

This article was downloaded by: [University Of Surrey]

On: 15 July 2013, At: 03:29

Publisher: Taylor & Francis

Informa Ltd Registered in England and Wales Registered Number: 1072954 Registered office: Mortimer House, 37-41 Mortimer Street, London W1T 3JH, UK



Architectural Engineering and Design Management

Publication details, including instructions for authors and subscription information:

<http://www.tandfonline.com/loi/taem20>

A proposed model for sustainable urban planning development for environmentally friendly communities

Ali AlQahtany^a, Yacine Rezgui^b & Haijiang Li^c

^a Cardiff School of Engineering, Cardiff University, Queen's Buildings, The Parade, Cardiff, CF24 3AA, Wales, UK

^b Engineering Informatics, Director BRE Institute in Sustainable Engineering School of Engineering, Cardiff University, Wales, UK

^c Teaching and Research, Computing in AEC & Structural Applications ACE Year 3 Tutor, BRE Institute in Sustainable Engineering School of Engineering, Cardiff University, Wales, UK
Published online: 02 Nov 2012.

To cite this article: Architectural Engineering and Design Management (2012): A proposed model for sustainable urban planning development for environmentally friendly communities, Architectural Engineering and Design Management, DOI: 10.1080/17452007.2012.738042

To link to this article: <http://dx.doi.org/10.1080/17452007.2012.738042>

PLEASE SCROLL DOWN FOR ARTICLE

Taylor & Francis makes every effort to ensure the accuracy of all the information (the "Content") contained in the publications on our platform. However, Taylor & Francis, our agents, and our licensors make no representations or warranties whatsoever as to the accuracy, completeness, or suitability for any purpose of the Content. Any opinions and views expressed in this publication are the opinions and views of the authors, and are not the views of or endorsed by Taylor & Francis. The accuracy of the Content should not be relied upon and should be independently verified with primary sources of information. Taylor and Francis shall not be liable for any losses, actions, claims, proceedings, demands, costs, expenses, damages, and other liabilities whatsoever or howsoever caused arising directly or indirectly in connection with, in relation to or arising out of the use of the Content.

This article may be used for research, teaching, and private study purposes. Any substantial or systematic reproduction, redistribution, reselling, loan, sub-licensing, systematic supply, or distribution in any form to anyone is expressly forbidden. Terms &

Conditions of access and use can be found at <http://www.tandfonline.com/page/terms-and-conditions>

A proposed model for sustainable urban planning development for environmentally friendly communities

Ali AlQahtany^{a*}, Yacine Rezgui^b and Haijiang Li^c

^aCardiff School of Engineering, Cardiff University, Queen's Buildings, The Parade, Cardiff, CF24 3AA, Wales, UK; ^bEngineering Informatics, Director BRE Institute in Sustainable Engineering School of Engineering, Cardiff University, Wales, UK; ^cTeaching and Research, Computing in AEC & Structural Applications ACE Year 3 Tutor, BRE Institute in Sustainable Engineering School of Engineering, Cardiff University, Wales, UK

(Received 23 February 2012; final version received 11 May 2012)

The purpose of this study is to shed light on the importance of sustainable urban planning development for communities and give a comprehensive review of key issues in terms of underpinning concepts, principles and challenges. The study will focus on a number of aspects related to the built environment, neighbourhoods and services, including the infrastructure, and public transport. Moreover, it aims to critically evaluate the most common and established frameworks of sustainable urban communities. Limitations of these frameworks are discussed, including regional variations. These are factored in a new approach for sustainable communities. The contribution of this research is to propose a scalable framework for an effective sustainable urban planning development for communities that address the gaps and the limitations of the existing models. This takes into account the core issues of urban communities including environmental, social, economic and planning perspectives.

Keywords: sustainability; urban planning; sustainable urban planning development; sustainable urban communities

1. Introduction

In the last few decades, there has been an increasing interest in the field of sustainable urban planning development and it is in constant mutation across the world. The reason for this is that during the last century the world has witnessed many social, economic and urban changes. In the second half of the twentieth century, the urban population of the world increased nearly four-fold, from 732 million in 1950 to 2.8 billion in 2000 and to more than 3.2 billion in 2006 (Redman, 2010; United Nations, 2006). The year 2007 marked a turning point in human history where half of the population of the world was living in cities (CITIES ALLIANCE, 2007). This growth has caused a lot of pressure on many of the available resources and has contributed to the exhaustion of environmental and natural resources.

Therefore, the significance of the subject of sustainability in general, and in particular on sustainable urban planning in communities, has emerged as one of the key issues that must be taken into account by the relevant authorities and experts. Marsden and Rezgui (2010) state that the

*Corresponding author. Email: alqahtany-ali@hotmail.com

twenty-first century is characterised by a number of significant and severe global environmental challenges, with real and potential risks to our natural and built environment, including global climate change, increasing population and population density, increasing resource scarcity and both traditional and asymmetric forms of conflict. In the same context, at present, there are many areas that have witnessed a marked change in their own style and quality of use. These factors without doubt increase the challenges facing sustainable urban planning development currently and in the future.

The purpose of this article is to give a comprehensive review and a better understanding of the concepts of sustainable urban planning development. Moreover, it aims to critically discuss the most common frameworks of sustainable development at urban planning scale, which are internationally recognised such as Comprehensive Assessment System for Building Environmental Efficiency for Urban Development (CASBEE-UD), Building Research Establishment Environmental Assessment Method (BREEAM) Communities and Leadership in Energy and Environmental Design for Neighbourhood Development (LEED-ND). The justifications of the selection of these three frameworks will be provided within this article. The purpose of this discussion is to reach the limitations of these frameworks and find out the gaps in these models. Finally, a framework for an effective sustainable urban planning development is proposed highlighting key dimensions, categories and criteria of this model.

The paper first provides a review of sustainable urban planning research. This is followed by a discussion on the most common frameworks. Then, it will propose a framework for an effective sustainable urban planning development that will be followed by the conclusion and future work.

2. Review of sustainable urban planning related research

In recent years, sustainable development and urban planning concepts have been in constant mutation across the world and are becoming more and more in demand. In fact, they have evolved throughout the twentieth century, and this evolution lead to a great variety of urban forms that often had little regard for their impact upon the environment (Ardeshiri, 2010). According to United Nations Human Settlements Programme (2009), definitions of urban planning have changed over time. For instance, earlier views defined urban planning as physical design, enforced through the control of the land-use and centred in the state. It also defined it as a multi-disciplinary and comprehensive framework that aims to balance the regional development and physical organisation of space in accordance with an overall strategy (He et al., 2011).

Healey (2004) highlights that urban planning development can be seen as a self-conscious collective effort to imagine or re-imagine the city or urban region and translate the result into priorities for area investment, new settlement areas, strategic infrastructure investments and regulation principles of land-use. It is considered as a traditional tool for connecting different aspects and fostering interaction among sectorial experts and the local community. Vanessa (2009) points out that urban planning in every part of the world is essentially formed and influenced by the context in which it functions, as well as taking into account the local conditions. In many parts of the world urban planning systems have imposed or borrowed from somewhere else, in some cases these foreign ideas have not changed considerably since they were imported (UN-HABITAT, 2009).

