development' dates back to the 1970s, but it was not until the 1990s that it was used in the context of urban renewal policy (Bromley, Tallon, & Thomas, 2005). Sustainable development is a complex concept (Weingaertner & Barber, 2010) made even more so by the fact that there is no commonly agreed definition of sustainability. There is a growing body of research that attempts to conceptualize urban renewal sustainability in different contexts. Lorr (2012) reviewed three of the most common theoretical approaches to sustainability: the *inter-generational and intra-generational equity and justice perspective*, the *comprehensive environmental, economical, equitable change perspective*, and the *free-market greening perspective*. These approaches were applied in the context of North American cities and provided a working definition of urban sustainability, in which studies on multiple scales were emphasized. In the UK context, sustainability has been conceptualized by a case-based study of the Eastside regeneration of Birmingham, based on three pillars of sustainability and a weak-strong sustainability continuum (Lombardi, Porter, Barber, & Rogers, 2011).

No matter what conceptualization of sustainability is applied, the consensus appears to be that sustainable development has three pillars: social, economic, and environmental. This has therefore become the popular approach to achieving a more sustainable society in most contexts, and urban renewal is closely linked to it. Urban renewal aims at solving a series of urban problems, including urban function deterioration, social exclusion in urban areas, and environmental pollution. It is regarded as a sound approach to promoting land values, and improving environmental quality (Adams & Hastings, 2001); to rectifying the urban decay problem and meeting various socioeconomic objectives (Lee & Chan, 2008a); and to enhancing existing social networks, improving inclusion of vulnerable groups, and changing adverse impacts on the living environment (Chan & Yung, 2004). Specifically, urban renewal projects facilitate good-quality housing and reduce health risks to the community (Krieger & Higgins, 2002); promote the repair of dilapidated buildings (Ho, Yau, Poon, & Liusman, 2012); and improve the effective use of the building stock and land resources in the city (Ho et al., 2012). In these respects, urban renewal can significantly contribute to sustainable urban development if it follows a sustainable path. However, most urban renewal policies have tended to focus on economic regeneration rather than on environmental or social regeneration (Couch & Dennemann, 2000). For

example, an examination of one military site redevelopment in Jordan indicated that although the development had been promoted by a political commitment to sustainable urban renewal, it was more profit-driven rather than driven by the need to solve environmental and community concerns in the redevelopment process. Thus, although the relationship between sustainability and urban renewal is complex, it does provide a direction for a sustainable urban future.

3. METHODOLOGY

Paper Retrieval

Urban renewal, urban regeneration, urban redevelopment, and urban rehabilitation share similar meanings, but are used in different countries or regions. Therefore, the key words used in the literature search were *urban renewal, urban regeneration, urban redevelopment, urban rehabilitation, sustainable development and sustainability*. The search rule used was ("*urban renewal*" OR "*urban regeneration*" OR "*urban redevelopment*" OR "*urban rehabilitation*") AND ("*sustainable development*" OR "*sustainability*"), which was put in the searching criterion *Topic* in the SCI database. The procedure for retrieving papers was as follows:

1. Topics were scanned with the search rule mentioned above in the SCI database with a time span of 1990/01/01 to 2012/12/31 and the language of English. With this rule, 118 papers (including articles, proceedings papers, editorials, and reviews) were retrieved.
2. Papers in conference proceedings and editorials were rejected, leaving 115 articles.
3. The abstract of each paper was read to exclude irrelevant ones. Finally, 81 papers were selected for the literature review.

An Overview of Selected Papers

A brief analysis was made of the 81 selected papers. Figure 1 shows that the number of relevant papers published between 1990 and 2012 increased substantially, indicating an increasing research interest in sustainability and urban renewal. Table 1 shows the distribution of the 81 papers in the different journals.

