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An Ethnographic and Space Syntax Analysis of Urban Morphological Formation in Tartous, Syria, from 1937 to 2022

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Abstract

Port cities hold significant importance in the Middle East, yet they face numerous challenges, mainly morphological changes. This paper aims to study and track changes in the morphological structure of Tartous City, Syria, from 1937 to 2022. The central argument posits that urban spaces historically nurtured social life and can be a physically sustainable expression of resilience and social interaction.

The research employs a combination of ethnographic fieldwork, historical documents, and an analysis of historical photographs sourced from Google Earth alongside existing municipal plans for Tartous City. Space Syntax theory is applied to examine changes in the urban landscape, focusing on the street network and applying local and global integration metrics using depthmapX-0.8.0 software.

The results reveal the significant influence of natural factors, such as the city's coastal location, on its economic and social development and urban morphology. Notably, the main streets, characterized by their social and economic roles, have maintained their importance and resilience throughout history. However, reliance on modern planning approaches that prioritize vehicular traffic has diminished the social-urban roles of streets in residents' daily lives.

The findings confirm that integrating ethnographic observation with Space Syntax offers a comprehensive approach to understanding urban contexts and their transformations. Given the scarcity of sources and research on urban planning specific to Tartous, this study provides valuable insights for policymakers and planners, guiding them in navigating future changes and addressing the new job opportunities emerging in the city.

This research underscores the necessity of recognizing the local context. It highlights the urgent need for urban documentation, particularly in Syria and other Middle Eastern countries where urban structures face risks due to ongoing conflicts.

Keywords: **Ethnographic fieldwork, Space Syntax, Morphological change, Tartous city, Syria, Urban Spaces**

1. INTRODUCTION:

The Sustainable Development Goals (SDGs) set forth by the United Nations emphasize serving people through development and planning while promoting sustainable urban forms that ensure accessibility and connectivity [1]. These goals are particularly significant in coastal cities facing unique challenges[2]. Social sustainability has been linked to a city's identity and open spaces, highlighting their importance in urban development[3].

In Syria, rapid urban growth has been observed, especially in coastal cities like Tartous, where the population has significantly increased over the past four decades. This growth has placed considerable pressure on the economy, infrastructure, and transportation networks[4]. Morphological changes in Syrian cities have been the focus of several studies. For example, Alsherfawi Aljazaerly et al. [5] found that public activities in Damascus have undergone notable changes. Similarly, studies on the morphological transformation of Latakia city have provided valuable insights into urban development patterns [6].

This study aims to trace the development of the port city of Tartous and investigate the mutual relationships between its traditional spaces and the social and economic life they support by analyzing the city's morphology. Archaeological evidence highlights Tartous's historical connections to ancient civilizations, particularly the Phoenicians [7]. Today, Tartous holds significant importance for Syria and the broader Middle East due to its strategic geographical location and its status as the only Syrian city spared from destruction during the war. As a result, it became a refuge for many internally displaced persons, recording the highest percentage of displaced individuals within the Tartous Governorate during the Syrian crisis [8].

Previous studies on Tartous have focused primarily on its tourism and archaeological significance. For instance, Rahmoun et.al [9] highlighted the region's rich heritage sites, while Neglia [10] explored the multicultural fabric of the Crusader Citadel of Tartous. World Federation of United Cities conducted a project for the ancient city of Tartous within a program to support municipalities in third-world countries [11]. Suriti and Mansour published The History of Tartous [12], and

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Tayarah [13] examined the city's history and tourism. However, these studies did not comprehensively address the evolution of the city's morphology, the development of its key spaces, and their changing functions over time.
The present study explores Tartous's spatial and functional transformations from 1937 to 2022 to address this gap. It combines the analysis of historical maps with ethnographic observation based on two years of continuous fieldwork (2020–2022). The study also employs Space Syntax analysis to examine the network of primary and secondary streets, linking this network to the morphological changes observed in the city. By integrating these approaches, the research aims to deepen the understanding of Tartous's urban evolution and the socio-economic factors influencing its development.
Ethnographic and Space Syntax analyses complement and enhance urban exploration and analytical studies [14]. While Space Syntax theory has faced criticism, particularly for neglecting the third dimension (e.g., height) and the urban character, it remains a valuable tool when used as a supporting method to achieve research objectives. Despite these limitations, numerous studies have successfully applied Space Syntax, demonstrating its utility in urban research. Combining ethnographic methods with Space Syntax analysis offers a synergistic approach, adding quantitative credibility to ethnographic fieldwork and qualitative depth to Space Syntax studies. Accordingly, the objectives of this paper are summarized as follows:

1- To study the social and functional changes in the city through ethnographic monitoring.
2- To find out and track the changes in the street network using a Space Syntax analysis from 1937 to 2022.
3- To understand the effects associated with these changes.
4- Highlight the most important spaces that witnessed social and functional life in the past and today.

This study aims to contribute to morphological research and urban documentation by establishing a foundation for future studies and advancements in the field. The focus is particularly relevant to Syria, which is currently recovering from a devastating war that has left significant burdens on its cities. Understanding the context and dynamics of Syrian cities is crucial for guiding the reconstruction process. Unlike other Syrian cities, Tartous was spared from physical destruction during the war. However, it experienced significant dimensions of social, demographic, and economic impacts, making it a unique case for urban research.