Currently, there have been wide-ranging discussions about the relationship between urban planning and sustainable development (He et al., 2011). For instance, the concept of sustainable development has emerged over the past few decades as a new requirement for urban and metropolitan-level public action that involves conceptual principles and practices as applied to land-use and urban planning (EUE, 2009). Also, the 1987 Brundtland Commission and its report, *Our Common Future*, placed the issue of sustainable development at the core of urban policy and

planning concerns (Vanessa, 2009). According to United Nations (2004), sustainability in urban planning development has become a critical issue due to the high levels of urbanisation in almost all parts of the world. Sustainable City Conference, held in Rio de Janeiro in 2000, pointed out that the concept of sustainable development, as applied to a city, can be defined as the ability of the urban area to reach the level of the life quality that is required by the community without affecting the needs of the present and future generations and causing adverse impacts inside and outside the urban boundary (Wallbaum, Krank, & Teloh, 2011).

Undoubtedly, sustainable urban planning development requires a comprehensive analysis that takes into account all the expected impacts and strives for development in terms of increase in the quality rather than the quantity and avoids ecological risks such as fossil fuel depletion, habitat loss and climate change (Litman, 2011). Therefore, people are increasingly realising the importance of this development that will eliminate or minimise these risks and problems (Jenny, 2006; Shearer et al., 2006). Also, many countries have already enacted strategies to promote urban sustainable development (Bolund & Hunhammar, 1999; Costanza et al., 1997, Diamantini & Zanon, 2000).

A number of studies (DEFRA, 2011; EUE, 2009; Sorensen, 2004; UN-HABITAT, 2010), have found that sustainable urban planning development has a number of core principles that must be taken into account and understood in order to achieve the desired objectives. These principles should cover many of the key elements for sustainable urban planning, which include cultures, populations, urban form, infrastructures, transports, safety and environmental factors. Proper urban planning is an essential tool to make cities inclusive, environmentally friendly, economically vibrant, culturally meaningful and safe for all; however, to be successful in helping to achieve sustainable urban planning development, there are a number of principles that must be followed (UN-HABITAT, 2010).

The Global Planners Network (2009) has laid a number of principles for new sustainable urban planning development. These can be summarised in four issues. Firstly, it should promote both sustainable development and market responsiveness. Secondly, it needs to achieve integrated planning and develop appropriate planning tools. Thirdly, it needs to be planned with partners and finally it should take into account the variation of the culture and local conditions. Moreover, the Global Report (UN-HABITAT, 2009) argues that future urban planning must take place with an understanding of the factors shaping twenty-first-century cities. These factors include the environmental challenges of climate change, increase socio-spatial and social and spatial inequalities and the economic challenges.

3. Models for sustainable urban communities

As a result of the emergence of such critical global issues as the phenomena of urbanisation and climate change, more attention is being paid to sustainability topics and in particular to sustainable urban communities issues. It has become an important process due to the wide range of involved aspects including environmental degradation, resource depletion and socio-economic issues (Uwasu & Yabar, 2011). Furthermore, the characteristics of urban areas in different parts of the world, including environmental, social and economic aspects, make any such process more difficult. Over the past few decades, numerous sustainable development frameworks and tools have been developed for the urban areas to improve the quality of life of the citizens and protect the environment. Most of these tools and frameworks have been widely discussed and have been presented in the proceedings of several international conferences across the world (Grace, 2000; Hansen, 2005; Petersen & Beat, 2002). In the same context, there are several national frameworks for sustainable development and urban communities,

which are developed for a specific urban area or project (Appu, 2012; Tanguay, Rajaonson, Lefebvre, & Lanoie, 2010).

However, in order to achieve the aim of this paper, designing a framework for effective sustainable urban communities, this study focuses on the most common frameworks and models that are known at international level and deal with neighbourhoods and communities issues. For this reason and during the review of literature, this research found that there are three of the most popular frameworks for developing sustainable urban communities, which are internationally well known and agreed by a number of researchers and studies. These models are CASBEE-UD, BREEAM Communities and LEED-ND. According to Appu (2012), currently, the focus is on developing assessment tools and frameworks for sustainability and urban development such as BREEAM for Sustainable Communities from the UK, CASBEE-UD from Japan and LEED-ND from the US. At the same time, these methods have been used in many academic articles to discuss several key issues that are related to sustainable urban planning development (Ali & Al Nsairat, 2009; Assefa et al., 2005; Grace, 2008; San-José, Losada, Cuadrado, & Garucho, 2007).

BREEAM, LEED and CASBEE are the main existing methods for assessing the building environment as well as sustainable development (Kawazu, Shimada, Yokoo, & Oka, 2005). Rivera (2009) points out that LEED and BREEAM have both become the national standard in their respective countries, becoming an integral part of the design and construction process. He also added that numerous government bodies have already mandated these two frameworks into development and planning processes, for example, London may soon require all major developments to achieve BREEAM certification. In the same context, Crawley and Aho (1999) point out that BREEAM is considered as the first real attempt to create comprehensive means of simultaneously assessing a broad range of environmental considerations.

Substantially, these three models have been chosen due to their globally good reputation and because they are also considered to be the most widely recognised methods for building environment, which are used worldwide in sustainable urban planning development. For example, BREEAM is the leading and most widely used environmental assessment method and rating system for buildings, with 200,000 buildings with certified BREEAM assessment ratings and over a million registered for assessment since it was first launched in 1990 (BRE GLOBAL, 2010). They have also been chosen because of the constant reference to them in many academic papers (Appu, 2012; Fowler & Rauch, 2006; Grace, 2000; Haapio & Viitaniemi, 2008a; Tanguay et al., 2010) where they are mentioned as the most important models for city sustainable development.

The following sections aim to shed light on the most important key issues of these frameworks including their concepts, aims and features. Then, discuss with more detail the similarities and differences between them in order to take advantage of these frameworks in respect of creating an effective sustainable urban planning development model, which is the main purpose of this research.

3.1. BREEAM for sustainable communities

BREEAM was the first commercially available environmental assessment method for buildings, established by the Building Research Establishment Ltd in the UK in 1990 (Grace, 2000). BREEAM model for creating sustainable communities is based on the established BREEAM methodology and focuses on mitigating the overall impact of development projects within the built environment (Haapio & Viitaniemi, 2008a). It aims to enable all the stakeholders to determine the extent to which the key issues of the sustainable development requirements are met within the urban areas (BRE GLOBAL LTD, 2009). In BREEAM for sustainable communities framework, there are eight key categories and each one of these categories has a number of

assessment criteria (Appu, 2012; BRE GLOBAL LTD, 2009). These categories are climate change and energy, community, place shaping, building, transport, ecology, resources and business.

3.2. CASBEE-UD

CASBEE is a joint research and development project of Japanese government, industry and academia (Institute for Building Environment and Energy Conservation, 2007). CASBEE-UD is an environmental performance assessment method for whole urban area by focusing on the phenomena that can accompany the conglomeration of buildings and the outside areas (CASBEE, 2007). It is used as a tool and framework to support the planning of the city with a view to sustainable urban development.

The framework was developed in 2006 to assess the environmental efficiency of planned projects consisting of multiple buildings and public areas (Murakami et al., 2011). According to Appu (2012), CASBEE-UD focuses on the assessment of urban areas, the phenomena of conglomeration of buildings and the outdoors spaces. It has six main categories and each one has a number of assessment points (CASBEE, 2007). The first three are related to environmental quality in urban development and the others are related to load reduction in urban development (LRUD) (CASBEE, 2007).

