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Voluntary Local Review Framework to Monitor and Evaluate the Progress towards Achieving Sustainable Development Goals at a City Level: Buraidah City, KSA and SDG11 as A Case Study

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Abstract: Around the world, cities are on the front lines of sustainable development. They are responsible for more than 70% of global carbon emissions. Many of these cities are experiencing dangerous levels of pollution, underemployment, and health disparities. Since 2015, 193 countries have endorsed the 17 Sustainable Development Goals (SDGs), intended to help address a wide range of challenges affecting cities and ultimately secure the resources for their next generations. All states are expected to present the national progress towards the SDGs through a Voluntary National Review (VNR). Despite the importance of the cities within this framework, only a handful of them worldwide have actively begun to review and assess progress towards these SDGs on a city scale. This paper seeks to develop a Voluntary Local Review (VLR) framework to assess and evaluate the progress of cities towards contributing to the SDGs. This framework has been developed by localizing the international and national frameworks to measure the performance of cities as they advance towards achieving the SDGs. Such a framework can serve as a tool for benchmarking progress on different aspects of sustainable development and help urban planners and policymakers prioritize policies and actions to improve urban quality of life. This framework is applied to monitor and evaluate the progress of the city of Buraidah in Saudi Arabia, as it strives towards achieving the targets of SDG11 ("Make cities and human settlements inclusive, safe, resilient and sustainable").

Keywords: Voluntary Local Review (VLR); Sustainable Development Goals (SDGs); SDG11; Urban Observatory; monitoring framework; localization

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1. Introduction

Cities experience a significant number of the world's greatest development challenges [1–3]. Simultaneously, they have enormous potential for advancing sustainable development (SD). Cities are home to extreme poverty, unemployment, socioeconomic disparities, and unsustainable consumption and production patterns [4,5]. Today, cities generate approximately 80% of global gross domestic product (GDP). However, they are the

key contributors to climate change and environmental degradation. They are responsible for over 70% of global energy consumption and 70% of global carbon emissions [6].

In September 2015, the world leaders pledged support for sustained action around a universally agreed policy agenda. This agenda comprises 17 Sustainable Development Goals (SDGs) with 169 specific targets that set out quantitative objectives [7,8] associated with the social, economic, and environmental dimensions of SD, to be achieved by 2030. These goals should provide a framework for action to adopt and implement collaboratively with critical stakeholders [5,9]. Furthermore, this conjunction with the Sendai Framework for Disaster Reduction and the New Urban Agenda emphasizes how cities should be pivotal in taking the lead in managing several of these persistent global challenges [10].

The majority of the world's leaders and their governments are committed to implementing the 2030 Agenda, goals, and targets [11,12]. This follow-up is intended to strengthen policies and institutions of governments for the implementation of the SDGs at the national level called Voluntary National Reviews (VNRs), and a standard and inclusive framework should be provided. This process aims for mutual learning by sharing countries' experiences, including initiatives, challenges, and lessons learned, which could help accelerate SDG implementation [13,14]. One hundred forty-two countries have already presented their VNRs at the high-level political forums (HLPF) on SD since 2016. A further 51 countries' experiences were due to be presented during 2020 [15].

Despite governments' excellent conceptualization of the SDGs, the goals contextualized to the local actors' diversity are yet unclear. Many local actors remained unaware of SDGs since their output contributed to the achievement of these goals. So far, the situation is the same with SDGs, especially in many third-world countries. By the time of the writing of this paper, there exists no comprehensive mechanism for localizing SDGs. The Inter-Agency and Expert Group on SDG Indicators has focused on developing the global statistical framework necessary to evaluate the achievement of the SDGs. The group appears to establish a bottom-up analytical approach of SDGs that disaggregate indicators metadata by sex, age, race, and ethnicity, among other national characteristics. This analytical approach means combining data from diverse sources to generate a trend [16,17]. The SDGs' localization process is not only relevant to developing countries but also among developed countries. Countries like Germany, Sweden, Japan, Norway, Denmark, Finland, Belgium, and the Netherlands have already aligned SDGs with their national development strategies [18,19]. Thus, while almost all of the states involved have already presented or had intended to show their VNRs by 2021, only a handful of initiatives around the world have tried to prepare VLR at the city level [12,20]. These VLRs could be a practical approach in accelerating the progress of SDG implementation [10] and offer and contribute to addressing the common obstacles and challenges that urbanization represents. Localization in this context involves linking global development goals with national and subnational government's development agendas to establish paradigmatic transformation and coherence in the design and implementation of development policies [20].

Moreover, reporting and monitoring the SDGs on a city scale requires a paradigm shift in governance to gather coherent and consistent information about the transition towards SD [21]. For this purpose, localization of these indicators to customize monitoring to each city's context to accurately reflect the progress towards achieving SDGs is required [4,22,23]. Such indicators should act as the backbone of any monitoring framework to measure the progress towards the SDGs at the city level. A robust indicator framework should be a crucial management tool in helping to develop implementation strategies and allocate resources to enhance the sustainability levels and improve the accountability of all relevant stakeholders in moving towards the SDGs [24].

A monitoring framework with clear indicators and targets should be required for all cities in developed and developing countries if they are committed to successfully implementing long-term SD plans [15,25]. Such a monitoring framework should track the progress, over time, of indicators and targets and alert policymakers to identify the challenges or constraints, leading to the creative adaptation of better-informed policies in

a local context [1]. In addition, such a framework should promote the accountability of different stakeholder groups and enhance collaboration between them to develop further plans and actions [21]. It has been emphasized that better-integrated information of the indicators has been one of the most significant dimensions in monitoring SD [21]. There remains a lack of localizing the international and regional indicators to make them valid at the city level [25,26]. However, some of the most pioneering and critical international initiatives that have tried to monitor a city's progress towards delivering the SDGs are the US cities' SDGs Index and The VLR for Bristol.