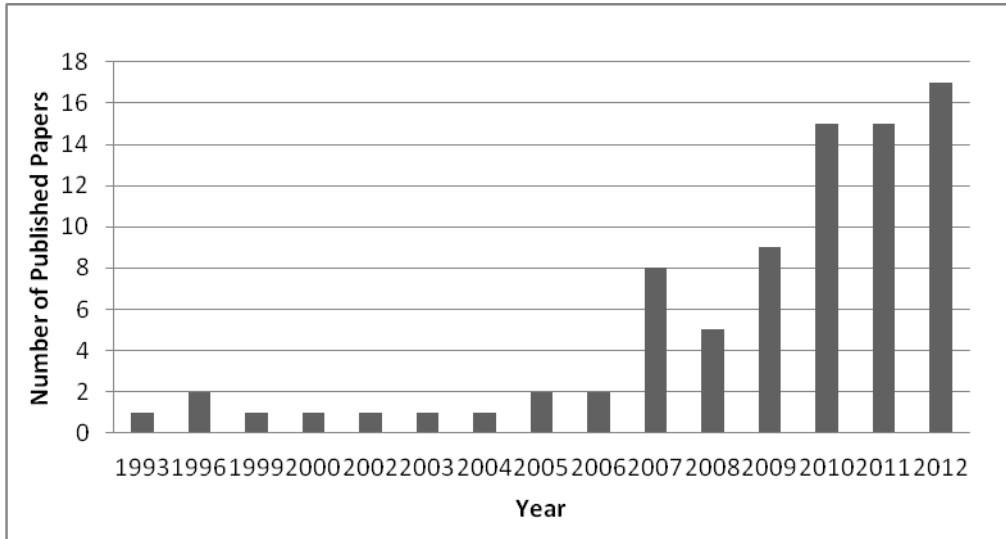


Figure 1 Number of relevant papers published yearly in the selected journals

Table 1 Overview of selected papers and the journals

JOURNAL TITLE	NUMBER OF SELECTED PAPERS
Proceedings of The Institution of Civil Engineers Engineering Sustainability	14
Urban Studies	10
Proceedings of The Institution of Civil Engineers Municipal Engineer	4
Cities	4
European Planning Studies	4
Environmental Planning A	3
Habitat International	3
Open House International	3
Sustainable Development	3
International Journal of Urban and Regional Research	2
Social Indicators Research	2
Amfiteatru Economic	1
Area	1
Building Research and Information	1
Business Strategy and The Environment	1
Community Development Journal	1
Energy Policy	1
Environment and Planning B Planning	1

Design	
Environment and Planning D Society Space	1
Environment and Urbanization	1
Geographical Review	1
Global Environmental Change Human and Policy Dimensions	1
International Journal of Strategic Property Management	1
International Journal of Sustainable Development and World Ecology	1
Journal of Asian Architecture and Building Engineering	1
Journal of Environmental Management	1
Journal of Environmental Planning and Management	1
Journal of Mountain Science	1
Landscape and Urban Planning	1
Journal of Urban Planning and Development ASCE	1
Management Decision	1
Nature Culture	1
Policy Studies	1
Progress in Planning	1
Public Money Management	1
Science in China Series E Technological Sciences	1
Technological and Economic Development of Economy	1
Tijdschrift Voor Economische En Sociale Geografie	1
Urban Geography	1
Zeitschrift Der Deutschen Gesellschaft Fur Geowissenschaften	1
Total	81

4. REVIEW OF STUDIES ON SUSTAINABLE URBAN RENEWAL

“Considering the city a spatial-constructional and social system, we may outline

two large sub-systems: town planning and social sub-system. While the town-planning sub-system includes all material elements of a city, including environmental factors that form the territorial structure, the social sub-system consists of the number of inhabitants as beneficiaries of the whole system.” (Ristea et al 2010, P103). The above statement shows that in order to achieve sustainable urban renewal in a city, addressing the two systems properly is the only approach. Studies relating to sustainable urban renewal cover a broad range of topics, many of which overlap and thus cannot be easily classified into a certain field. To gain a better understanding of the research area and to identify possible gaps in the knowledge base, this paper discusses the findings of recent studies based on the following structure: 1) planning sub-system in sustainable urban renewal; 2) stakeholders and their engagement; and 3) evaluating sustainable urban renewal. The first part involves material elements in the town planning sub-system. Figure 2 shows the planning subsystem in urban renewal. This subsystem involves various material elements including land, housing, infrastructure, heritage, and transportation. Urban design serves to address these complex issues for sustainable urban renewal. The second part discusses social sub-system in urban renewal. Figure 3 shows the various stakeholders involved, and how they contribute to the operation mechanism in urban renewal. The final part reviews the evaluation of urban renewal in terms of the two sub-systems.

