

Original article

The Role of Urban Geography in Supporting and Developing the Tobruk Free Zone: An Analytical Study in Urban and Economic Planning

Saeed AL-Dahia *Department of Geography, Faculty of Education, Tobruk University, Libya***Corresponding Email.** hamedsaeed962@gmail.com**Abstract**

The study explores the critical use of urban geography in the development and consolidation of Free Economic Zones (FEZs), with particular reference to Tobruk, Libya. The research identifies Tobruk's advantageous geographical attributes, such as a natural deep harbour, closeness to the Egyptian border, and important transportation routes, while analyzing infrastructure weaknesses and urban planning matters. Through spatial analysis and urban planning evaluation, the study demonstrates how integral geographic and economic planning through the use of modern geospatial technologies can remake Tobruk as a thriving economic hub. Recommendations are provided for improving infrastructure, making land-use planning rational, and promoting sustainable development.

Keywords. Urban Geography, Free Economic Zones, Tobruk, Spatial Planning.

Introduction

Urban geography is one of the fundamental support pillars in the formation and building of Free Economic Zones (FEZs), which plays a key role in defining the spatial opportunities of a city as well as in directing the courses of its urban and economic development. In the context of quicker-than-ever global transformations, FEZs have turned into strategic means of stimulating innovation, attracting foreign direct investment (FDI), and varying sources of revenues, especially in places with promising geographic positions, such as Tobruk. Due to its strategic seaside position on the Mediterranean Sea and proximity to international frontiers, Tobruk has a competitive advantage when it comes to transport and trade, being an important connection between regional and global markets.

The relevance of urban geography is seen in its ability to analyze and leverage the physical and human qualities of a city's terrain, climate, infrastructure, and population distribution to determine the best location for economic and urban development endeavors. The integration of existing geospatial technology, particularly more so the Geographic Information Systems (GIS) and Artificial Intelligence (AI), has become a necessity in urban planning. These technologies provide efficient tools to process and analyze vast quantities of spatial and socio-economic data, thereby enhancing decision-making, sustainable development, and equity in the provision of services and resources [1,2].

Recent research highlights the imperative role of free zones in facilitating city-level innovation by establishing markets for foreign investment and quality labor, expanding local markets, and financing and logistics provision. This mechanism not only raises economic activity in the host city but also fills regional competitiveness and development gaps [3]. Besides, geography-based planning ensures that FEZs are integrated fully into the whole urban system, hence more sustainable to economic, environmental, and social shocks.

Urban geography plays a significant role in shaping the growth and success of free zones, such as Tobruk Free Zone, by influencing spatial organization, economic planning, and sustainable urban development. Urban geography focuses on examining the spatial organization and function of cities and the way urban areas are located and arranged, along with how they interconnect with economic, social, and environmental systems. Two prevalent schools of theory in urban geography, pluralistic, context-specific urban theory and planetary urbanization, offer alternative theories of urban growth and planning with emphasis on global urban processes or location-specific, non-Western perspectives [4].

Free trade zones are unique urban areas established to foster economic activity, innovation, and investment. Research shows that the establishment of free trade zones can significantly enhance urban innovation and economic development, mostly in large cities and regions with strong economic ties. These regions allow talent agglomeration, promote foreign direct investment, expand market size, and enhance financial input, all of which contribute to sustainable urban development [3]. The geographical impact of free zones also extends to nearby cities, establishing regional innovation and economic integration [3].

Technological innovations in urban planning, such as Geographic Information Systems (GIS), artificial intelligence, and spatial decision support systems, have enhanced the ability to evaluate and manage urban functional spaces. The technologies facilitate accurate segmentation of cities, support resource allocation, and contribute to the facilitation of participatory planning processes [1,5,6]. The integration of ecosystem services into spatial planning harmonizes urban development with environmental sustainability, particularly in urban peripheries where land use decisions have powerful ecological impacts [6].

The application of principles of urban geography and advanced planning tools can favor the Tobruk Free Zone by optimizing spatial organization for economic purposes; fostering innovation and investment through

strategic urban policies; harmonizing development with environmental sustainability; and facilitating regional integration and economic spillovers. All these approaches have a strong theoretical and practical foundation for the long-term sustainable development of Tobruk Free Zone, reconciling urban and economic planning for long-term success [1,3-6].