The US cities' SDGs Index was compiled in 2017. This index ranked 100 metropolitan statistical areas, according to 49 indicators based on 16 of the 17 SDGs. In addition, ten indicators were used to evaluate the progress in meeting SDG11. The chosen indicators were closely aligned to the Inter-Agency and Expert Group on SDG Indicators (IAEG-SDG), adopted by the UN Statistical Commission [5]. Furthermore, the VLR for Bristol aims at evaluating the city's progress towards achieving SDGs. The format of this report was based on the guidance of VNRs produced by the UN Department for Economic and Social Affairs [15]. In developing a comprehensive understanding of the city's progress, this report combined a review of statistical indicators with an extensive consultation exercise and the involvement of a wide range of citizens and stakeholders. This report utilized 146 indicators compiled from various sources, including city sustainability frameworks and the IAEG-SDG indicators. Bristol's metrics were established while developing plans and strategies for the city [27]. However, only 15 indicators were used to evaluate the progress towards SDG11.

In this research, SDG11 ("Make cities and human settlements inclusive, safe, resilient and sustainable") is used because it is the most related target to the city conditions in addition to its interlinkages with other SDGs (Figure 1). It suggests that improvements in the levels of inclusiveness, safety, resilience, and sustainability of cities will set the stage for achieving the targets of the other SDGs such as ending poverty, enhancing equality, promoting economic growth, and ensuring citizens enjoy healthy lives.

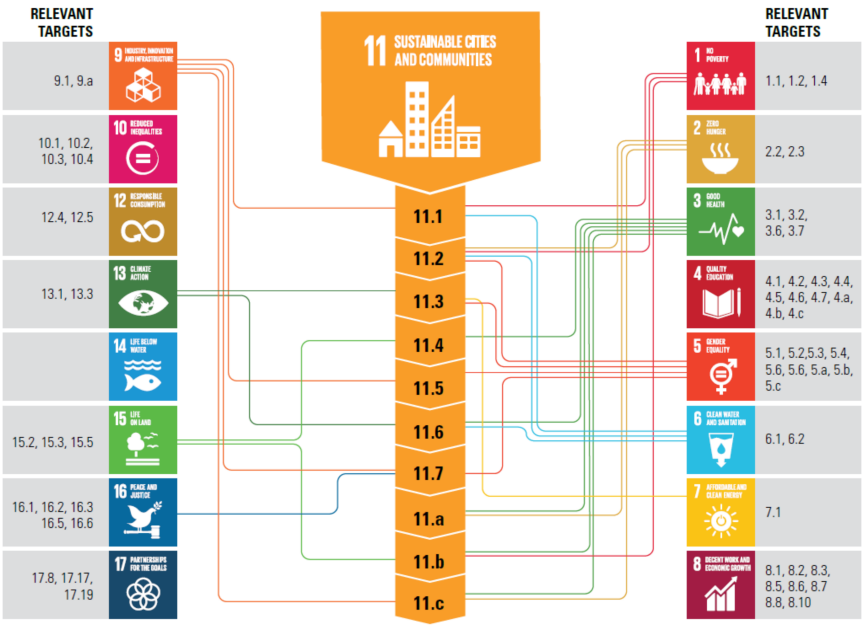

Figure 1. Interlinkages between SDG11 and other SDGs. Source: [10].

This paper seeks to develop a robust VLR framework to monitor and evaluate the progress towards achieving SDG11. This framework can serve as a tool for benchmarking progress on different aspects of sustainable development and help urban planners and policymakers prioritize policy actions designed to improve the sustainability levels in cities.

With Saudi Arabia being a signatory state of the Urban Agenda, one of its second-tier cities, Buraidah, has been chosen as a case study for many reasons outlined in Section 3 below.

The paper (Figure 2) is structured around four main parts. Following this brief introduction, the next section presents a new framework based on a critical evaluation of existing frameworks. Next, it explains how this proposed one may better monitor and evaluate the target's indicators. Then, in Section 3, we apply the proposed framework, particularly to Buraidah City, as a case study and discuss the monitoring outcomes for practice. Finally, research conclusions are presented.