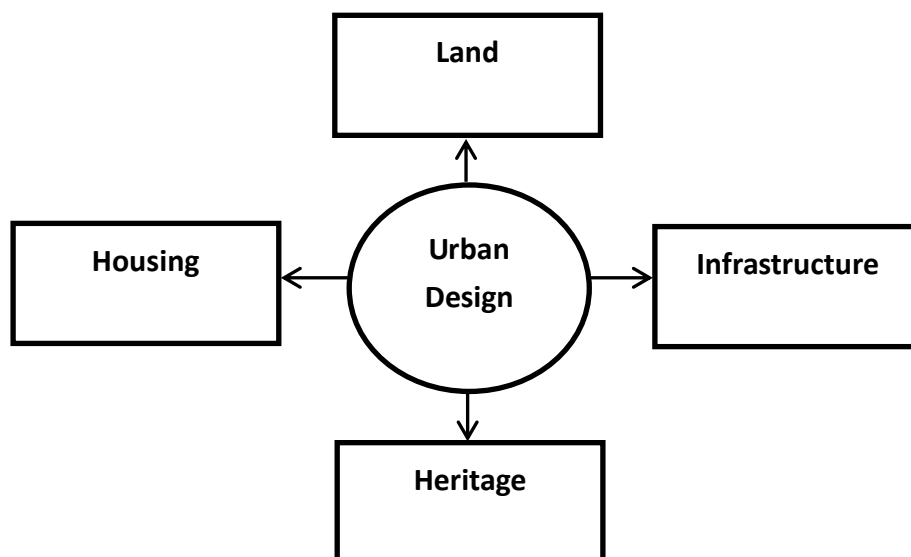


Figure 2 Planning sub-system in urban renewal

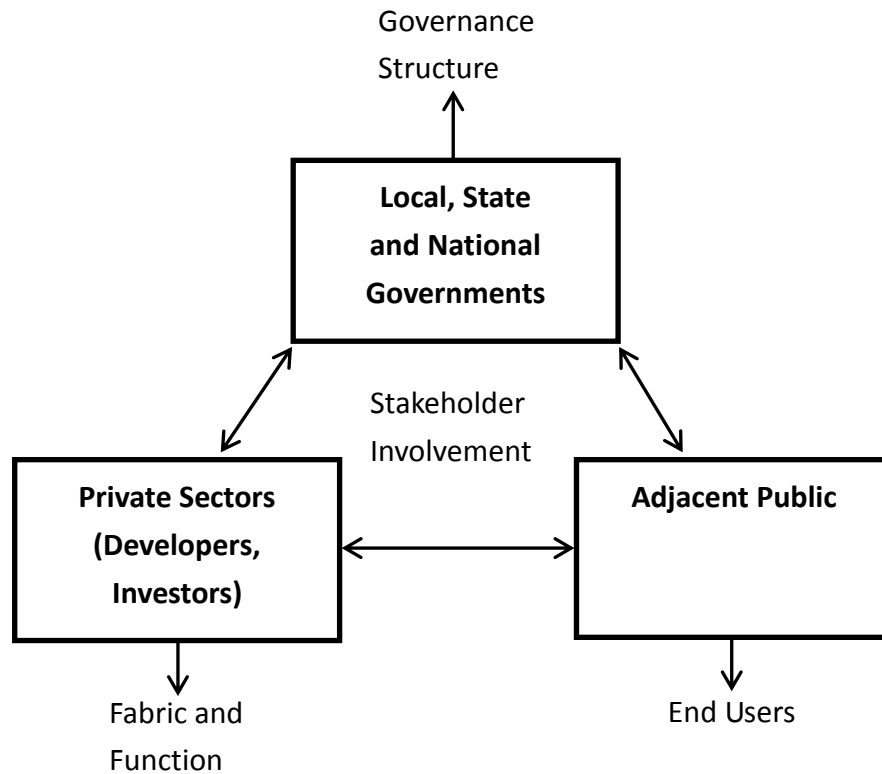


Figure 3 Social sub-system in urban renewal

Planning Sub-system in Sustainable Urban Renewal

Land

Sustainable land use is an important component of sustainable urban renewal because land redevelopment is a form of resource re-use and adaptive re-use is now considered a sound strategy in architectural conservation and urban regeneration (Mahtab-uz-Zaman, 2011). Urban refurbishment-led regeneration is regarded to be a cheaper, faster, less disruptive option compared with demolition and redevelopment (Turcu, 2012) and it has the potential to meet the demand for land resources. Of the papers reviewed, the need for urban rehabilitation and adaptive re-use is explored by using a number of cases from developing countries (Steinberg, 1996). Mahtab-uz-Zaman (2011) studied the adaptation of a residential building of Dhaka in order to understand the local adaptive re-use process, and from a holistic perspective, Power (2008) discussed social, economic and environmental benefits of refurbishment compared with demolition in the UK. Apart from the issue of adaptive re-use, Abu-Dayyeh (2006) finds that processes of land succession can contribute to the creation of opportunities for development and redevelopment by freeing a sizeable percentage of available land.

Housing

Housing policy and practice can have both a positive and negative effect on the sustainable development of urban areas (Winston, 2010). On one hand, housing is the home of residents and plays a crucial role in their quality of life and sense of well-being. On the other hand, various aspects of housing can have a significant negative impact on the environment and the eco-system (Winston, 2010). Although housing and regeneration have been relatively neglected topics, Garner (1996) discussed the role of housing and social housing in improving a city's competitiveness as well as the revitalization and reintegration of areas of economic and social exclusion in urban renewal, while Winston (2010) outlined the key characteristics of sustainable housing in terms of location, construction and design, use, and regeneration.

Infrastructure

Infrastructure is another necessary planning consideration for urban renewal. Provision of social infrastructure is assessed using a futures analysis in Lancaster. Equitable access for residents is necessary for delivering social benefits through provision of social infrastructure in urban regeneration areas (Brown & Barber, 2012). Mell (2009) addressed the planning of green infrastructure to promote human integration, ecological sustainability and economic regeneration in the UK. Green hubs were discussed, showing their potential to enhance community sustainability, cohesion and engagement in the UK context (Burrage, 2011). Commercial facilities were studied in Romania based on territorial disparities by using the "point method", which quantifies the equipment levels reached and makes space comparisons available (Ristea, Ioan-Franc, Stegaroiu, & Croitoru, 2010).

