Assessment of urban growth of Jeddah: towards a liveable urban management

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Abstract

In Saudi Arabia, an array of diverse strategies has been applied in response to the adverse effects of urban sprawl. A review of the historical proliferation of these strategies indicates that although in the short term the strategies have achieved high-quality infrastructure in some parts of the major cities, longer-term prospects are less promising since numerous urban problems persist in these cities. Among these problems are uncontrolled developments in the fringes, inadequate urban services, spiralling land prices and construction costs, the proliferation of slums and degrading quality of the urban environment. This research focuses on urban growth management as an approach for sustainable communities. The study will then discuss urban growth management as a discipline that can empower Jeddah as one of the fastest Saudi major cities to generate better urban development strategies and policies for a new generation of communities. This research paper explores ways to manage Jeddah’s urban growth and new development. The objective is to generate new communities that offer higher standards of living while meeting the challenge inside the existing urban mass by providing the much-needed new policies to limit and control urban growth. It is, therefore, an absolute must begin revising our urban growth and spatial development policies and plans. New theories of urban growth, development and management must be carefully examined and studied, and solutions must be devised, sooner than later, to help promote achieving sustainable urban management in Saudi Arabia.

Keywords: urban growth; urban sprawl; urban management; sustainable communities; Jeddah

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1. INTRODUCTION

Since the formal establishment of the Kingdom of Saudi Arabia (1932) political and administrative leadership has considered urban development essential for the economic and social well-being of the citizens. Initially, urban growth was promoted by expanding the municipal area boundaries as well as other components of urban structure and thus enabling economic growth and population increase. Till date, urban growth and development continue to be the main strategic tool for sustained economic growth of the country. By and large, urban growth has been perceived beneficial because of the outstanding achievements in infrastructure and services and a parallel rise in the standards of living in a short period of time [1].

In Saudi Arabian context, over the past two decades, urban analysts and social commentators have started to point out that negative externalities in environmental, social and economic terms outweigh the benefits. They argue that the development policies so far have been self-defeating because they failed to allocate resources in a balanced manner [2, 3], which has resulted in a distorted nature of urbanization [4], manifest in ‘leapfrogging development’, proliferation of scattered settlements, unregulated urban fringe, shortage of affordable housing, insufficiently funded public services, increasing social differences, long commuting times, traffic congestion and notable ecological problems.

The phenomena of excessive urban growth, which has recently been placed on the Saudi national planning agenda, can be attributed to the inherited legacy of conventional urban planning practices and actions for regulating urban development and service delivery. It has been pointed out [1] that due to the lack of appropriate policy guidance and the absence of coordination among government agencies, the public sector authorities could not perform the duties assigned to them. Moreover, the municipalities seemed poorly equipped to deal with the
massive forces of urbanization. Expansion of the administrative jurisdiction within cities required a greater degree of control over the area than the local authority was able to exercise. It can be said that the laissez-faire attitude towards the urbanization process and uncontrolled urban sprawl has developed because of the weakness in urban management system and limited manpower and legal power. Clearly, it is not urban growth itself that is the problem, rather the rate and pattern of that growth, which outpaces the institutional, administrative and financial capabilities to cope with it. The primary question decision-makers and scholars should now pose is how to assist the local authorities in formulating long-term objectives and enable them to effectively manage the potential impact of oncoming urban growth.

2. REGULATING URBAN GROWTH PROCESSES IN SAUDI ARABIA

The urban growth process in Saudi Arabia is one of the world’s fastest. The prime urban centres like Riyadh, Jeddah, Makkah, Madinah and Dammam have experienced explosive growth since 1973. According to the National Population Census of 2004, the population has grown at a rate of 2.4% per annum from 16.94 million in 1992 to 22.7 million in 2004, an increase of 5.72 million (33.8%) [5]. The gross density of Saudi cities is significantly low, ranging from 12 to 29 persons per hectare [6]. This indicates that the share of the population living outside the central city is increasing. Such urban sprawl has been forcing municipalities to expand their boundaries in order to serve the urban fringe. This policy option and management strategy to accommodate urban expansion has led to premature expansion of public infrastructure networks [7]. This in turn has led to imbalanced urban growth.