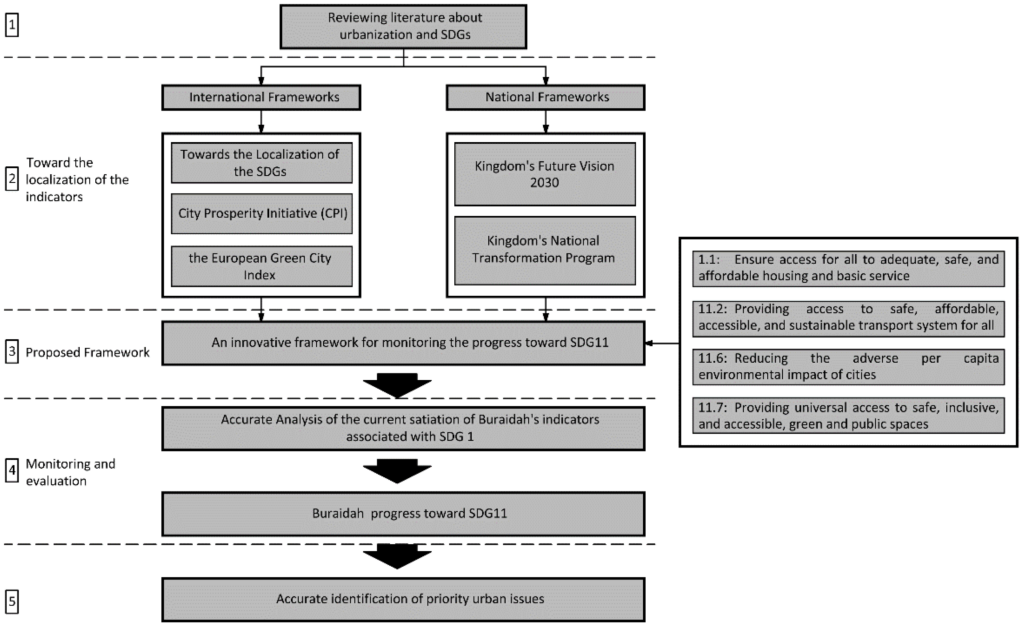

Figure 2. The research methodology.

2. Research Methodology

This study seeks to develop an innovative framework to assess the progress towards achieving SDG11 at the city level. The research will develop a VLR framework based on analyzing and comparing many international and national methodological frameworks for evaluating a city's position towards achieving a sustainable urban environment. This monitoring framework will be based on integrated indicators, including global, national, and local indicators. It is an effective platform for an integrated analysis and better monitoring of the implementation of this goal at the city level. This framework also helps to understand better the nature of relations and synergies between all indicators that reflect each target of SDG11. Accordingly, the temporal and comparative analysis processes will be addressed within this framework using the selected appropriate national and global trends and the availability of the local indicators that are important for achieving SDG11 in both the short and long term. This monitoring of outcomes could help urban planners and decision makers to develop policies to improve Buraidah's resilience and mitigate the issues that affect people's quality of life.

The research methodology to develop the proposed framework, as shown in Figure 2, consists of five stages. The first stage is to review the literature about urbanization and SDGs to draw a comprehensive picture of the role of VNR and VLR. Additionally, the conducted review demonstrates the reason for choosing the SDG11 and its linkage with the different SDGs' urban-related targets. This stage has been accomplished in the introduction section. The second stage is studying and comparing three international and two national methodological frameworks for achieving the SDGs. These frameworks have focused on the dimensions of the sustainable urban environment, those most related to the research objectives. The included international frameworks are: Towards the Localization of the SDGs,

City Prosperity Initiative (CPI), and the European Green City Index, while the national frameworks are Saudi Arabia's Vision 2030 and its National Transformation Program [28]. The third stage is to propose an innovative framework for monitoring the progress towards SDG11. This stage includes determining a set of criteria to prioritize the list of indicators before making a final selection.

The fourth stage interests implementing the proposed framework to monitor and evaluate the progress towards SDG11 in the case study "Buraidah". Understanding the dynamic evolution in the value of indicators during a specific period is considered the basis for identifying and monitoring the progress towards achieving the targets and defining weaknesses, including the critical urban issues that impede performance against the aspect of the targets. Therefore, this stage sought to track the evolution of the indicators chronologically from 2012 to 2017 and then compare it with the average of this value during the last decade beginning with 2009 to accurately analyze the current situations of Buraidah's indicators associated with the targets of SDG11. The main reason for choosing 2017 as the base year was that the government of KSA formally endorsed the recommendations of the UN in improving the quality of life for the individual and community and achieving sustainable development. To identify the value directions, we have to determine whether the values of the indicators have been enhancing positively or declining negatively. This process is crucial before monitoring and evaluating the progress towards achieving targets by comparing the last values of the indicators with the future targets to assess how much the value represents against the target.

The methodology that has been used in this stage is the chronological tracking of the evolution of the indicator values, the average value of the indicator during the last five years, and then comparing these results with other Saudi cities as well as the averages of the Kingdom and international standards, if any are available. One of the outcomes of this stage is the classification of the indicators, based on this comparison, into three main categories: (1) moderate indicators whose values are equal or around the average within the last five years, (2) negative indicators reflecting aspects of challenges in achieving future targets, and (3) positive indicators reflecting improvement in the value towards future targets and ultimately the sustainability levels. In addition, one of the outcomes of this stage includes the evaluation of the progress in the following targets.

This fourth stage focuses on the indicators representing numerically global, regional, or future national targets. The outcome of this stage is the ratio for each target, describing how much the target has been achieved in the city—in addition, identifying which targets are expected to be realized within the timeframe and which are facing difficulties in being achieved by 2030. The urban issue that has hindered the achievement of some aspects of the targets has been identified, as shown in Figure 2. These issues have been utilized as input to develop several practical measures to improve the city's resilience and then fulfil the expectations of realizing the goals of SDG11.

The fifth stage is concerned with prioritizing the different development issues in the city according to the conducted evaluation.

2.1. Reviewing of Previous Rewiring Frameworks

2.1.1. The International Frameworks

Towards the Localization of the SDGs is an initiative to build a creative approach to monitoring and then solve the global challenges related to SD at local levels. This approach was based on collaboration between the local and regional governments on one side and with the communities on another [14]. The main aim of the localization of SDG indicators in this initiative was to accelerate the implementation of SDGs at different levels using a rights-based approach in their development strategies that have been built on the "Right to the City" principles acknowledged in New Urban Agenda [21]. The first two editions of this report have been presented to the HLPF in 2018 and 2019, respectively [29]. As Table 1 shows, around 15 indicators extracted from both of these editions could be used to monitor local progress towards SDG11; four indicators reflect the situation of the

target 11.1, five indicators for 11.2, and only two indicators reflect each of 11.3 and 11.6, while only one indicator related to each of 11.5 and 11.7. The following section presents the different international and national SDGs reviewing frameworks and their linkage with SDG11, representing the second stage in this research.