1.1 Urban changes in historic background:
Many researchers have studied changes in cities. It started with Giambattista Noli's maps of Rome. Then came Allan Jacobs's diagrams of city streets [15]. Past research and analyses have focused on the old city [16]; they did not focus on exploring the modern city's layout. This is despite the city's changes. It was once a closed fabric with solid links between urban elements. Falahat pointed out that the Islamic city succeeded in representing a unique urban form that reflects the traditions and meanings of Islam [17]. Now, the streets dominate [18]. People have built cities and civilizations on the edges of bodies of water. The water attracts residents [19]. However, as Lewis Wirth pointed out, cities are large, dense, and diverse. His theory then showed that city growth caused increased division. It also caused distant neighborhoods to grow [20]. The works of Emile Durkheim, Norbert Elias, Michel Foucault, Elisabeth Stroker, Niklas Luhmann, and others have attempted to explain the process of formation by examining positional relations [21]. As for Norbert Elias, he tried to analyze the social side of formation. He did this by focusing on the elements that, in their arrangement, make up the concept of formation [22]. How is the arrangement made, and who makes this arrangement? Norbert Elias also sought to clarify the standards and traits of these linked parts. Human societies exhibit a structured order, he claims. From here, Elias developed the concept of formation. He used this term in 1933. According to Elias, formation is a critical relational term. It focuses on the links between structures and levels. It preserves the landscape at significant and minor scales. It also studies the links between people and communities. Urban form is about the layout of public and private spaces in the city. It is also about density and patterns. Urban form determines the city's physical traits. It is linked to scale. This scale has three levels [23]. The urban form on the urban scale refers to the spatial extension of the city (land uses). Fixed elements exist on the city scale, including markets, business and service areas, and suburbs. On the scale of cities, the organization of streets, transit, facilities, and parks refers to Urban form. Urban form shapes and sizes urban blocks at the neighborhood scale. It also determines how to divide them: Streets, blocks, and spaces form different urban fabrics. They represent the elements of urban form. Stead confirmed that the level of access between destinations has two dimensions: the scale of spatial structure and the movement pattern [24]. They lead to different types of urban fabrics [25]. It showed the link between designing urban space, its use, and how people will reach these spaces. It stressed the human scale in the sustainability of urban form. This is consistent with the objectives of most renewal programs. Mike Jenks stressed that urban form must converge and integrate. This is key to achieving the highest level of synergism [26]. Six patterns of urban form are the basis of the theory of Form and ground. They are (grid, angular, curved, radial-axial, and organic). The patterns in the design depend on the relationship between spaces and buildings.

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1.2 Theories in Urban Changes:

Linkage theory indicates the lines connecting one element to another, such as street-pedestrian walkways. They are linear open spaces [27]. The city's connection system links its activities. The lines are movement axes. They shape the city and transform its forms. Also, Visual axes are fundamental to how people interact with the built environment. They enhance the sense of belonging to this environment [28]. The theory of connection identifies three axes in buildings: 1-Historical cities are the model for cumulative form. In them, groups of buildings gather around the principal axes of movement. These axes are critical spaces in the city. They are like the space around the Grand Mosque in the old Islamic city [29]. 2-The free placement of essential buildings in shapes represents compositional form. Unclear boundaries merge separate areas into cohesive units. So, the connection is implicit and follows the location and shape of the blocks. 3-Continuous form. Like the main streets and beach paths, this space connects all the critical parts of the city [30]. After the 1980s, place theory emerged. It was a response to postmodernism and changes in land use. It was a response to the dominance of car traffic and the private sector's control over public spaces. It also responded to the modern movement's lack of human scale and size. It responded to the focus on individual buildings. It criticized the lack of respect and the lack of a link between a building and its environment. It responded to people's cultural needs for accommodation [31]. The theory of Place can reveal the balance. It lies between the material and cultural context and people's needs and aspirations [32]. Thus, all past theories emphasized the importance of space. They emphasized their relationship with the surrounding blocks. The Spaces and blocks may represent a formation that reflects this relationship. In 1984, Bill Hellyer joined with Janson to write the book The Social Logic of Space (SLS). Hillier also developed a complete theory. Explains the relationship of cities to social processes. It also helps produce social forms [33], and space syntax has grown into a tool used worldwide in many fields. Architects, urban designers, planners, transportation experts, and interior designers use it. Space Syntax builds on ideas about how spatial organization affects society [34]. The theory measured relative accessibility. It studied how similar the spatial and social features of many cities were. It also studied the history of a single city. The theory suggests that Space Syntax links behavior and the environment [35]. Syntax Limited was set up at The Bartlett University College London in 1989. Swedish cities used it as a tool in the urban renewal process. Hillier and others tried to predict urban crime patterns using this theory [36]. The method was also used in a study of the Openness of squares in London. It confirmed that people prefer places that are open, visible, and well-connected [37]. For example, Haider used space syntax to study the impact of urban growth on a desert city's public space's reality and form [38]. The previous research also used space syntax to understand the role of accessibility [39]. Moreover, Zhai used space syntax to study urban parks and walking [40].

1.3 Case Study Historical view:

The city of Tartous has a rich and ancient history. Around 2000 BCE, it began as a commercial settlement on the mainland near the island of Arwad, which later became part of the Crusader Kingdom [7]. The mainland of Tartous was designated for farming and trade, serving as a protective buffer for the island against invasions. Over time, Tartous fell under the control of the Assyrians, Chaldeans, and Achaemenid Persians. In 333 BCE, Alexander the Great brought all Phoenician cities, including Tartous, under his rule. During the Roman era, greater attention was given to the mainland, known as Antaradus. Christianity arrived in the city during the 3rd and 4th centuries CE, and the Church of Antaradus became the first church consecrated in the name of the Virgin Mary, attracting Christian pilgrims worldwide. In 638 CE, Muslim Arabs conquered the city, rebuilding and revitalizing it. Tartous later witnessed significant battles between the Arabs and Crusaders. Under the Crusaders, the city experienced a period of prosperity and development.