3.3. LEED for neighbourhood development

LEED-ND is developed by the US Green Building Council in partnership with the Congress for the New Urbanism and the Natural Resources Defense Council for national use and emphasises environmental considerations and land-use in the US (USGBC, 2011). It is primarily aimed at improving neighbourhood design, land-use patterns and technology in the US (USGBC, 2005). LEED-ND promotes best practices in location, design and development at the neighbourhood scale (LEED, 2009).

It aims to focus beyond the building level and evaluate whole neighbourhoods or multi-building projects that contribute to neighbourhoods and prioritise criteria such as site location, urban design and transportation (Welch, Benfield, & Raimi, 2010). As is the case with both BREEAM Sustainable Communities and CASBEE-UD, LEED-ND framework also has a number of categories. It has three main categories and two additional categories (USGBC, 2011). The main categories are smart location and linkage, neighbourhood pattern and design and green infrastructure, whereas the additional categories are innovation and design process and regional priority credit.

4. Critiques on the models of sustainable urban communities

Many organisations and countries around the world have developed sustainable urban development frameworks to lead their urbanisation process towards a desired position of urban sustainability (Cao & Li, 2011). There is no doubt that these frameworks have been developed for different types of needs and purposes and there are a number of similarities and differences between them, but by and large for achieving sustainable urban planning development. Haapio and Viitaniemi (2008a) claim that BREEAM for Sustainable Communities, CASBEE-UD and LEED-ND vary to a great extent. However, in this paper, it is argued that because the technical manuals of these frameworks were published recently, the number of scientific research analysing them is limited, which makes the comparison of these models more problematic.

Therefore, the main purpose of this section is to look at each one of these frameworks and then discuss and analyse the most important findings that have been reached during the review of these

three frameworks. Moreover, understanding the similarities and differences between them in order to consider the possibility of adopting these models in different parts of the world, as well as take the advantages of them in respect of creating a new effective sustainable urban planning development model. This discussion and analysis will focus on the essential results that revolve around six key points. These are categories and criteria (Appu, 2012), regional variations (Fowler & Rauch, 2006; Rivera, 2009), management aspects (Tam, Tam, & Tsui, 2004), financial issues (Grace, 2008), distribution of responsibilities (Lockwood, 2004; Said, Osman, Shafiei, Rashideh, & Kooi, 2009) and finally the local context issue (Kyrkou, Taylor, Pelsmakers, & Karthaus, 2011; United Nations, 2004).

4.1. Categories and criteria

The main categories and criteria of these frameworks are presented in Table 1. It can be seen that BREEAM has eight categories with 62 criteria, CASBEE presented with six categories with 80

Table 1. Categories and the number of criteria of the three city sustainable development frameworks.

BREEAM Communities	CASBEE-UD	LEED-ND
<i>Climate and energy (11 criteria)</i> , focuses on built form mitigation and adaptation issues	<i>QUD1</i> – Natural environment (microclimates and ecosystems) (17 criteria)	<i>Smart location and linkage (14 criteria)</i> – focuses on protected areas, populations and development
<i>Community (four criteria)</i> , addresses consultation processes and local community involvement	<i>QUD2</i> – Service functions for the designated area (15 criteria)	<i>Neighbourhood pattern and design (18 criteria)</i> – emphasises public transportation and land-use development
<i>Place shaping (15 criteria)</i> , focuses on land-use, open space, mix of use in addition to form of development	<i>QUD3</i> – Contribution to the local community (history, culture, scenery and revitalization) (seven criteria)	<i>Green infrastructure and buildings (21 criteria)</i> – addresses environmental impact, energy and water efficiency
<i>Buildings (three criteria)</i> , addresses overall sustainability performance of buildings	<i>LRUD1</i> – environmental impact on microclimates, façades and landscape (16 criteria)	<i>Innovation and design process (two criteria)</i> – focuses on innovation and exemplary performance
<i>Transportation (14 criteria)</i> , focuses on sustainable transport options	<i>LRUD2</i> – Social infrastructure (14 criteria)	<i>Regional priority credit (one criteria)</i> – addresses regional priority
<i>Ecology (four criteria)</i> , addresses protection of the ecological value of the site	<i>LRUD3</i> – management of the local environment (13 criteria)	
<i>Resources (six criteria)</i> , addresses sustainable use of resources		
<i>Business (five criteria)</i> , emphasizes local and regional economic issues		
<i>Eight main categories 62 criteria (BRE GLOBAL LTD, 2009)</i>	<i>Six main categories 82 criteria (CASBEE, 2007)</i>	<i>Three main categories and two additional 56 criteria (USGBC, 2011)</i>

QUD, quality in urban development.

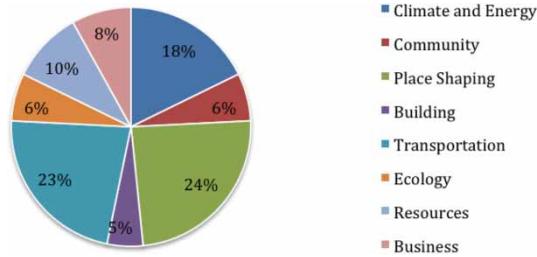


Figure 1. The main categories of BREEAM Communities.

criteria in total, whereas LEED has three main categories and two additional categories with 56 criteria in total including the criteria of the two additional categories.

However, by looking at Figure 1 it can be seen that BREEAM Communities places more emphasis on both place shaping (with 15 criteria) and transportation (with 14 criteria). On the other hand, it places less emphasis on buildings and business as well as the community side, which is considered as one of the most important issues to achieve sustainable urban planning development as mentioned earlier.

CASBEE-UD on the other hand, considered natural environment, which covers a number of issues such as ecosystems and natural resources, as the most significant categories (see Figure 2). Moreover, it mentions transportation as sub-category under service functions for the designated area, but not as BREEAM Communities as mentioned earlier. However, in the LEED-ND framework the most significant two are green infrastructure and buildings as shown in Figure 3. These two categories cover a number of issues including energy, water and infrastructure.

Ali and Al Nsairat (2009) point out that BREEAM considers transport as a main category and gives this category high credits, on the other hand LEED includes transport within the major aspects of its assessment and does not give much importance. However, in terms of evaluating the criteria, Appu (2012) points out that in BREEAM Communities and CASBEE-UD the criteria

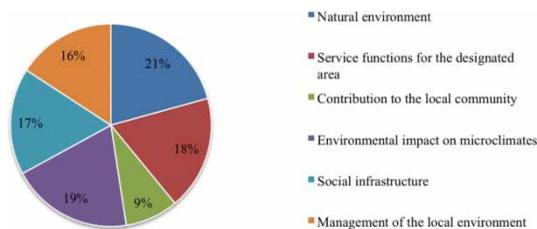


Figure 2. The main categories of CASBEE-UD.

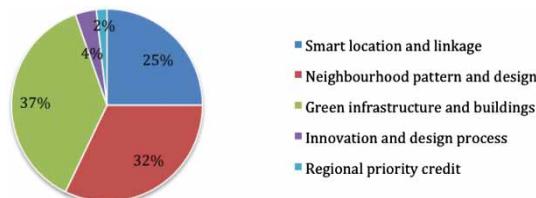


Figure 3. The main categories of LEED-ND.

are equal. In the same context, BREEAM Communities values criteria from one to three points and CASBEE-UD uses a five-step scale based on the ration of achieved and maximum points, whereas in LEED-ND, the criteria are not equal and are evaluated differently; some of them are worth 10 points, and others only one point.

