

The NUBEO Quality of Life Indicators Methodology for Analytical Assessment of Urban Community Public Satisfaction and Sustainable Development.

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Abstract- The growing problems of urbanization, economic development, and environmental sustainability have shifted the emphasis of contemporary urban studies to the quality of life in urban populations. Measuring quality of life helps cities measure citizens' overall contentment and suggest areas for improvement, offering valuable information to urban planners and politicians. One well-known instrument for this purpose is the ****Numbeo Quality of Life Index****, which collects data on important factors such as cost of living, healthcare, pollution, safety, and housing affordability. The purpose of this research is to examine the effect of utilizing the Numbeo Index to assess quality of life, with a particular emphasis on how its indicators affect public satisfaction and contribute to sustainable urban development. This study examines Quality of Life Indicators, Sustainable Development Indicators, and Numbeo Quality of Life Indicators. It compares their index scores to identify trends and establish the importance of these elements in determining urban citizens' well-being. In addition, the research sheds light on the Numbeo Index's potential as a practical tool for assessing and improving the quality of life in a variety of urban settings. This research aims to educate future urban planning methods and assist policies that promote sustainable, livable cities.

Keywords- *Quality of Life (QoL), Public Satisfaction, Sustainable Development, Numbeo Index.*

Table 1: Quality of life (QOL) and relevance assessment of previous studies.

Studies:	Focus:
[1] Gilhooly and A. Bowling, 2005.	QOL indicators.
[2] Roslan, 2019.	Environmental and urban quality of life.
[3] Wesz, 2023.	urban quality of life.
[4] Zhao, 2015.	QOL indicators.
[5] Katar, 2022.	sustainable urban development.
[6] R.SALAH 2023	sustainable and urban quality of life.

I. INTRODUCTION

The challenge confronting nations globally in enhancing urban community development transcends mere project implementation; it necessitates the integration of various developmental facets to cultivate communities characterized by a substantial enhancement in quality of life [1]. Throughout this process, people are pivotal, acting as both contributors to progress and beneficiaries of development. If development fails to meet its objectives, the investments aimed at achieving these objectives may become inadequate. This underscores the need of robust structures to achieve enduring progress and public contentment .[7]

In this context, assessing quality of life has become a pivotal concern, both globally and regionally, affecting the happiness and well-being of the local populace. The Numbeo Quality of Life Index is an essential instrument for evaluating and improving public happiness and sustainable development, since it offers insights into several elements affecting urban settings [8]. This research aims to examine the application of the Numbeo Index in the Egyptian urban setting, focusing on the influence of key elements that define quality of life .[9]

1 .The affordability of housing and the cost of living

Inhabitants in urban centers such as San Francisco and New York City may encounter discontent due to the elevated cost of living in these regions, particularly those with lower incomes[10]. The Numbeo Index aids policymakers in identifying challenges associated with the cost of living by providing statistics on housing affordability and supporting initiatives like affordable home building. This is achieved by mitigating budgetary limitations and significantly improving public well-being .

2. Environmental Standards and Pollution Metrics .

Air pollution in places like Beijing and New Delhi significantly adversely affects the health and well-being of

residents [11]. Numbeo's pollution metrics assess air and water quality, allowing authorities to tackle environmental issues via the promotion of cleaner transportation, enforcement of industrial rules, or creation of green areas .[12]

3 .Data on Protection Measures and Criminal Offenses

The low crime rate in Tokyo, relative to places such as Detroit or Johannesburg, clearly demonstrates the substantial impact of safety on the overall satisfaction of the populace. Numbeo's safety data identifies regions requiring enhanced security and promotes community policing and local initiatives designed to improve safety and quality of life .[13]

4 .The availability of medical assistance and services

Residents in places such as Zurich and Toronto, which possess exemplary healthcare systems, often exhibit greater levels of happiness compared to other cities. Cities with restricted healthcare access often exhibit diminished levels of community happiness [14]. The healthcare measurements offered by Numbeo assist in pinpointing places where urban planners might enhance healthcare accessibility and infrastructure .[15]

5 .Leisure Activities and Environmentally Important Areas Cities renowned for their green areas, like Copenhagen, promote elevated public happiness and advance sustainable development. Although not explicitly stated, happiness with green spaces may be deduced from related indicators, which subsequently encourages cities to improve urban livability by creating parks, pedestrian areas, and bicycle-friendly zones .