Tartous adopted its current name during the Mamluk era. During the Ottoman period, beginning in 1516, Tartous was annexed by Tripoli. The city entered another transformative phase with the arrival of the French Mandate in 1919. The French introduced organizational plans, with the first comprehensive plan for Tartous drafted in 1930. After Syria gained independence in 1946, the city embarked on a new development phase [13]. Figure 1 illustrates the location of the study area.

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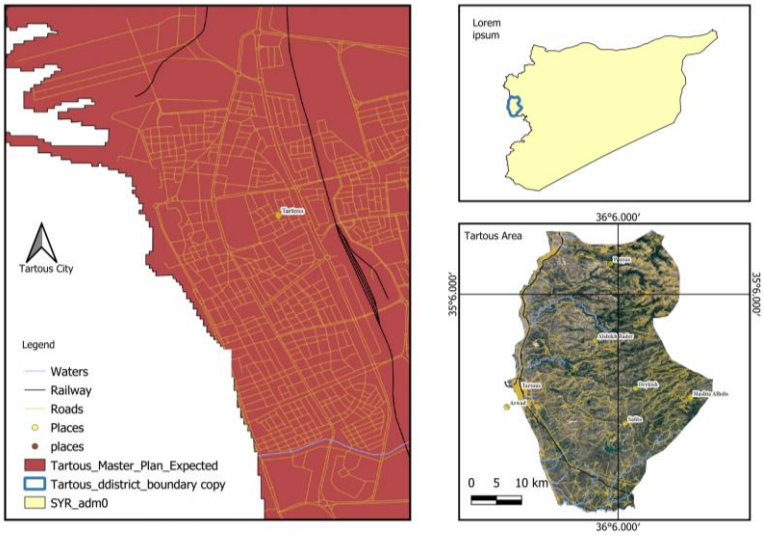

Figure 1. The study area, Drawings by Author, Based on GIS

2. MATERIALS AND METHODS

2.1 Data Acquisition

In this study, the reference data were based on the following reliable sources:

1- Prior knowledge of the study area.
2- Full-time and presence in the study area for two years.
3-Verification and comparison at each step of the study. Figure 2 shows the flow chart of the methodology followed.

2.2 The Ethnographic Observation Method

2.2.1 Ethnographic observation is a standard research method in anthropology and sociology that aims to understand social and cultural phenomena through direct observation and participation in the lives of individuals and groups. This method involves deep immersion in the targeted environment over an extended period, allowing the researcher to capture the intricate details of behaviors and interactions and to comprehend the cultural and social contexts that shape them. However, it can be used to study how people utilize public spaces differently, reflecting issues related to accessibility. Scholars of the Chicago School approached the city as a laboratory where spaces and places could be studied through observation. Scholars of the Chicago School began examining the city in the early 20th century, particularly during the 1920s and 1930s [41]. The ethnographic observation was conducted by engaging with the spaces and neighborhoods of the city, observing them through social behaviors, physical characteristics, and photographic documentation from September 2020 to September 2022 (see Figures 3 and 4). An in-depth review of studies on photographic observation guided this approach. Observations were meticulously documented by recording events with precise dates and times in a notebook. A collection of daily life photographs was utilized as a part of the photo-elicitation interview technique [42]. Alongside the photographs, undirected commentary was included to address aspects such as ease of access, overall impressions, and the significance of these spaces to various participants.

Additionally, an undirected interview method allowed participants to discuss the photographs freely. Conversations were recorded to identify recurring themes and critical insights using verbal context analysis (philology). This phase spanned two months, with participants selected based on their frequent use of the city's spaces, such as long-term residents or workers [43]. Table I provides details on the participants.

A total of ten participants were engaged in the study and contacted at local stores and restaurants between February and April 2021. The interviews, lasting one to two hours each, were narrative-based and focused on questions related to the displayed photographs. Questions ranged from motivational prompts to reactions, feelings, and comparisons, such as:

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"What do you mean by...?"

"Can this be explained in more detail...?"

"Based on this picture, do you think that...?"

"What is your reaction to this part of the picture...?"

"After viewing old and new photographs of the same element, what is your response?"[44]. Upon completing the data collection process, the information was systematically sorted, classified, analyzed, and interpreted to uncover patterns and relationships. This process employed constructing and deconstructing the studied phenomenon [45].

Participant structure				
Shop owners (old occupation)	Sidewalk vendors Informal occupation	Old generation residents	Frequent visitors	Engineers (Decision makers)

Table 1. Participant structure– source by the Author

The study deduced four critical stages in the formation of the city of Tartous (Figure 5):
The first stage lasted from the end of the Ottoman occupation in 1918 AD until the French mandate in 1937 AD:

- From a functional standpoint, the city relied mainly on agriculture, especially olive farming. Olive presses spread there. In that period, there were about two hundred presses between the city and its villages. After 1945 AD, several shops appeared. Most were on Al-Wahda Street (as it is now called). In the past, the street was named Al-Khrab after the neighborhood that borders it.
- Urban composition changed. Houses replaced the Crusader castle during the Ottoman occupation. They called the area Al-Saha. The cathedral was at its southeast end. Then, several neighborhoods emerged. They aligned vertically. They followed the direction of the nearby cathedral. It was next to some farmland. Three neighborhoods emerged in Tartous at that time. They were al-Saha, Islam Khrab (ruin), and the Christian Khrab.
- One of the most essential spaces emerged then: Nejmeh (Star) Square. Another was the space by the fishing and picnic port. Passengers made regular trips between Awrad and Tartous. Also, the current city center (the clock node) was a critical Space. It connected the city to the highway linking Tartous to Tripoli in Lebanon. The highway ends in Latakia. After that, several Spaces began to appear. In 1945 AD, Al-Souriti Street emerged in the Manshiya area. Which had a close relationship with the shops currently on Al Wahda Street.