4.2. Regional variations

As mentioned previously, these three frameworks come from different countries and have been developed for different aims and needs. For this reason, some of the scientific articles argue that these methods could be suitable for these particular countries more than others. For example, Appu (2012), indicates that CASBEE-UD emphasises the characteristics of Japan and Asia, whereas LEED-ND is strongly directed to the North American market area. In addition, he points out that BREEAM Communities could be applied to urban areas across the world but with the use of compliant assessment methodologies.

According to Rivera (2009) all the projects, which use LEED framework, must follow the US recognised standards and criteria (e.g. ASHRAE and Imperial Units), regardless of where these projects are located. This without doubt is one of the most common difficulties facing the use of such as frameworks due to the differences in the regulations and standards in different parts of the world which are unlikely to be familiar with the standards of the US, the UK or Japan (Kyrkou et al., 2011). Fowler and Rauch (2006) point out that CASBEE is a relatively new framework, which has been developed for the Japanese market that is available in English, but has not been tested in the US.

Grace (2008) claims that most of the city sustainable development frameworks have been developed to service the local use and do not allow for national, regional or international variations. However, regional, cultural and social variations are considered as complex issues and boundaries that are difficult to define. These variations include differences in the level of income, climatic conditions, techniques and building materials in addition to appreciation of historic value (Kohler, 1999). For example, although most of the sustainable urban development and design profession are aware of BREEAM framework and have used it as their development basis, this is not recognised by the US professionals nor used in this field (Fowler & Rauch, 2006).

In fact, a number of countries have used the BREEAM frameworks for their own use giving rise to have new framework, for example, HK-BEAM, adjustments to customise the system include environmental, social, economic and cultural considerations (Ding, 2005). Reijnders and Roedel (1999) point out that it is improbable that a set of pre-designed environmental criteria could be developed for worldwide use without further amendments, for instance, the use of geographically adapted database. This means that BREEAM Communities, CASBEE-UD and LEED-ND could be used worldwide but with some adjustments on these frameworks, which takes into account the environmental, social and economic issues of the region and the location of the development.

4.3. Management aspects

In general, the management issue is considered as the key for the success of any model or institutional structure, including those for sustainable urban planning development. In the absence of successful management and organisation of tasks, it is undoubtedly the beginning of the end. Jabareen (2006) points out that there is an urgent need to have modern management programmes that are often called smart growth programmes to balance the growth of economic, social and environmental needs. Management of sustainable urban planning development is one of the

critical issues, which need to be referred in this study. It has a number of issues, which must be considered by policy-makers, planners and managers (United Nations, 2004).

Through looking at the three models, BREEAM Communities, CASBEE-UD and LEED-ND, it is fair to say that none of these models has included management issue as the main category; on the contrary; they use it as a criterion within their main categories. In BREEAM Communities framework, for example, management side is used more than both of CASBEE-UD and LEED-ND. However, despite BREEAM including the management aspects within the most of its main categories such as climate, transport and resources, it has not considered the management side as a key issue that must be categorised as one of the main categories within its framework to manage a whole development process.

One the other hand, CASBEE-UD mentions the management side only once in its main categories, which is LRUD3 management of the local environment. It is used as the system to reduce energy usage inside the designated area and conserve the surrounding environment of the designated area. Moreover, management side is used in CASBEE-UD model to measure for transportation demand. This means that CASBEE-UD uses management side as a tool to manage some of the issues within the main categories, not as main category that aims to manage the overall of sustainable urban planning development process.

The case is almost the same with LEED-ND, where management used as criteria under some of the main categories, neighbourhood pattern and design category and green infrastructure and building category. In the last a few years, some scientific articles discussed some of the criticism of LEED model and some of these criticisms are focused on the management side. For example, Tam and Tsui (2004) point out that one of the criticisms of the LEED framework is that it is concerned mainly with the technical aspect of environmental performance with very little emphasis on the management side.

4.4. Financial issues

The frameworks of city sustainable development supposed to be focused on the achievement of the key elements of sustainable urban planning development, which are environmental, social and economic issues as mentioned before. There is no doubt that financial aspect is one of the key issues included within economic element and has a critical role in terms of achieving the objectives of sustainability. However, as a result of reviewing a number of academic research papers and reports, this study found that some of the sustainable urban planning frameworks give the financial issues little attention, as is the case with management issues as stated earlier.

Many frameworks have been developed to reach sustainable development; however, most of them aim to prevent the environmental deterioration and ignore the importance of economic or social goals (de Graaf, Musters, & Ter Keurs, 1996). In terms of the international well-known frameworks, which have been chosen in this research, Grace (2008) indicates that some frameworks such as BREEAM, CASBEE and LEED do not include financial aspects in the evaluation framework, which may contradict the ultimate principle of a sustainable development. The reason for this is that financial returns are fundamental to all projects due to the fact that a project might be environmentally friendly and sound, but at the same time very expensive to create.

4.5. Distribution of responsibilities

As stated earlier, sustainable urban planning development is a comprehensive process, which requires the effective involvement of different stakeholders including government, citizens, workers and public officials (Litman, 2011). For instance, the government organisations play an important role in achieving the sustainability through the development and enforcement of

the rules and laws (Said et al., 2009). According to Lockwood (2004), the planning process should be understood by all stakeholders with clearly defined visions, goals, objectives, evaluation criteria and performance indicators. Therefore, the importance of distribution of responsibilities within this process has emerged to avoid the conflicts between them.

In this paper, it is argued that one of the main weaknesses of BREEAM Communities, CASBEE-UD and LEED-ND is the failure to address how the distribution of responsibilities between the different stakeholders within the process can be achieved. At the same time, despite these frameworks aim to enable the stakeholders to determine the extent to which the requirements of the sustainable urban planning are met within the urban areas, these models offer no explanation for the allocation of duties of each one of them. Therefore, these frameworks would have been more interesting if they had considered the distribution of responsibilities during the development process in their own methods.

4.6. Local context

One of the most significant findings to emerge from this study and literature review is that the local context, including city background and social considerations of customs and traditions, must be taken into account by any sustainable urban planning framework. The importance of understanding the local conditions is being recognised increasingly worldwide (United Nations, 2004). Therefore, local customs and traditions of urban areas must be respected during the design process of sustainable urban planning development in order to achieve the desired goals. In the same context, different frameworks for sustainable urban planning development should be designed to take into account the local context, especially, if used in countries other than those which the system was initially designed to work in (Kyrkou et al., 2011).

However, by looking at the frameworks included in this research, BREEAM Communities, CASBEE-UD and LEED-ND, it can be seen that these frameworks fail to address the local context as main issue in their framework. Less emphasis is placed on this side, while it is considered as one of the most important key issues to achieve the sustainable urban planning development as mentioned before. The conditions of urban planning are very different from city to city and the quality of life as well as the impacts produced on the environment depends on a variety of local factors of environmental, economic and cultural nature (Diamantini & Zanon, 2000). Therefore, all frameworks must understand these local conditions, traditions and attitudes.