In this context, the current study aims to explore the focal role of urban geography in facilitating and guiding the growth of the Tobruk Free Zone. It tries to evaluate Tobruk's geo-space capital and infrastructure and their implications on urban and economic planning, and how the use of advanced geographic tools can be directed to achieve balanced, sustainable, and resilient development within the city and the surrounding region.

Methods

Tobruk is located in the northeast of Libya, bordering the coast of the Mediterranean Sea. It is marked by its notable coastal position overlooking Tobruk Bay and being close to the border of Libya with Egypt, thus a transport and trade strategic point between Libya, Egypt, and Mediterranean countries.

Tobruk is a Libyan city located in the distant north-eastern coastal strip and is the hub of the Al-Butnan region. The Al-Butnan region covers an area of approximately 83,860 km², which constitutes about 4.75% of the total area of Libya. The total area of the city of Tobruk is approximately 38.2 km², which is approximately 0.046% of the total area of the Al-Butnan region. As seen from (Figure 1), in terms of geography, Tobruk is situated in the northeast corner near the border with the Arab Republic of Egypt, approximately 140 km away. It sits on a promontory that extends into the sea for about 4.5 km in an easterly-westerly direction, making a peninsula enclosed on three sides by sea on the east, north, and south, constituting Tobruk Bay, one of the most important natural bays along the Libyan coast onto which the seaport of the city was constructed.

This position has given the city a unique geographical advantage over Libyan coastal cities concerning its regional role. Tobruk is considered an urban center with a relatively large population in eastern Libya near the Arab Egyptian border with a seacoast that provides easy access and linkages. It has a network of land roads that links most settlements within its region, in addition to connecting all cities in Barqa with those of the Arab Republic of Egypt, particularly the cities of Sallum, Marsa Matruh, and Alexandria.

The current research applied a descriptive analytical approach grounded on the examination of urban geography data and relevant economic and social determinants related to the Tobruk Free Zone in order to realize the spatial planning and development opportunities within the area. Research processes involved the following steps:

• *Analysis of the Urban Environment of the Tobruk Free Zone*

This involved examining data in terms of geographical position, infrastructure, transport connectivity, energy sources, local climate, and land preparation for investment. Analysis was carried out based on geography, population, and economic indicators such as density of population, trends in economic activity, and industrial and service sector spatial patterns.

• *Analysis of the Economic Role of the Free Zone*

Focus on this instance was put on the evaluation of the potential contribution of the free zone to the national economy via investment, creation of employment, and stimulation of transit trade. Constraints that will deter the development of the free zone, such as unfavorable infrastructures, poor regulatory regimes, and prevailing security and political environments, were also taken into consideration.

• *Research Approach*

The study employed a descriptive analytical method since it is capable of justifying interactions among factors of urban geography and economic development and linking theoretical understanding with the field situation in Tobruk city. In addition, the case study technique was employed, and the Tobruk Free Zone was an empirical case whose findings could be extended to other parallel regions in Libya.