Traffic and transportation are the sixth theme .

Traffic congestion adversely affects the quality of life for Los Angeles residents by prolonging travel times and exacerbating pollution levels [16]. To alleviate congestion and enhance sustainability, Numbeo's traffic index identifies areas requiring enhancements to their transportation systems. It also promotes investments in public transit and other mobility options .

This project aims to provide an analytical method for assessing urban quality of life that aligns with societal happiness and promotes sustainable urban growth. The research use the Numbeo Index to analyze essential aspects, providing urban planners and lawmakers with a complete framework for improving community satisfaction and creating coherent urban landscapes that address local requirements. .

II. Methodology

This mixed-methods study investigates urban public satisfaction and sustainable development through quantitative and qualitative data [10]. The quantitative assessment will utilize the Numbeo Quality of Life Index, which evaluates urban quality of life metrics. Interviews and case studies will be incorporated to contextualize the findings and elucidate the impact of these variables on urban environments. This methodology encompasses the following steps :

1 .Data Acquisition (Theoretical)

Extraction of Numbeo Index Data: This project will retrieve data from the Numbeo Quality of Life Index for various cities worldwide, focusing on cost of living, pollution, safety, healthcare, green spaces, and traffic conditions. The data will be categorized by city and examined across regions to assess urban satisfaction and sustainability trends .[6]

Supplementary Secondary Data: Government reports, urban development statistics, and other publicly accessible data regarding city demographics, infrastructure, and environmental policies will be utilized to enhance the research .

2 .Data Examination (Quantitative Analysis)

Numbeo and secondary data will be employed to evaluate the influence of each quality of life indicator on public satisfaction. The examination of quality of life indices (pollution, safety, expense of living) and public satisfaction will utilize correlation and regression analysis. This examination will delineate the paramount aspects for each city or region .

3 .Framework Formulation

Developing a Quality of Life Framework: Quantitative and qualitative studies will be employed to construct a model for assessing quality of life in sustainable urban development [9]. This methodology will integrate Numbeo's data with metrics of urban planning and sustainable development, as shown in Figure 1.

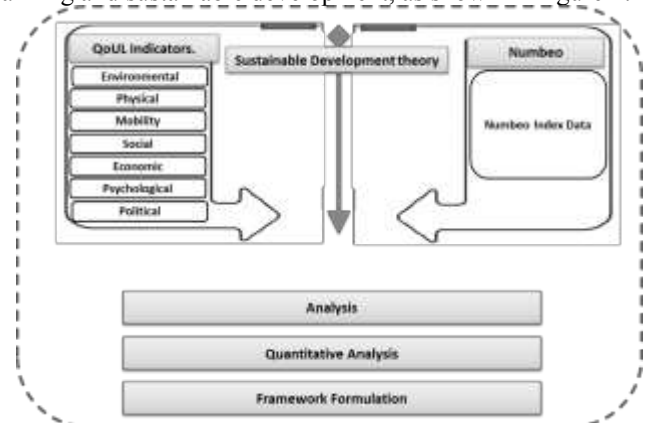


Figure 1: The method research approach of this study.

III. Sustainable Development in Urban Communities

Sustainable development in urban areas is crucial for creating resilient, efficient, and habitable cities that meet the needs of present inhabitants without jeopardizing resources or future generations. With over 50% of the global population residing in urban areas, sustainable urban development is a paramount issue for governments, politicians, and citizens. A comprehensive strategy that harmonizes economic development, environmental conservation, and social fairness is necessary to address interrelated challenges such as housing, infrastructure, public health, and environmental safeguarding [17] .[19]-[

Challenges to sustainable urban development include population expansion, resource limitations, and environmental deterioration. Smart city technologies, green building initiatives, investment in renewable energy, waste reduction and recycling initiatives, and integrated public transit systems can help advance sustainable urban development [20]. As metropolitan areas expand, sustainable development approaches will be essential in creating environments that are both habitable and resilient to global challenges, providing a good quality of life for all inhabitants [21].