5. Discussion

The previous literature review and different frameworks have a great role in shedding light on one of the most important issues at present. Through this study, the role and importance of sustainable urban planning development have emerged as two of the most important key elements that must currently be taken into account (Kühtz, 2007). There is no doubt that sustainable urban planning development is a major concern, which must be considered by the relevant authorities. The reason for this is that it focuses on the improvement of the quality of the environment, enhancing social prosperity and the improvement of economic performance (Addis, Talbot, Research, & Association, 2001).

Moreover, it emphasises on the integrated nature of human activities and the balance of economic, social and environmental objectives (Litman, 2011). As pointed out previously, the term of sustainable urban planning development means different things to different people; however, all definitions agree that it is important to ensure that all the environmental, social, economic and planning issues have been adopted in a sustainable manner (Boyko, Cooper, Davey, & Wootton, 2006; Haapio & Viitaniemi, 2008b; Hald, 2009; OGC, 2007). Currently, there has

been wide-ranging discussion about the key issues of sustainable urban planning development and a number of frameworks have been developed for different purposes and needs in different countries.

The most common frameworks that are internationally well known, which are BREEAM Communities, CASBEE-UD and LEED-ND, were discussed in this study. These three frameworks show different methods of creation of city sustainable development and the selection of the categories, criteria and indicators. Furthermore, these models were developed in different countries, under different circumstances and for different purposes, but all of them aim to achieve sustainable urban planning development (Cao & Li, 2011).

However, as can be seen through the critique of these three models, there are a number of key issues and differences between them in terms of the division of the main categories and the features of the criteria of each one (Haapio & Viitaniemi, 2008a). For instance, BREEAM has eight major categories, CASBEE has six main categories whereas LEED has five categories. Moreover, each model focuses on different categories and aspects more than the other, to some extent, according to the purposes and needs. For instance, BREEAM considers transport and energy as the main categories in their framework and gives them more emphasis in terms of the number of criteria, whereas LEED does not give them this importance, and it includes transport and energy within the major categories of its model (Appu, 2012).

However, in general, it is argued in this paper that these frameworks have a number of strengths and weaknesses (Kyrkou et al., 2011). On the one hand, one of the most important strengths of them is addressing the key issues of the sustainable urban planning development within their models. For example, they are more conscious towards the environmental issues that are related to urban areas such as climate change, environmental quality, ecosystems and green infrastructure. Moreover, there are common concerns between these three frameworks in terms of emphasise the importance of the issues of transportation, energy, resources and material. This means that all of them agreed the importance of these categories (Haapio & Viitaniemi, 2008a).

On the other hand, there are a number of weaknesses that have been touched on previously during the critique of these three frameworks. One of the most obvious weaknesses is the failure to address how these methods deal with the management issue as an important factor in the development process where it is almost disregarded and not attaching sufficient importance to it (Tam et al., 2004). It is fair to point out that each one of these three frameworks has mentioned a number of key issues of the management side, but unfortunately with very low focus.

Critics have also argued that these frameworks not only have overlooked the importance of the management issue, but they also have not addressed the financial issue within their models where the emphasis on this issue is limited. For instance, BREEAM, CASBEE and LEED do not include financial aspects in their framework, which might contradict the principles of the sustainable urban planning development (Grace, 2008). There is no doubt that financial issues are considered as one of the most important factors that would help to ensure success and also could lead to failure. Therefore, they should have sufficient importance in order to achieve sustainable urban planning development.

Furthermore, despite these frameworks originating from different countries, Japan, North American and European countries, and an emphasis on different characteristics, these methods offer no explanation of how to implement these frameworks outside these countries. For example, dealing with the variations of the regions and local context, include the city and social background. In addition, one major drawback of these approaches is the absence of the clear methods of the distribution of responsibilities between the stakeholders within these frameworks as mentioned earlier.

Therefore, as a result of these differences and similarities between these three models as well as the strengths and weaknesses of them, this study intends to develop a new proposal for the idea

of an effective sustainable urban planning development model. This framework will be designed based on two main foundations. Firstly, the scientific research and knowledge, which include the academic research papers and reports in terms of the concepts of sustainable urban planning development etc. Secondly, based on the strengths of the existing frameworks of city sustainable development, meanwhile addressing those weaknesses, which were discussed earlier in this article. The expected outcome of this proposal model is to have an effective sustainable urban planning development framework that could be applied in different parts of the world. Moreover, it aims to integrate the core issues of sustainability to meet the current needs without compromising the needs of future generations.

6. Proposed model for sustainable urban communities

Most of the results and findings reached through this literature review have emphasised the need for an effective framework for sustainable urban planning development due to fact that there are several issues, obstacles and challenges, which must be dealt with and managed properly. By the same token, this paper argues that the presence of such a model would return substantial benefits to the communities and cities despite potential difficulties and obstacles. For those reasons, this study intends to develop a new framework in the hope that this can be the first step in creating an effective sustainable urban planning development framework, which could be applied across the world.

The core of this framework has four key dimensions, which must be integrated in order to achieve the desired goal of this proposal framework, namely environmental, social, economic and planning dimension. Furthermore, each one of them has a number of major categories in addition to a number of criteria. In the same context, the model has an additional dimension, which is the information and communication technology dimension (ICT). This one will be presented as an implicit dimension that will be included within all of the four key dimensions. This proposed framework can be seen in Figure 4 which includes its main dimensions, major categories and the criteria.

The environmental dimension focuses on a number of critical issues that are related to the environment. For instance, it considers the phenomenon of global warming and reduces the emissions to the environment. Also, it touches the subjects of the biodiversity, natural environment as well as the ecosystem in order to reduce the impacts on the environment, which have risen steadily as a result of human activities and natural disasters as mentioned earlier in this paper. Moreover, the energy and resource issues have been taken into account in this framework with the aim to maintain a stable resource base.

The social dimension looks at meeting the different needs for people in order to provide high citizens satisfaction. There is no doubt that sustainable urban planning development is difficult to achieve without people who feel that they have a fair share of wealth, safety and influence as mentioned earlier. Therefore, this dimension aims to provide the society with the essential services in order to reach citizen satisfaction. For instance, human health, include welfare facilities and access to the medical service, and educational development, management and facilities. Moreover, it emphasises equity in the society that include equitable distribution of service and income.

The third dimension of the proposal model of sustainable urban planning development is the economic dimension, which deals with a number of aspects regarding the economy. These include economic growth, sustainable economy, employment and productivity. Each one of them has a number of issues such as the local economic development, business facilities, economic capacity, employment opportunities as well as the quality of the product. In the same context, this dimension focuses on the importance of the achievement of stable economic growth. In addition, it works to organise the production and consumption processes and choosing forms of production that minimise the use of resources and reduce environmental pollution.

