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A Review of Sustainable Urban Development Frameworks in Developing Countries

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Abstract

Cities are considered the engines of economic prosperity and responsible for a substantial amount of the world's CO2 environmental pollution. Urban sustainable development frameworks have become common to manage these challenges. However, new frameworks are required as existing global frameworks are not sufficient to meet current challenges nor do they consider future requirements in developing countries. These frameworks currently focus on planning and engineering aspects and lack the flexibility to incorporate local issues factoring in views of stakeholders. Examples of this are issues such as political instability, degradation of public services and utilities and damage to the infrastructure and economic deterioration caused by conflict.

This paper reviews and analyses existing sustainable urban development frameworks, it identifies that they have focused on urban sustainable development assessment tools by electing several urban sustainable development factors with rating systems.

Through this review, this paper finds several strategies have not been addressed in previous research related to locality specific issues. These include (a) consideration of the views of the public, (b) future urban planning requirements, (c) future domestic property requirements of occupants, and (d) achieving a reduction in domestic energy consumption.

Thus, this paper proposes that future frameworks should be designed based on considering stakeholder feedback, experts' consultation, and validation stage. This is a challenging proposition, however it does, provide significant advantages in highlighting and addressing the community's priorities for solving problems in the local context, experts' views, in order to combatting the gaps found between decision-maker's opinions and public priorities.

Keywords: urban sustainable development, global energy consumption, public perceptions, urban sustainable frameworks, global assessment tools

1. Introduction

In the past two decades, it has been recognised that buildings are a major factor regarding rising pollution and increasing environmental problems (Ameen and Mourshed 2017a) (Mohsin et al. 2020) . The built environment is therefore one of the main areas where work can be undertaken to reduce undesirable impacts on the environment caused by conventional power generation, traffic congestion, greenhouse emissions, rapid urbanization and population growth (Gómez-Muñoz et al. 2010) (Dumitru et al. 2020). Cities, the main engines of economic prosperity, are considered the main source of more than 70% of greenhouse gas emissions, due to the excessive use of energy consumption, transportation problems and weaknesses in management (Fawzi et al. 2016).

the demand for energy from fossil fuels is a particular problem which is exacerbated by a lack of investment in renewable resources.

Urban development has special importance within the broader context of sustainability. In terms of global urbanization and population growth, the world's urban population was reported to 3.17 billion out of a total of 6.45 billion in 2005 (UN-HABITAT, 2007). Current international reports forecast that the urban population will continue rising, reaching approximately 5 billion by 2030, out of a total of 8.1 billion (UNHABITAT, 2007). In Baghdad, Iraq, a city which houses a quarter of the total population of the country, the population will double by 2030 to reach 12 million. Across Iraq, city populations will also rise from 35 million to aproximately 70 million by 2030 (CSO, minstry of planning reports).

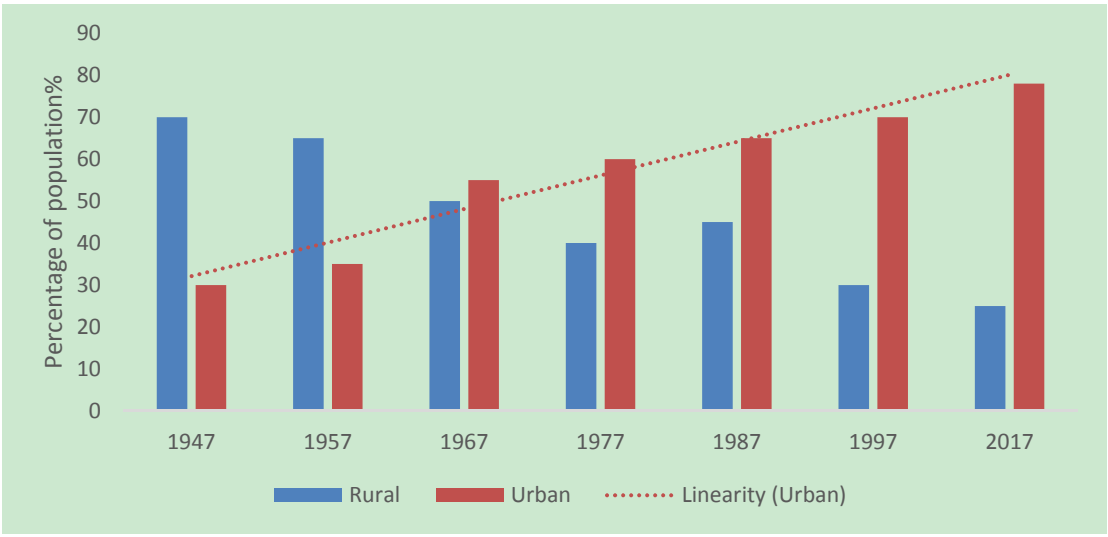

Figure 1. Trends of Population distribution (Urban, Rural), Iraq

Source: Central Statistical organization; Statistical Annual Abstract [source: World Bank 2014].

Energy consumption plays a significant role in developing regions, hot dry and arid countries, due to the excessive use of natural resources and environmental pollution, because of their use of conventional power production. The main reason for increasing energy demands lie in the growth of the economy and population (i.e., in countries such as China, India and the Middle East regions (IEA 2013)) this has resulted in rapid urbanization. For example, in Iraq, there has been a rapid shift from the population living mainly in rural areas to urban regions as shown in Figure 1. In 1947, 70% of the population lived in rural areas; by contrast, today more than 70% of the population live in urban areas (The United Nations 2014). Such urbanization and increase in population density are identified as the key factors shaping future cities (Suzuki et al. 2010). This, therefore, constitutes a significant challenge to find acceptable solutions for new and existing city developments tackling the impacts of climate change, and achieving a balance between various dimensions of sustainability (Siemens 2012; Sharifi and Murayama 2015).

Over 90% of energy is produced by burning fossil fuels in Arab Gulf countries (Sgouridis and Kennedy 2010; Reiche 2010). This is because these countries are rich in oil and fossils fuels. Hence, there is a limited uptake of renewable resources like solar radiation, despite favourable climatic conditions (Al-Saleh, 2009). However, a shift in global practices to reduce energy consumption through an increased reliance and investment in renewable resources, could contribute to energy savings and reduce CO2 emissions. A number of developed countries already emphasize the use of energy saving systems but these renewable technologies are largely absent in the Middle-East (Aldossary et al. 2014; Ameen et al. 2015; Alyami et al. 2015). Therefore, energy consumption is one of the most important challenges that needs to be addressed by sustainable frameworks, focusing on the transition from the concept of energy-consumption to energy-producing homes, exploiting the use of solar energy.

A number of authors (Mohammed Ameen et al. 2014a; Alyami et al. 2015; Aldossary et al. 2014) have focused on sustainable assessment tools, defining global sustainability indicators which include various socio-economic factors specific to developing regions, with the goal of minimising resource consumption (water, energy and materials) while addressing environmental factors. However, an understanding of locality-specific problems is essential to achieve urban sustainable development (Alyami et al. 2015). This includes the identification of local challenges, specifically in high-density cities in developing regions that increase pressure on transportation and housing, and water and energy consumption. As such, sustainable urban development faces major challenges in developing countries, including Iraq, addressing current and future requirements.

