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Urban Transformation and its Impact on the Quality of Life in Riyadh: Reviewing the Progress Toward the Global City Rankings

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Abstract: Managing growth in Riyadh after the city's rapid expansion is a significant issue in its development that needs to be discussed. The study aims to assess the impact of the urban development of Riyadh on the quality of life. A cross-sectional study design was adopted to determine the impact on the quality of life in the four domains of physical health, environment, psychological health, and social relationships using the World Health Organization Quality of Life Brief Version (WHOQOL-BREF questionnaire). The study recruited 217 participants. However, data related to urban transformation in Riyadh has been qualitatively collected using secondary data. The study's findings revealed that urban transformation was significantly and positively correlated with the quality of life. The study reviews that the overall infrastructure under Vision 2030 is according to the global standards of development and recognition, which will increase the likelihood of Saudi cities to get global recognition.

Keywords: Development; Riyadh; Saudi Arabia; Urban Transformation; Quality of Life.

1. Introduction

The concept of urban transformation has arisen through the mixing of cultural and economic policies among the major cities worldwide. These cities have created a supportive atmosphere to welcome the changes associated with urban transformation. The main aim of urban transformation is to encourage the aspects that combine with other factors, resulting in a thriving city. Urban transformation is likely to provide attractive conditions for residents, promote culture, and provide leisure facilities for environmental and sustainability protection (Alamoudy, 2017). Almost all cities tend to face economic, social, infrastructural, and environmental challenges that force citizens to find solutions to the ongoing problems within the city. A state's economy can be improved by bringing about structural changes along with new economic potential leads (Gehl and Svarre, 2013).

The rapid urban transformation has been observed in Riyadh since the 20th century (Addas, 2020). These changes have significantly influenced the evolution of its urban identity. A study conducted by Al Naim et al. (2013) has shown that the conflict between modern ways of urban transformation and traditional ways of urban development is the main challenge that hinders the establishment of a cohesive urban identity in Riyadh. Therefore, it is essentialessential to explore how globalization and modernization helped in introducing new urban concepts, resulting in a division of Riyadh into urban entities.

The core issue addressed by the study revolves around Riyadh's attempts to adopt smart city initiatives and implement sustainable urban data systems. The Saudi government aims to see

Riyadh, Jeddah, and Dammam placed among the top 100 cities in the world (Ajlan and Al Abed, 2023). With its strategic location at the crossroads of Asia, Europe, and Africa, Saudi Arabia is uniquely poised to host a leading global city. The Royal Commission for the Development of Riyadh has been awarded a Certificate of Merit, realizing the city's contributions in advancing the transition to a smart city and assisting in achieving the 2030 Sustainable Development Goals. Riyadh stands alongside other globally acknowledged cities striving to establish international benchmarks for smart cities. However, a smart city's definition, requirements, and analytical framework remain uncertain with the absence of a structured strategy to transform Riyadh into an intelligent urban center (Ajlan and Al Abed, 2023). Major projects include King Salman Park, the Sports Boulevard, the Green Riyadh initiative, and the Riyadh Art project. The city still has enormous challenges, including the speed of growth it is recording at the moment, which creates problems in achieving the structure of a sustainable urban layout.

A city cannot claim to be "smart" by means of using integrating technology alone, nor does "smart" automatically apply to urban sustainability through applications alone, yet technology supports the sustainability process as applied effectively by community stakeholders and local government. While attempts have been made to advance both "smart" and "sustainable" initiatives, neither has reached the promised potential. This gap has hindered Riyadh from becoming systematically transformed into a smart, sustainable city, seamlessly integrating digital technologies with urban planning and meeting sustainable development objectives. A smart city is sustainable when a outlines different concepts, dimensions, and measurable indicators (Ajlan and Al Abed, 2023). There is a need to explore how smart technologies can be employed to assess and implement urban development patterns that align with sustainable smart cities. Additionally, it is crucial to develop improved methods for understanding the interplay between sustainable urban development and smart applications to enhance overall sustainability outcomes.

Managing growth in Riyadh after the city's rapid expansion is a significant issue in its development that needs to be discussed. Studying the evolution of urban transformation in Riyadh is essential to assess the influence of physical development patterns and identify the consequences that help in this transformation (Aina et al., 2019). The study aims to evaluate the impact of urban transformation in Riyadh on people's quality of life. Moreover, the study will also explore how urban transformation will help recognize Riyadh in the top-ranked 100 cities. The study will explore different ways in which Riyadh's urban transformation can be practically employed. The study has examined several influential studies in this field to identify the concept of urban transformation best suited for Riyadh, as it is the administrative capital of Saudi Arabia. The study results are significant as no study has been carried out to investigate the impacts of the urban transformation of Riyadh on the quality of life and how it is to be recognized as one of the top 100-ranked cities. This study seeks to answer how the correlations between the four QOL domains (physical health, psychological health, social relationships, and environment) explain variations in overall quality of life.