Culture and Heritage

Culture is one part of urban design considerations. Degen and Garcia (2012) explored the changing relationships between urban regeneration, the use of culture and modes of governance in the 'Barcelona model', which is a prominent cultural regeneration example, and concluded that culture has the potential to improve social cohesion and market the city's brand. Tweed and Sutherland (2007) outlined the broad contribution cultural heritage can make to sustainable urban regeneration and highlighted a survey that was conducted to assess people's perceptions of cultural heritage in urban regeneration. They suggested that planners should promote the importance of a better understanding of how

people interact with the urban environment and its heritage.

Urban Design

Urban renewal involves changes in the physical and functional aspects of cities as a response to urban design; it is a process of making decisions about the location and physical fabric of investment in the built environment and the adaptation of these decisions to functional and aesthetic ends (Couch, 1990). Urban design is a broad idea that addresses issues in planning sub-system for sustainable urban renewal. A series of studies focused on these issues for sustainable urban renewal in Hong Kong and identified critical factors for enhancing social, economic and environmental sustainability (Lee and Chan, 2008b; Chan and Lee, 2008a; Chan and Lee, 2008b).

Stakeholders and Community Involvement

Stakeholders

The various stakeholders in urban renewal projects include local, state, and national officials in both environmental and economic development departments, as well as those in the private sector, both institutional and individual, who seek to place capital, reduce risks, gain profits and enhance their reputation; in view of the possible impact on their health and quality of life, the public living in close proximity to urban renewal projects should also be included. The urban renewal policy, process and project implementation are greatly influenced by the relationship between these different stakeholders, the characteristics of different partnership modes, as well as the power, mechanism, and operation of different agents. Different stakeholders guide sustainability in different situations. Under some circumstances planners take a lead, while under others it may be the developers. It's important to remember that stakeholders do not have equal rights and powers in the renewal process.