Scientific evidence suggests that sustainability assessment tools such as BREEM and LEED, are not appropriate for developing countries including Saudi Arabia and Iraq (Mohammed Ameen et al. 2014a) especially regarding the development of the built environment (Alyami et al. 2015; Ameen et al. 2015). To this end, (Ameen et al. 2015) reviewed six international urban sustainable development assessment tools; BREEAM Communities, CASBEE-UD, LEED-ND, Pearl Community Rating System (PCRS), SBToolPT–UP and GSAS/QSAS. These tools were reviewed to compare rating indicators in developing and developed countries to identify appropriate environment, economic and ecology indicators for developing countries such as Iraq. Previous urban sustainable development

studies have also highlighted the need to link the goals of sustainable development with the demands of decision-makers and organizers, including community factors (Fawzi et al. 2016). Urban sustainable development challenges in developing countries include addressing stakeholders' perceptions, opinions, and their ambitions to identify the public perspective, acceptable solutions for users and policies based on the local context, these normally different in comparison with global tools (Ameen et al., 2016). Finally, recent work by (Aldossary, Rezgui & Kwan 2014a, 2014b), revealed a gap between public and expert perceptions regarding sustainable development. They found a wide difference between public perceptions and expert /government views on topics such as housing patterns.

The main contribution of this research is to suggest directions for new frameworks for urban development projects which meet with the goals of urban sustainable development, while possessing the flexibility to incorporate specific local problems. Rapid urbanization is the most important challenge to emerge in recent years, due to the rapid transition of populations from rural to urban regions, this occurring in developing countries, more so than developed regions. This is specifically the case in Baghdad, adding to problems including insufficient public services and infrastructure, exacerbating undesirable environmental impacts (Roberts 2008; Bryant 2006). According to previous studies such as (Mohammed Ameen et al. 2014b; Alyami et al 2013; Lange et al 2012), the advantage lies in identifying the most important indicators of urban sustainable development.

The aim of this paper is to review the existing literature, analyse the current research gaps and then provide guidelines for the future research required to meet the requirements for new urban sustainability frameworks in developing countries, specifically Arab countries.

This will be achieved via a case study approach to describe in a concrete way, the challenges faced using urban sustainable development frameworks in developing countries. This review will then be used to formulate future research directions to allow developing urban regions, to formulate sustainable development frameworks that can address locality specific issues in their own contexts.

The remainder of this section will identify the need this paper is fulfilling, outline its methodology, and present the case study in Iraq.

1.1 Research Gap

Currently, most urban sustainable development frameworks and assessment tools have been designed to fit a particular urban context and range of local issues; they are not applicable to all regions. Locality specific, environmental, social and economic factors within a specific environment can actually hinder the direct application of existing global assessment tools to a given locale (Devuyst et al. 2001; Zhu et al. 2015). Examples of such diverse elements are ecological conditions, geographical characteristics, national urban infrastructure and utilities, resource availability consumption (e.g., energy, water, and waste), the potential of renewables, construction materials used, local policy and regulation, local culture and historical value, urban population, and economic growth. Especially problematic are countries recovering from severe events this includes disasters and war-torn countries.

To date, there has been little research (15 papers) on how existing sustainable development frameworks can and should properly consider the variety of locality specific issues that occur in as part of sustainable development projects across the globe. These papers focuses on the assessment tools, identifying the methods and tools that have been used in the investigation and development of sustainability frameworks. However, only a few of them (8) discuss any practical applications of the framework. These 8 papers have primarily focused only on the development of a set of urban sustainable development indicators (Alyami et al. 2015; Fawzi et al. 2016; Ameen and Mourshed 2017b; Almutairi et al. 2019), in particular in hot dry arid regions such as Arab Gulf countries including Iraq. In addition, a few (2) of them have specified sustainability frameworks that consider domestic properties (Aldossary et al. 2015; Aldossary 2015). However, even these two papers focus solely on the development of sustainability indicators and do not focus on elicited practical solutions to solve the multiple problems in developing cities in hot arid climates. This is important because these countries are reliant on burning fossil oil for power production. Furthermore, most of developing cities in hot arid climates suffer from a number of problems such as; (1) population growth, (2) high energy and transport demand, (3) lack of environmental solutions.

To meet this gap this paper will review of the following: (a) identification of global sustainability factors based illustration analysis the global frameworks (b) a critical review of global urban sustainable development assessment tools (GUSAT), (c) a comparative analysis of a selected group of GUSATs such as BRREM, LEED, CASBEE and, (d) the identification and comparison a number of articles relevant to this work, leading to recognize the research gap between the current study and the previous research as a foundation for the development of a new

local comprehensive framework.

1.2 Case Study Region

This paper focuses on urban development problems that occur in urban environments within developing countries. To illustrate this, throughout this paper, examples will be drawn from a case study focussing on Iraq.

A developing country is a nation state with a low human development index and developed industrial base comparing with other developed countries (Ameen and Mourshed 2017a; Robinson 2004; Ali-toudert et al. 2020). Iraq such one developing countries based on the list among 35 developing countries, such as China, India, Brazil, and etc. (Liu and Qiu 2022; Urb and St 2021; Dumitru et al. 2020).

Iraq has been selected as representative of other developing countries due to post war damage to infrastructure and ongoing terrorist attacks in its cities, specifically Baghdad. Previously, this city was far more sustainable than it is now, specifically in terms of the domestic housing sector, public services, utilities, and infrastructure. For example, in the past Baghdad had diverse public transport e.g., trains, buses, river transport, and an over ground metro, while nowadays the city is experiencing an acute shortage of using public transport, because of post-war degradation of infrastructure and public services. Despite intensive efforts to reconstruct and rebuild cities, efforts are required in order to achieve a better quality of life and mitigate existing problems such as high energy consumption and demand, and traffic congestion (MOHSIN et al. 2017).

Iraq, in general, faces many issues regarding the future sustainability of its urban areas. For example, the population in Iraq's capital city will double by 2030, according to national report forecasts (The United Nations, 2014). There is therefore an urgent need, in Iraq, to utilise a sustainable framework to achieve the correct balance between human activity and the environment, including the need to minimize energy consumption (Mavromatidis et al. 2013). Previous studies have claimed that the evaluation of individual buildings is insufficient and that a more comprehensive assessment is required on a bigger scale to investigate factors such as neighbourhoods with a diversity of means of transportation, population, services and utilities (Mohsin et al. 2017). Therefore, urban sustainable development indicators play a vital role in the identification of factors which can improve the lifestyle of local people while achieving locality-specific priorities both in the present and for the future (Ameen and Mourshed 2017a; Mohsin et al. 2017).

The key issue facing Iraq is firstly that it has exceptionally high energy consumption, peaking during summer. This region experiences some of the highest recorded air temperatures, at times exceeding 50 degrees Celsius. Traffic congestion has increased approximately 14 times from that recorded prior to 2003 because of a significant increase in GDP due to the economic prosperity which followed the change in political regime in 2003. This has meant that the domestic population has been able to invest in a better lifestyle, this directly impacting on overcrowding in housing and transportation, thus increasing energy demands. In addition, despite efforts to re-build cities following conflicts, these works need more planning to meet current and future challenges. For example, existing infrastructure and public services are not sufficient to mitigate locality-specific problems including traffic congestion and increases in population, including power shortages basically because of a lack of in-depth effective planning and innovative strategies (Ameen and Mourshed, 2017a; Mohsin et al. 2017).