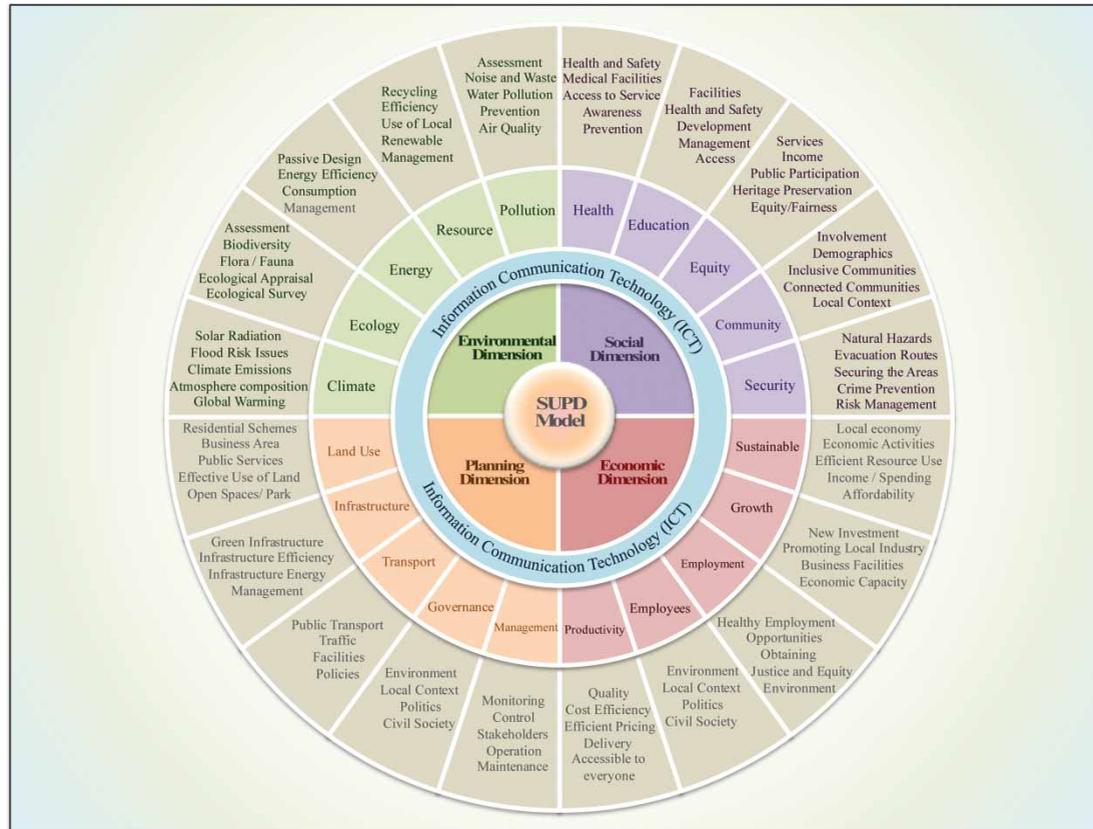


Figure 4. Proposal for the sustainable urban planning development framework with the main dimensions, categories and criteria.

Table 2. The main dimensions of the proposal framework with full list of the categories and criteria.

Environmental dimension	Social dimension	Economic dimension	Planning dimension
Climate change	Human health	Sustainable economy	Land-use
Consideration of global warming	Medical and welfare facilities	Local economic development	Residential schemes
Climate change emissions	Access to medical services	Healthy economic activities	Employment and business areas
Atmosphere composition	Increased public fitness and health	Efficient resource use	Public services and spaces
Solar radiation	Awareness and prevention	Income and spending	Mixed-use and effective use of land
Flood risk issues	Control and monitoring	Affordability	Open spaces and parks
Ecology	Education	Economic growth	Infrastructure
Ecological survey	Educational development	Promoting local industry	Green infrastructure
Ecological appraisal	Educational facilities	New business and investment	Infrastructure efficiency
Biodiversity	Access to education	Business facilities	Infrastructure energy efficiency
Ecological impact assessment	Educational management	Economic capacity	Recycled content in infrastructure
Protected flora and fauna	The surrounding environment	Operational efficiency	Infrastructure management
Energy	Equity	Employment	Transportation
Energy management	Equitable distribution of services	Worthwhile and healthy employment	Public transport
Energy consumption	Equitable distribution of income	Employment opportunities	Traffic management
Renewable and clean energy	Public participation	The possibility of obtaining	Transportation facilities
Energy efficiency	Social equity (Fairness)	Justice and equity	Regional transportation planning
Passive design principles	Employment opportunities	The proper environment to work	General policy
Resource	Community	Employees	Governance
Resource management	Local demographics	Skills, abilities and qualifications	Governance and politics
Use of local resources	Prosperous and inclusive communities	Effective training	Local urban planning governance
Resource efficiency	Connected and open community	Vocational guidance	Environmental governance
Renewable resources	Community outreach and involvement	Motivation	Governance and sustainable planning
Resources recycling	Respect the local conditions	Effective employees participation	Civil society organisations
Pollution	Security and safety	Productivity	Management
Air quality management	Securing residential areas, open spaces etc.	Quality of the product	Process management
Pollution prevention measurements	Understanding the natural hazards	Cost efficiency	Comprehensive monitoring and control
Water pollution reduction	Providing proper evacuation routes	Efficient pricing	Development of alternative scenarios

(Continued)

Downloaded by [University Of Surrey] at 03:29 15 July 2013

Table 2. Continued.

Environmental dimension	Social dimension	Economic dimension	Planning dimension
Noise control and solid waste	Crime prevention	Accessible to everyone	Engage stakeholders
Pollution assessment	Risk management	Delivery services	Operation and maintenance
Information and communication technology <i>Twenty-first century skill outcomes</i> <i>Universal access to technology</i> <i>Access to services and resources 24/7</i> <i>ICT management</i>			

The fourth dimension that has been ignored by many sustainable development studies is the planning. It is argued in this paper that sustainable urban planning development not only based on environmental protection, economic growth and social equity, but also on a strong foundation of good planning. However, this dimension highlights several concerns in terms of planning aspects that include the proper use of the land, addressing the infrastructure issues and consideration of the importance of transportation matters. Furthermore, it sheds light on the management side in terms of the control and monitoring the overall process of sustainable urban planning development.

Finally, this framework includes one of the most important core elements, which has also been disregarded in most of the studies and research papers in the field of sustainable urban planning development, which is the ICT. Undoubtedly, the role and importance of ICT has emerged as one of the most important key elements that must currently be taken into account. It looks at a number of essential issues that affect the daily human life (The Welsh Assembly Government's Outline Framework for Action, 2010).

For example, it emphasises the twenty-first-century skills outcomes and the ability of citizens to access the technologies, services and resources (Economist Intelligence Unit, 2010). Moreover, this dimension has been included in all the previous dimensions due to the importance of the aspects of technology in the era of globalisation. However, these main dimensions with full list of the major categories and criteria can be seen in Table 2 above.

7. Conclusion and future work

In recent years, as a result of developments in the globalisation era, the world has witnessed many environmental, social, economic and urban planning changes. These changes have affected the living conditions of the population, natural resources, environment and economy. Therefore, the aim of this research was to give a comprehensive view of the current concepts of sustainable urban planning development, which is supposed to deal with most of these changes. However, as a result of the information included within this study, there is no doubt in concluding that the sustainable urban planning development plays a powerful role in terms of addressing these changes when applied properly and improving the quality of the citizens' life in addition to meeting the needs of both the current and future generations.

In this research, there have been several discussions and investigations made to reach the reality of sustainable urban planning development at the current time. Moreover, there has been a discussion on the most common frameworks, which are internationally well known. These are BREEAM Communities, CASBEE-UD and LEED-ND. However, one of the most significant findings to emerge from this study is that there is an urgent need for a comprehensive and

effective framework for sustainable urban planning that is based on scientific knowledge. Furthermore, it addresses the strengths aspects of the existing frameworks of city sustainable development and avoids their weaknesses.