Government plays the most important role in the governance structure of urban renewal, which directly influences the planning strategies involved. When studying sustainable urban renewal, some scholars pay attention to the governance structure. In the UK for example, the transition of the governance structure from a traditional hierarchical government to new forms of governance in was discussed and the Thames Gateway regeneration project was examined in terms of its institutional context and the relationship between traditional and new forms of planning. The analysis suggested that traditional forms of planning

still influence urban regeneration and gave causes for focusing on planning that can better achieve sustainable development (Greenwood & Newman, 2010). Using the same case, the Thames Gateway regeneration project, Brownill and Carpenter (2009) probed the relationship between an increasing emphasis on the integration of social, economic, democratic and environmental objectives within planning practice and the emergence of new forms of networked governance. Barber and Pareja Eastaway (2010) studied how planners and policy-makers in Birmingham (UK) and Barcelona (Spain) have tackled challenges in the creation of new urban districts. By examining this issue, they found that the institutional context within which leaders operate and exercise their roles in the regeneration process, as well as the prevailing planning culture, explained the different experiences in these two cities

Stakeholders in the private sector also contribute to the regeneration process. In most cases, private sector stakeholders are developers who invest in and build renewal projects and they greatly influence landscape and urban space, the supply and design of domestic space, and in turn, residents' lives (Kriese & Scholz, 2011). Additionally, the role of the private sector in property investment and financing is identified although their negative impacts are also discussed. In order to shed light on the specific role and responsibility of housing builders and investors in achieving sustainable urban regeneration, the evolution of sustainability positioning in residential property marketing was explored by Kriese and Scholz (2011). Bryson and Lombardi (2009) probed the activities of two UK-based property development companies that have integrated sustainability into their business models as a source of competitive advantage in response to an evolving sustainability agenda.

As end users of a renewal community, the residents are the ultimate stakeholders. Whether an urban renewal community is sustainable or not influences their daily life, while their behaviour and their preferences simultaneously have a significant impact on the decision-making of government and the private sector. Due to the importance of these stakeholders, some scholars have probed into this issue in various contexts. By exploring city centre residential redevelopments in the UK cities of Bristol and Swansea, Bromley et al. (2005) found the contribution of residents to sustainable urban regeneration. These residents are frequent shoppers, helping to sustain the local daytime economy; they walk to city centre attractions, and also to their places of work, showing reduced reliance on cars. On the basis of research in Manchester and Glasgow in the UK, the characteristics

of new residents, their reasons for choosing to live in the two districts, and their factors of satisfaction with the new place of residence were examined (Seo, 2002).

Community Involvement

In the current urban renewal context, social inclusion has become a crucial objective. When discussing achieving sustainable urban renewal, it is seemingly impossible to avoid the issue of 'community involvement' or 'public participation'. For example, by examining OECD member countries' urban regeneration policy and programmes, Fordham (1993) concluded that improved co-ordination of public programmes, the promotion of sustainable development, and the involvement of the local community are required for solving urban problems. Bagaen (2006) contrasted experiences of redeveloping former military sites in three countries by focusing on whether citizens participate to promote sustainability. The author concluded that in redeveloping military bases developers must look after the interests of all the parties involved when improving competitive advantages through revenue-generating activities. However, public participation does not necessarily gain support as it may fall into the dilemma of tokenism. Jones (2003) discussed whether participatory and partnership approaches have reached an impasse, by drawing upon the participation experience of the 'developing world' and the findings of a research project studying a major regeneration programme on Merseyside. To improve the participation of 'hard-to-reach' groups, Cinderby (2010) proposed an innovative participatory GIS methodology aimed at overcoming the barriers to engagement experienced by these groups. The application of the method was illustrated with reference to three case studies carried out in UK cities. Under the participatory context, partnership is one positive aspect for sustainable urban renewal. It is defined as "*a dynamic relationship amongst diverse actors, based on mutually agreed objectives, pursued through a shared understanding of the most rational division of labour based on the respective comparative advantages of each partner*" (Brinkerhoff, 2002, P21). The function and relationships of partnership within a group of institutions that comprise the Catholic Church development chain was found to be 'patchy' at all levels (Morse & McNamara, 2009). Therefore, how to improve partnerships, which is expected to solve multi-faceted problems and also to bring sufficient resources to the development in urban renewal, remains a challenge.

Evaluation of Sustainable Urban Renewal

From a policy perspective it is widely agreed that early, persistent and rigorous evaluation of regeneration initiatives is important, since existing programmes can be improved or be terminated (Hemphill, Berry, & McGreal, 2004). From the perspective of achieving the most sustainable outcomes, it would be ideal to monitor the urban regeneration process throughout its lifecycle for developing more practical strategies (Cahantimur, Ozturk, & Ozturk, 2010). In summary, evaluation of sustainable urban renewal can help stakeholders to improve their strategies or solutions for attaining sustainable urban renewal.