Urban sprawl in Saudi Arabia has gone unabated so far by the public laissez-faire in urban development. Impact of the free land grant policy and interest-free loans by government agencies during the past four decades can be cited as factors responsible for the urban sprawl phenomena in the Kingdom of Saudi Arabia. Through these policies, hundreds of thousands of residential plots were distributed free of cost to the public. Above all, the enthusiasm of real estate developers has been a significant force in the premature and unprecedented expansion of suburban areas in major cities such as Riyadh, Jeddah and Dammam. This in turn necessitated the rapid expansion of the road networks and utilities with high financial outlays [8]. According to some estimates, the population of Saudi Arabia may reach from 24 to 39 million by the year 2020. The urban share of the national population is expected to reach 86% by the same year [9]. Since such a rapid growth seems very likely, it would be a mistake to assume that urban growth will be contained in major urban centres or rural–urban migration will be limited. Since the cost of unchecked urban expansion is already so high, the question we need to address is how to make growth management policies and instruments more liveable and effective?

3. OVERVIEW OF JEDDAH STRUCTURE PLAN

With the start of the 1990s the phenomenon of regional disparities in spatial development began to be sufficiently highlighted. This stimulated the preparation of the National Spatial Strategy (NSS). The NSS suggested a system of ‘growth poles’ and ‘growth centres’ inter-connected by primary, secondary and tertiary ‘development corridors’ based on the principles of ‘efficiency-equity’, which would harness the positive forces of the fast growing areas such as Jeddah city. It also provided a guideline for a balanced pattern of population distribution and settlement development. In the meantime, the concept and practice of structure planning had gathered popular acceptance in the UK and other commonwealth countries. The NSS incorporated the concept of strategic plans (structure plan) to address the issues of lop-sided urban growth as well as to provide a broader framework for subsequent local plans, which could also provide a basis for improved recourse allocation [10].

In 1989, the Council of Ministers directed MOMRA to undertake the preparation of structure plan for Saudi cities to guide their long-term growth. For the preparation of structure plans, individual municipalities were requested by MOMRA to consider redefining urban growth boundaries in order to cover much larger areas so that the problems that were being faced in the implementation of boundaries could be addressed effectively [8].

In 1995, a local consultant firm was appointed to prepare a structure plan for Jeddah. The plan was mainly based on the idea of ‘sustainable development’ and intended to provide a broader spatial strategy for urban development within the metropolitan area up till 2055 (Figure 1). However, in preparing the structure plan, unforeseen problems were encountered because the structure plan approach requires wide range of interconnected development activities [11]. This caused delay in preparing the plan. The delay in preparation has been due to a shortage of skilled planning staff but also to an ambition to be comprehensive, to collect vast amount of data and to involve too many committees and agencies in the planning process. Besides, since the approval of the NSS by the council of Ministers in 2001, no review or updating had been carried out to incorporate the fast structural changes that had changed the pattern of urbanization in Saudi Arabia [10].

In 2004, the same consultant was also requested to prepare a detailed local plan at scale 1:1000 and also to prepare detailed zoning regulations for selected areas. In early 2005, applying the previous development directives, and planning by-laws, the Jeddah Municipality approved a new local development plan to guide the city’s growth up to 2055 in order to cope with the ongoing pressure of development. The plan attempted to utilize vacant lands in the city more fully, while increasing the height of existing buildings. In doing so, it clearly responded to the demands from the public. However, both the structure plan and the local development plans provided a feedback to the most recent zoning and subdivision regulations. The structure plan aimed at controlling horizontal growth by delineating the urban growth boundary on the one hand and by facilitating urban in-fill development on the other by deploying an incentives policy.
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The underlying assumption of this local plan was that compact development would ensure efficient use of available land and maximize their profitability. It seems that policy makers at all levels were tempted to increase the incentive for upgrading and redevelopment by permitting more building densities and height within existing residential areas and on undeveloped land. It should be noted that if the decision to allow increasing densities was desirable and would maximize the return to real estate investment and ultimately would assist in shrinking the city size, then the loss from lower housing consumption would be offset by other gains such as improved access to open space and lower traffic congestion. and the consumers on balance would be better off [12]. But if the criticism on urban sprawl is misguided by few benefits arising from increasing city density, such a decision may lead to a serious environmental deterioration, social problems and depressed standard of living in the city.