UN-Habitat developed the City Prosperity Index (CPI) in 2012 to evaluate the sustainability of cities as a part of its support and technical aid programs for the countries and their cities. This index is one of the main components of City Prosperity Initiatives to implement and monitor the policies and measures of SD for increasing welfare in the cities [30]. The CPI of the city is based on 6 main dimensions, further subdivided into 15 subdimensions. The main dimensions are infrastructure, productivity, quality of life, equity, and social inclusion, environmental sustainability, governance, and legislation [31]. Most national governments have adopted CPI as a global monitoring scheme for SDGs with an urban component. The CPI merges indicators of all targets of SDG11 (Figure 3). Around one-third of these indicators are urban-related and can be used to monitor the progress of cities towards achieving SDG11. As Table 1 shows, 11 indicators related to the infrastructure dimension can be utilized to review both targets 11.1 (6 indicators) and 11.2 (5 indicators). In addition, six indicators are associated with the Quality-of-Life dimension, which can help measure the progress of both targets 11.2 and 11.7, with three indicators for each. In comparison, only four indicators can be used to reflect the situation of target 11.6 (Environmental Sustainability).

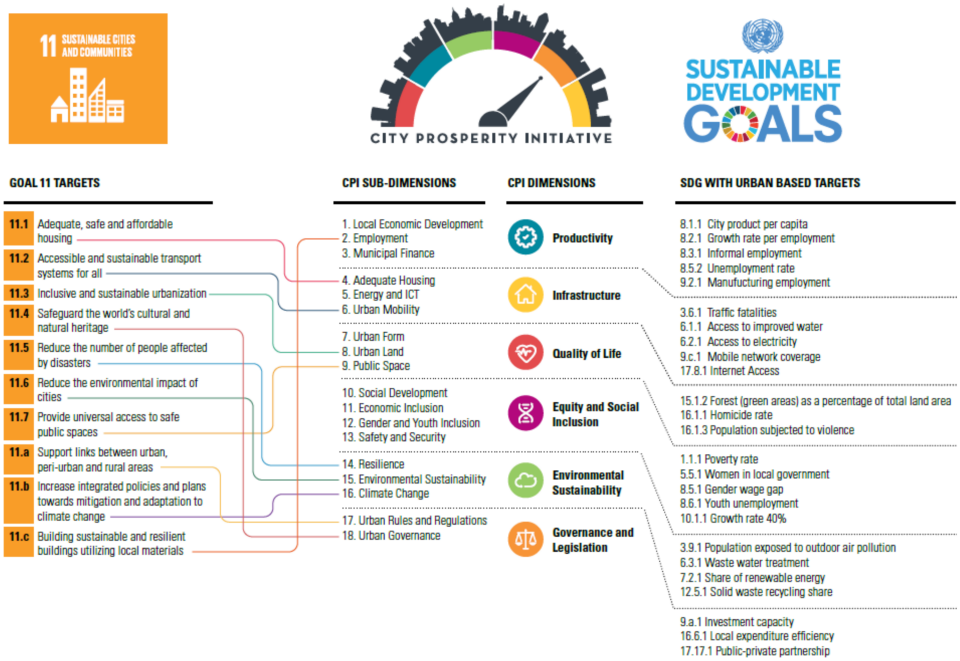

Figure 3. Linkages between CPI and SDG11 targets. Source: [10].

The European Green City Index is an assessment framework of environmental sustainability used to evaluate 30 European cities; their populations range from 1 to 3 million people [32]. During this evaluation process, a group of 30 indicators has been developed by an expert panel. This set of indicators included all significant aspects of urban environmental sustainability. They also encompass quantitative indicators to evaluate the current cities' performance and qualitative to reflect their commitments to sustainable measures. As Table 1 shows, ten indicators can be utilized to review target 11.1. In comparison, only four are associated with the transport dimension and can measure the progress of target 11.2. In addition, 12 indicators can be used to reflect the situation of target 11.6. Finally, four indicators can measure the progress of the target 11.7 [32].

Table 1. Possible indicators were identified to monitor the SDG11 at the city scale.