Existing domestic buildings, (Republic of Iraq Ministry of Construction & Housing State Commission of Housing Studies Section 2010) are not fit for purpose with regard to future challenges such as population-inflation. This is because by 2030, Baghdad will double in size. New urban development areas have been allocated by local government to plan new urban projects, but these plans need to include measures of urban sustainable development to avoid more pressure on existing domestic services, as well as to meet future requirements including energy consumption. This is one of the most important challenges in light of power shortages specifically in summer (Hague 2010). This may be addresses by promoting the use of renewable sources like PV systems leading to the optimisation of energy consumption and reduction in pollution through CO2 emissions.

1.3 Definition of Sustainability and its Application to Urban Development

This section will identify the multiple definitions of the concept of sustainability as it has been seen in various applications across the world. The relationship between sustainability and the present issues and future requirements of urban development will also be discussed along design weaknesses in various applications.

Despite there being several definitions of sustainability, the definition "The sustainable development that offers the needs of the current requirements without compromising the future generations to manage their own needs" (Satterthwaite 1997) remains the most significant (Lélé 1991). This definition has been adopted by politicians, decision-makers, stakeholders, sociologists, scientists, economists, planners, architects and designers in order to understand environmental issues, together with social and economic impacts, to identify public priorities on urban

sustainable development (Anon 1997 ;Lund 2007; Ameen et al. 2015; Aldossary et al. 2015; Satterthwaite 1997).

Sustainability can also be defined as the balance between the use of resources and human well-being, to reduce pollution and costs and save the environment from undesirable impacts. Sustainability is also defined as the maintenance of quality of life through adaptation to the environment through the exploitation of natural resources to sustain life (Barredo and Demicheli 2003; Cilliers et al. 2014; Lélé 1991). This, by definition, includes resource conservation such as energy, quality of environment and the provision of a capital budget for future generations (Hezri and Hasan 2004). Because of this, the word sustainability is commonly used for different purpose by various groups. Other commonly used examples include sustainability, sustainable development, sustainable community, and society.

Achieving sustainability has emerged as a major challenge in recent years. It is a key factor for the environment, and human well-being, due to the undesirable environmental impacts caused by conventional power generation (burning fossil oil), particularly in developing countries, including Arab Gulf countries and Iraq. This has seen increases in CO2 emissions, water and air pollution (Aldossary et al. 2015).

Several studies have claimed that sustainability frameworks are the creation of an environmental plan based on a number of urban sustainable development indicators in order to mitigate exciting issues in cities, to meet future challenges and to invest in natural recourses such as solar radiation as alternative approaches, to achieve economic balance, environmental quality and social equity (Assefa and Frostell 2007).

A sustainable society is conceived of as the long term pursuit of improvements in the environment, by developing relationships between the public, between nations and by placing emphasis on the equal distribution of resources (Assefa and Frostell 2007). In terms of a sustainable society, sustainability is also a personal effort towards a certain level of performance over a long period (Hoppit and Laland 2013). This is a significant aspect of sustainability, because not only do buildings impact on our environment, there are also social and economic impacts including pollution, excessive extensive of natural resources, and damage to the environment (Alyami et al. 2015). The concept of sustainability integrates the needs of future generations, extending opportunities for economic and social advancement, social awareness and public motivation towards a sustainable environment, this playing a vital role in the construction sector (Boustani 2008). The term sustainability also implies the capacity of a development project to ensure that it creates the opportunity to achieve a unique sustainable environment (Lélé 1991).

The final dimension of sustainability is the economic dimension, which focuses on the creation of new opportunities for growth in sales and reduction in costs through improvements in efficiency and reductions in use of resources. Environmental and social dimensions focus on reducing waste and emissions in the environment through the use of renewable methods to enhance the quality of life (Assefa and Frostell 2007).

These multiple definitions of sustainability encapsulate the significance of the multi-dimensional benefits of sustainability goals.

1.4 Urban Sustainable Development

Sustainability is viewed as the balance between using resources and managing current and future issues by ensuring the minimum use of such resources (Cilliers et al. 2014). In developing countries achieving urban sustainable development faces major challenges due to rapid urbanization, population-inflation, lack of environmental strategy, high energy and transport demands and weaknesses in the design of public services and utilities (MOHSIN et al. 2017; Mohsin et al. 2018). In response to this, sustainability frameworks constitute a strategical plan to manage current and future problems (Haughton 1997) this includes planning for how to address environmental issues, reduce excessive use of resources such as energy and water and considering socio-economic aspects (Xing et al. 2009).

One way to aid in achieving sustainability is the use of frameworks. Sustainability frameworks are balanced, comprehensive plans which address the development of a quality standard of life by investigating current and future requirements of the region being considered (Dumitru et al. 2020). The adoption of urban sustainable development goals and organising them into a framework suitable for locality-specific issues is key. This involves balancing the short and long-term improvement in environmental, socio-economic and resource utilisation problems to ensure balance.

In most frameworks, the urban sustainable development indicators that make up the framework, can be classified into two major groups: common and local, reflecting global and local priorities for urban sustainable development. Most international indicators are assumed to be applicable to all countries and communities. There are some indicators which can be adopted worldwide, i.e. energy, climate change and reductions in pollution/greenhouse

gas emissions which have global importance and as such, are utilised as common indicators worldwide (Devuyst et al. 2001; Alyami et al. 2015; Aldossary et al. 2015). There is also the need to assess the local context to investigate communities' priorities, their standard of living and awareness of sustainable solutions. This is specifically the case in Iraq, where harsh conditions have endured for more than four decades (Mohsin et al. 2017). Intensive efforts are underway to-rebuild the country while addressing environmental, economic, and cultural aspects. This has rendered common international tools, (such as BREEAM Co., LEED-ND, Pearl Community and GSAS/QSAS) inappropriate for use because of political instability (Castro-Lacouture et al. 2009). These tools also lack evidence of community priorities gathered through the collection of public perceptions (Bryant 2006).

However, identifying these indicators, especially comparable indicators is a complex matter because the requirements of cities are measured using different goals (Mohsin et al. 2017; Ameen and Mourshed 2017b). Local priorities can be highlighted quite easily, reflecting real needs in specific contexts. For example, the water indicator which includes conservation, availability and quality, is rated as one of the most important indicators in Iraq, according to (Fawzi et al. 2016), due to a shortage of water and climate change, experienced as a decline in rainfall creating drought. In Arab Gulf countries, both Pearl Community and GSAS/QSAS have addressed issues around water, comparing this to other indicators. Natural hazards, for example, can be rated as significant factors in some coastal regions (Castro-Lacouture et al. 2009; Alyami et al. 2015).

Several studies have discussed the use of global urban sustainable development indicators in developed countries such as Europe, Japan, the USA, and the UK. These indicators/factors have been designed by different organizations including the Japan Green Building Council, the European Commission, US Green Building Council and BRE/UK. However, they are often not fully applicable for developing regions (Castro-Lacouture et al. 2009). This is because of considerable differences between developed and developing regions including; rapid urbanization, population growth, high energy and transport demands because of climate, cultural background and locality-specific problems (Alyami et al. 2015; Ameen et al. 2015). Critically, most developed countries have passed the stage of development which requires the reconstruction and/or establishment of basic services, thus the level of well-being of the individual is better than in developing countries (Lange et al. 2012; Ameen and Mourshed 2017b) . As such, developed countries no longer require detailed investigations of locality-specific issues in comparison to developing regions (Ortiz et al. 2009). The reverse is true of developing countries where locality-specific issues and community priorities play a vital role in the development of any new framework (MOHSIN et al. 2017).