With regard to the structure planning process, although it was intended to cover all possible aspects of city planning, the relationship between different dimensions of planning such as social, economic, spatial and institutional remained ambiguous and fragmented. The lack of clarity about how to integrate the spatial planning system with development management objectives continues to hinder the local authorities to effectively implement the designated public policies and define the responsibilities of different public sector units. With regard to the implementation of the local plan of 2006, which calls for an in-fill development to make city more compact, it must be pointed out that the adoption of the structure plan necessitated formulation of new zoning regulations that further necessitated improvement in terms of skills and knowledge of municipal officials and professionals in order to successfully implement the new zoning regulations. Obviously, the application of new regulations and/or policy instruments requires...
more institutional expedience as well as technical and administrative competence to resolve the expected conflicts, negotiations, complaints and confusions in the development process.

4. URBAN MANAGEMENT CONTEMPORARY APPROACHES

Due to the complexity of the urban growth process and the interrelated catalysts associated with the huge stream of decisions from different players in this process, the regulative approaches remain a key element in urban growth management. So it’s important to apply specific controls applied to different types of development activities to regulate their impacts on the overall urban growth to meet the desired sustainable and liveable community.

Understanding the dimension and balance of the values of the urban growth is essential, they must be studied in a manner that can improve the way communities can grow, avoid sprawl toward more environmentally and economically sustainable pattern of development [13]. Many concepts and theories have lately deliberated this issue and aimed to propose a balanced solutions and references that can guide the manner of development and management to keep these values balanced and compromised and to avoid community degradation in any aspect at the expense of others. The next sections will present two of these concepts.

4.1. Smart growth

Smart growth is an umbrella term for a set of tools that communities can use to direct growth the way they want [14]. The objectives of smart growth is to achieve neighbourhood liveability, better access, less traffic, thriving cities, suburbs and towns, shared benefits, lower costs, lower taxes and keeping open space open [15]. These are the principles of smart growth (see Table 1).

4.2. Intelligent urbanism

Intelligent urbanism encourages ground level, walkable and people-oriented urban development based on anthropometric measures. Human-scale principal advocates removing artificial barrier and promotes face-to-face contact, providing friendly places, pedestrian walkways and public domains where people can meet freely. Principles of intelligent urbanism is a theory of urban planning composed of a set of 10 axioms intended to guide the formulation of city plans and urban designs [16]. They are intended to reconcile and integrate diverse urban planning and management concerns (see Table 2).

4.3. Comparison between smart growth and intelligent urbanism

This section investigates how each concept deals with liveability approach and to how extent these concepts are similar or different, Table 3 is exploring these issues.

5. JEDDAH CITY EVALUATION

The evaluation criteria are driven from the discussion above. The research has abstracted 10 criteria that should be considered. These criteria are presented as follows (Table 4):

In the discussion below, the city will be examined against the above-mentioned criteria to determine the extent to which the urban growth management delivers the development with liveable norms.

5.1. Growing within a regional urban growth strategy

Jeddah governorate is in close proximity to Middle Eastern, African, European and South East Asian markets. The vast majority of global markets is within 15 hours flight time and other regional centres including Riyadh, Cairo, Dubai and Kuwait are within 3.5 hours. Its function as a port city has enabled Jeddah to flourish as part of the global economy and it has seen considerable growth, in comparison to other cities in Saudi Arabia and the wider region.

Jeddah comprises unique historical, natural and economic assets. These include economic assets such as the port and airport, together with other assets including the historic Al Balad cultural district and natural features such as the waterfront, coral reefs and Hijaz Mountains. There is significant potential to sympathetically utilise these assets for urban gain.

Moreover, Jeddah’s location as a gateway to the holy cities reinforces its position as a major cultural centre. Jeddah is visited every year by between 4 and 6 million visitors, including 1.5 million international visitors. Even excluding Pilgrims, this is comparable to cities such as Marrakech, Athens, Abu Dhabi and Cape Town, which each welcome between 1.4 and 1.9 million international visitors each year.