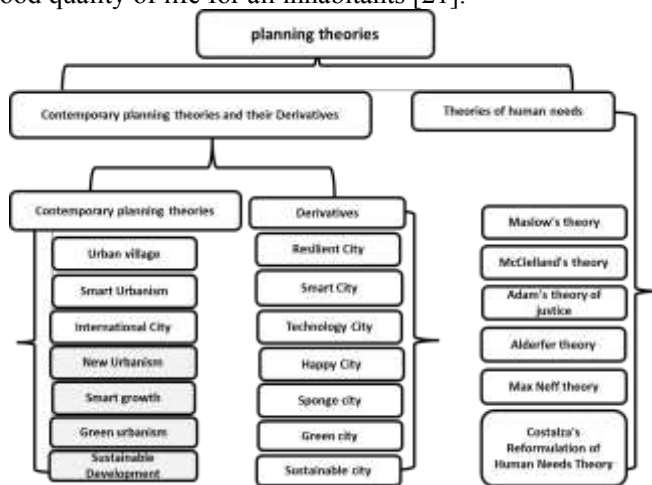


Figure2 Classification of planning theories,[9].

IV. Sustainable Development theory

Sustainable development has garnered global interest in recent years, embracing economic, social, and environmental dimensions. The execution of the 17 sustainable development objectives specified in the 2030 development agenda, endorsed by global leaders at a landmark international conference in September 2015 (United Nations - New York), has officially begun. The tenets of sustainable development theory are encapsulated as follows [9], [22 :[23], [

Eradicating poverty in all its manifestations globally .

- Eradicating hunger, guaranteeing food security and nutrition, and promoting sustainable agriculture .
- Advocating for healthy lifestyles and well-being across all age groups .
- Guarantee inclusive and equitable quality education for all individuals and opportunities for lifelong learning for everyone .
- Advancing gender equality and the empowerment of all women and girls .
- Guarantee universal access to and sustainable management of water and sanitation services .
- Ensure universal access to affordable, reliable, and sustainable energy services .

- Promoting economic and sustainable development, comprehensive and productive employment, and dignified work for everyone .
- Establish robust infrastructure, encourage inclusive industrialization, and stimulate innovation .
- Minimizing heterogeneity both within and among countries .
- Ensure that cities and human settlements are inclusive, secure, resilient, and sustainable .
- Ensuring sustainable consumption and manufacturing practices .
- Implement immediate measures to address climate change and its consequences .
- Conserving the oceans, seas, and marine resources while utilizing them sustainably to attain sustainable development .
- Protect, restore, and advocate for the sustainable utilization of terrestrial ecosystems, manage forests sustainably, battle desertification, cease and reverse land degradation, and prevent biodiversity loss .
- Promoting the formation of harmonious societies where no individual is marginalized to attain growth .
- Ensure universal access to justice and establish effective, responsible, and inclusive institutions at every level .
- Enhancing the mechanisms for implementation and rejuvenating the global collaboration to attain sustainable development.

V. The Indicators of Quality of Urban Life

QOL includes societal, individual, and spatial dimensions, with societal quality emphasizing individuals .[6]

These indicators constitute factors of subjective well-being used to measure the quality of life of individuals within a given environment [12]. These indicators include dimensions and sub-dimensions of QOL, such as environmental, physical, mobility, social, economic, psychological, and political aspects .[24]

- Environmental:** It involves providing a clean, pollution-free environment for the population by incorporating elements such as trees and promoting the use of multiple modes of transportation, such as walking and bicycles Furthermore[25], Table 2 highlights the utilization of technology and artificial intelligence to promote the use of renewable energy .
- Social:** This dimension emphasizes the availability of services and facilities for all individuals. It is crucial to ensure that the constituent elements of a healthy urban environment are present in city neighborhoods. Additionally, providing diverse

- housing options that cater to various economic classes within society is of great importance .[26] ,
- C. Economic: This dimension focuses on supporting and stimulating local commercial activities owned by neighborhood residents, such as restaurants and cafes. It also involves providing residents with facilitators that support their economic capacity .
- D. Psychological: This dimension focuses on preserving the identity and historical value of residential neighborhoods, as it greatly influences the residents' sense of uniqueness and belonging .[27]
- E. Political: This dimension involves establishing urban policies and regulations to manage urbanization and prevent abuses, aiming to preserve the urban setting and improve the overall QoL. It also emphasizes the importance of involving the local community in decision-making and brainstorming processes, as illustrated in Table 2.