In recent years, urban sustainable development frameworks have faced major challenges in their application in developing countries, specifically in hot climatic regions such as Arab Gulf countries and Iraq (Mohsin et al. 2018). According to (Mohammed Ameen et al 2014a), these countries depend on burning fossil oil for power production, this causing an increase in levels of CO2 emissions and environmental pollution. Therefore, it is essential to establish comprehensive, urban sustainable development frameworks to enable developing countries to reduce the undesirable effects caused by use of conventional strategies. For example, sustainable frameworks will recommend the use of renewable resources, such as solar energy in hot climatic regions instead of fossil fuels, thus investing in natural resources for future generations. Frameworks will allow planners, developers, policy makers and architects to design future cities guided by their sustainability. New sustainable frameworks will include urban sustainable development goals considering environmental, social, cultural, and economic and innovation factors, rated according to public perceptions and expert views, to identify a policy plan for the area based on local priorities, standards of living, social awareness towards sustainability issues and cultural background.

1.5 Research Methods

This review paper will use the literature review research methodology, consisting of three main stages. The strategy of selecting the numbers of papers related to urban sustainable development research, in addition to the recommendations for future sustainable urban development frameworks for cities in developing countries as shown in Figure 2.

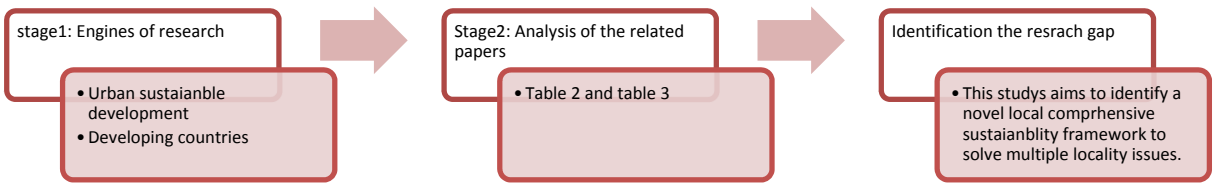

Figure 2. The main stages of the literature review research methodology

Stage 1: Searching

The first stage focused on identification of papers. To do these key words, were selected. These were 'urban sustainable development frameworks', 'developing countries', 'urban sustainable development indicators', and 'assessment tools.

Stage 2: Title and Abstract Analysis

The papers found in the previous stage were analysed, based on the titles, and abstracts of the papers. This stage elicited a total of 35 papers are related to urban sustainable development research, in developing countries as shown in table 2 and 3.

Stage 3: Analysis of the related papers

This analysis has identified that, to date, there has been 15 papers featuring sustainability frameworks for developing countries. However, out of this 15 only 8 conducted research on how existing sustainable development frameworks can properly consider the variety of locality specific issues, these 8 papers are related to urban sustainable development and assessment tools that occur in sustainable development projects across the globe. Furthermore, the work identified in these 8 papers is insufficient to combat current and future challenges in developing countries. This is because previous papers have focused on the global assessment tools and re-rated/re-developed urban sustainable indicators based on their regions. This paper will fully analyse these 8 papers to determine recommendations for the development of new local comprehensive sustainability frameworks.

2. Requirements for Urban Sustainable Development

According to (UNCSD 2012), rapid urbanization leads to increases in air pollution because use of the effects of transport, waste and the growth of population, factors recognised as the main reasons for increases in CO2 levels. In Iraq, population has had a location shift from mainly rural to mainly urban 30% of the population are now reported as living in rural areas in comparison to 70% in the past. This trend is also seen in other countries due to the growth of national migration from rural regions to cities (The United Nations 2014), creating cities which have become crowded and polluted (Niemelä 2014). These urban regions are responsible for increases in greenhouse gas emissions, having fewer green spaces and natural resources than rural areas. The built environment in which people live, therefore has a substantial negative impact globally, regarding pollution, environmental problems, global warming and climate change (Haughton et al. 1996). Professionals are therefore focusing on enhancing economic, social and environmental sustainability indicators, specifically in the construction industry (Lélé 1991). Secondly increasing energy consumption in many countries has been attributed to climate change; this phenomenon has been identified in Middle East countries. Exacerbating this situation, these countries generate power by burning fossil oil, leading to further increases in levels of CO2 emissions (Reiche 2010).

This high-energy consumption, rapid population growth, the need to combat climate change is becoming a key determinant of the economic development pathways. Economic growth remains a priority for national governments (Kenworthy 2006) but dealing with population growth has raised significant challenges for developing economies (Ameen and Mourshed 2017c). Additionally, local traditional urban build standards, despite some updating, still need further development to truly implement future sustainable development.

One of the criticisms levelled at global sustainability assessment methods is that they are not suitable for every urban area/neighbourhood, at a sector city or district level (Carmen and Bruno 2014). Reasons for this are that these tools do not adequately address specifics around climate differences, socio-cultural factors, and locality-specific problems.

2.1 Global Energy Consumption and Urban Sustainable Development

Based on the concept of sustainability described previous, sustainable development is defined a new approach to meeting human needs, promoting the use of economic aspects to preserve our environment and resources, by integrating various aspects e.g. the construction sector, industry and health services (Mebratu 1998; Assefa and Frostell 2007). This approach includes challenges concerning the utilization of natural resources such as energy, food, transportation, social activities, shelter and effective waste management, while conserving and protecting the quality of the environment and the supply of said natural resources (Boustani 2008).

Recent studies have focused on practical solutions; i.e. renewable sources, sustainable societies and minimising energy consumption, to combat excessive carbon emissions and environmental pollution (Dincer 2000). Urban sustainable development can thus be conceptualized as improving quality of life by creating a healthier environment while satisfying socio-economic demands (Pauleit et al. 2005). This is of significance for the domestic building sector as it occupies the largest proportion of national energy consumption; 25% for Japan, 28% for China,

42% for Brazil, 47% for Switzerland and 39% for the UK. In Saudi Arabia, domestic energy consumption exceeds 50% (Alyami et al. 2015) while in Iraq, domestic energy consumption has been recorded at a staggering 83% (Hague 2010). These levels are a result of weather conditions, cultural background, standards of living, building design, domestic local features and population growth (Markandya and Wilkinson 2007).

Developed countries are leading the way through investing in clean energy sources such as photovoltaic (PV) as a source of clean energy for future cities (Schaffers et al. 2011).

Table 1. Energy consumption in domestic sector- worldwide

Country	
UK	39-40%
Brazil	45-47%
Iraq	80-83%
Switzerland	45-47%
China	28-30%
Saudi-Arabia	50-55%
Australia	30-35%

Source: Europe energy guidelines reports, 2014, 2015, and developing countries developments assessments tools 2014

As the building sector in the EU is seeking to increase the utilization of renewable energies, several studies already reporting on the use of these (Lund 2007). Previous studies have also focused on decreasing energy consumption by maximizing the use of renewable energy resources through the use of small-scale power plants in the domestic sector (Omer 2008). That said, environment protection and quality of life improvements may need more time to become embedded in practice through an increase in social awareness and education.