Therefore, this study presented a proposal for the idea of an effective sustainable urban planning development framework, which has been designed to contain the core dimensions of the real development. In the same context, in this paper, it is argued that all the institutions and individuals related to this field must coordinate with each other in order to reach the desired objectives of this new model. Finally, as mentioned earlier, there are a number of important key issues that must be taken into account when planning and designing a new framework for sustainable urban planning. The most significant one lies in taking into consideration the environmental, social, cultural and economic backgrounds of the city.

The future work will focus primarily on the evaluation of this proposed framework in order to ensure that it is acceptable, reliable and valid. This process can be done through different methods and systems. However, this study intends to use two main techniques to evaluate its model. The first one is the Delphi Techniques, which will be used to obtain the views of experts regarding the proposed model in terms of the dimensions, categories and criteria. The second technique is the analytical hierarchy process that will be used to elicit the weights of the categories and criteria that had been identified earlier and to reduce complex decisions within the development process.

References

- Addis, B., Talbot, R., Research, C. I., & Association, I. (2001). *Sustainable construction procurement: A guide to delivering environmentally responsible projects*. London: CIRIA.
- Ali, H. H., & Al Nsairat, S. F. (2009). Developing a green building assessment tool for developing countries – Case of Jordan. *Building and Environment*, 44, 1053–1064. doi:10.1016/j.buildenv.2008.07.015.
- Appu, H. (2012). Towards sustainable urban communities. *Environmental Impact Assessment Review*, 32, 165–169. doi:10.1016/j.eiar.2011.08.002.
- Ardeshiri, A. (2010). *The issue of sprawl vs compact city towards sustainability in developing countries*. Paper published in the procedure of the Future Intermediate Sustainable Cities Conference, 23–25 November 2010. Egypt: The British University in Egypt.
- Assefa, G., Glaumann, M., Malmqvist, T., Kindembe, B., Hult, M., Myhr, U., & Eriksson, O. (2005). *Environmental assessment of real estates – Where natural and social sciences meet: The case of ecoeffect*. The 2005 World Sustainable Building Conference Tokyo, 27–29 September 2005 (SB05Tokyo).
- Bolund, P., & Hunhammar, S. (1999). Ecosystem services in urban areas. *Ecological Economics*, 29, 293–301. doi:10.1016/s0921-8009(99)00013-0.
- Boyko, C. T., Cooper, R., Davey, C. L., & Wootton, A. B. (2006). Addressing sustainability early in the urban design process. *Management of Environmental Quality*, 17, 689–706. doi:10.1108/14777830610702520.
- BRE GLOBAL. (2010). *The world's leading design and assessment method for sustainable building*. BREEAM. Retrieved from <http://www.breeam.org/page.jsp?id=66>
- BRE GLOBAL LTD. (2009). Certification Scheme for BREEAM Communities: Statutory planning (Developer Application) Stage.
- Cao, S., & Li, C. (2011). The exploration of concepts and methods for low-carbon eco-city planning. *Procedia Environmental Sciences*, 5, 199–207. doi:10.1016/j.proenv.2011.03.067.
- CASBEE. (2007). CASBEE for urban development. *Comprehensive Assessment System for Building Environmental Efficiency*. Technical Manual 2007 Edition.
- CITIES ALLIANCE. (2007). *Livable Cities, The benefits of urban environmental planning*. Washington, DC. Retrieved from http://www.unep.org/urban_environment/PDFs/LivableCities.pdf
- Costanza, R., D'Arge, R., de Groot, R., Farber, S., Grasso, M., Hannon, B., & van den Belt, M. (1997). The value of the world's ecosystem services and natural capital. *Nature*, 387, 253–260.
- Crawley, D., & Aho, I. (1999). Building environmental assessment methods: Applications and development trends. *Building Research and Information*, 27, 300–308. doi:10.1080/096132199369417.
- DEFRA. (2011). *Guiding principles for sustainable development*. Department for Environment Food and Rural Affairs. Retrieved from <http://sd.defra.gov.uk/what/principles/>

- Diamantini, C., & Zanon, B. (2000). Planning the urban sustainable development: The case of the plan for the province of Trento, Italy. *Environmental Impact Assessment Review*, 20, 299–310. doi:10.1016/S0195-9255(00)00042-1.
- Ding, G. K. C. (2005). Developing a multicriteria approach for the measurement of sustainable performance. *Building Research and Information*, 33, 3–16. doi:10.1080/0961321042000322618.
- Economist Intelligence Unit. (2010). ICT for city management, using information and communications technology to enable, engage and empower city stakeholders. Retrieved from http://www.managementthinking.eiu.com/sites/default/files/Siemens_Reports_2010_FINAL%20TO%20PRINT.pdf
- EUE. (2009). *Urban planning and sustainable development. Introductory note*. Urban Planning and sustainable Development Special Issue (EUE). Retrieved from http://www.vrm.ca/EUUE/vol3_2009/EUE3_gauthier_en.pdf
- Fowler, K. M., & Rauch, E. M. (2006). *Sustainable building rating systems summary*. Completed by the Pacific Northwest National Laboratory, operated for the U.S. Department of Energy by Battelle.
- de Graaf, H. J., Musters, C. J. M., & Ter Keurs, W. J. (1996). Sustainable development: Looking for new strategies. *Ecological Economics*, 16, 205–216. doi:10.1016/0921-8009(95)00088-7.
- Grace, K. C. D. (2008). Sustainable construction – The role of environmental assessment tools. *Journal of Environmental Management*, 86, 451–464. doi:10.1016/j.jenvman.2006.12.025.
- Grace, M. (2000). *BREEM – a practical method for assessing the sustainability of buildings for the new millennium*. International Conference Sustainable Building 2000, 22–25 October 2000, Maastricht, The Netherlands. The Netherlands: In-house publishing. Retrieved from <http://www.irbnet.de/daten/iconda/CIB3011.pdf>
- Haapio, A., & Viitaniemi, P. (2008a). A critical review of building environmental assessment tools. *Environmental Impact Assessment Review*, 28, 469–482. doi:10.1016/j.eiar.2008.01.002.
- Haapio, A., & Viitaniemi, P. (2008b). Environmental effect of structural solutions and building materials to a building. *Environmental Impact Assessment Review*, 28, 587–600. doi:10.1016/j.eiar.2008.02.002.
- Hald, M. (2009). *Sustainable urban development and the Chinese eco-city*. Concepts, Strategies, Policies and assessments, Fridtjof Nansen Institute. Retrieved from: <http://www.fni.no/doc&pdf/FNI-R0509.pdf>
- Hansen, K. (2005). *Environmental indicators for buildings – a Danish approach*. Proceedings of the 2005 sustainable Building Conference (SB05), Tokyo, Japan. Retrieved from <http://www.sb05.com/homeE.html>
- He, J., Bao, C.-K., Shu, T.-F., Yun, X.-X., Jiang, D., & Brwon, L. (2011). Framework for integration of urban planning, strategic environmental assessment and ecological planning for urban sustainability within the context of China. *Environmental Impact Assessment Review*, 31, 549–560. doi:10.1016/j.eiar.2010.09.002.
- Healey, P. (2004). The treatment of space and place in the new strategic spatial planning in Europe. *International Journal of Urban and Regional Research*, 28, 45–67. doi:10.1111/j.0309-1317.2004.00502.x.
- Institute for Building Environment and Energy Conservation. (2007). *CASBEE for Urban Development. Comprehensive Assessment System for Building Environmental Efficiency*. Technical Manual 2007 Edition.
- Jabareen, Y. R. (2006). Sustainable urban forms: Their typologies, models, and concepts. *Journal of Planning Education and Research*, 26, 38–52. doi:10.1177/0739456X05285119.
- Jenny, A. E. (2006). A participatory approach to conservation in the Calakmul Biosphere Reserve, Campeche, Mexico. *Landscape and Urban Planning*, 74, 242–266. doi:10.1016/j.landurbplan.2004.09.006.
- Kawazu, Y., Shimada, N., Yokoo, N., & Oka, T. (2005). *Comparison of the assessment results of Breeam, Leed, Gbtool and Casbee*. The 2005 World Sustainable Building Conference, 27–29 September 2005 (SB05Tokyo), Tokyo.
- Kohler, N. (1999). The relevance of green building challenge: An observer's perspective. *Building Research and Information*, 27, 309–320. doi:10.1080/096132199369426.
- Kültz, S. (2007). Adoption of sustainable development schemes and behaviours in Italy: Barriers and solutions – what can educators do? *International Journal of Sustainability in Higher Education*, 8(2), 155–169. doi:10.1108/14676370710726625.
- Kyrkou, D., Taylor, M., Pelsmakers, S., & Karthaus, R. (2011). *Urban sustainability assessment systems: How appropriate are global sustainability assessment systems?* PLEA 2011 – 27th Conference on Passive and Low Energy Architecture, Louvain-la-Neuve Belgium, 13–15 July 2011.
- LEED. (2009). *LEED 2009 for neighborhood development rating system*. US Green Building Council.
- Litman, T. (2011). *Planning principles and practices*. Victoria Transport policy Institute. Retrieved from <http://www.vtpi.org/planning.pdf>