2. Theoretical Background

Modern spatial planning policies and management practices have reshaped urban spaces but often exacerbate social segregation. Disconnected commercial and residential areas, traffic routes isolating urban life, and two-dimensional engineering plans have neglected high-quality public realms. Poor management and rapid urbanization further contribute to the decline of vibrant public spaces (Gehl and Svarre, 2013).

The urban spaces in developed countries have changed radically based on economic, political, and cultural fluctuations that alter organizational functions. The present study has focused on Riyadh, Saudi Arabia, to study the quality of life and spaces. Contemporary spaces in Riyadh suffer from deficiencies in modernist design, planning, and management. This deficiency is fulfilled by altering traditional street culture, creating unusable urban spaces, transforming socio-spatial fabric, eroding the sense of local identity, and responding to the needs and aspirations of the residents (Mandeli, 2019).

2.1 Vision 2030: A Blueprint for Urban Transformation of Saudi Arabia

Vision 2030 envisions Saudi Arabia as a thriving and diversified economy that promotes sustainable urban development. It is going to be a country with lively cities that have all the modern facilities that help create the perfect environment for living. An essential component of Vision 2030 is the revitalization of Saudi culture. It will instill pride in national identity and also bring about a change in the education system to suit the needs of modern markets and industries.

The initiative focuses heavily on job creation and economic diversification. As part of these goals, Saudi Arabia's unemployment rate dropped to 6% in Q1 2022, down from 6.9% in Q4 2021 (General Authority for Statistics, 2020). Vision 2030 also aspires to elevate the Kingdom's global position, aiming for a top-five ranking in the E-Government survey, where Saudi Arabia currently ranks 37th (Kumar and Albashrawi, 2022). The program should, therefore, empower private businesses, increase content produced locally, and bring governmental and business operations to the digital front. Moreover, Vision 2030 has emphasized energy transformation, commitment towards reducing its dependency on oil, and maximum use of renewable energies.

This change is well-supported by the National Renewable Energy Program, which is set to diversify energy sources in the Kingdom, an initiative started in 2016. Investment Recycling Company. Further sustainability also involved the establishment of a National Environment Strategy and integrated waste management programs to further enhance environmental protection. Saudi participation in international initiatives includes the International Solar Alliance and Global Coral Reef Conservation, intending to reinforce a commitment toward global environmental goals. The Kingdom also contributes to climate change mitigation through the Middle East Green Initiative and the Saudi Green Initiative, in addition to local projects such as the Sakaka Solar Power Plant. Urban development is another key thrust. Vision 2030 seeks to ensure that Saudi cities are globally competitive, emphasizing sustainability standards. The Kingdom signed up for the Circular Carbon Economy (CCE) framework during its G20 Summit hosting, which calls for reducing carbon emissions and sustainability. The approach will be recycling and reducing carbon emissions while diversifying the economy (Ritchie and Roser, 2018). In ranking cities globally, the Economist Intelligence Unit considers five criteria: culture, stability (25%), infrastructure and healthcare (20%), and education (10%).

2.2 Urban Transformation in Riyadh

While Riyadh's urban transformation draws on global trends, looking at international case studies like Sydney and Vienna provides valuable insights into how other cities have navigated similar challenges. Both cities have implemented successful urban strategies that Riyadh can learn from in achieving its sustainability and quality of life goals. Sustainable Sydney 2030 is an example of such a model in Sydney. Sydney became in 2008, and its urban transformation is highlighted by green initiatives such as the urban growth forest strategy and projects like the South East Light Rail and Sydney Metro systems. Like Vienna, the city's urban policies focus on human-centric housing models and have significantly improved the city's livability despite challenges such as population growth and migration (Pavel and Jucu, 2020). Quality of Life Program: This forms another essential aspect of Vision 2030, encouraging diverse lifestyle activities and improving general living conditions. The program invests in local talent and allows for a regulatory framework to support Saudi citizens' quality of life. Additionally, Vision 2030 attempts to reduce dependence on revenues from natural resources and on public sector employment, establishing an economy that is more sustainable and diversified (Abou-Korin and Al-Shihri, 2015; Khan, 2016; Khashan, 2017).

The UK sports clubs and the Premier League contribute more than $3 billion to the economy (Alghenaim, 2013). While Saudi Arabia is looking to replicate these opportunities in industries such as sports and entertainment, it requires new financing models to attract investment for operational and capital expenditures. Local government and residents of Riyadh work hand-in-hand with the city's developers to find and fix gaps in the infrastructure, with priority given to the areas that would need improvement to promote the city's development. With Riyadh's strategic plan being adjusted in response to new urban policies and economic expansion, demands. This effort will help residents and prospective landowners navigate the

shifting landscape of urban development. The rapid transformation of Riyadh in the 20th century, driven by the conflict between traditional urban forms and modern urbanization, remains a key challenge.