Three Aspects of Sustainable Urban Renewal

Since both sustainability and urban renewal surround social, economic and environmental aspects, the evaluation of sustainable urban renewal must be grounded on these three pillars. Some researchers focus only on social and economic aspects. For example, Baeing and Wong (2012) examined the impact of an urban residential brownfield development in the most impoverished areas of England by evaluating their changing housing markets, residential density, population growth and economic deprivation. In the older parts of Sydney, housing, household and housing investment characteristics and trends were explored by applying socio-demographic and development application data (Randolph & Freestone, 2012).

A small number of papers deal with the environmental impacts of urban renewal areas or programmes. Collier (2011) discussed how long-term changes through regeneration projects in Greater Manchester, England, may have been impacted by local weather and air quality. Similarly, the impacts of a proposed development on air quality are assessed in a 6.6 ha case study in Lancaster, UK (Pugh et al., 2012). The environmental impacts of maintenance, consolidation, transformation, and redevelopment for two typical cases of urban renewal in the Netherlands were compared by using the Life Cycle Assessment method (Itard & Klunder, 2007).

From a holistic perspective, Turcu (2012) discussed impacts at the local level in the UK, by probing into three neighbourhoods and looking at six aspects: housing and the built environment; economy and jobs; local communities; use of resources; local services; and facilities. In the Budapest region, sustainability of property development in urban regeneration was evaluated in terms of physical, social and economic aspects (Kauko, 2012).

Approaches for Evaluating Sustainable Urban Renewal

Urban renewal evaluation is increasingly following an indicator-based approach, since there is a consensus that Indicators can contribute to assessing the combined performance of individual agencies/interventions, the overall effectiveness of partnerships to improve economic well-being, and the cost-effectiveness of the main regeneration activities (Hemphill, Berry, & McGreal, 2004). Although there are many sets of indicators or frameworks, there is no agreement on the application of this approach. The indicator-based ways of evaluating urban renewal include qualitative discussion and quantitative assessment. On a city scale, the key characteristics of sustainable housing, including location, construction and design, use, and regeneration, have been used to assess housing and regeneration in Dublin since the early 1980s (Winston, 2010). Based on the principles of encouraging participation, building community character, advancing equity, improving the environment and enlivening the economy, Ng (2005) developed quality of life indicators for assessing sustainable urban regeneration in Hong Kong. A large number of papers focus on the district level through an indicator-based approach or assessment framework (Berg, Eriksson, & Granvik, 2010; Boyko et al., 2012; Cahantimur et al., 2010; Cheng & Lin, 2011; Wedding & Crawford-Brown, 2007; Williams & Dair, 2007; Hemphill, Berry, & McGreal, 2004; Hemphill, McGreal, & Berry, 2004), but the selection of factors in each is different. For example, Hemphill et al. (2004) developed an approach to measure the performance of regeneration by using indicators relating to the economy and work, resource use, buildings and land use, transport and mobility, and community benefits. They applied this approach to several case areas using sensitivity analysis. Forty indicators of successful brownfield redevelopments and corresponding weightings were proposed to stakeholders for reference. These indicators involve four categories: environment-health, finance, liveability and social-economic (Wedding & Crawford-Brown, 2007). In addition, Williams and Dair (2007) presented a framework for assessing the sustainability of brownfield developments that includes identifying the stakeholders in land reuse and assessing sustainability objectives to be achieved on reused sites.

Urban planning follows the path of evaluating current performance, predicting the future and then proposing corresponding solutions. Thus it is common that future-based approaches are also applied to evaluate urban renewal in the selected papers. Future scenarios have not been applied in much depth, yet have the potential to be a helpful approach to thoroughly scrutinize existing and

potential plans, and then provide valuable insight for decision-making in connection with sustainable development. For instance, a strategy of balancing the supply and demand of water resources at local level based on a proposed urban regeneration site in north west England was assessed through four future scenarios, which gave clues as to how current 'sustainable solutions' might cope whatever the future holds (Farmani et al., 2012). Scenarios are sometimes combined with indicator-based ways. *Urban Future*, a toolkit developed in the UK context, is to facilitate the evaluation of urban renewal performance. The toolkit comprises a series of indicators and a list of characteristics that describe four future scenarios (Boyko et al., 2012). Caputo et al. (2012) applied this toolkit in assessing three energy conservation strategies for a flagship regeneration project. The analysis showed that each one of these solutions could be vulnerable to unpredicted future events and the conclusion gave insight for improvements required today. This toolkit was also used for assessing the sustainability of sub-surface environments (including infrastructure and utilities) through cases in the UK (Hunt, Jefferson, & Rogers, 2011).