Framework / Targets	International Frameworks			Saudi National Frameworks	
	Towards the Localization of the SDGs	**UN-Habitat's City Prosperity Index (CPI)**	**European Green City Index**	**Vision 2030**	**National Transformation Plan**
Target 11.1: By 2030, Ensure access for all to adequate, safe, and affordable housing and basic service	Four indicators	Dimension: Infrastructure subdimension Adequate housing: six indicators	Dimension: Buildings-Three indicators Dimension: Water, Waste and Land use: seven indicators	Pillar: A Vibrant Society sub pillar: Ensure the sustainability of vital resources: seven indicators	Theme: Improve living standards and safety, subtheme: Improve the Quality of Services Provided in Saudi Cities: four indicators Theme: Ensure Sustainability of Vital Resources, subtheme: Ensure, Sustainable Access to Water Resources: three indicators
11.2 By 2030, Providing access to a safe, affordable, accessible, and sustainable transport system for all	Five indicators	Dimension: Infrastructure subdimension Urban Mobility: five indicators Dimension: Quality of life subdimension Urban Form: three indicators	Dimension: Transport: four indicators	Pillar: A Vibrant Society, sub pillar: Improve living standards and safety: two indicators	Theme: Improve living standards and safety, subtheme: Enhance Traffic Safety: two indicators
11.3: By 2030, enhance inclusive and sustainable urbanization and capacity for participatory planning	Two indicators				Theme: Social Empowerment and Non-Profit Sector Development, subtheme: Empower Citizens Through the Welfare and Social Development System: one indicator
Target 11.4: Strengthen efforts to protect and safeguard the world's cultural and natural heritage					
11.5 Disaster and risk reduction	One indicator				
Target 11.6: By 2030, reduce the adverse per capita environmental impact of cities, including paying special attention to air quality and municipal and other waste management	Two indicators	Dimension: Environmental sustainability, subdimension: Environmental sustainability: four indicators	Dimension: Co2: Three indicators Dimension: Energy: Four indicators Dimension: Air quality: five indicators	Pillar: A Vibrant Society, sub pillar: Improve living standards and safety: one indicator	Theme: Improve living standards and safety, subtheme: Reduce All Types of Pollution: one indicator
Target 11.7: By 2030, provide universal access to safe, inclusive, and accessible, green, and public spaces, particularly for women and children, older persons	One indicator	Dimension: Quality of Life, subdimension: Public space: three indicators	Dimension: Waste and Land use: one indicator Dimension: Environmental governance: three indicators		
11.a Rural-urban and regional planning					
Target 11.a: Support positive economic, social, and environmental links between urban, peri-urban and rural areas by strengthening national and regional development planning					

2.1.2. The National Frameworks

In April 2016, Saudi Arabia adopted Vision 2030 as a roadmap for economic growth and national development up to 2030 [28]. This vision was structured around three main pillars: A Vibrant Society, A Thriving Economy, and An Ambitious Nation. This future vision included 96 objectives that would be achieved by several initiatives [3,33,34]. A Vibrant Society is the only pillar with ten indicators that can monitor the SDG11 at the city levels. As shown in Table 1, seven of these indicators can reflect target 11.1 and two indicators target 11.2, while only one indicator can be used to review 11.6.

The National Transformation Program (NTP) was developed to support achieving the future vision for KSA. This program was first launched in June 2016 and updated in 2018. The updated version required adaptation, integration, rearrangement, and re-identifying all government bodies and local authorities' roles and responsibilities [35]. The NTP comprises eight themes; only three included indicators that can help monitor the progress towards SDG11 (see Table 1). For example, the theme of Improve Living Standards and Safety has seven indicators; four of them could be used to evaluate target 11.1, two for target 11.2, while only one indicator can be used to assess target 11.6. In addition, there are three indicators related to Ensuring Sustainability of Vital Resources, which reflect target 11.2. At the same time, the theme of Social Empowerment and Non-Profit Sector Development includes only one indicator that can be used to review target 11.3.

Both Vision 2030 and the NTP are essential to delivering the diversification and growth aspirations of KSA. However, the achievements of the individual goals and strategic objectives critically rest on practical implementation and governance mechanisms. The comprehensive governance model developed by the Council of Economic and Development Affairs is a step in the right direction to coordinate efforts and ensure effective monitoring of progress towards the 2030 goals and strategic objectives. The escalation mechanisms are also fundamental to the successful implementation of the vision. Furthermore, sustainability assessment of national visions should be a common practice to balance achieving environmental, social, and economic goals [36].

2.2. The Proposed Framework Indicators

In the third stage, the framework indicators have been selected. At first, we are reviewing and discussing the critical indicators from the international and national initiatives that resulted in a long list of potential indicators for each target of SDG11. A group of criteria has been used to prioritize the indicators to shorten this list into a more manageable set that can be used as a framework for monitoring the progress of cities towards achieving SDG11 in developing countries.

- Relevance: each indicator should have a significant influence on the monitoring process. That means the indicators should have a robust relationship to the targets of SDG11.
- Availability: the value of the identified indicators should be readily available.
- Measurability: chosen indicators should be measurable to calculate the percentage of the targets' achievement.
- Reliability: definitions of the chosen indicators should be precise according to the principles drawn from the metadata guides of the UN.
- Non-Redundancy: identified indicators within a monitoring framework should measure only one target of SDG11 [37].

Furthermore, indicators should be clear, simple, scientifically sound, and reproducible. Utilizing these criteria gives a clear indication of the strengths of an indicator system [32].

As Table 2 shows, the proposed framework, based on these criteria, will focus on the main four targets using eighteen indicators for target 11.1, seven indicators for each 11.2 and 11.6, and five indicators for 11.7 and, using this framework, we selected indicators that evaluated all aspects of each mark of SDG11. To enhance the monitoring and increase the likelihood of delivery *against Vision 2030, the* authors revised the definition and metadata of the chosen indicators based on the UN documents [31]. One of the proposed framework's

strengths is its simplicity and flexibility to monitor sustainable urban development in line with the New Agenda 2030 at the city level. This framework provides practical measures and instruments for evaluating a city's progress. In addition, it also functions as a checklist for future sustainable development plans and strategies.

Such an integrated framework inevitably offers potential benefits compared with both US cities and Bristol initiatives. It has the potential to consider and combine a broader spectrum of indicators that can reflect all aspects of the main four targets of SDG11 properly. The proposed framework includes 37 indicators reflecting SDG11 compared with only 10 and 15 in US cities and Bristol initiatives.

Table 2. Proposed framework indicators.