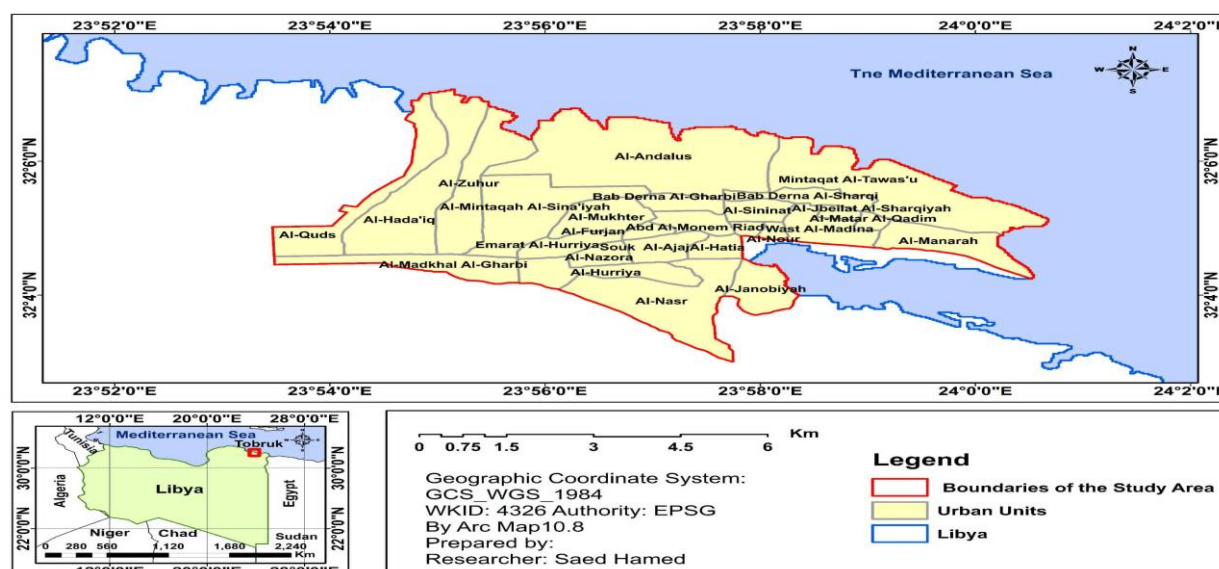


Figure 1: The location of the study area concerning the region and the country

Results and Discussion

The study found that there are a number of geographical and urban factors that make Tobruk Free Zone an ideal regional and international economic hub. They include its coastal position on the Mediterranean Sea, proximity to key shipping lanes, and strategic border position between Libya and Egypt, which enhances its potential for transit trade and international logistics.

The Tobruk Free Zone is strategically situated to become a significant economic hub due to its geographical location and economic integration prospects. Learning from the experiences of the world with free economic zones (FEZs) highlights issues for Tobruk development. FEZs are business platforms for international trade that offer instruments that enhance competitiveness, secure investment, and encourage trade. They allow companies to obtain access to new markets, establish cooperative partnerships, and conform to new global economic realities, such as shifting trade routes and arising international regulations [7,8].

Tobruk's location near the coast and proximity to major shipping lines and the Libyan-Egyptian border mirror the success drivers of other global FEZs. These areas are successful when they leverage geographical means to become commerce centers connecting businesses and investors from multiple continents, thereby providing transit trade and logistics [9,8]. For example, Gulf free zones have become key interfaces in international trade by attracting diverse investors and meeting up with global projects such as China's Belt and Road [9,8].

While the FEZs have huge potential, success is subject to good management, favorable legal systems, and harmonization with overall economic policies. The experiences in Iran and China demonstrate that the zones can underperform if national policies are not harmonized or if investment and trade barriers are present [10,9]. Long-term success requires sustainable development, open governance, and responsiveness to global standards [9].

Urban geography data show that the Tobruk Free Zone offers open and uncultivated land areas for various economic uses, mainly industrial, logistical, and commercial purposes. Urban planning for the region is at the introductory stages, offering prospects for deliberate spatial development by international free zone standards.

Having large land is a major plus point because it allows flexible zoning and agglomeration of industrial, logistical, and commercial activity. Empirical evidence for Chinese free trade zones suggests that well-designed such zones can significantly contribute towards improving the efficiency of urban land use and enhancing high-quality economic development. Such effects are especially meaningful in the context of proactive planning that considers future urbanization and economic trends [11].

As a leader in city planning, Tobruk can leverage the best international practices from free zones to adopt such concepts as combining land use optimization, adopting sustainable development practices, and making infrastructure responsive to diverse economic activities [11,12].

Use of Geographic Information Systems (GIS), artificial intelligence, and open-source planning can greatly contribute to decision-making, resource allocation, and scenario planning. These technologies assist planners to visualize land use possibilities, analyze environmental impacts, and engage stakeholders. Incorporating sustainability and resilience in urban planning is imperative with consideration of land carrying capacity, ecological footprint, and adaptive cycles to maintain long-term sustainability and adherence to global free zone standards [12].