VI. Numbeo Index

Numbeo is a worldwide index that offers extensive information on the quality of life in various cities and nations, derived from data gathered from users globally. This index encompasses many economic, social, and environmental indices, providing an overview of living conditions in a particular region.



Figure 3 Current Quality of Life NUBEO Index.

https://www.numbeo.com/quality-of-life/rankings_current.jsp

Principal Quality of Life Metrics in the Numbeo Index

Purchasing Power Index: Assesses residents' capacity to acquire goods and services based on average income and regional pricing .

- A. Safety Index: Indicates overall safety conditions in a city, encompassing crime statistics and the citizens' perception of security .
- B. Health Care Index: Evaluates the quality and accessibility of healthcare services, response times, and the affordability of medical care .

- C. Cost of Living Index: Reflects the expenses associated with living in a specific place, encompassing the prices of necessary commodities, housing, and services .
- D. Property Price to Income Ratio: Analyzes real estate prices in relation to income levels, providing insights into home affordability for inhabitants .
- E. Traffic Commute Time Index: Assesses the average duration individuals allocate to commuting for work, indicating levels of traffic congestion .
- F. Pollution Index: Assesses environmental pollution, encompassing air and water quality as well as overall pollution levels in the region .
- G. Climate Index: Reflects climate comfort determined by variables including temperature, humidity, and air quality .

These indicators are crucial for offering a comprehensive perspective on the quality of life in a particular location. Numbeo utilizes real-time data provided by citizens from many areas, facilitating quality-of-life comparisons among cities and countries.

VII. Results and Discussions

A. Comparative analysis

Numbeo proficiently encompasses some fundamental characteristics, including economic and environmental aspects, its coverage of sustainable and psychological measures is constrained. Sustainable development indicators offer a more extensive framework for equitable growth, governance, and mental well-being, which are crucial for a full examination of quality of life. Consequently, augmenting Numbeo with further sustainable and psychological metrics would yield a more comprehensive and nuanced comprehension of quality of life, as shown in Table 1.

Table 1 A comparison of QoL, Sustainable Development, and Numbeo Indicators.

Dimension	Quality of Life Indicators	Sustainable Development Indicators	Numbeo Quality of Life Indicators
Economic	Income level, employment rate, cost of living	Economic growth, income distribution, poverty reduction	Purchasing Power Index, Cost of Living Index
Environmental	Air and water quality, pollution levels, green spaces	Air quality, water resource management, climate resilience	Pollution Index, Climate Index
Spatial	Housing quality, urban space, accessibility	Land use, urban planning, sustainable housing	Property Price to Income Ratio
Transportation	Traffic conditions, public transit availability, commute time	Sustainable transport infrastructure, carbon emissions from transport	Traffic Commute Time Index
Political	Governance, public policy impact, safety	Institutional effectiveness, rule of law, political stability	Safety Index
Social	Community cohesion, social inclusivity, quality of healthcare	Social equity, access to education, healthcare availability	Safety Index, Health Care Index
Psychological	Mental well-being, life satisfaction, stress levels	Mental health resources, work-life balance, community support	(No direct indicator in Numbeo)

Table 2 shows that Numbeo effectively covers economic and

basic environmental aspects but has limited coverage of political, social, and psychological dimensions, requiring supplementary indicators for a holistic view of quality of life .

Table 2 Dimensions of Quality of Life and Numbeo Quality of Life Metrics.

Quality of Life Dimensions	Purchasing Power Index	Safety Index	Health Care Index	Cost of Living Index	Property Price to Income Ratio	Traffic Commute Time Index	Pollution Index	Climate Index
Economic	✓			✓	✓			
Environmental							✓	✓
Spatial				✓				
Transportation						✓		
Political								
Social		✓						
Psychological								

VIII. Assessment of Coverage

The economic dimension: Numbeo offers robust economic indicators, such as purchasing power and cost of living, which correlate effectively with quality of life and sustainable development objectives concerning income and affordability .