Goals and Targets of SDG11	Global Monitoring Indicators of SDG11	Complementary Indicators on National and Local Levels (Localization)
Target 11.1: By 2030, Ensure access for all to adequate, safe and affordable housing and basic service	11.1.1 Proportion of urban population living in slums, informal settlements or inadequate housing	Housing areas per capita
		Room occupancy rate
		Percentage of vacant housing
		Housing productivity to household
		Household formation ratio
		Housing prices to income rate
		Residential land price to income rate
		Residential rent to income rate
		Percentage of house owners
		Percentage of housing fund from Real Estate Development Fund Loan (REDFL)
		Percentage of poor Saudi families
		Percentage of families under sufficiency line
		Average of water consumption per capita
		Percentage of wastage of water
		Percentage of houses access the public network
		Percentage of houses access to the sewage network
		Percentage of electricity coverage
		Percentage of internet users
11.2 By 2030, Providing access to safe, affordable, accessible and sustainable transport system for all	11.2.1 Proportion of population that has convenient access to public transport, by sex, age, and persons with disabilities	Average time of the daily trip to work
		Expenditure on road construction
		Road lengths per 1000 people
		Road density
		Roads' intersection density
		Accident rate
		Road accident death rate
Target 11.6: By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management	11.6.1 Proportion of urban solid waste regularly collected and with adequate final discharge out of total urban solid waste generated	Regular collection of solid waste
		Solid waste recycling
		Percentage of treated wastewater
	11.6.2 Annual mean levels of fine particulate matter (e.g., PM2.5 and PM10) in cities	Carbon monoxide ratio
		Nitrogen dioxide ratio
		Ground ozone concentration
		The concentration of fine particulate matter
Target 11.7: By 2030, provide universal access to safe, inclusive, and accessible, green and public spaces, particularly for women and children, older persons	11.7.1 Average share of the built-up area of cities that is open space for public use for all, by sex, age, and persons with disabilities	Green and public spaces per capita
		Sustainable population density
	11.7.2 Proportion of person victim of physical or sexual harassment, by sex, age, disability status, and place of occurrence, in the previous 12 months	Murder rate
		Robbery rate
		Physical and sexual harassment rate

3. The Case Study Area

There is already international cooperation aimed at promoting sustainable development in Saudi cities, in line with the recommendations of the World Urban Forum, organized in collaboration with UN-Habitat. Previous research asserts a need to conduct a comprehensive study on how Saudi cities can ensure equitable development achievements [38].

For this research, Buraidah has been selected as a case study area. The city is located in the central part of eastern Al-Qassim, which is positioned in central Saudi Arabia (Figure 4). Buraidah is about 350 km away from Al-Riyadh, the Kingdom's capital. Buraidah is situated on a vast plateau, gradually descending from the west to the east. It is considered the capital of the Al-Qassim region and is also the biggest city there [39]. Buraidah was home to 644.4 thousand people in 2017, representing 2% of the total KSA population. The administrative activities account for 45% of the entire economic sector, then comes the service sector (15.5%) and commercial (10.3%). Finally, the agricultural sector accounts for 1.1% of the economy [40]. Buraidah is mainly known for producing high-quality dates, 117.7 tons in 2017, with revenues of SAR 824 million [40,41]. The arable land is located outside the urban mass of the city [41,42]. The demographic analysis for Buraidah shows that it is a youthful community with more than half of the population under 30 years of age, while only 30% of the population is over 65 years [40]. Therefore, it should be considered while developing future policies and plans to maximize young people's benefits [43]. The main reason for choosing this particular city was its steadily growing economy, caused by its significant location at the crossroads of the leading trade routes. Specifically, it is located at the junction of two important highways. The first is the Riyadh-Buraidah-Hail. The second is the Medina-Buraidah-Riyadh, which links the holy city to the capital.

Additionally, Buraidah has a very active Urban Observatory, which worked hard to provide accurate indicators reflecting a truthful image of the progress of the city towards achieving the SDGs in general and the targets of the Kingdom's Vision 2030 in particular. The Observatory gathers a massive amount of information on most city characteristics. The Observatory began with 84 key indicators in 2011, but this has extended to 137 today. Buraidah's Urban Observatory represents the primary source of information on the identified indicators in the monitoring framework utilized within this research. The methodology of Buraidah's Observatory to issue indicators is consistent with the national and international priorities [42].

Figure 4. Buraidah location. Source: [41].

4. Results

4.1. Monitoring the Current Situation of the Indicators

Monitoring the current situation of the indicators as a part of the fourth stage of the research methodology aims to understand and crystallize the current situation of the selected indicators, in Buraidah, for each target of SDG11. Understanding the current situation is considered an initial step to evaluate the progress of the city of Buraidah towards achieving all targets of the goal.

For target 11.1 (Ensure Access for All to Adequate, Safe and Affordable Housing and Basic Services), by presenting and analyzing the current situation of the selected 18 indicators, it was found that the relative weight of the number of positive indicators displaying improvement towards achieving these targets in the city reached 55.6% of the total number of indicators reflecting the target of 11.1 of SDG11. However, the number of negative indicators represented 16.7% of the total number of indicators. This reflects some of the significant challenges faced to achieve the targets, which must be considered in future policies to ensure that everyone has access to adequate, safe, affordable housing and essential services, resulting in improvements in the levels of sustainability and quality of life for the citizens in the city of Buraidah. These include, in particular, citizens' ability to access adequate housing, as the percentage of housing funds from REDFL decreased. The moderate indicators that did not positively affect the achievement of the target recorded 27.7% of the total number of indicators. Still, these highlighted the potential for policy interventions to make a positive contribution.

For target 11.2 (Providing Access to Safe, Affordable, Accessible and Sustainable Transport System for All), by presenting and analyzing the selected seven indicators' current situation, all the indicators positively contribute to achieving the second target SDG11.