Sustainability and utilization of renewable energies are critical challenges for Middle-East countries, due to the limited direction from policy-makers; these countries have difficulties investing in natural resources (Kenworthy 2006). This is because the countries with the largest oil reserves, Saudi Arabia, Iraq, Iran and Kuwait, all favor the use fossil oil to generate energy (Markandya and Wilkinson 2007). Breaking this down by country, Iraq‘s oil reserves rank fifth in the world making it a relatively rich country but with rapid urban development, economic development, a population boom and large demands on electricity (The United Nations, 2014). Global practices such as renewable energy should be considered as an option to oil and gas sources, recognizing, for example, the sun as a source of natural energy (Assefa and Frostell 2007).

Due to poor infrastructure and mounting demands on energy, shortages of electricity are common in developing countries, for example the people of Iraq suffer considerable shortages in electricity supply, this affecting the economy. The cost to the economy from Life Cycle Cost (LCC) is estimated to be about US$40 billion per year at present (Hague 2010). Therefore, it is essential to identify alternative methods to address the waste of resources and provide practical sustainability solutions for future generations. For example (Prasad et al. 2014) report that the economy of oil, transport, health cost, and energy consumption related carbon emissions are causing an increase in societal problems. Mitigation of climate change, energy usage, traffic congestion and transport demands can however be achieved through a range of international policies that reduce greenhouse-gas emissions on a global scale (Woodcock et al. 2007).

A rapidly growing global population also impacts the urban environment. Various kinds of air pollution, noise, material waste, and high energy demand expand necessitating sustainable development (Kántor and Unger 2010). For example, the UK domestic sector is expected to adopt the Government's carbon emission reduction program, which expects a reduction in emissions of 20% (Pauleit et al. 2005). Energy Efficiency Standards of Performance (EESOP) have been imposed to achieve gas and electricity reductions, the majority of which have to come from low-income households (Milne and Boardman 2000).

Many global practices have focused on achieving a reduction in CO2 emissions of 60%, like Japan, by 2050. Minimising CO2 emissions is proving difficult for Japan (Yamaguchi et al. 2007), the main challenge determining energy savings from the building sector by reducing environmental issues such as air pollution (Oikonomou et al.

2009).

In recent years, significant efforts have been made to optimise energy efficiency and reduce energy consumption in buildings. This is related to the energy demand to achieve desirable environmental conditions, at the same time reducing energy consumption and CO2 emissions (Maleki 2011). For this reason, researchers have been looking at techniques to improve indoor climatic conditions and reduce energy consumption (Babaizadeh et al. 2015). These techniques include the use of exterior shading systems which decrease the amount of roof surface exposed to direct sunlight. These shades can keep the interiors of buildings cooler and reduce cooling loads and operation costs. Construction practices on optimizing site layout and urban sustainable design can lead to the optimize land use effectively in particular for new urban development areas, also improve the indoor buildings temperatures for hot dry regions according to use the practical techniques feed into the new urban projects' frameworks (Tam et al. 2002).

Table 2. Multi- illustration themes of the previous studies (Fenton et al. 2015; Gerbinet et al. 2014; Christian 2008; Munda 2006; Alnaser et al. 2008; Hernandez and Kenny 2010; Mohammed Ameen et al. 2014a)

	(Olatomiwa et al. 2016; Ahmad, Mourshed, et al. 2016; Suganthi and Samuel 2012; Debnath et al. 2015a; Ã et al. 2008; Yuce et al. 2016; Mohsin et al. 2018)	(Peng et al. 2013; Mohammed Ameen et al. 2014a; Alyami 2015; Fawzi and Ameen 2017; Almutairi et al. 2019)	(Morelli 2011; Ameen and Mourshed 2017a; Peng et al. 2013; Liu et al. 2010; Gerbinet et al. 2014; Mourshed et al. 2009)	(Cohen 2006; Holden 2012; Olatomiwa et al. 2016; Pauleit et al. 2005; Rodrigues et al. 2015; Ahvenniemi et al. 2017; Alyami 2015; Munier 2011; Dumitru et al. 2020; Ali-toudert et al. 2020)	(Roberts 2008a; Ruhé et al. 2013) (Hamilton-MacLaren et al. 2013; Aldossary et al. 2015b; Alyami 2015; Mohsin et al. 2018)
Aims and tools	***Predicting energy and optimisation resources***	***Urban sustainability framework and assessment tools***	***Environmental impacts: LCA Life Cycle Assessment***	***Urban sustainable development: Minimising energy consumption***	***Reducing CO2 emissions and, optimizing use of resources***
Theme 1 Optimization energy	✓		✓	✓	✓
Theme 2 Urban sustainable development	✓	✓	✓	✓	
Theme 3 Energy consumption & zero energy		✓	✓	✓	
Theme 4 Renewable source	✓	✓	✓	✓	✓
Theme 5 Framework assessments tools	✓		✓	✓	✓

Table 2 lists previous works which have focussed on different subjects related to sustainable development. Many studies have reviewed global assessment tools, Life Cycle Assessment tools LCA, analysing energy and optimisation and urban sustainable developments goals. These goals include minimising energy consumption, CO2 emissions, the use of resources, and predicting energy needs. Several themed topics can be found targeting the same area but in different subjects. There are several papers under the title of optimisation of energy consumption, zero energy, renewable energy, urban sustainable development, and framework assessment tools. All these

different areas have common objectives related to sustainability with objectives of reducing the consumption of resources and energy and improve the quality of the environment.

To conclude, efforts are underway worldwide but particularly in developing countries such as China and India, Arab gulf regions, including Saudi Arabia and Iraq, to reduce energy consumption. These countries, more so the Arab Gulf, endure a long summer season with high temperatures up to 50 degrees Celsius, and as such are classified as having energy consumption levels. In response, intensive efforts are being made to gather theoretical and practical knowledge about how to reduce the undesirable effects of relying on conventional power generation and traditional methods to combat climate change and high energy consumption.

3. Urban Sustainable Development Frameworks

Sustainability assessment frameworks are an integrated concept, which combine numerous urban sustainable development indicators, covering environmental, social, and economic dimensions. These indicators are combined as part of a framework to improve applications by cities to help meet future challenges, specifically in developing regions such as housing deficits, rapid urbanization and high energy and transport demands.

This section discusses only the most influential prior studies focusing specifically on hot arid countries. This strategy has been taken due to the large quantity of literature set in a variety of contexts. Thus, this section has selected 13 articles which address urban sustainability frameworks suited for their hot dry regions. In Table 3 these papers are surveyed in the context of urban sustainability indicators that are related to global guidelines such as BREEAM, LEED, CASBEE, etc. It has been found that these 13 past studies have surveyed the most common indicators, including environment, water, energy, transportation, and etc, in order to design a local urban sustainability framework, suit to their countries including a set of urban sustainability indicators based on their locality-specific issues.

Working at two levels, sustainability frameworks comprise a set of urban sustainable development factors which are designed to mitigate locality-specific issues. Addressing these issues can involve the adoption of multiple strategies which in turn feed into the process of the further development of urban sustainable development guidelines (Huang et al. 1998; Wu 2014).

Urban sustainable development frameworks are characterised by the development of mutual relationships between local and global challenges such as rapid urbanization, high energy consumption and environmental problems. A number of studies have listed urban sustainable development assessment tools and compared them (Rebitzer et al. 2004; Xing et al. 2009), highlighting the content, structure and output of urban sustainable development tools. Key findings suggest that no framework or tool can cover the wide range of urban design aspects required to meet both the development of new city applications, such as city districts and domestic sectors, or further improve existing ones. Many researchers have tested several practices (Alyami et al. 2015; Fawzi et al. 2016; Aldossary et al. 2015) and suggested new assessment tools which include comparative items such as environmental, social and economic aspects of urban sustainable development to understand the goals of addressing a specific region and its locality-specific issues. In contrast, authors such as (Willis 2006; Alyami et al. 2015) suggest that urban sustainable development assessment tools are not fit for all regions because of diverse locality-specific factors including community features, weather conditions, social awareness levels and standards of living.