The second stage comes in the post-independence period from 1946 AD until 1977 AD. At this stage, work was being done on many service aspects in the city. It helped bring it back to life. It has also drawn many visitors. Those who came from the countryside and surrounding areas to work and live in the city

- Operating the port from 1960 AD - 1969 AD, significantly changing the city's landmarks and arrangement among Syrian cities [46].
- Urban composition: The port's work attracted many residents seeking work opportunities. The residents settled in Islamic and Christian Khrab neighborhoods. Other neighborhoods emerged because many expatriates of rural origin returned to Tartous.
- The work of opening the beach Sea Road ended in 1970 AD. The road is 20 meters from the sea and 3,500 meters long [47]. Old Tartous had a close relationship with the sea. In 1969, the city's layout changed with the construction of Al-Thawra Street. Buildings began to rise on both sides. Other streets kept their old importance. This includes today's Al-Wahda Street (the Khrab and gold in the Past) and Gamal Abdel Nasser Street. This importance comes from their ancient history.

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The third stage: (from 1980 AD to 2004 AD)

- The city has a vital tourist character. There is a concentration of many recreation and entertainment services. It has attracted economic investments.
- Urban composition: Many neighborhoods emerged (Al-Ramel District - Al-Hamrat District -...) with modern buildings, services, and administrative centers.
- Three important axes divide Tartous parallel to the sea. They have constant width and straightness. They are the Marine Corniche, Al-Thawra Street, and Eastern Corniche Street. Other streets cut across them. The width and importance of these streets change according to the neighborhood. The center at the clock roundabout is the current commercial center. It has maintained its function since its first features in the city. Next to it is Al-Basel Park (Tartous Central Park), an open green area.

The fourth stage: Tartous today (from 2008 AD to 2022 AD)

- The city expanded and changed after the founding of many university colleges in 2015 [48].
- In 2008 AD, city officials drew up the first organizational plan for the city, Starting the implementation of March 8 Street and connecting it to the city's street network [47], In addition to the youth housing project in the north of Tartous city
- The war in Syria began in 2011, and Tartous attracted many displaced residents from the interior provinces such as Homs, Aleppo, and Damascus, a large number of whom settled in the areas surrounding the city.