For target 11.6 (Reducing the Adverse per Capita Environmental Impact of Cities), the relative weight of the number of positive indicators in the city was 71.4% of the total number of indicators related to target 11.6 of SDG11. Meanwhile, 28.6% of the total number of indicators highlighted a negative contribution. These were associated with recycling solid waste and treating wastewater, which requires further policy attention.

For target 11.7 (Providing Universal Access to Safe, Inclusive and Accessible, Green and Public Spaces), all five indicators imply a positive contribution in achieving the targets of SDG11.

An overview of the current status of the indicators for SDG11 in Buraidah revealed 37 of the indicators currently produced by Buraidah's Urban Observatory were related to SDG11.

The chronological and comparative analysis of these indicators shows that 73% of the total indicators of the targets demonstrate a positive direction of travel with significant improvements towards achievement SDG11. In comparison, only 13.5% of the indicators reflect challenges to achieve the targets, as Table 3 shows.

Table 3. The overall current situation of the indicators which relate to the targets of SDG11.

Indicators Related to	Target 11.1	Target 11.2	Target 11.6	Target 11.7	Total	
Positive	10	7	5	5	27	73%
Negative	3	0	2	0	5	13.5%
Moderate	5	0	0	0	5	13.5%
Total	18	7	7	5	37	100%

4.2. Monitoring the Progress of Buraidah towards Achieving Targets of SDG11

This section aims to evaluate the progress towards achieving better sustainability levels and improving the quality of life in Buraidah, according to SDG11. This evaluation is based on indicators with clear and specific numeric targets at the national or international level towards an end date of 2030. Vision 2030 of the Kingdom of Saudi Arabia and the NTP represents the primary source of these targets, and both were designed and based on the UN targets. If the target is not available in those sources, the city prosperity indices,

according to the Program of the United Nations Human Settlements for 2015, have been used. Ten of the prior thirty-seven selected indicators have been excluded from this stage because of a lack of comparative information. Consequently, only twenty-seven indicators have been utilized to evaluate and measure the progress of the four targets of SDG11 as shown in Table 4.

Table 4. The overall situation for the progress towards improving sustainability levels and achieving all SDG11 targets.

Targets 2030	Target 11.1		Target 11.2		Target 11.6		Target 11.7	
	No of Ind.	%	No of Ind.	%	No of Ind.	%	No of Ind.	%
Achieved	6	40%	2	50%	2	50%	0	0%
Expected to be achieved	7	46.7%	2	50%	1	25%	3	75%
Difficult to achieve	2	13.3%	0	0	1	25%	1	25%
Total	15	100%	4	100%	4	100%	4	100%

For target 11.1 (Ensure Access for All to Adequate, Safe and Affordable Housing and Basic Services), the number of numeric indicators for 2030 that reflect the progress towards achieving 11.1 target was fifteen (three were excluded due to lack of data). These three indicators are Percentage of housing fund from Real Estate Development Fund Loan (REDFL); Percentage of vacant housing, and Household formation ratio. Meanwhile six indicators, representing 40% of those fifteen, have reached the future target very early. For instance, the percentage of the population living in households with access to essential services, safe water, electricity, and safe sewage systems reached the maximum of 100% in 2017. In addition, seven more indicators are expected to have achieved the target by 2030. These indicators include room occupancy rate, housing prices, income rate, percentage of house owners, and internet users. However, the last two indicators are difficult to be achieved within the 2030 timeframe (Percentage of houses access the public network and Percentage of houses access to the sewage network). Here, the local government needs to intervene and work collaboratively to design measures to help their achievement. The overall situation of ensuring access for all to adequate, safe, and affordable housing and essential services in the city of Buraidah has witnessed significant progress to achieve 84.3% of the total targets for 2030.

For target 11.2 (Providing Access to Safe, Affordable, Accessible, and Sustainable Transport System for All), the number of numeric indicators for the year 2030 that reflect the progress towards achieving this target was four. Two indicators, (average time of the daily trip to work and road's intersection density), had already reached the future target by 2017. In addition, another two indicators, (road density and road accident death rate), are expected to be achieved by 2030. Thus, the overall situation of providing access to a safe, affordable, accessible, and sustainable transport system for all in the city of Buraidah has witnessed remarkable progress, already achieving 78.2% of the total targets for 2030.

For target 11.6 (Reducing the Adverse per Capita Environmental Impact of Cities), the number of numeric indicators for the year 2030 was four. The percentage of treated wastewater and carbon monoxide ratio has already reached the future target very early. In addition, regular collection of solid waste is expected to be achieved by 2030. However, the percentage of solid waste recycled appears challenging to achieve by 2030. Therefore, the overall situation of reducing the adverse per capita and the environmental impact in Buraidah has witnessed tremendous progress, completing 70.6% of the total targets for 2030.

For target 11.7 (Providing Universal Access to Safe, Inclusive, and Accessible, Green and Public Spaces), the number of numeric indicators that reflect progress towards achieving this target was four for the year 2030. Although no indicator has been achieved yet, three indicators are expected to be achieved by 2030. These three are green and public spaces per capita, murder, and robbery rates. Meanwhile, only sustainable population density is difficult to achieve within the timeframe. The overall situation of ensuring access

for all to safe, inclusive, accessible, green, and public spaces in Buraidah has witnessed significant progress towards achieving 60.1% of the total 2030 targets.