5.2. Directing urban growth through creating a priority area map and locating strategic sites for development

Jeddah recognised the value of its historic attributes more than 20 years ago and was the first municipality in Saudi Arabia to list historic monuments and buildings. As a result, Jeddah is the only city in the Kingdom with a historic city district (Al Balad). Al Balad is one of the few remaining locations that retain traditional ‘Hijazi’ architecture, once prevalent on both coasts of the Red Sea.

Jeddah has a number of economic, environmental and historic assets, which provide huge economic opportunities. However, in many instances, the potential of these assets are not being met. In particular, Al Balad and the waterfront present tourism and recreational opportunities, while the airport and port have large areas of underutilised land adjacent to them, which may be more effectively utilised.

On the other hand, there are extensive areas of vacant land in the existing urban area. Failure to develop this land as a primary

1 Source: Tourist Information and Research Centre, MAS and the Saudi Commission for Tourism and Antiquities.
option is the result of inadequate governance and control alongside speculation of value. If commitment to develop this land at higher levels of density is not met, urban sprawl will continue and the negative impacts of urban growth will continue to be felt.

5.3. Efficient Local resources and infrastructure usage in a cost-effective manner

Jeddah’s linear form is as a result of its location between the Hijaz mountains and the Red Sea coastline, which has presented limits to growth. Failure to recognise the importance of environmental protection, compounded by numerous instances where urban sprawl has been permitted, is resulting in the degradation of many naturally occurring systems. Urbanisation is damaging terrestrial and marine habitats, altering the hydrological performance of the natural drainage systems and construction in the Wadis affecting stormwater drainage.

The management of the city is largely reliant on hard engineered infrastructure. For example, the stormwater management systems redefine natural water management. While this approach to infrastructure may be appropriate in some instances, the potential for more naturalised systems that provide an alternative and more sustainable approach should be explored where possible. This approach may provide additional benefits such as locations for recreation or wildlife.

In terms of wastewater, water, electricity, telecommunications and drainage infrastructure, there is a lack of coordinated investment from the public and private sectors with no overarching strategic direction for infrastructure planning. This has resulted in infrastructure lagging behind the growth of the city with little regard given to future demands and growth patterns when installing new supply and distribution systems. Many parts of the city are disconnected from the main networks.

5.4. Enhancing the physical sense of place by creating destination places

For centuries Jeddah was focused upon the Al Balad as a centre of trade and commerce at the heart of the city. However, during the past five decades, Jeddah has developed along a network of highways that has led to linear patterns of growth, rather than a network of centres as is typical in comparable cities around the world.

Centres are important in establishing the character and nature of the city providing a focus for retail, commercial and mixed use functions. The opportunity to establish a hierarchy of centres in Jeddah should be realised and will allow for flexibility in providing for city-wide needs with a detailed consideration of catchment areas and population requirements. Around centres, increases in residential density will be appropriate enabling residents to

| Principle | Explanation |
|-----------|-------------|
| Mix land uses | Cluster of development works better if it incorporates mixed stores, jobs and homes, while single use is inconvenient and needs more driving. |
| Take advantage of compact building design | Designing our community should be in a way that preserves open spaces and makes efficient use of land and resources and take advantage of compact building design that avoids land consumptive development. |
| Create range of housing opportunities and choices | Providing people with more choices in housing, shopping, communities and transportation is a key aim of smart growth. Provision of housing opportunities can mitigate the environmental costs of auto-dependent development and ensure a better jobs–housing balance. |
| Create walk-able neighbourhoods | It’s not only that walkways and sidewalks are necessary but also to have something to walk for it like a store, transit station or school and that can create a sense of community and encourage neighbours to know each other. |
| Foster distinctive, attractive communities with a strong sense of place | Communities should be encouraged to craft a vision and set principles for development and construction, which respond to community values of architectural beauty and distinctiveness, creating special places from train station to local business; these places should be celebrated. Creating special neighbourhood public space encourages social interactions. |
| Preserve open space, farmland, natural beauty and critical environmental areas | Open-space preservation supports smart growth goals by bolstering local economies, preserving critical environmental areas, improving our community’s quality of life with an access to nature and guiding new growth into existing communities. |
| Strengthen and direct development towards existing communities | It’s better to find opportunities to grow in the built-up areas before plowing up forests and farms, and direct development towards existing community to take the advantage of the existing infrastructure and utilities. |
| Provide a variety of transportation choices | Cars should not be the only transport system for any community but that will also never happen until we provide transportation alternatives and choices like public transportation, sidewalks and bike paths. |
| Make development decisions predictable, fair and cost-effective | Private sector is very important to be embraced to obtain a successful smart growth community, and then smarter development should be encouraged by intensives. |
| Encourage community and stakeholder collaboration | Participation in the decision-making can help to build great places to live, work and play because it reflects the community sense and how and where they want to grow. When people feel that they are left out of important decisions, they will not help when hard decision should be taken. |
benefit from access to amenities, jobs and public transport in close proximity to their homes.