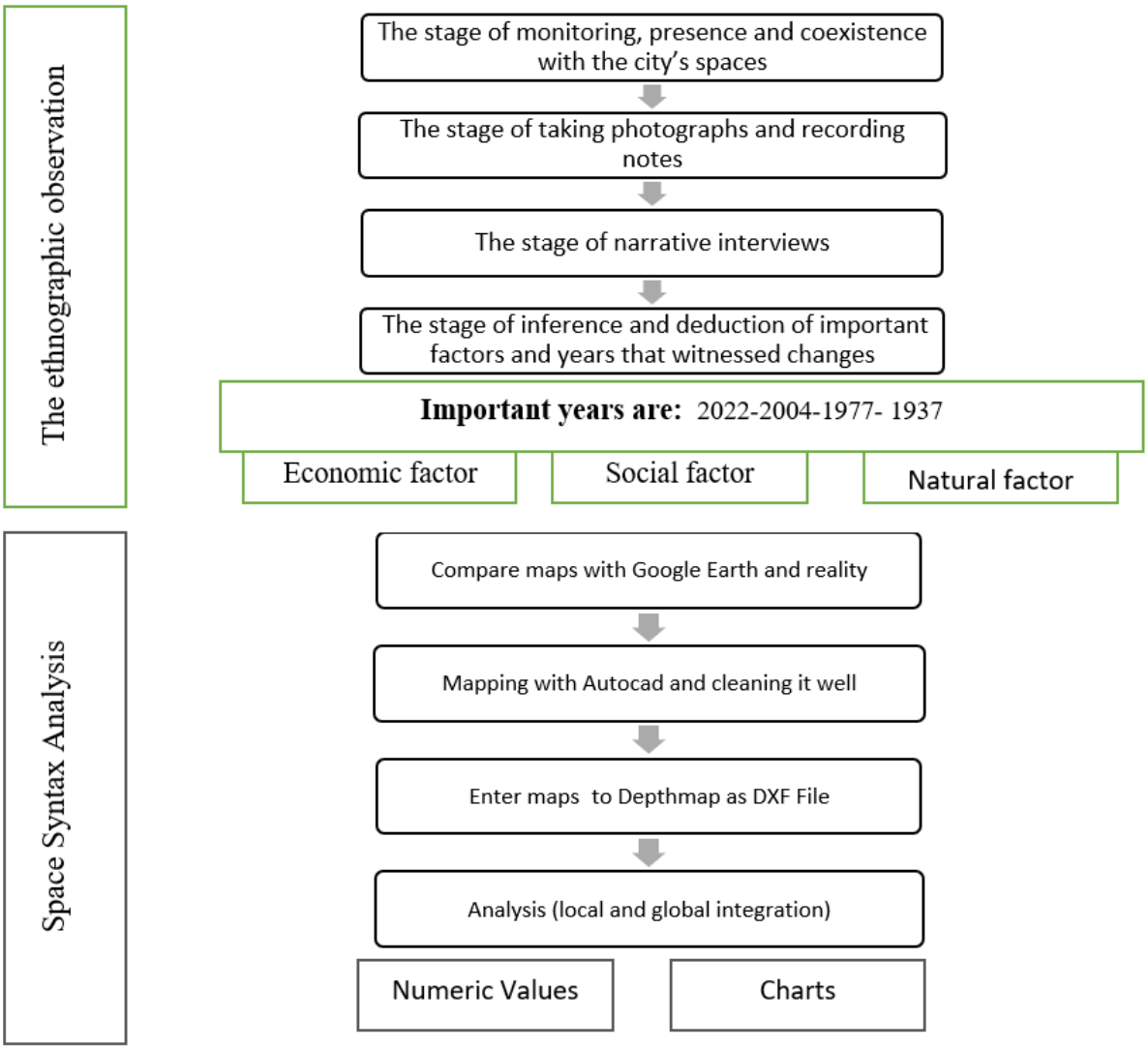

Figure 2. Research process flow diagram

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2.2.2 The social material context in Tartous based on observation :

The central space at the clock roundabout towards Al Wahda Street and Al Khrab Street (Al Salihiya district) was considered one of the spaces that most translated social and functional interactions across time and space and represented a rich mix of layers accumulated over the ages as the study found. Today, all activities are concentrated in the center itself and the surrounding area without any plans to shift pressure to other secondary centers in the city. This is the main reason behind the traffic congestion problems witnessed today. On the other hand, this is the only central area that still maintains its character. Shop owners depicted their daily lives in the morning, which begins with chatting with neighbors from neighboring shops and drinking tea on the sidewalk. Most shops there have preserved their profession, passed it on, and inherited it from generation to generation. The study found that the father and son were working, and the grandfather was leaning back while sitting. Not only that, but most of them have maintained the simple design that has distinguished them for ages, and the facades of these small shops with wooden doors still compete with the expansive glass facades in the newly updated streets. The study's observations found sidewalk vendors who set up shop every day in the same area and boasted about the advantages of their competitive location in the city.

Figure 3: Source: Author's photos from Tartous City, Syria. In 2020-2021

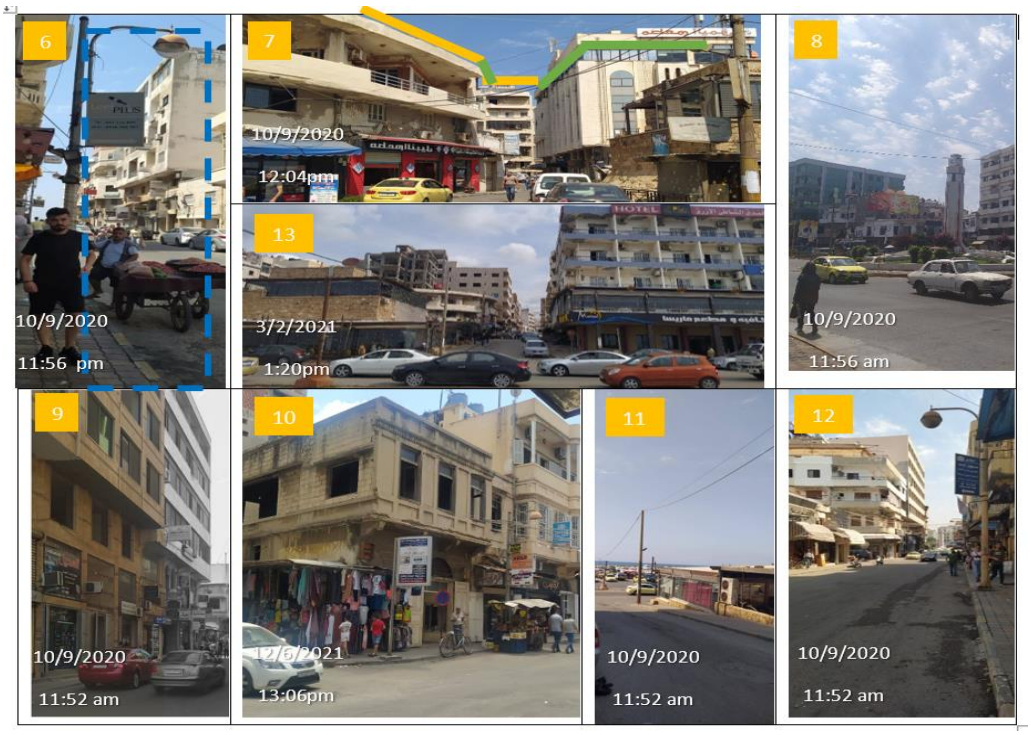

Figure 4. Tartous city in 2020-2021 (Photographs by the author)

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The name difference also emerged for the street that connects the Clock Roundabout to the fishing and recreational port. It is known to its visitors (customers) as Gold Street, but for the owners of the old shops there, the name was divided into Al-Salihiya Market at its beginning from the Clock Roundabout; in the middle, it is known as Gold Street, and at its end it is known as Al-Khrab Street about the old neighborhood next to it. Few of the participants in the monitoring knew that the organization's name was Al-Wahda Street. Figure 6 shows the importance of streets in the case study.