Consequently, it has been realised that global frameworks/assessment tools need to be re-assessed/designed, their urban sustainable development goals appropriate for the countries they are applied to (Alyami et al. 2013; Mohammed Ameen et al. 2014a). To achieve this, leading experts in various fields such as environmental and sustainable development have been consulted in previous works, in addition to professionals and local experts from government organisations, academia and Non-Government Organisations (NGO). Their findings conclude that global environmental assessment methods are not suitable for application in Saudi Arabia, Jordan, and Iraq (Alyami et al. 2015; Willis 2006; Ameen and Mourshed 2017c).

These urban sustainable development frameworks are key to urban development. They encompass a wide range of indicators that identify successful strategic plans and policies designed to meet urban sustainable development targets (Devuyst et al. 2001). Indicators can be defined as "A quantitative or qualitative variables/factors that explain a reliable means to determine achievement, reflecting changes relationship to assess the behavioural development actor or phenomena"(Devuyst et al. 2001). These urban sustainable development indicators improve interactions between international and local contexts and enhance human well-being and social satisfaction.

Global sustainability frameworks/assessment tools involve several urban sustainable development indicators which cover a variety of dimensions e.g., environment, water, energy infrastructure and transportation socio-economic factors, and natural hazards. One global sustainable development assessment tool for buildings is the

Comprehensive Assessment System for Built Environment (CASBEE), created and developed in 2001. A similar tool is a Leadership in Energy and Environmental Design for Neighborhood Development (LEED-ND in 2009), and the BRE Environmental Assessment Methods for Communities (BREEAM Communities in 2011), UK. However, there is no specific list of all indicators that suit all countries and communities due to the wide-ranging differences between regions, local communities' culture, climatic regions, social factors, local priorities and availability of resources (Alyami et al. 2015; Willis 2006; Fawzi et al. 2016).

Table 3 lists the global and local assessment tools for different countries which have established urban sustainable development assessment tools. It also illustrates all indicators used in selected urban sustainable development assessment tools, such as BREEAM Community, LEED-ND, CASBE-UD and GSAS/QSAS. Several indicators representative of energy, climate change and greenhouse gas emissions, have global significance and are used as major indicators in all assessment tools. These essential indicators can be adopted across countries for use in local guidelines, but they must be appropriate for these specific countries based on community priorities, culture, and economic situation. This paper has identified urban sustainable development indicators relevant to each country's needs. Selection was based on a review of previous studies and the re-assessment of indicators to establish their suitability for Baghdad. Each of the tools in the table is described in more detail below.

Table 3. Several global/local assessment tools of urban sustainability indicators in developed and developing have surveyed through different authors

Type of urban sustainability tools	Organization	Region	Context	Indicators	Previous studies surveyed
-LEED-ND	US Green Building Council	USA	Local	Environmental indicators Ecology Energy Water Transportation Economy Natural hazards Community involvement Sustainable buildings Resources	(A'zami et al. 2005; Ameen et al. 2015a; Fawzi et al. 2016; Aldossary et al. 2015b; Aldossary et al. 2014a; Alyami et al. 2015; Willis 2006) (Haroglu 2015; Rezaallah and Bolognesi 2012) (BREEAM Design 2018) (Bounoua et al. 2020; Ameen et al. 2015a; Alyami et al. 2013)
- BREEAM	BRE/UK	UK	Local		
-Community	(JaGBC) and (JSBC) ††	UK	Local		
- CASBE-UD	IBM	Japan	Local		
- Smart cities challenge	Gulf Organization for Research	USA	Global		
- GSAS/QSA	Green Building Council of Australia (GBCA)	Qatar	Local	Environmental indicators Ecology Energy Water Transportation Economy Natural hazards Resources	
- Green Star Sustainable Communities		Australia	Local	Ecology Energy Water Transportation Economy Natural hazards	

One of the global assessment tools considered in Table 3 is BREEAM, which was developed in 1990 in the UK by the Building Research Establishment (BRE). Nowadays, BREEAM has a variety of sustainability assessment

tools covering different locations, e.g. BREEAM Canada, BREEAM Hong Cong and BREEAM International (BRE 2011). According to the technical guidelines for BRE (2013b), this version was issued for local projects and has been adopted in the UK as a guide for building sustainable communities. It is not just a local assessment tool but also constitutes global and international project guidelines in terms of sustainability. LEED-ND and CASBE-UD have also launched global and local indicators that can be adopted anywhere with different rating systems which allow for local specific issues such as energy consumption, environmental indicators, and transportation factors. These global/ local assessment tools have been assessed by different researchers, as shown in Table 3, to establish their appropriateness for application in countries such as Iraq, Saudi Arabia, and Jordan.

In addition, there are sustainable assessment tools and sustainable development methods already available, i.e., life-cycle assessment (LCA), indicators of sustainable-cities, sustainability-projects, urban sustainable frameworks, rating-system and certification guidelines (Paranagamage et al. 2010; Joss 2012; Gil and Duarte 2013). In recent years, several well-known global and international assessment tools have been improved, some expanded making the transition from building assessment to urban development (Sharifi and Murayama 2013, 2014). Another global tool, the Comprehensive Assessment System for Built Environment (CASBEE) was developed in 2001, later expanded to include urban development in 2007. Similar developments can also be seen in the Leadership in Energy and Environmental Design for Neighbourhood Development (LEED—ND) in 2009).

In developing countries, tools such as UAE, the Estiadma Pearl Community Rating System (Pearl Community 2010), BRE Environmental Assessment Methods for Communities (BREEAM Communities in 2011) and the Sustainable Building Tool in Portugal for Urban Projects (SBToolPT – UP in 2014), are available. The Global/Qatar Sustainability Assessment System (GSAS/ QSAS) emerged in 2010 as a set of assessment tools for buildings and urban development, as shown in Table 3. These assessment tools include multi-dimensional indicators, like other global frameworks but with different rating systems. These rating systems reflect locality-specific issues for individual countries. For example, water quality and availability were rated as the most significant indicator in UAE using the Estiadma Pearl Community Rating System (Pearl Community 2010), due to very little rainfall coupled with hot, dry and arid climatic conditions. Likewise, Iraq has suffered from the same issue caused by the low rainfall because of climate change caused by desertification and the exposure of rivers and water bodies such as marshes, to drought. Ecological indicators, including green cover, were rated the highest according to BREEM and LEED systems. Rating systems and assessment tools must be able to evaluate individual climatic regions amongst other things making it important to engage local stakeholders and member of the public to collect accurate data and thus create a successful framework.

Globally, the establishment of new urban sustainable development frameworks is based on identifying designs, planning, selecting the site, topography, services, and utilities. Most key urban planning decisions are made by policymakers such as politicians, engineers and designers without public consultation on urban construction projects, particularly in developing economies.