The urban transformation of Riyadh can be defined in three different stages. Phase 1 represents the initiation of Riyadh as a city in the traditional Arabic culture in 1902 with an open central space bounded by mud-constructed houses, markets, and mosques. At that time, the city covered only an area of 1 sq. km and was populated by about 19,000 residents (Middleton, 2009). Phase 2 began when King Abdul-Aziz declared Riyadh the capital in 1932, initiating the city's gradual growth. The transformative oil boom of the 1950s helped accelerate growth (Arriyadh Development Authority, 2003; Conservation Easement Assistance Program, Urban Growth Boundary, n.d.), improve access, and spur a remarkable increase in population (Middleton, 2009). Phase 3 appeared with the master plan launched in 1972, to control urbanization in light of increasing urban problems. However, this plan did not succeed, and consequently, the Comprehensive Riyadh Strategic Plan (CRSP) emerged with tools such as urban growth boundaries (UGBs) for the proper management and guiding of urban development. Despite these plans, earlier strategies faced setbacks due to rapid urbanization and unforeseen challenges in infrastructure implementation.

A group of areas known as urban containment was present within UGB that included: defined urban service areas provided by the government, open spaces surrounding the city, public lands, and non-buildable lands (farmlands, parks, open spaces, etc.). The implementation of UGBs in urban development helped direct and limit urban growth towards a specific geographic area during a specified time. Decreased development costs are one of the benefits of UGBs, as they are directed towards a specified area with increased density. This area will likely be provided with city services and public infrastructure like sewer, public transportation, hospitals, water, schools, etc. However, the agricultural and rural areas outside UGBs are poorly affected. In the later stage, authorities felt that UGBs limit the expansion of the city as a narrow necktie. It is recognized as the best solution because it considers the issues and principles of sustainable urbanization and respects socioeconomic and environmental factors in any urban development.

Riyadh had a population of 705 thousand in 1975, while it was 4.5 million in 2006 (Bin Sulaiman, 2017; Garba, 2004), but its population reached 7,070,665 in 2019. The capital city of Saudi Arabia was expanding rapidly as it allowed residents of several areas to participate in the new riches that the city demonstrated by moving northward over 3 km per year (Bin Sulaiman, 2017). During this period, the changes in Saudi Arabia were substantial as car registrations increased by a factor of 10, and the supply chains for electricity increased by 50% per year from 1974 to 1980. In recent years, the automotive sector has continued to grow. According to the Saudi Zakat, Tax and Customs Authority (ZATCA), the Kingdom imported over 160,000 vehicles during 2022 and 2023. Moreover, 93,199 vehicles were imported in 2023, up from 66,870 in 2022, marking a growth rate of about 40% (Equal Ocean, 2024). According to the Global Footprint Network, Riyadh has created different land requirements from other cities due to the footprint size in many rural areas (Osra and Jones, 2017).

Riyadh's growing demand for resources makes it have a enormous ecological footprint, to be exact, 114 times that of the actual city size, with estimates ranging from 20,250,000 hectares. This has brought the urban transformation to face new challenges in shelter, water, and food regarding sustainability and quality of life (Bin Sulaiman, 2017; Garba, 2004; Osra and Jones, 2017; Alkhabbaz, 2010). Urban rankings measure the competitiveness of cities in the world, taking into account sustainability and urban planning. However, sustainability in a city is more than rankings; it involves strategic efforts to meet changing needs through innovation, resource allocation, and adaptation to economic conditions (Bin Sulaiman, 2017; Garba, 2004; Osra and Jones, 2017). The population growth and rapid urbanization in Riyadh reflect these dynamics, with increased car registrations and expanding electricity supply networks between 1974 and 1980. The city's environmental footprint is a challenge that requires sustainable urban planning.

One of the most prominent centers in the northwest district of Riyadh city is King Saud University (KSU). It has taken a significant step to adopt the idea of the Riyadh Knowledge Corridor (RKC) in the realm of Prince Turki Al-Awal Road (Al-Hathloul, 2017). It is foremost goal of KSU to organize and establish a model for Riyadh as a Smart City, and the focus would be to develop the

Table (1). Urban transformation projects in Riyadh are aligned with the domain of quality of life.

QoL Domain	Relevant Urban Transformation Projects in Riyadh
Physical Health	Sports Boulevard Riyadh Metro & Bus System
Psychological Health	Green Riyadh Project King Salman Park Qiddiya Project
Social Relationships	Diriyah Gate Project Downtown Riyadh
Environment	Green Riyadh Project King Salman International Airport Natural Environmental Valleys – Wadi Hanifa & Al Sulay King Abdullah International Gardens Humanization of Riyadh Project

Riyadh Techno Valley (RTV) project. The focus would be to develop the project of Riyadh Techno Valley (RTV)foremost goal of KSU to organize and establish a model for Riyadh as a Smart City. The focus would be to develop the Riyadh Techno Valley (RTV) project. It is anticipated that the project will contribute to improving other developments, such as King Abdul Aziz City for Science and Technology (Shalaby, 2008).