5. Discussion

Although Buraidah has taken a giant leap towards achieving SDG11 targets, as outlined above, some of the urban issues that negatively affected the sustainability and quality of life in the city of Buraidah remain. Continuation of these issues without understanding their nature can significantly hinder the progress towards the full achievement of SDG11. Understanding the nature of these issues and their evolution over the last five years has made it clear that it is difficult to deal with them simultaneously. So, they should be prioritized according to their importance and the urgency of intervention required to reduce their negative impacts on the quality of life of Buraidah's inhabitants. Thus, to make tangible progress towards improving the levels of sustainability and quality of life, the issues have been classified into three levels (first/second/third priority) by using the risk analysis method [44–46], as shown in Table 5, based on the following factors:

- The level of change in the values of indicators related to the urban issues during the last five years.
- The level of achievement, whether whole or part of future targets.
- The value of the numerical gap between the current situation and target.

Table 5. The priority urban issues.

Priority \ Targets	Target 11.1	Target 11.2	Target 11.3	Target 11.4
First priority		Absence of a public transport system	The decline of the solid waste system	
Second priority	- Increasing the average water consumption per capita beyond sustainability levels - Declining housing fund from the Real Estate Development Fund Loan (REDFL)			Robbery crime rate
Third priority			The sewage system	

5.1. First Priority

The priority issues include:

The absence of public transport system; there is no public transport network in Buraidah at all. Although the consequences of reliance on private means of transport in the last monitoring are not clear, problems will inevitably emerge with the increasing population size in Buraidah and its approach to becoming a million-person city.

The decline of the solid waste system; this has been witnessed in Buraidah during the last five years as a comprehensive system ends with recycling operations. The waste buried in Buraidah in 2017 represents 94.7% of the total disposal of solid waste [41,42], which is considered a significant waste of resources that can be dealt with in a more environmentally friendly way which is also economically sound. The municipality has already introduced measures, and the recycling rate is expected to increase in the coming years.

5.2. Second Priority

The second priority issues are:

Increasing the average water consumption per capita beyond sustainability levels; although the limited water sources are mainly groundwater, the current consumption in Buraidah is very high, 277.8 LPD [41,42], and moving towards unsustainable consumption behaviour. Moreover, this consumption contravenes future development goals and the

Kingdom's vision for 2030. So, the government needs to put a considerable effort into rationalizing the rate of water consumption.

The decline of housing funds from REDFL; the percentage of buildings that REDFL has funded has declined by about half over the last five years. This decline has significantly hindered achieving targets to improve the percentage of families who receive housing support and funds. This decline could have a significant negative impact on the housing market in Buraidah and the welfare indicators of the population.

Robbery crime rate: although the robbery rates in Buraidah have reduced by 50% over the last five years, it remains significantly above the national and global target for the year 2030 [41,42]. Further information needs to be available, like the crime types and the nationalities of offenders, for better understanding and finding practical solutions.

5.3. Third Priority

The third priority issue focuses on untreated wastewater. Untreated wastewater has several negative impacts on groundwater and soil contamination, the city's health condition, and treating costs.

6. Conclusions

All the UN member states are committed to following up their progress towards implementing the ***2030 Agenda*** and its goals and targets. Although almost all those states have presented, or are going to present their VNRs, only a handful of initiatives worldwide have tried to prepare VLR at the city level. This would be a practical approach in accelerating the progress towards achieving the SDGs. This is because the cities have been suffering from a significant number of development challenges; simultaneously, they have enormous opportunities for advancing SD. In the same regard, the Sendai Framework and New Urban Agenda both emphasize that urban cities should be in an excellent position to take the initiative to manage several of the persistent global challenges like pollution and environmental degradation. So, VLR will offer a brilliant opportunity to address common obstacles and difficulties those urban areas suffer from. In addition, reporting SDGs on city levels will require a paradigm shift in governance to involve the local authorities and government in gathering indicators representing SD's situation. Therefore, a robust VLR framework is a crucial management tool to develop implementation strategies and allocate the resources to enhance the sustainability levels and improve the accountability of all relevant stakeholders for achieving the SDGs on another. In addition, this paper sought to develop a robust VLR framework to monitor and evaluate the progress towards achieving SDG11. The main reasons behind choosing this goal are interlinkages between SDG11 and the other Goals. A monitoring framework with clear indicators and targets is required for cities to implement long-term SD plans successfully. This research developed the VLR framework based on analyzing and comparing three international and two national methodological frameworks in evaluating the city's position towards achieving a sustainable urban environment. The proposed framework focused on four main targets (as Table 2 shows), including eighteen indicators for monitoring target 11.1, seven indicators for each 11.2 and 11.6, and five indicators for 11.7. The proposed framework was tested in Buraidah, a very active Urban Observatory that measures some 137 indicators reflecting a truthful city image.

To enhance the monitoring and then increase the likelihood of implementation of the agenda out to 2030, this research tried to understand the dynamic evolution in the value of the indicators as a base for monitoring the progress towards achieving the targets and defining the weaknesses and urban issues that impede achieving some aspects of these targets. The outcomes of this monitoring show that Buraidah has made significant progress in achieving 84.3% of target 11.1, 78.2% of target 11.2, 70.6% of target 11.6, and 60.1% of target 11.7.

Although Buraidah achieved this progress towards these targets, some of the urban issues have negatively affected the city's sustainability and quality of life. By understanding

the nature of these issues, it has been seen that it is difficult to deal with all these issues simultaneously. So, the research prioritized them according to their importance and urgency of intervention to reduce their negative impacts on the quality of life of Buraidah's inhabitants. These issues have been classified into three levels (first/second/third) priority, as shown in Table 5.

The outcomes of this research could provide the impetus for more strategic action to guide both central and local governments to enhance the sustainability levels and quality of life at the city levels. However, the mitigation measures and policies for addressing the urban issues which impeded SD need further research.

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