The dimensions of urban sustainable development are characterized by a huge number of indicators i.e., with (Xing et al. 2007) suggesting over 600 (Zhou et al 2012) have created a framework comprising 141 urban indicators for sustainability assessment applicable to Chinese cities. The need for a comprehensive and integrated framework for urban sustainable development has been investigated by researchers by considering the influence of cities. However, there is no specific list of indicators exists that suits all countries, areas, and communities (Ugwu and Haupt 2007). Several indicators such as, energy, climate change and greenhouse gas emissions have international priorities and are common indicators in all evaluation methods. These common aspects are essential for monitoring the evaluate process of sustainable urbanization in order that it does not remain as a fixed abstract concept (Shen et al. 2011; CIDA 2012), while providing designers and policymakers of urban development from multiple dimensions of urban factors.

Urban sustainable development assessment tools and frameworks have the potential to assist in achieving a balance between the needs of humans and environmental requirements thus developing the quality of life and the economic competitiveness of the urban area. Moreover, there is the need to promote the active participation of those living in urban areas, to achieve effective decision-making processes. Specifically, this is applicable to the case study region and its locality-specific problems to demonstrate that urban sustainable development is one of the most important solutions to mitigate current and future challenges.

To conclude, this section has examined a wide range of global sustainability tools, which tend to have the same range of main indicators such as the environment, ecology, water, energy, transportation, and infrastructure. To improve the quality life in the area being considered, new sustainable frameworks can be established to provide policymakers, developers, architects and engineers with local guidelines which embrace the concept of urban

sustainable development. The problems that have been identified through the current review is that existing tools cannot simply be adopted in any location, because of locality-specific factors. These include levels of social awareness, local community priorities, cultural background, and standard of living. For this reason, many authors from Arab Gulf countries have re-assessed global indicators according to their specific community needs and the perceptions of local experts, to create/design suitable frameworks for their regions. This previous work shows there is a mismatch between previous studies and this study which focuses on proposing strategies and the elicitation of a set of urban sustainable development indicators, focussing on planning strategies and domestic features. The selection of a set of appropriate indicators can improve quality of life and minimise the use of valuable resources.

5. Identification of Research Gaps

The review of existing sustainability frameworks, described in the previous section, has shown that there is the need to develop a framework for sustainable urban development specifically for developing countries that incorporates the viewpoint of the public in the decision-making process. This will allow the identification of priorities, as perceived by the local community, thus providing a greater understanding of locality-specific issues. The purpose of this section is to draw attention to the research gaps present in previous frameworks; this has been done through the analysis of other significant reviews in the area. Table 4 lists previous work that has been reviewed across several sustainable studies.

Table 4. Review papers listed according to the specific regions/countries in developing countries. (Caprotti 2014; Li and Wen 2014; Aldossary et al. 2015b; Willis 2006; Ameen et al. 2015b; Alyami et al. 2015)

Papers reviewed (authors)	Country	Title/Subject	Tools/ Methods
(Aldossary et al. 2014a)	Saudi Arabia	City form and sustainable indicators framework	Use of a multiple case study in Riyadh city via a simulation model using IES-VE software
(Alyami et al. 2015)	Saudi Arabia	The development of sustainable assessment method for Saudi Arabia	Saudi environmental assessment method (SEAM), (AHP), Panel of experts
Willis (2006)	Jordan	The urban sustainable methods: case study Jordan	Weighting system (AHP), Panel of experts
(Aldossary et al. 2015b)	Saudi Arabia	Consensus based, low-carbon, domestic sustainable design in Saudi Arabia	An in-depth investigation of public views and a consultation with 40 experts across Saudi Arabia
(Ameen and Mourshed 2017a)	Iraq	Urban environmental challenges in developing countries: A stakeholders perceptions	Investigation of public views across Iraqi cities
(Ameen et al. 2015b)	Iraq	A critical review of urban assessment tools	Reviewed six widely used sustainability global assessment tools to identify the research gap
(Alyami et al. 2015)	Saudi Arabia	The development of assessment methods for Saudi Arabia	Weighting system method (SEAM) categories. AHP process
Shohouhian and Soflaee (2005)	Iran	Environmental sustainable Iranian traditional architecture in hot-humid regions	Use of library documents and Internet sites as well as analysing building plans

The primary problem that have been identified through the current review is that existing tools cannot simply be adopted in any location, because of locality-specific factors (Aldossary et al. 2014; Ameen et al. 2015; Alyami 2015). These include levels of social awareness, local community priorities, cultural background, and standard of living. For this reason, many authors from Arab Gulf countries have re-assessed global indicators according to their specific community needs and the perceptions of local experts, to create/design suitable frameworks for their regions. This previous work shows there is a mismatch between previous studies and this study which focuses on proposing strategies and the elicitation of a set of urban sustainable development indicators, focussing on planning

strategies and domestic features. The selection of a set of appropriate indicators can improve quality of life and minimise the use of valuable resources.

This paper has identified 8 highly relevant papers out of 15 that were initially identified as relevant. These 8 have been selected because they focused on hot dry and arid countries (Ameen and Mourshed 2017a; Al-Najideen and Alrwashdeh 2017; Aldossary et al. 2017; Mohsin et al. 2020). These papers identify the methods and tools that have been used in the investigation and development of sustainability frameworks. This is shown in table 4 which documents several previous studies that have critically reviewed assessment methods of urban sustainable development goals in developing countries. Even so, the previous papers that are shown in table 3 and table 4 have considered only the development of sustainable development indicators and have no focused on eliciting practical solutions. This is a key research gap.

Analysis of these studies has identified research gaps based on reviewing the past studies, this study focuses on engaging with the public to identify the locality-specific issues based on their priorities, lifestyle, viewing regarding the existing city's applications, and cultural background. While the previous research has developed their research methods-based software programs and technical solutions. Furthermore, there are three important aspects need to be addressed to solve multiple issues in the area being considered. These 3 dimensions are the city's future vision, future domestic requirements towards low energy consumption, and a set of urban sustainable development factors to improve the quality of life.

Previous studies have presented a comparative analysis of tools, practice, and the purpose of global sustainability assessment of urban developments to provide a better understanding of the vision and goals of each practice. They also highlight the special circumstances different countries consider before selecting their list of indicators and categorizing them according to the environment and economic, social, and cultural parameters.

Developing a new framework can help to improve the decision-making process by identifying the optimal urban indicators to tackle current challenges and future requirements including setting the most important priorities for new urban developments. In this context, global strategies target three major areas: energy savings, improvements in energy production and alternative energy sources which encourage the use of renewable energy. Large-scale, renewable energy plans must therefore adopt strategies to integrate alternative sources systems influenced by energy consumption and consumer awareness (Lund 2007). Given the significant proportion of energy consumed by buildings in developed countries, this use of the roof of a building as an intelligent system, can be adopted anywhere to minimize the operational LCA of said building.

While there currently are many international assessment tools and frameworks, these are not suitable for specific developing regions, such as those in hot dry countries i.e., our Iraqi case study. In addition to climate challenges, there are many reasons why global frameworks and assessment tools are not suited for developing countries. There are wide differences between local priorities from place to place, as well as social factors, the standard of living of the community and political issues. Iraq has been classified as politically unstable for more than four decades, this causing a wide gap between global and local circumstances.

Well-known global methods such as BREEAM and LEED were not originally designed to suit all regions, including developing countries, such as the Saudi built environment (Alyami and Rezgui 2012). This is because their environmental assessment indicators and criteria were primarily improved to suit a specific region and own its environment, such as the US for LEED, UK for BREEAM, and CASBEE for Japan. Despite the used wide range of global indicators in other regions, evidence suggests that assessed built environments do not perform well because of their climate and socio-economic factors (Oregi et al. 2015; Susilawati and Al Surf 2011).