Saudi Arabia's Vision 2030 has guided Riyadh to become one of the world's top 100 cities. The projects that support this vision include various urban transformation initiatives directed at improving different aspects of Quality of Life (QOL), as shown in Table 1.

Some of the significant projects contributing to this vision are detailed below:

- King Salman International Airport: It will strengthen Riyadh's role as a global logistics hub while boosting transport, trade, and tourism. By 2050, it will handle up to 185 million passengers and 3.5 million tons of cargo. Covering an area of about 57 km², the airport will consist of six parallel runways, support facilities, residential and recreational areas, and retail outlets. It will be designed with sustainability in mind and powered by renewable energy (Public Investment Fund, 2022).
- Riyadh Medstar Structural Plan (2030): It is a very comprehensive restructuring of the city into a multi-center system with more public services and transportation; the Riyadh Metro covers 176 km and takes 1.16 million passengers at full capacity (The Royal Commission for Riyadh City, 2020a).
- The Metro Network: The system intends to carry 1.16 million passengers per day, with a peak of 3.6 million per day in ultimate capacity during its initial phase. The Riyadh Bus network will be the main feeder to the Riyadh Metro system. It will also be the primary transportation mode within several neighborhoods of the capital, which carry up to 900,000 passengers daily at full capacity. A total of 80 bus routes will cover the city, which includes a spread of 1900 km of roads, 3 BRT, 19 communities, and 58 feeders, serving the population through 3,000 bus terminals, stops, and stations. Riyadh airport in the North East was included in the 2003 plan, and directions were provided for the most significant expansion towards the North and East in the form of new suburbs (Figure 1) (The Royal Commission for Riyadh City, 2020a).

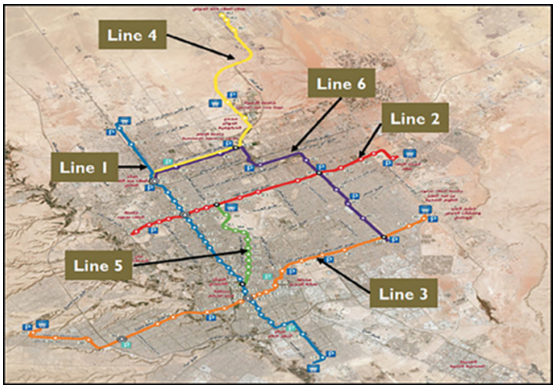

Figure (1). Riyadh metro lines (The Royal Commission for Riyadh City, 2020a).

- King Salman Park: An international-class green space for the heart of the city, on an area measuring 13.3 km², intended to host cultural,

ecological, and recreational facilities. This will help Riyadh's aspiration to be more livable and attractive globally in Vision 2030 (The Royal Commission for Riyadh City, 2020b). This development is one of the several visionary and multibillion-dollar projects introduced by the Saudi government to make Riyadh a more internationally attractive and livable city (Figure 2).

Figure (2). King Salman Park Project (The Royal Commission for Riyadh City, 2020b).

● King Abdullah International Gardens: This environmentally friendly botanical garden will utilize recycled water and solar power. It is supposed to educate and raise awareness on climate change and sustainability (Paghera, n.d.). The award-winning 160-ha scheme is set to become one of the primitive educational resources for understanding the climate and sustainable progression. Water will be recycled, and much of the rock, soil, and gravel on the site will be used, while power will be derived directly from the sun (Figure 3).

Figure (3). The King Abdullah International Gardens (Paghera, n.d.)

● Green Riyadh Project: This project will plant 7.5 million trees in the city, improving air quality and providing green spaces for residents. The project supports the Kingdom's objectives of enhancing quality of life and urban sustainability (The Royal Commission for Riyadh City, 2020c). The Green Riyadh project will increase the per capita share of green space and total green spaces by planting trees around all city aspects and facilities in all its provinces. The greening initiative will , mitigatedenhance air quality, and mitigating temperatures in the city. This project will support Riyadh citizens in following a healthy lifestyle, which is part of the Kingdom's Vision 2030 (Figure 4).

Figure (4). Green Riyadh Project (The Royal Commission for Riyadh City, 2020c)

● Qiddiya Project: This is a huge entertainment and cultural complex that will satisfy the recreational and cultural needs of future generations. It will comprise more than 300 facilities and will be the landmark of the region (Newatlas, 2019). A wide range of community services and real estate options will further be available for achieving the vision of Qiddiya as a 24-hour destination resort community, with everything in one place (Figure 5).