In regards to Jeddah’s waterfront, it is a unique asset for the city. However, uncoordinated development, alongside competing pressures for public and private users, has resulted in this resource being degraded by unsympathetic development and misuse of the natural environment. This must be overcome if the social, environmental and economic potential of this asset is to be realised.

5.5. Creating walkable streets and a pedestrian-friendly environment and supporting non-motorised transportation

Current open space provision in Jeddah is deficient at 2 m² per person. This is lower than the MOMRA standard of 4.23 m² per person and significantly reduced from the World Health Organisation, which suggests that 8 m² per person is required. The type of open space and public access to the open space network can influence the provision allocation. Approximately 50% of lands reserved for parks in existing urban areas have not been developed for open space. It is essential that reserved land is developed for community parks to a recreation and water management function as part of a green infrastructure network.

The current open space provision is characterised by a network of fragmented and disconnected spaces that lack capacity to provide for varied recreational activity or water management functions. However, the municipality is undertaking a program of open space improvements focused on the corniche. The opportunity exists to expand this to cover the entire urban area.

Moreover, Jeddah is structured around a series of high density corridors running in a north to south east direction that accommodate the majority of the population. This has it served to develop disconnect between communities and access to other land uses across the city as the limited levels of connectivity at local scales require people to use vehicular modes of travel to access the services they require. The network is also characterised by low levels of permeability and legibility as users are forced to make extended trips in single directions before the opportunities to travel in alternative directions are presented. The limited east–west connections further enforce the reliance on high density north–south–east movement that has embedded a linear city form across Jeddah.

| Principle | Explanation |
|-----------|-------------|
| Balance with nature | This principle is concerned about the environmental issues to identify different zones and location according to their environmental properties then how to deal with it; there are fragile zones and threatened natural systems should be conserved; density should be controlled or kept as open spaces. |
| Balance with tradition | This principle is intended to respect the heritage and cultural assets existing in the community; each community has its unique cultural and societal iconography that represented in their signs and symbols; by orienting attention toward historic monuments and heritage structures and promoting architectural styles and motifs, then we can communicate cultural values. |
| Appropriate technology | Technology must be incorporated in the process of the urban growth like building materials, construction techniques and infrastructure system; all problems should be solved with its potential technologies and assure that there is a fair distribution of urban utilities and services. |
| Conviviality | This principle is concerned about social interactions in the public domains and promoting all kind of social relationships by providing numerous opportunities for gathering and meeting one another for personal solace, companionship, romance, domesticity and neighbourliness. This hierarchy of social layers needs a hierarchy of place and space to enhance it. |
| Efficiency | It intended to balance between consumption of the community resources and its benefits. While we consume energy, finance and time, there must be a feasible return on safety, security, health and overall quality of life; all functions should be performed in a cost-effective manner. It reduces the facilities, services and infrastructural networks cost per household, then we can get more affordable houses and have an optimum share of resources. |
| Human scale | It promotes pedestrian and walkable environment through circulation networks along streets, creating a people friendly destination like parks, cafes, shops and amenities. This human-scale sensation can be enhanced by elements like arcades and pavilions or using natural materials. |
| Opportunity matrix | Intelligent urbanism views the city as an opportunity system even it is personal, social, economic, service or facilities, all citizens should have an equal access to opportunities like education, health, recreation, transportation and business within the urban system. |
| Regional integration | The city should work as part of the larger environment, which sometimes comes from its physical form, or a geographic character. Without integration of social and economic aspects, the urban growth will be as leapfrog growth. |
| Balanced movement | There must be varied transport systems including walkways, bus lanes and light rail beside automobile. Urban would be intensified along mass transit corridors and around major urban hubs. |
| Institutional integrity | This principle is to clarify that the urban planning is not enough to generate a real urban development; there must be responsible, transparent, expert and participatory local governance that can set urban development management tools to achieve appropriate urban practices, systems and forms. There must be a structure plan or other document that defines how the land will be used, serviced and accessed with development control regulations that reflect the stakeholders and citizen interests. |
Table 3. Comparison between smart growth and intelligent urbanism concepts done by the author.