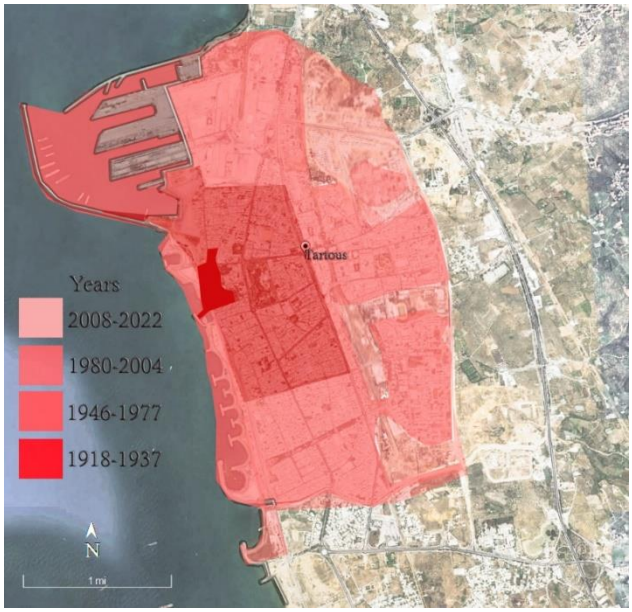

Figure 5. The four stages of morphological change in Tartous city

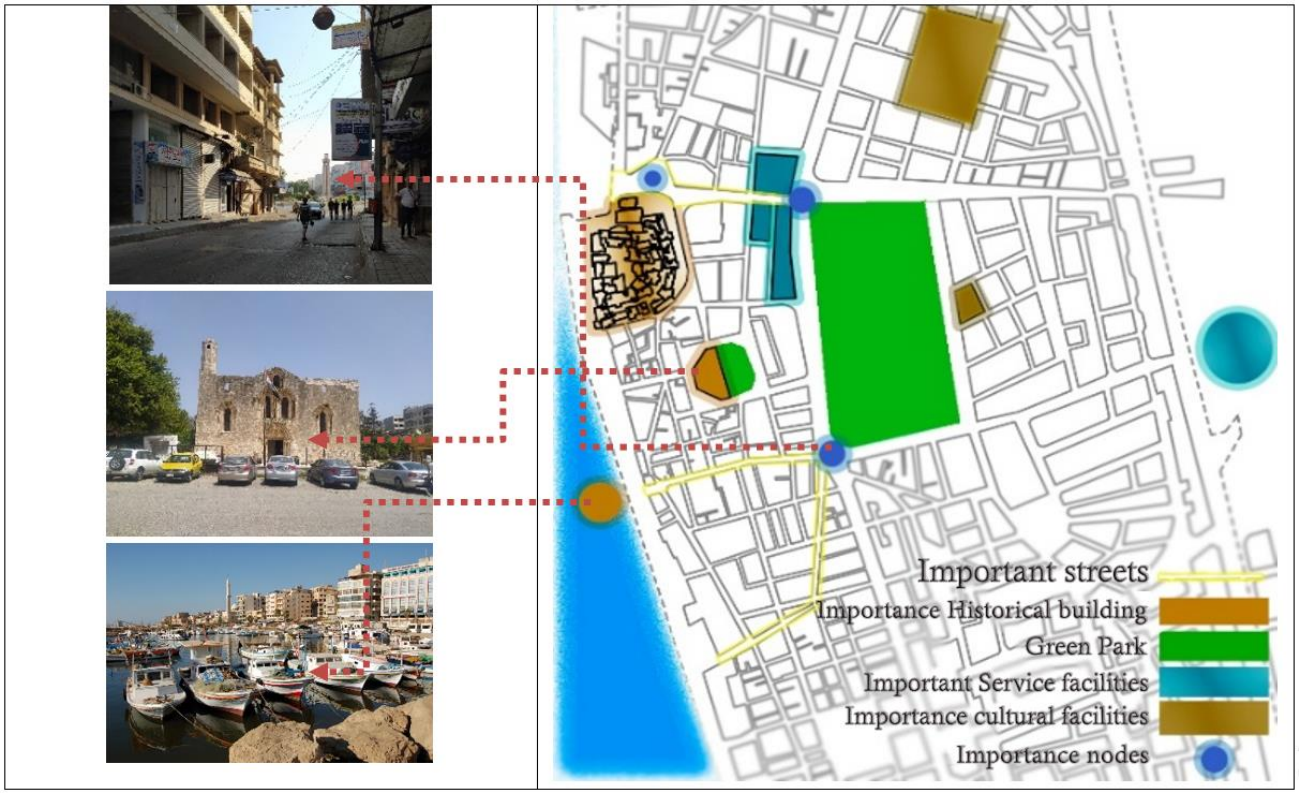

Figure 6. The Importance of streets in the study area

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Table 2. Descriptive statistics of the morphological changes for Tartous in different periods (Local integration)

The Year	Local integration		
	Minimum	Average	Maximum
1937	34.3484	58.1773	81.1683
1977	83.2425	141.754	209.369
2004	148.1	278.824	432.96
2022	148.571	280.715	434.036