Figure (5). Qiddiya Giga Project (Newatlas, 2019)

● Sports Boulevard: 135 km track for professional cycling and 350 ha green spaces, designed to contribute to health and wellness in the city of Riyadh. The plan is aligned with the objectives of sustainability and livability in the city (Paghera, n.d.) (Figure 6).

Figure (6). Sports Boulevard (Paghera, n.d.).

● Humanization of Riyadh Project: This project aims to upgrade the pedestrian infrastructure by making curbs wider and sidewalks larger to make it safer and more accessible. The vision of the city is for a more pedestrian-friendly and sustainable urban environment (The Royal Commission for Riyadh City, 2020d). The experience of pedestrians in the city can be improved through wider sidewalks. These can offer space for street furniture, trees, landscaping, and café seating in commercial areas. Sidewalk extensions can also work effectively on transit streets to accommodate higher volumes of pedestrians waiting for trolleys and buses. A pilot project can rapidly examine sidewalk extension zones. The sidewalk extensions can be made permanent, with additional lasting amenities, after accepting their value and viability (Figure 7).

Figure (7). Humanization of Riyadh City Project (The Royal Commission for Riyadh City, 2020d).

● Diriyah Gate Project: It started in 2020 with three detailed plans for the transformation of Diriyah. The importance of Diriyah is observed from the roots of society and the Kingdom, which connects the people with their history and civilization. The project will include academic institutions, edutainment facilities, museums, several hundred shops, 100 restaurants, and academic institutions. The Wadi Hanifah valley will be overlooked in Najd, which is occupied by 1 million date palm trees, and another 1 million will be planted in the upcoming years (Figure 8) (Diriyah Gate Development Authority, n.d.).

Figure (8). Diriyah Gate Giga project in Saudi Arabia. (Diriyah Gate Development Authority, n.d.).

● Development of downtown Riyadh: The downtown area of Riyadh is to undergo a renovation, which will transform it into an administrative, economic, cultural, and historic center. The area involving residential, utility, and transport projects will be redeveloped as proposed by the Royal Commission for Riyadh City (RCRC). The project plan emphasizes identifying realms for residential development and several residential units to accommodate many residents. The redevelopment aims to escalate job opportunities and diversify residential trends to achieve demographic and urban balancing while also protecting the cultural and urban heritage and current business activities (Figure 9).

Figure (9). Aerial view of Qasr Al-Hukm District Downtown (The Royal Commission for Riyadh City, 2020e)

● Natural Environmental Valleys: Wadi Hanifa and Al Sulay projects have been considered one of the main watercourses of the capital city, revolutionized as a clean and green ribbon of riverside parkland that has become a treasured civic amenity. A comprehensive plan has been proposed. The project restores the natural flora and fauna of the area by planting and growing 50,000 shrubs, 6000 date palms, 30,000 shade trees, and 2000 acacia bushes. The transformation to the valley protects the city from flooding. It allows Wadi Hanifah and its branches to act as a channel for rainfall (Figure 10) (The Royal Commission for Riyadh City, 2020d).

Figure (10). Wadi Hanifa and Al Sulay Projects (The Royal Commission for Riyadh City, 2020d).

These projects reflect Riyadh's continuous transformation in terms of its physical infrastructure and its commitment to sustainability, innovation, and improving the quality of life. They are integral to improving the quality of life and essential to realizing the aspirations laid out in Vision 2030 to ensure that the city is competitive, sustainable, and livable.

The benefits of sustainable urbanization include: better job opportunities, increased economic production, availability of affordable houses with public transportation and city services, and a better lifestyle (Conservation Easement Assistance Program, n.d.). The urban growth phases in CRSP aim to achieve a defined geographic area within the specified time limit. This helps create a cohesive and focused urban growth environment, reduce scattered urbanization, and regulate the provision of public services.

Riyadh's urban transformation is guided by the dual goals of sustainability and enhancing quality of life. The city's alignment with sustainable urban growth theories, such as the Compact City Model, the Green City Concept, and Smart Growth, supports realizing these goals. By integrating these theories with practical urban development initiatives, such as the Quality of Life Program, Riyadh strives to create a livable, resilient, and environmentally sustainable urban environment. The case studies of Sydney and Vienna provide relevant examples of successful urban transformation that Riyadh can learn from to achieve its Vision 2030 goals of becoming a global leader in sustainable urban development and improving the quality of life for its residents. The current study explores practical strategies for the transformation of Riyadh by discussing the changing identity of the city and its possible future.