The city of Tobruk's infrastructure road networks, distance to Tobruk Airport, and Tobruk Seaport is a pillar supporting economic activity in the free zone. Certain deficiencies were noted in energy infrastructure, telecommunication, and water services that would have to be addressed to raise investment attractiveness. Infrastructure networks, energy, water, transport, and telecoms—facilitate economic productivity and jobs. They directly influence achieving sustainable development goals. Today's investment decisions will shape Tobruk's development for the next decades in terms of requiring the building of a long-term, adaptable infrastructure vision that aligns with global practice and sustainability [14].

Good infrastructure enables easy movement of goods and individuals, indicates investment, and enables economic activities. Poor infrastructure in energy, telecommunication, and water, by contrast, might limit growth, reduce investor confidence, and be a social or environmental issue if not maintained [14].

The organizational and financial makeup of infrastructure assets is closely related to their performance in operation. Investors today perceive infrastructure as not only physical assets but also as promoters of urban flows and economic activity. Capital, organizational, and regulatory arrangements must be considered in effective planning for infrastructure to provide both financial sustainability and urban development [15].

Policymakers first need to prioritize whole-of-city, sustainable infrastructure planning, with technologies such as georeferenced data and zoning used to guide development. The inclusion of green infrastructure and cross-sector coordination can help Tobruk bypass common pitfalls and gain maximum long-term dividends [14].

Economically, the free zone can contribute to the diversification of the Libyan economy, increase the non-oil revenues, and provide employment opportunities for the local communities. For this, effective urban planning and governance, encouragement of investment legislation, and upgrading administrative and logistic services in the zone are required. Research on the free zones of the emerging and developing economies is enlightening in accounting for their role in economic development, revenue diversification, and job creation outcomes highly relevant to Tobruk's case.

Studies indicate that free zones have a statistically significant and positive contribution to GDP per capita in developing countries. If well incorporated into the national economy, free zones are a foundation for sustainable economic and inclusive growth. The incorporation is required to ensure that the advantage of the free zone extends beyond it and becomes economic diversification at the national level as well as diminishing reliance on oil revenues [16].

Free zones promote foreign direct investment and induce export-oriented manufacturing, increasing non-oil revenues and stimulating domestic economies. Evidence in China shows cities with free trade zones experience more vigorous economic growth, especially when they are in coastal or border areas, consistent with Tobruk's geographic advantages [17]. Besides, the establishment of free zones tends to create employment for local populations directly in the zone as well as indirectly for ancillary industries and services [16,17]. The absence of a defined urban development policy, duplication of responsibilities between institutions, and political uncertainty are some of the challenges listed as hindering the optimal exploitation of Tobruk's urban geographical potential. These discourage investor confidence and limit the growth potential of the zone.

Poor planning of urban development leads to inefficient use of land, sprawl of growth, and wasted opportunities for sustainable development [18]. Overlapping institutions lead to administrative delay, disorganization, and lack of accountability, hence making integrated policy implementation more difficult [18]. Political turmoil decreases investors' confidence, undermines planning, and increases risks on long-term investments [19,20]. Moreover, urbanization and economic growth are capable of enhancing ecological hazards such as loss of land for cultivation and increased landscape degradation when not suitably controlled through planning [21]. Optimal free zones require strong government programs, effective local administration, and clear institutional roles. Without these, zones are susceptible to structural inadequacies and underachievement, as in the Russian and other regions' cases [18]. Faster growth can also lead to environmental hazards and insecurity of resources, especially in regions with a scarcity of water and energy. There should be planning and risk assessment techniques to balance development and sustainability [21]. Political instability and decentralization in Libya render it difficult to achieve economic cooperation and growth in regions such as Tobruk [19,20].

Conclusion

This study confirmed that urban geography is a significant element that helps construct free economic zones, particularly in the case of cities like Tobruk, which have a strategic geographical location and high urban development potential. The study recommends formulating a master urban and economic development plan for the Tobruk Free Zone, considering spatial and environmental considerations and establishing the zone as a logistical and business hub for North Africa.

Conflict of interest. Nil

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