| Issue                      | Smart growth                                                                 | Intelligent urbanism                                                                 |
|----------------------------|------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| Urban growth control level | It tends to intensify within the existing communities, develop on a brownfield rather than creating new communities. | It tends to accommodate growth in the best place but after conducting a cost-effective study for all functions. |
| Regional integration       | Regional integration is essential.                                            | City should work as part of the larger environment.                                   |
| Effective usage of resources | It is enhanced by using the community existing assets such as infrastructure and old buildings. | It balances between consumption of resources and planned achievements.                 |
| Sense of place             | It enhances the sense of place through the community identity.                | Sense of place is achieved by focusing on the human scale in urban design.            |
| Transportation             | It calls for providing transportation alternatives and using the TOD as structure of development. | It calls for varied transport systems.                                                |
| Walkability                | It encourages walkability by creating something to walk for within pedestrian-friendly environment. | It encourages pedestrian-oriented urban patterns by providing circulation networks that link local destinations. |
| Mix use Development        | Mixed use development is a main pillar to achieve smart growth.              | Mixed use is important to achieve the matrix of opportunities for all groups in community. |
| Compact development        | Promoting high level of compactness and infill projects with minimum conversion of new land for development. | It does not indicate criteria about compactness, but it requires to develop in an effective manner. |
| Affordable and mixed housing | The provision or mixed housing is way to mitigate the environmental problems and reduce car dependence; also, it can provide job opportunity. | It requires a variety of dwellings types that respond to a complex matrix of needs and abilities; therefore, opportunity matrix can be enhanced. |
| Community participation     | It gives a high importance to the participation process, to accelerate the urban development in its different phases. | It calls for the institutional integrity and participatory local governance.           |

Table 4. Criteria of evaluation.

1. Growing within a regional urban growth strategy.
2. Directing urban growth through creating a priority area map and locating strategic sites for development.
3. Efficient local resource and infrastructure usage in a cost-effective manner.
4. Enhancing the physical sense of place by creating destination places.
5. Creating walkable streets and a pedestrian friendly environment and supporting non-motorized transportation.
6. Providing alternative transportation facilities connected to the regional transportation network.
7. Mixed use development centres and corridors through creating vibrant places to live and work, make business and have access to recreational areas.
8. Compact development and infill projects with minimizing new land conversion to urban development and encouraging brownfield redevelopment.
9. Provision of affordable houses and multiple housing choices.
10. Participation between all development parties through effective participation tools.

5.6. Providing alternative transportation facilities connected to the regional transportation network

Currently, the private vehicle is the dominant mode of travel accounting for 96% of all journeys undertaken within the city. Jeddah’s recent development around a grid network of major highways has resulted in high levels of traffic congestion. At present, the city lacks a public transport network with an over reliance on vehicular travel. Walking and cycling at the local level become difficult as primary roads define the city and act as barriers to movement within and between destinations.

Investing in public transport, aligned with other strategic planning initiatives, will in the long term help to control and limit growth in traffic congestion. This will lead to significant improvements in quality of life through reduced air pollution and ease of movement. In this context, Jeddah municipality is presently working with delivery partners to invest in a comprehensive public transport system including a metro system and a public transport master plan is underway.