3. Materials and Methods

3.1 Study Design and Settings

This study has adopted a mixed-methods approach. A cross-sectional study design has been adopted to measure the quality of life of the people due to urban transformation. At the same time, a qualitative secondary research method was used to accumulate relevant information regarding the given topic related to urban development in Riyadh city. One of the primary objectives behind implementing this method was to acquire reliable and up-to-date data regarding current urban planning and design patterns to be considered as the criteria of the top-ranked 100 cities in the world. Riyadh is currently ranked 76th among the sustainable cities in the world, but it is currently experiencing some challenges in maintaining its sustainability. Therefore, this study aims to review the urban transformation in the development of Riyadh to be recognized among the top 100 cities.

3.2 Sample Size

According to the data available on the website of the Riyadh Municipality, there are more than 130 districts in Riyadh. Three districts of Riyadh, namely Nemar, Irqah, and Diplomatic Quarter, were purposively selected based on the ongoing transformation. Thus, the study recruited the respondents via a purposive sampling technique. The participants were selected from the local communities, and through the groups of these residential neighborhoods, whether formal or

Table (2). List of Neighborhood groups and activities

Groups	Activities
Nemar Valley Park Visitors	• Admire the stunning waterfalls and observe birdlife by the lake. • Jog or walk along dedicated paths surrounding the 200,000-square-meter lake. • Host barbecues with family or friends in a scenic outdoor setting. • Enjoy diverse shows and musical performances at the Wadi Namar Theater.
Nemar Sub-Municipality	• Engage in the development, planning, and maintenance of the area.
Nemar Business and Commercial Centers	• Experience a unique shopping center blending traditional Saudi architecture with modern commercial needs, including car showrooms and upscale retail.
Irqah Sub-Municipality	• Focus on urban planning and development in the district.
Irqah Business and Commercial Centers	• Explore a vibrant hub offering parks, luxury hotels, and adventurous activities like go-karting, paintball, and indoor skydiving.
Diplomatic Quarter Residences and Visitors	• Enjoy serene walks through beautiful parks, shop at Al Nakheel Mall, or visit the National Museum and Al Malaz Zoo for a cultural experience.
Diplomatic Quarter Business and Commercial Centers	• Discover a unique blend of greenery and water features that enhance the atmosphere.

informal, they could give opinions about the ongoing transformation in Riyadh. Finally, 217 people were selected who were associated with ordinary residents and those with commercial, business, and service activities. The research objectives were explained to the participants, and the consent of the participants was obtained before conducting the research. In Table 2, the participants have been given.

3.3 Instrument

The study used the validated WHOQOL-BREF to measure the impact of the ongoing transformation in Riyadh City on quality of life (QOL). It comprised 24 items to evaluate insights related to the quality of life in four domains, i.e., physical health, psychological health, social relationships, and environment. The scores of domains were changed into a linear scale that ranged between 0 and 100, as mentioned in the scoring guidelines (World Health Organization, 1996). A better QOL was denoted with a higher score. Moreover, physical health was assessed by the International Physical Activity Questionnaire short form (IPAQ-SF) (Lee et al., 2011). Physical health was rated as low, moderate, and high, as mentioned in the IPAQ guidelines (IPAQ, 2005).

3.4 Reliability and Validity

The reliability of the questionnaire was assessed before the study via Cohen`s kappa value, which came out to be in the range of 0.50–1.00, along with the value of the intraclass correlation coefficient that ranged between 0.55 and 1.00. It showed the reliability of the questionnaire was fair.

3.5 Study Procedures

This cross-sectional study adopted purposive sampling to reach the study participants. People from the three different residential neighborhoods in Riyadh were approached, and their consent was acquired after explaining the study objectives. Moreover, data from secondary sources were gathered to review the urban transformation in the development of Riyadh to be recognized among the top 100 cities.

3.6 Statistical Analysis

Data were analyzed using SPSS version 23. Descriptive statistics were reported by mean ± standard deviation or proportion, as appropriate. Relationships between QOL in the four domains were assessed by using Spearman's correlations.

4. Results

4.1 Socio-demographics

217 people participated in the survey during January and February 2023. Among the participants, the majority were males (137), and females were 80. The mean age of participants was 45.12 years (SD = 17.28) (Table 3).

Table (3). Demographic Details of the Participants

Demographic Details	n (%)	Mean ± SD
Gender		
Male	137 (63.1%)	
Female	80 (36.8%)	
Ages (years)		
25–44	57 (26.2%)	45.12 ± 17.28
45–64	114 (52.5%)	
≥ 65	46 (21.1%)	

4.2 Quality of life

The study investigated four domains related to quality of life: environment, social health, psychological health, and social relationships. The detailed analysis showing variations within each domain is presented in Table 4. Physical health emerged as the strongest domain, while environmental factors posed the greatest challenges to participants' QoL.