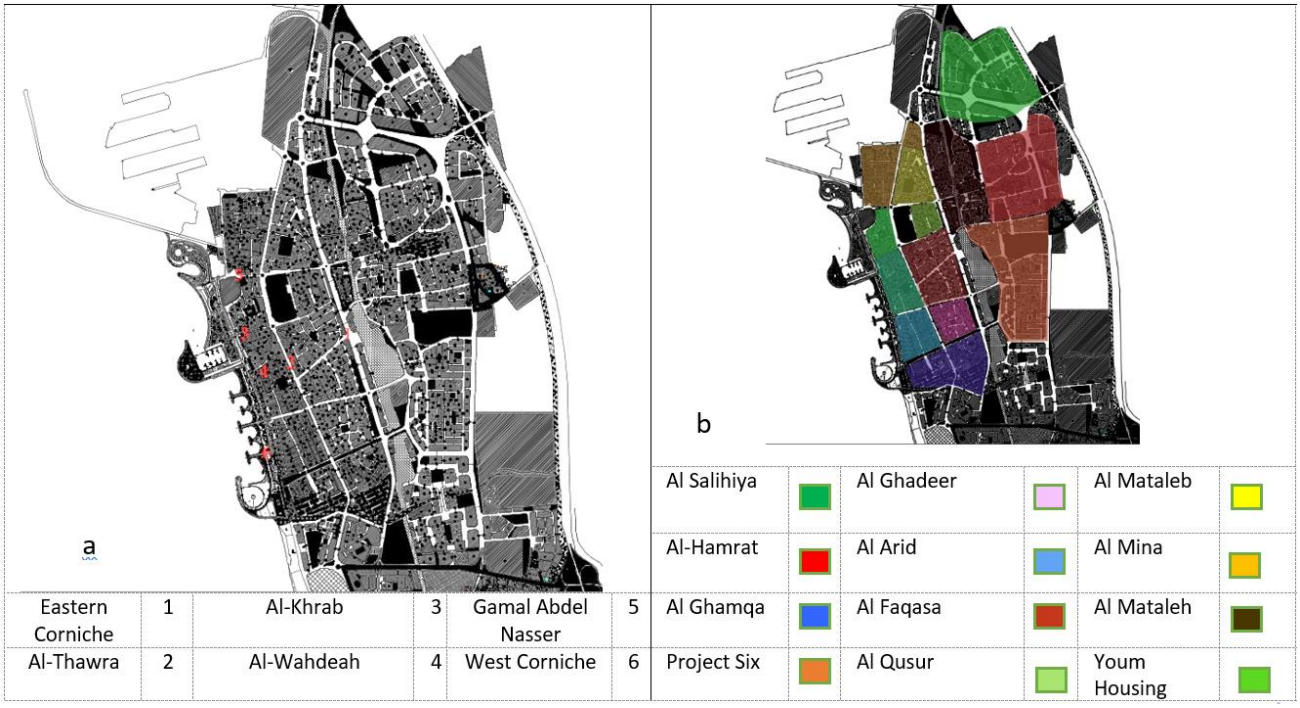

Figure 7. Tartous map Source (Department of Urban Planning, 2008). On a, it shows the neighborhoods in Tartous City, and on b, it shows the main streets in the city by the author.

The Year	Global integration		
	Minimum	Average	Maximum
1937	0.024	0.041	0.058
1977	0.066	0.113	0.169
2004	0.146	0.266	0.434
2022	0.145	0.266	0.434

Table 3. Descriptive statistics of the morphological changes for Tartous city in different periods (Global integration) - Source by Author using depthMapX Software

2.3 Space Syntax Analysis:

The study based their identification on the ethnographic monitoring conducted on the design and distribution of the street network in five maps to analyze the design and distribution of the street network in five maps. The study found four primary periods in the history of the city of Tartous. Despite the difficulty of finding maps, some were found in the Tartous Municipality and the Urban Planning Directorate, and They were checked with Google Earth. The maps are for 1937 and 1977 [49]. after the construction of the port, which is a critical point in the formative history of the city of Tartous [46]. And 2004 and 2022. Figure 7 shows a map of Tartous City, where part a shows the residential neighborhoods in the city and part b shows the most important streets in the city. Integration is an essential measure of Space Syntax [50]. This depends on the principle of spatial depth, which is the number of topological steps as a distance that must be crossed from the space whose depth is to be measured. The theory of Space Syntax is based on two properties: 1- Symmetry and

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Asymmetry, which determine the nature of the relationship of space with all other spaces in the system and express the kinetic depth of the different spaces. When the number of kinetic steps between spaces in the spatial system increases, the separation between them increases, and the space with less depth is considered the most symmetrical and integrated [50]. The integration measure is chosen using two radiances, Rn and R3, to analyze the global and local levels of integration. The global measure of the Integration indicator indicates access to all streets in the entire space. Therefore, there can be Spaces of high integration value that have an excellent opportunity for gatherings and interaction between people. R3 is a local measure representing the amount of integration the street segment provides to adjacent streets within a 3 m radius [34]. D'Acci's Study emphasized the importance of the depth of contact criterion when analyzing street morphology, which can provide a greater understanding of the impact of spatial arrangements on social interactions within urban environments [51]. In addition, the clarity that represents the relationship between local and global integration values has been calculated [32]. The analysis is applied using a Depth Map. It is an open-source software and is available on the official website of Space Syntax. After collecting the maps, cleaning them on the AutoCAD program, modifying them to suit reality, and entering them into Depth Map as a DXF file. The study used Axial maps [5]. The spaces with high integration values take on the red color, while spaces with low integration values take on the blue color. Note that the narrow alleys in the old Crusader castle in Old Tartous were not included and were considered a closed area with one main street due to the specificity of the analysis and to achieve the purpose of the research, which is to study the development of the city of Tartous outside the walls of the Crusader castle.