Environmental Dimension: Numbeo's Pollution and Climate indices encompass air quality and environmental comfort; however, sustainable development goals would incorporate metrics on resource management and climate change adaptation .

The spatial dimension: Quality of life indicators on urban accessibility and housing quality are somewhat encompassed by Numbeo's Property Price to Price-to-income ratio, although they lack the urban planning metrics present in sustainable development indicators .

Transportation: Numbeo's Traffic Commute Time Index indicates commuting conditions; however, sustainable development would enhance this by incorporating sustainable infrastructure and carbon footprint metrics .

Political Dimension: Although Numbeo's Safety Index addresses security, sustainable development metrics incorporate institutional robustness, stability, and governance quality .

The social dimension of Numbeo addresses healthcare quality and safety, whereas sustainable development goals encompass a wider scope and emphasize social fairness, inclusivity, and educational access .

The psychological dimension: Neither Numbeo nor the conventional quality of life metrics adequately encompass mental well-being; however, sustainable development indicators could integrate mental health resources and work-life balance .

These additions would significantly strengthen Numbeo's coverage by :

Addressing gaps in socioeconomic equity and sustainable development, providing a holistic economic and environmental assessment .

Enhancing social and political dimensions with inclusivity, transparency, and civic engagement, reflecting community

cohesion .

Including psychological indicators, such as mental health support and life satisfaction, which give insights into overall well-being beyond physical health .

Together, these proposed indicators would make the Numbeo Index more reflective of comprehensive quality of life and sustainability in urban environments, aligning with modern development goals and public satisfaction needs. As shown in Table 3.

Table 3 Dimensions of Quality of Life and Numbeo Quality of Life Metrics.

Dimension	Proposed Indicator	Description	Rationale
Economic	Income Equality Index	Measures income distribution across different population segments.	Provides insight into economic fairness and poverty levels, complementing purchasing power and cost of living.
Environmental	Green Space Access Index	Assesses accessibility and availability of public parks and green spaces.	Enhances environmental quality indicators by adding urban greenery, important for physical and mental well-being.
	Renewable Energy Use Index	Evaluates the percentage of renewable energy use in the city.	Supports sustainability by reflecting cities' progress toward energy efficiency and climate resilience.
Spatial	Housing Quality Index	Measures the overall quality of housing, including structural safety and access to utilities.	Complements property affordability by evaluating actual living conditions, ensuring a more complete housing view.
Transportation	Public Transit Accessibility Index	Assesses availability, coverage, and quality of public transportation.	Adds depth to commuting data by including access to sustainable transport options, enhancing urban mobility insights.
Political	Governance and Transparency Index	Measures residents' perceptions of governmental transparency and effectiveness.	Reflects political stability and governance quality, which impact long-term urban development and trust.
	Civic Engagement Index	Tracks civic participation, such as voting rates and community involvement.	Indicates citizen engagement in policy-making and strengthens social cohesion insights.
Social	Social Inclusivity Index	Evaluates inclusivity and diversity within communities, focusing on equality for all social groups.	Supports social quality of life by promoting diversity, acceptance, and equitable access to resources.
	Education Quality Index	Measures accessibility and quality of educational institutions in the area.	Adds a crucial social dimension by evaluating educational opportunities, impacting overall urban quality of life.
Psychological	Mental Health Support Index	Assesses availability and accessibility of mental health services.	Complements health indicators by addressing mental well-being, a key aspect of overall quality of life.
	Life Satisfaction Index	Measures residents' overall satisfaction and happiness with their living conditions.	Provides an essential subjective metric that reflects personal contentment and well-being.

The proposed approach of NUBEO QOL indicators:

The criteria deduced from the theoretical study are used to develop the proposed NUBEO QOL approach, including suggested indicators, as depicted in Table 4.

Table 4: Proposed approach of NUBEO QOL Index suggested indicators.