The domain of physical health had the highest mean score of 69.83± 13.69. However, the environmental domain was investigated as the lowest, showing a mean score of 51.98±14.76. 29% of the respondents reported poor QOL in the environmental domain, followed by the physical health domain (25.8%), psychological domain (23%), and social domain (10.5%) (Table 5).

The correlations among the four domains of quality of life indicated substantial interrelationships between them, with improvements or declines in one domain being associated with changes in others. The physical and psychological health domains had the highest correlation (r = 0.53), indicative of a strong association between physical health and mental well-being. This means that greater physical health positively affects psychological functioning, and vice versa. The environmental domain, with the lowest mean score, was moderately positively correlated with the other domains, such as physical health (r = 0.44), psychological health (r = 0.49), and social relationships (r = 0.33). This means that though environmental factors significantly influence overall quality of life, they may not align as strongly with interpersonal or social aspects compared to physical and psychological health domains. Social quality of life indicated the weakest correlations with other domains, especially physical health (r = 0.34) and environmental (r = 0.33) domains. This might be interpreted as social relationships less directly affected by physical or ecological factors but are still modestly related to psychological well-being (r = 0.51). These relationships highlighted that life-quality factors are integrated as physical and mental health domains form significant drivers that positively impact the overall QoL.

Table (4). Domain-wise Itemized Scores and Standard Deviations (N = 217)

Domain	Item Description	Mean ± SD
Physical Health Domain	Pain and discomfort	70.12 ± 12.34
	Energy and fatigue	68.90 ± 13.21
	Sleep and rest	69.50 ± 14.02
	Mobility	71.30 ± 13.50
	Activities of daily living	68.45 ± 13.67
	Dependence on medicinal substances	70.25 ± 12.80
	Work capacity	70.80 ± 12.99
Psychological Health Domain	Positive feelings	56.10 ± 10.80
	Thinking, learning, memory, and concentration	54.80 ± 12.15
	Self-esteem	55.90 ± 11.50
	Body image and appearance	53.90 ± 12.20
	Negative feelings	54.60 ± 11.70
	Spirituality/Religion/Personal beliefs	55.50 ± 12.40
Social Relationships Domain	Personal relationships	54.30 ± 14.10
	Social support	53.50 ± 15.00
	Social activity	54.10 ± 16.20
Environment Domain	Safety and Security	50.90 ± 15.30
	Home environment	52.10 ± 14.50
	Financial resources	50.80 ± 15.00
	Health and social care accessibility	52.20 ± 14.80
	Opportunities for acquiring new skills	51.60 ± 14.90
	Physical environment (pollution/noise/traffic)	50.50 ± 15.40
	Participation in leisure activities	52.00 ± 14.90
	Transportation	51.80 ± 15.10

Table (5). Scores of the 4 QOL domains and their values of Spearman's Correlations (N = 217).

	Mean	SD	Participants with poor scores, n (%)	Spearman's correlations (r)			
				Environmental QOL	Social Relationship QOL	Psychological Health QOL	Physical Health QOL
Domain 1 Physical Health QOL	69.83	13.69	56 (25.8%)	0.44**	0.34**	0.53**	1.00
Domain 2 Psychological Health QOL	55.43	11.61	50 (23%)	0.49**	0.51**	1.00	
Domain 3 Social Relationships QOL	53.96	15.61	23 (10.5%)	0.33**	1.00		
Domain 4 Environmental QOL	51.98	14.76	63 (29%)	1.00			

5. Discussion

The results show that among the four domains of QOL, people had a relatively higher quality of life in Riyadh in the physical health domain. At the same time, participants reported a lower QOL in the domain related to environments. The study's findings are similar to those of Hiller (1990), who concluded in his research that urban transformation had a positive impact on people's lives. The research studied the role of urban transformation in the wake of landmark events in the host cities or countries. Since this research has investigated the lower QOL related to the environment in the wake of urban transformation, Müller (2012) has concluded that negative impacts can be minimized through making a positive perception of the urban transformation. The results of this study are also similar to the findings of Michael et al. (2020), who unveiled that due to urbanization and modern infrastructure in Cambodia, there was an improvement in the lifestyle of people in the form of a consumption and resource-intensive lifestyle in the last four decades. Dhyani et al. (2018) also conducted their study in the Indian city of Nagpur, which has been an example of a smart city. However, the findings of this study have revealed that due to urban development in this city, environmental deterioration has been evidenced in the form of a reduction in the wetlands, water scarcity and degradation in water quality, reoccurrence of floods, loss of croplands and yields, and loss of biodiversity. All such impacts call the entire urban development into question and stipulate to devise more sustainable economic policies that may benefit from increasing the quality of life in all domains. Masnavi et al. (2019) reviewed the published literature related to the studies of urban transformation and stressed the need to emphasize spatial morphology and improve urban spatial structures.