5.7. Mixed use development centres and corridors through creating vibrant places to live, work, make business and have access to recreational areas

Jeddah’s public realm is not sufficient to meet the demands of a liveable city. The opportunity to focus new destinations and development across the city could realise the potential to establish a consistent and integrated approach that would provide a more liveable city for residents. Public realm incorporates all areas
to which the public has open access such as streets, squares, pathways, right of ways, urban parks and open spaces.

Many of the unplanned settlements have limited or no direct access to main services and utilities with a significant proportion of residents living in crowded conditions. This results in unhealthy living conditions to develop with a poor quality of life for residents living in many of the unplanned settlements parts of which can be defined as slums using UN-Habitat criteria.

The provision of accessible, high-quality social services to all citizens is fundamental to achieving sustainable development and a high quality of life for all. Through application of the referenced standards, aligned to the centres hierarchy, it will ensure that all communities in the governorate are well served by high-quality, accessible and equitable services that meet the demands of projected growth to 1454/2033.

At present, there is an imbalance in social service provision across the governorate and residents within many areas of the city, such as the unplanned settlements and outlying sub-regional communities, lack access to acceptable services. There are also issues of capacity within the high-density urban areas where many services are operating beyond their intended capacity. Furthermore, the provision of social services needs to account for the high number of visitors in the governorate. While visitors to the city do not require all social services, there is requirement for certain social and healthcare requirements.

5.8. Compact development and infill projects with minimizing new land conversion to urban development and encouraging brownfield redevelopmen

Until the middle of the 20th century, Jeddah’s growth was contained to the area around Al Balad. However, the rapid economic expansion, and increase in car use, has led to linear patterns of development around main highways infrastructure. Recent development has seen fragmented developments, some a considerable distance from the core urban area, leading to issues of infrastructure provision and the long-term sustainability of these isolated districts.

Many of the unplanned settlements are disconnected from the city wide vehicular transport network. This leaves many unplanned communities segregated from other parts of the city with significant limitations to integration and wider social and economic participation.

Jeddah has a number of opportunities to intensify its existing urban area. It is estimated that approximately 12,000 ha of unbuilt land exists within the core urban area. This comprises a number of consolidated vacant land holdings ranging in size from single plots to over 4000 ha. These represent a significant opportunity, providing constraints such as land ownership can be overcome.

5.9. Provision of affordable houses and multiple housing choices

Supply affordable housing programmes pursued by the Ministry of Housing, Municipality and Jeddah Development & Urban Regeneration Company must be continued along with the provision of market housing to serve the needs of all citizens. A lack of affordable housing presents a significant threat to the long-term economic and social sustainability of Jeddah. The requirement for affordable housing in Jeddah is acute. The shortage of housing in Jeddah particularly affects middle- and low-income residents. The growth of unplanned settlements is partly attributed to a significant sector of the resident population that has become priced out of Jeddah’s housing supply. The lack of affordable housing supply must be addressed to prevent continued unplanned settlement growth and establish sustainable mixed use communities.

5.10. Participation between all development parties through effective participation tools

The successful implementation of housing and social service provision will rely upon the public and private sector working together to create the right kind of environment within which sustainable, healthy and successful communities can thrive. The public sector has a key role to play here, working closely with the private sector to provide the right conditions within which market demand can be stimulated, by ensuring that public services are delivered across the governorate for the benefit of all. At present there is limited coordination between facility providers. This misses a significant opportunity to ensure efficient investment in social services for example through co-location of complimentary facilities.

6. DISCUSSION AND CONCLUSION

According to the discussion above, opportunities for promoting urban growth in Jeddah as well as challenges facing achieving sustainable urban growth are summarised in Tables 5 and 6.

Based on this study, the research argued that there are four components that make up all cities and towns: environment, economy, people and infrastructure.

- The environment relates to built and natural areas. Built environment includes buildings and the public realm and will reflect decades or centuries of development responding to the long-term social and economic requirements. Natural environment includes the terrestrial environment upon which urban areas are built, surrounding undeveloped areas and habitats (including agricultural land) together with marine environments including coastline, rivers, wadis and ground water. The natural environment is a finite resource.