5. DISCUSSION

The above review of recent studies on sustainable urban renewal provides insights into the complexity of urban renewal. Figure 4 shows this complexity along with the path for realizing sustainable urban renewal. There are planning sub-system and social sub-system involved in the urban renewal process. These planning issues and relating stakeholders closely interact with each other. Only by scrutinizing the complexity of this interaction, as well as evaluating the past, present and future situation of urban renewal, can solutions and strategies for sustainable urban renewal be proposed. As academics are expected to contribute to such proposals, this section discusses some possible research directions.

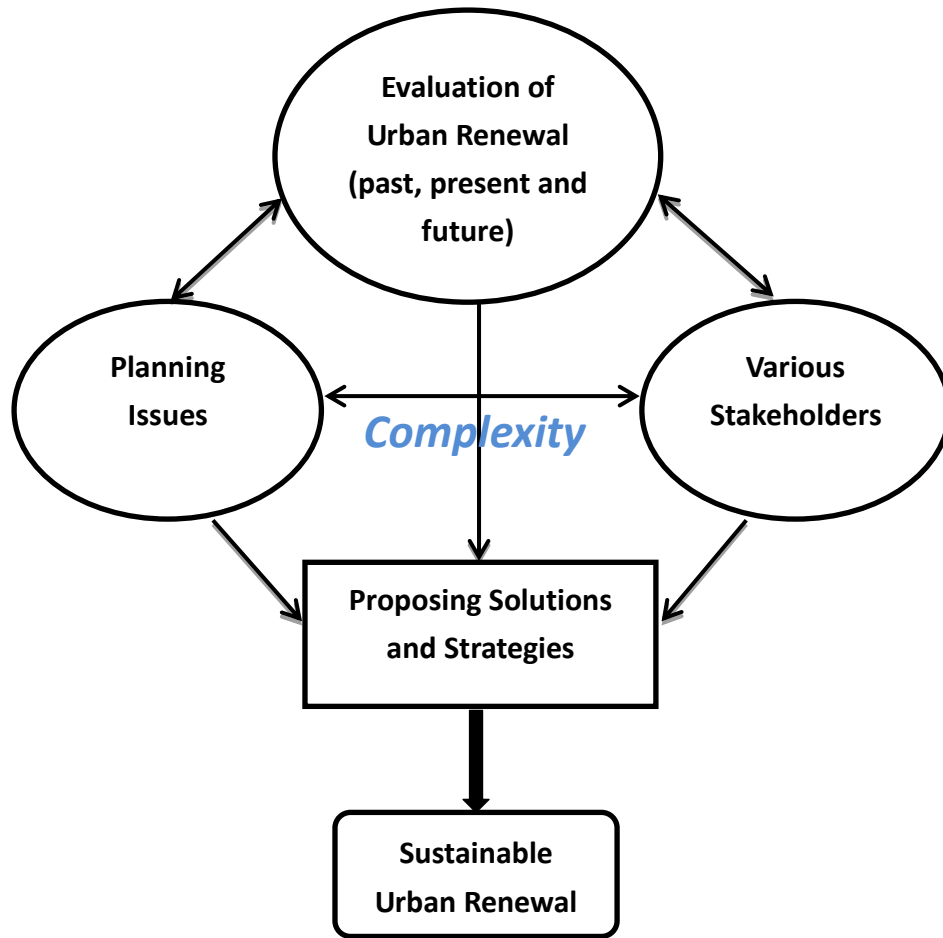


Figure 4 Path to Sustainable Urban Renewal

Planning Sub-System in Sustainable Urban Renewal

Land, as one of the most important elements in natural systems, is the basis for development. Due to its particular characteristics, meeting the demand for sufficient land supply is an on-going challenge. In addition to applying brownfield redevelopment and adaptive re-use to address this challenge, future research should probe existing mechanisms to seek more useful approaches. Additionally, the question of how to perfect land use in urban renewal is still waiting for an answer. Future research should explore how to realize sustainable housing in urban renewal. Specifically, urban image, culture, public facilities and other elements should be studied in terms of their function and relationships to one another and with sustainable urban renewal. Urban design directly decides the physical fabric and aesthetic appearance in urban renewal areas. Chan and Lee (2008) provided urban design considerations and key design factors for sustainable urban renewal of Hong Kong from a holistic perspective. This framework provides insights for other contexts. In future, scholars can refer to