Regarding the societal impacts of urban transformation, this study has observed slightly significant positive impacts that are lower than the physical and psychological effects. Sharp (2020) has mentioned the case study of Airbnb's Home Sharing Club as part of urban transformation with the real-life implication of the theory of Transformational Social Innovation Theory. Sharp (2020) asserts that for socioeconomic empowerment, building the narrative of share ability can be one of the sustainable ways that positively sustainably impact society.

In addition, the results of the study are consistent with the findings of Kalaycı et al. (2019), who examined that on account of urban transformation to solve complex issues of society, improvement in the quality of life was observed among urban dwellers. However, the results of the study are not consistent with the findings of Kannan (2020). In his study, Kannan (2020) unveiled that urban transformation did not beget any improvement in the QOL of people. Rather, it brought about an increase in the crime rate against women in the Rajasthan region, India. Kannan (2020) figured out an increase in traffic, congestion, influx of slum areas, and sprawl of narrow lanes (Kannan, 2020).

6. Conclusion

The study evaluated QOL in the physical health, psychological health, social relationships, and environment domains. It was found that the highest score was recorded in the physical health domain, and the lowest score was found in the environmental domain. All the domains were positively correlated with each other. However, the association between physical and psychological health QOL was the strongest, while the environmental and social domains reflected greater vulnerability. This, in turn, brings forth the need for a balanced approach towards urban transformation, where sustainability, environmental quality, and social well-being are considered. The physical and psychological elements have received continuous development, but the environmental challenges and weaker social relationships demand immediate attention. Thus, and policymakers need to give importance to sustainable practices, environmental protection, and community-oriented approaches to bring holistic quality of life improvement.

This study emphasizes the need to focus on the spatial morphology of urban spatial structures in urban policy. The study explores the readiness and compliance of urban planning, infrastructural development, and standards adopted by the Saudi government to recognize Riyadh as one of the top cities across the globe. This study has encapsulated a comprehensive view of state-of-the-art projects that are to be built and parts of Vision 2030 of Saudi Arabia. The study will offer insights to academicians, researchers, and policymakers. However, the sample size was limited and was taken from the three municipalities of Riyadh. Thus, future studies may investigate QOL in other regions of Saudi Arabia.

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Appendix:

Study Questionnaire

1. Physical Health

- To what extent do you feel that physical pain prevents you from doing what you need to do?
- How much do you need medical treatment to function in your daily life?
- How much do you enjoy life?
- How safe do you feel in your daily life?
- How well are you able to get around?
- Do you have enough energy for everyday life?
- Are you satisfied with your sleep?

2. Psychological Health

- How much do you enjoy life?
- To what extent do you feel your life is meaningful?
- How well are you able to concentrate?
- Are you satisfied with yourself?
- To what extent do you feel accepted by your family and peers?
- How often do you have negative feelings such as blue mood, despair, anxiety, or depression?

3. Social Relationships

- How satisfied are you with your personal relationships?
- How satisfied are you with your social life?

- How satisfied are you with the support you get from friends?

4. Environmental Health

- How safe do you feel in your daily life?
- How healthy is your physical environment (e.g., climate, noise, pollution, aesthetics)?
- Have you enough money to meet your needs?
- How available is the information that you need in your daily life?
- To what extent do you have the opportunity for leisure activities?
- How satisfied are you with the conditions of your living place?
- How satisfied are you with your access to health services?
- How satisfied are you with your transport?

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التحـول الحضري وأثـره على جـودة الحيـاة في الريـاض: مراجعـة التقـدم نحـو تصنيفـات المـدن العالميـة

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ملخص البحث. إن إدارة النمو في الرياض، بعد التوسع السريع الذي شهدته المدينة، قضية رئيسة تحتاج إلى مناقشة. تهدف الدراسة إلى تقييم تأثير التطور الحضري للرياض على جودة الحياة. تم اعتماد تصميم دراسة مقطعية لتحديد التأثير على جودة الحياة في المجالات الأربعة: الصحة البدنية، والبيئية، والنفسية، والعلاقات الاجتماعية، من خلال استخدام النسخة المختصرة من استبيان منظمة الصحة العالمية لجودة الحياة. وقد استقطبت الدراسة ٢١٧ مشاركاً. ومع ذلك، تم جمع البيانات المتعلقة بالتحول الحضري في الرياض نوعياً باستخدام بيانات ثانوية. كشفت نتائج الدراسة أن التحول الحضري كان مرتبطاً بشكل كبير وإيجابي بجودة الحياة. تستعرض الدراسة أن البنية التحتية الإجمالية في ظل رؤية السعودية ٢٠٣٠ تتوافق مع المعايير العالمية للتنمية والاعتراف وهو ما سيزيد من احتمالية حصول المدن السعودية على اعتراف عالمي.

الكلمات المفتاحية: التنمية، الرياض، المملكة العربية السعودية، التحول الحضري، جودة الحياة .