When adopting a new method or framework to tackle existing problems and future challenges, the evaluation of global indicators based on the local priorities and stakeholders' perception are required to ensure success. Assessment tools such as LEED for US, BREAM for UK, CASBEE for Japan, and PERAL guidelines for UAE countries, originally designed for specific regions, are not applicable for use in all countries due to locality-specific conditions in politically unstable countries such as Iraq. Iraq has suffered from harsh conditions, which have served to damage infrastructures, public services, and utilities in addition to impacting negatively on quality of life. Currently, there are several construction projects underway and at the planning stage in Iraq: adopting new methods such as appropriately designed urban sustainable development indicators will help designers and decision-makers mitigate undesirable impacts in the future.

Secondly, previous studies have not featured public participation in order to identify the local context, priorities, and weaknesses in existing applications nor have they measured people's social awareness of urban sustainable challenges (Fawzi et al. 2016). It is important to identify the priorities of the local population with respect to their daily experience as users of their environments and to test their awareness of urban sustainable development goals.

This will facilitate the development of an optimal sustainable plan for a case study in Baghdad based on the local key priorities needed to improve the quality of life.

Neither LEED nor BREAM consider public perceptions when they investigated locality-specific factors in developed regions, specifically the USA and UK. In contrast, in some developing countries a few authors have attempted to build new frameworks suitable for their regions after assessing their community's perceptions and carrying out expert consultations to achieve a consensus for their built environment(Iraq, Saudi Arabia and Jordan) (Fawzi et al. 2016; Aldossary et al. 2015; Alyami et al. 2015; Aldossary et al. 2014; Willis 2006).

Therefore, there is the necessity to identify an effective way to integrate public participation into the development of frameworks. Integrating public perception has become a significant challenge for creating urban frameworks (Fawzi et al. 2016). This involves investigating stakeholders' perceptions to understand their priorities, testing their social awareness, consideration of cultural background and the standard of living. Some authors i.e. (Fawzi et al. 2016; Alyami et al. 2015; Aldossary et al. 2015; Willis 2006) have used urban sustainable development indicators to create new frameworks/assessment tools for Iraq, Saudi Arabia, and Jordan. These authors have re-assessed global assessment tools by evaluating their community's views through surveys of urban sustainable development goals across several regions. These studies have built new assessment tools or frameworks, based on public perceptions about priorities, standards of living and community awareness, thus supporting policymakers and designers by providing new indicators with respect to urban sustainable development. Public perceptions are a significant challenge, due to the need to assess global indicators suitability for developing countries by investigating locality- specific issues. Using a scientific, consensus-based consultation (Alyami and Rezgui 2012), the authors have identified new criteria not used in either LEED or BREEAM, but which are considered of importance when working in the Saudi built environment. In this context, socio-cultural, environmental issues, and locally built environment aspects, should not be assessed based on global criteria. It is important to include locality-specific issues such as high energy consumption, traffic problems, rapid population growth and environmental pollution, such issues applicable in Saudi Arabia and Iraq (A'zami et al. 2005; Aldossary et al. 2014; Mohammed Ameen et al. 2014).

6. Conclusion

There is broad agreement that urban issues are important for all countries, both now and in the future. Previous studies have not involved public perceptions of urban sustainable development frameworks/assessment tools and local ideas about local urban development, because global indicators were originally designed to be suited to developed regions. In developing countries, global sustainability indicators need to include locality-specific issues. As such, this study recommends the use of local and international indicators, based on selection of a set of indicators which reflect local views and priorities.

This paper has discussed the omissions identified in previous sustainability frameworks. This study proposes to establish new sustainable guidelines using the priorities identified by those local to the area under consideration.

A second recommendation concerns refer to urban sustainable development assessment tools such as BREEM and LEED in that these are not applicable for use in war-torn countries, due to the locality-specific problems present in these environments. They lack the inclusion of environmental strategies to tackle the consequences of the impact of war on the environment as well as little focus on socio-cultural factors.

Gathering public perceptions about urban development challenges is an essential task for policymaking. Participants' views of urban development indicators reflect their daily experience and their ambitions for the future.

It is suggested here that the best way to achieve this is by firstly collecting the views of those who live in the region under consideration, this, followed by consultation with experts, based on public opinion re their needs. These investigations ought to use urban sustainable development indicators from global assessment tools such as LEED or BREAM, as their foundation to create a new framework which is then based on the priorities of the local community.

7. Recommendations for Future Development of Sustainability Frameworks

Urban populations will make up nearly 70% of the total world population by 2050. Therefore, governments are facing major challenges regarding the provision of essential services and around how to mitigate environmental issues, in developing countries such as Iraq. Iraq suffers from major problems including population-inflation, the lack of an environmental agenda, and high energy and transport demands. However, several cities around the world have developed urban sustainable development plans to manage their locality-specific problems in terms of urban sustainable development.

Various studies have analysed a series of urban sustainable development frameworks, both commercial and

academic. Their findings suggest that global indicators can be used anywhere as a guideline but that the methodologies and assessment tools for specific regions as referenced in table 3, such as developing countries, should be investigated locally ensuring specific issues for each country are dealt with. This is due to a wide range of differences between developed regions and developing areas, in addition to the impact of different climatic conditions hot, dry, arid regions.

As a result of this analysis of the literature, the key recommendation for future research is that global urban sustainable development assessment tools such as BREEAM and LEED, are not appropriate for developing countries such as Arab Gulf countries and Iraq, because of locality-specific issues that present problems in these regions (as identified in Section 3). This study has presented multiple factors covering environmental, social, and economic and management issues relevant to the development of new frameworks by providing guidelines which deal with urban sustainable development goals. This will help decision-makers and designers in developing countries, specifically our case study - Baghdad, Iraq, to identify how successful strategies and technical policies have been in the implementation of sustainable goals. This section has also explored issues around taking a global approach to urban sustainable indicators and argued why there is a need to re-assess urban sustainable development goals, based on locality-specific issues, meeting the need to create comprehensive sustainable living frameworks to address quality of life, minimise the use of resources, tackle environmental challenges, and mitigate current housing crises and traffic congestion.

This paper recommends that:

- Future urban sustainable development frameworks should be developed by combining theoretical and practical knowledge about urban sustainable development goals including environmental, transportation, socio-cultural aspects, and economic aspects. (As Described in Section 2.2).
- New urban development projects need to tackle issues such as high energy consumption, rapid urbanisation, and population growth and transportation problems, (As Described in Section 2.3)
- The locality-specific issues in the case study area should be considered by the creation of guidelines, roadmaps, and new standards, (As described in Section 1.2)

An investigation approach of the locality-specific issues should be adopted to identify public views via a national survey in the area being considered as mentioned across, (As Described in Sections 3 urban Sustainable Development Frameworks and 4 identifications of research gap).

- Existing urban criteria should be updated to drive the domestic housing sector towards the wider development of low energy homes. This is important because the highest percentage of electric energy consumption comes from the domestic sector, particularly in hot, dry regions, (As Described in Section 2.3).
- On-site renewable energy is promoted in the domestic sector as an alternative solution to burning fossil oil across this paper, (As Described in Section 2.3).

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