Environmental	Physical	Transportation	Social	Psychological	Economic	Political
1. Air Quality: Monitors overall air quality, including particulate matter and carbon monoxide levels.	4. Housing Quality: Evaluates safety, accessibility, and availability of public housing and green spaces.	8. Public Transit: Assesses availability, coverage, and quality of public transportation.	12. Social Inequality: Measures income inequality and social mobility within communities.	16. Mental Health: Assesses availability of mental health resources.	20. Income Equality: Measures income distribution across demographic groups.	24. Governance: Monitors transparency, accountability, and effectiveness of government institutions.
2. Water Quality: Monitors water quality, including contamination and waste management.	5. Urban Land Use: Evaluates land use patterns, including green spaces and urban density.	9. Traffic Conditions: Monitors traffic congestion, safety, and alternative transport options.	13. Community Engagement: Measures citizen participation and involvement in local decision-making.	17. Life Satisfaction: Assesses overall life satisfaction and happiness levels of residents.	21. Employment: Monitors job availability and economic stability.	25. Civic Engagement: Measures citizen participation and influence in local decision-making.
3. Green Space Access: Assesses accessibility and distribution of public parks and green spaces.	6. Public Infrastructure: Monitors quality of infrastructure and roads.	10. Sustainable Urban Mobility: Evaluates accessibility and quality of non-motorized transport options.	14. Educational Quality: Measures accessibility and quality of educational institutions.	18. Employment Opportunities: Monitors job availability and economic stability.	22. Environmental Sustainability: Measures sustainable development practices and resource management.	26. Urban Planning: Monitors urban development and infrastructure quality.
7. Renewable Energy Use: Monitors percentage of renewable energy consumption.	3. Waste Management and Recycling: Evaluates waste management and recycling practices.	11. Commuter Satisfaction: Measures satisfaction and happiness with commuting conditions.	15. Healthcare Access: Monitors accessibility and quality of healthcare services.	19. Social Cohesion: Measures social cohesion and community support.	23. Environmental Quality: Monitors air quality, water quality, and noise levels.	27. Urban Safety: Monitors crime rates and public safety measures.

VIII. CONCLUSION

In essence, the relationship between Quality of Life Indicators, Sustainable Development Indicators, and Numbeo Quality of Life Indicators: is complementary: Sustainable Development Indicators support Quality of Life Indicators by ensuring resource sustainability and balancing social, environmental, and economic dimensions, while Numbeo's indicators offer real-time data on these aspects, helping individuals and policymakers evaluate and

compare quality of life in various locations. This study emphasizes the importance of sustainability in quality of life ratings, arguing that sustainable development principles maximize long-term well-being. Assessment of the association between Quality of Life Indicators, Sustainable Development Indicators, and Numbeo's Quality of Life Indicators provides an in-depth understanding of how sustainability affects residents' current living conditions and future resilience. Sustainable development harmonizes environmental, social, and economic issues to improve quality of life. Environmental conservation improves social well-being, social fairness strengthens economic stability, and economic prosperity funds environmental conservation. This highlights the need to incorporate sustainability into quality of life assessments to ensure that current and future generations have the same resources and opportunities. Sustainable development harmonizes environmental, social, and economic issues to improve quality of life. Environmental conservation improves social well-being, social fairness strengthens economic stability, and economic prosperity funds environmental conservation. This highlights the need to incorporate sustainability into quality of life assessments to ensure that current and future generations have the same resources and opportunities. Sustainable development harmonizes environmental, social, and economic issues to improve quality of life. Environmental conservation improves social well-being, social fairness strengthens economic stability, and economic prosperity funds environmental conservation. This highlights the need to incorporate sustainability into quality of life assessments to ensure that current and future generations have the same resources and opportunities. By combining Numbeo's findings with comprehensive Sustainable Development Indicators, governments and urban planners can create policies that address both immediate needs (like pollution reduction and public transportation improvements) and long-term goals (like carbon reduction and social equity). This strategy ensures quick and long-term quality of life improvements in line with sustainability goals. Investment in renewable energy sources reduces urban pollution and mitigates climate change, benefiting future generations. Income equality and employment opportunities can improve the economy and build a more inclusive society .

This study emphasizes the importance of sustainability in quality of life assessments. By comparing conventional quality of life metrics, sustainable development goals, and Numbeo's real-time data, policymakers may create a balanced approach that meets current needs without compromising future potential. Developing cities and communities that are habitable now and ready for future challenges requires this balancing.

Declarations

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