- The city’s economy is a primary reason for its existence. Cities exist to facilitate trade and commercial transactions. Businesses cluster together in cities to make the most of being in close proximity to other businesses, infrastructure, trading partners, customers and employees.

- People are attracted to cities for economic, employment or trade, social, community or culture reasons as well as housing. People define the character of the city.
Table 5. Opportunities for promoting urban growth in Jeddah.

| Natural environment | Hijaz Mountains and Red Sea Coast present significant opportunities for biodiversity enhancement, recreation and leisure. |
|---------------------|--------------------------------------------------------------------------------------------------------------------------|
| Historic assets     | Al Balad plays a symbolic and cultural role in Jeddah and must be preserved.                                               |
| Opportunities for urban regeneration | Vacant land and the improvement of unplanned settlements present potential to make Jeddah’s urban core a better place to live. |
| Public realm        | Improvements by Jeddah Municipality to Falastin Street and the Northern Corniche demonstrate how public realm can radically transform previously vehicle dominated streets. |
| Economic assets     | The port, airport and university present significant assets to assist in Jeddah’s future growth and expansion.             |
| Centres hierarchy   | At present there is no definitive hierarchy of centres. The old airport site presents the opportunity to develop a metropolitan centre for Jeddah, with further lower order centres potentially developed across the governorate. |
| Religious and cultural gateway | Jeddah is visited by between 4 and 6 million people every year, many of whom are taking part in the Hajj and Umrah pilgrimages. |
| Open space          | The municipalities program of open space investment needs to be implemented across the city to reduce current deficits.     |
| Transport hub       | Jeddah is a major transport hub. However, investment in public transport is required to ensure it functions at a local level. |
| Climate change and renewable energy | Jeddah must respond to the challenges of a changing climate through investment in flood defense and urban cooling initiatives together with renewable energy technologies. |

Table 6. Challenges facing achieving sustainable urban growth in Jeddah.

| Damage to the natural environment | Urban sprawl and failure to protect natural areas has resulted in a loss of habitats and natural features. |
|----------------------------------|---------------------------------------------------------------------------------------------------------------|
| Engineered infrastructure solutions | Hard infrastructure dominates the urban area.                                                                 |
| Fragmentation of the waterfront  | Much of the waterfront of the governorate is blocked by private development or industrial processes.         |
| Housing supply and affordability | There is a lack of affordable housing in Jeddah.                                                              |
| Unplanned settlements            | The uncontrolled expansion of unplanned settlements has occurred over many years.                              |
| Social services                  | There is an under provision of social services across the urban area.                                          |
| Open space deficit               | There is currently a significant shortage of open space in quantitative terms, and in proximity to people’s homes. |
| Lack of public transport network  | Jeddah suffers from high levels of traffic congestion as a result of no formal public transport network.       |
| Road structure acting as barrier to movement | The motorway-grid structure results in barriers to movement, particularly in an east–west direction.        |
| Limited utility networks         | Many parts of the urban area have no access to services including main water and sewage networks.               |

- Infrastructure enables socio-economic processes to occur. Transport networks allow people to move around for economic or social purposes, while utilities bring power, water and telecommunications to enable economic and social activities.

In the current case, for Jeddah city to be successful and sustainable, it should therefore bring together these four strands: it has to provide high quality built and natural environments and sufficient infrastructure and services to attract people and economic activities. These processes will only be successfully facilitated through effective leadership and governance. This is typically undertaken through effective urban planning and implementation.

Jeddah being a successful city can be achieved where there is strong leadership, effective governance and inter-agency working. Although Jeddah has had a ‘plan-led’ system for a number of years, which has loosely guided the development of the city, it has suffered from a lack of planning tools to implement urban planning initiatives, and a failure by authorities to enforce against illegal development.

In addition with a number of agencies responsible for development and the provision of infrastructure in Jeddah there needs to be a greater emphasis on coordination and joint-working between agencies to a series of common aims.

Jeddah has to implement a more integrated development management process that provides a high level of certainty for all stakeholders. Responding to opportunities and challenges will be fundamental in ensuring Jeddah is a liveable, sustainable and resilient place.

**CONFLICT OF INTEREST**

There is no conflict of interest.

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