this framework and develop an adaptive framework for other regions. In summary, the contribution of every element in the planning sub-system, how they interact with each, and their relationships with sustainable development must be studied broadly and deeply to understand the mechanism of the planning sub-system in urban renewal.

Stakeholders in Urban Renewal

Sustainability means different things to different stakeholders and members of the public (Kriese & Scholz, 2011). Future research should continue exploring their behaviour in other cases of urban renewal in order to provide insights for sustainable urban renewal. Research into more effective governance structures to facilitate urban renewal and how to improve the positive role of private agents are particularly meaningful issues. The relationship between different stakeholders is also a valuable area for future research and is a topic that has been seldom touched upon. Little attention has also been given, at both national policy and neighbourhood levels, to working productively and politically with vulnerable ethnic and gender groups in urban regeneration agendas (Beebeejaun & Grimshaw, 2011); the importance of community engagement has been highlighted in recent years, but only discussed in general terms. Future research should explore the mechanism behind community engagement and answer the question of how to enhance public participation.

Evaluation of Sustainable Urban Renewal

The importance of evaluating sustainability in urban renewal has been recognized by many researchers. Evaluation can provide stakeholders with the current problems and facilitate the prediction of future trends in order to work out better strategies for sustainable urban renewal. Current research mainly focuses on social and economic evaluation of urban renewal. It is therefore suggested that future case studies should conduct a more holistic evaluation by balancing social, economic and environmental aspects.

In terms of evaluation approaches, the indicator-based approach has attracted the most attention, since indicators provide a platform for clarifying major urban problems and identifying regional differences and priorities (Hemphill et al., 2004). However, the approach needs to be refined in several ways. Firstly, since application of the indicator-based approach emphasizes the local context of each urban renewal project (Williams & Dair, 2007; Berg et al., 2010), more cases should be studied in order to develop indicators according to local characteristics.

Secondly, although expert surveys are useful for developing indicators or their relative weightings to some extent, Wedding and Crawford-Brown (2007) argued that expert evaluation may be unreasonably subjective and that more objective measures are required for establishing an indicator-based framework. Thirdly, there is a tendency for quantitative factors to receive the most attention while less quantitative but equally important areas of concern are ignored (Wedding, 2007). Both qualitative and quantitative factors must be regarded equally in future research.

Urban renewal processes and sustainable development share temporal and spatial perspectives. Both are concerned with future scenarios, which are recognized as a helpful tool to facilitate thinking about and visualizing the future (Boyko et al., 2012), as well as scrutinizing existing plans and potential alternatives (Buegl, Stauffacher, Kriese, Pollheimer, & Scholz, 2012). It is suggested that this future-based method be applied more in the future with scientific support to help navigate a better development track (Buegl et al., 2012). Scenarios should be integrated into decision support systems for better utilizing the benefits from such systems, just like GIS-based decision support systems. Scenario development should also take account of nuanced local features.

6. CONCLUSIONS

This paper reviews popular research issues in relation to sustainable urban renewal. The 81 selected papers were discussed from the aspects of the planning sub-system in sustainable urban renewal, the social sub-system in urban renewal, and evaluation of sustainable urban renewal in terms of the two sub-systems. Although a growing body of research covers the areas mentioned above, the mechanism for achieving sustainable urban renewal has yet to be clarified. The discussion part of the paper identified the future research trends, which can be read as a road map for researchers exploring the field of sustainable urban renewal. The function of different planning elements as well as the role of various stakeholders and their interrelationship, are important topics in need of clarification. Research on evaluation of sustainable urban renewal still has some gaps as most studies focus only on one or two aspects of sustainable urban renewal. To better evaluate urban renewal, more comprehensive perspectives and more objective methods should be employed in future research.

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