- Lockwood, I. M. (2004). *Transportation prescription for healthy cities*. Prepared for the Robert Wood Johnson Foundation and the New Jersey Department of Transportation.
- Marsden, T., & Rezgui, Y. (2010). *Sustainable places at Cardiff University*. Future Intermediate Sustainable Cities Conference, 23–25 November 2010, The British University in Egypt, Egypt.
- Murakami, S., Kawakubo, S., Asami, Y., Ikaga, T., Yamaguchi, N., & Kaburagi, S. (2011). Development of a comprehensive city assessment tool: CASBEE-City. *Building Research and Information*, 39, 195–210. doi:10.1080/09613218.2011.563920.
- OGC. (2007). *Sustainability. Achieving Excellence in Construction Procurement Guide*. London: Office of Government Commercen.
- Petersen, E. H. (2002). *BEAT 2002 – An LCA based assessment tool for the building industry*. Proceedings of the sustainable Building Conference 2002, Oslo, Norway. Retrieved from <http://www.iisbe.org/iisbe/oslo.htm>
- Redman, C. (2010). *Urban socio-ecology and the sustainability of desert cities*. Future Intermediate Sustainable Cities Conference, 23–25 November 2010. Egypt: The British University in Egypt.
- Reijnders, L., & van Roekel, A. (1999). Comprehensiveness and adequacy of tools for the environmental improvement of buildings. *Journal of Cleaner Production*, 7, 221–225. doi:10.1016/S0959-6526(99)00080-3.
- Rivera, A. (2009). *International applications of building certification methods: A comparison of BREEAM and LEED*. PLEA2009 – 26th Conference on Passive and Low Energy Architecture, Quebec City, Canada, 22–24 June 2009.
- Said, I. I., Osman, O., Shafiei, M. W., Rashideh, W. M. A., & Kooi, T. K. (2009). *Modeling of construction firms sustainability*. Retrieved from <http://eprints.usm.my/16094/>
- San-José, J. T., Losada, R., Cuadrado, J., & Garrucho, I. (2007). Approach to the quantification of the sustainable value in industrial buildings. *Building and Environment*, 42, 3916–3923. doi:10.1016/j.buildenv.2006.11.013.
- Shearer, A. W., Mouat, D. A., Bassett, S. D., Binford, M. W., Johnson, C. W., & Saarinen, J. A. (2006). Examining development-related uncertainties for environmental management: Strategic planning scenarios in Southern California. *Landscape and Urban Planning*, 77, 359–381. doi:10.1016/j.landurbplan.2005.04.005.
- Sorensen, A. (2004). *Towards sustainable cities*. Urban Planning and Environment. Retrieved from <http://www.ashgate.com/isbn9780754637660>
- Tam, C. M., Tam, V. W. Y., & Tsui, W. S. (2004). Green construction assessment for environmental management in the construction industry of Hong Kong. *International Journal of Project Management*, 22, 563–571. doi:10.1016/j.ijproman.2004.03.001.
- Tanguay, G. A., Rajaonson, J., Lefebvre, J. F., & Lanoie, P. (2010). Measuring the sustainability of cities: An analysis of the use of local indicators. *Ecological Indicators*, 10, 407–418. doi:10.1016/j.ecolind.2009.07.013.
- The Welsh Assembly Government's Outline Framework for Action. (2010). *Delivering a digital wales*. Retrieved from <http://wales.gov.uk/docs/det/publications/101208digitalwalesen.pdf>
- UN-HABITAT. (2009). *Planning sustainable cities – global report on human settlements 2009. UN-HabitAT for a better urban future*. United Nations Human Settlements Programme, United Nations, 2009.
- UN-HABITAT. (2010). *Planning sustainable cities. UN-HABITAT practices and perspectives*. United Nations Human Settlements Programme, United Nations, 2009. Retrieved from http://zunia.org/uploads/media/knowledge/3008_alt1287470751.pdf
- United Nations. (2004). *Global urban observatory and statistics. UN-HABITAT for a better urban future*. Retrieved from: <http://www.unhabitat.org/>
- United Nations. (2006). *World population prospects*. United Nations: New York. Retrieved from: <http://www.un.org/sea/population/>
- USGBC. (2005). *LEED for Neighborhood Developments Rating System – Preliminary Draft*, September 6, 2005. Presented by the partnership of the Congress for the New Urbanism, the Natural Resources Defense Council and the US Green Building Council.
- USGBC. (2011). *LEED for neighborhood development*. US GREEN BUILDING COUNCIL. Retrieved from: <http://www.usgbc.org/DisplayPage.aspx?CMSPageID=148>
- Uwasu, M., & Yabar, H. (2011). Assessment of sustainable development based on the capital approach. *Ecological Indicators*, 11, 348–352. doi:10.1016/j.ecolind.2010.06.002.
- Vanessa, W. (2009). 'The planned city sweeps the poor away . . .': Urban planning and 21st century urbanisation. *Progress in Planning*, 72, 151–193. doi:10.1016/j.progress.2009.06.002.

- Wallbaum, H., Krank, S., & Teloh, R. (2011). Prioritizing sustainability criteria in urban planning processes: Methodology application. *Journal of Urban Planning and Development*, 137, 20–28. doi:10.1061/(ASCE)UP.1943-5444.0000038.
- Welch, A., Benfield, K., & Raimi, M. (2010). A Citizen's Guide to LEED for Neighborhood Development: How. *How to Tell if Development is Smart and Green*. US Green Building Council.