2.3.1 Space Syntax Results

The main streets appear in the 1937 map, and Al-Khrab Street gets a high local integration value; (See Table II) Gamal Abdel Nasser Street also An average global integration value is 0.041, which is low due to the small size of Tartous city at that time and the shortcomings of the network of spaces and streets to a small number In 1977, the features of the street network began to appear after the establishment of the port in 1960, and Al-Thawra Street gained a high integration value The residential neighborhoods appear clearly and the integration values graded between the green and blue colors where the spaces are more private. The average local integration value increased, as shown in Figure 6, and the center maintained the highest local integration values. At the same time, Table III reveals that the global integration value increased in the maps to 0.113. Al-Thawra Street maintained its integration, and the global integration values of the streets perpendicular to the sea increased due to their connectivity. In 2004, the value of local integration increased significantly due to the increase in connections and the influx of many people to live and work during that period. The value of local integration increased for several spaces between neighborhoods, As shown in Figure 7, which acquired a collective character due to the increased economic activity during that period. These streets appear in yellow in the plan. As for global integration, its average value increased, but by a small percentage, due to the stability of the expansion of the city of Tartous during that period, which was somewhat limited to some neighborhoods in the east and north of Tartous. In 2022, Tartous witnessed many changes, and the street network remained the same. The reason can be attributed to the municipality's orientation and plans towards vertical expansion, as it was allowed to increase the number of floors in residential neighborhoods, and towers were encouraged. Many neighborhoods in northern Tartous continued to suffer from a lack of infrastructure services and streets, and therefore, the value of global and local integration converged between 2004 and 2022. In this study, the 2022 map is chosen to point out the state of total stability the city has reached in recent years (the same neighborhoods, no expansion...).

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Figure 8. Local integration analysis, source by Author using depthMapX Software

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Figure 9: Global integration analysis, source by Author using depth maps Software

3. RESULTS AND DISCUSSION:

The map shows that in 1937, neighborhoods began to form in Tartous. The Saha neighborhood is an exception. They built it on the ruins of the Crusader castle. Houses sprawled across the castle's floor, walls, and supports in disarray. The first planned neighborhoods of Tartous formed outward from this castle. They followed the main streets and a few side streets. Neighborhoods abandoned natural layouts for organized grid patterns over time. The city has three neighborhoods. They are Islam, Christianity, and the port (Meena)—the port area formed with weak local and global ties to the rest of the city. Planners planned the sixth project neighborhood. It resulted from signs of city expansion towards the east and north. An engineering principle built the neighborhood. This experiment tried to expand. It copied the exact traits of the

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neighborhoods near the city center. These traits are in the Al-Hamrat and Al-Qusour neighborhoods. It did so with a new grid formation. They moved the division to essential streets. These streets link the latest neighborhood to the older ones in the west. They moved the division around Sixth Project Park. This park is the second largest in Tartous, after Al-Basil Park. The critical difference between the 2004 and 2022 maps is how they kept the street hierarchy. This was true, especially in residential areas like the Sixth Project. As for Al-Fakasa, there are new interlocking lines there. However, they lack the order of the rest of the neighborhoods. As for the outskirts or entrances of the city, the north entry axis has become critical. So has the youth housing project. However, this area still needs streets. Also, the city of Tartous is expanding. It goes south, east, and north at the cost of farms. The city is doing this by using a regular grid plan. In this plan, the main streets are parallel to the sea, and the streets are perpendicular to it. From these streets, smaller streets branch out. Thus, the new axes distributed the flow and needed to create secondary centers. The city center at the clock roundabout remains the main center. However, the rate of concentration and integration began to spread across the axes. The principal axes kept their local and global integration.

The 2022 map tried to highlight 8 March Street. It did this by better connecting it to nearby streets. These streets follow the Tartous University project. As for the clarity scale, it shows how well the local system fits the global one. Tartous was near the center of the old maps. Then, the expansion came in the following maps. Several main streets linked the expansion to the city's main center.

A strong link has emerged between the spaces of the center that witnessed the first urban life of the city and its flexibility and ability to maintain its role in promoting social sustainability, which was lost in the spaces of modern development that did not witness the social events and activities that might be able to root and strengthen them. The center's spaces have proven their ability to nourish themselves over time and play a decisive role in the city's image. (See Figure 8), Based on examining local urban contexts, this approach will help researchers determine priorities when looking at the city and identify the most critical dynamic and diverse spaces to benefit from in designing and planning modern spaces. The ethnographic observation method played a significant role in documenting ancient and modern cities [52], Chase emphasized the importance of considering the relational identities formed through repeated face-to-face interactions between residents in their shared living spaces and from movement patterns, as these residents share similar perceptions that contribute to shaping urban environments [53]. The city is small and modern. It adopted grid planning, which kept the city clear as new neighborhoods emerged. The expansions in the north of the city have pre-planned youth housing. However, they suffer from isolation from the city center.

Although Tartous witnessed the most significant number of displaced people who sought refuge there from the destroyed Syrian cities, according to statistics... However, the most significant number settled in the areas surrounding the city, such as Safita, Al-Dreikish, and Sheikh Badr [8]. The study of urban transformations has important implications for urban development policies by focusing on local, social, landscape, and historical contexts [54]. Thus, the study may conclude that urban spaces subject to modern development often lack the flexibility and diversity essential for social sustainability. Designing for the car and network planning without involving communities in the design process leads to gaps in the transformation and development of the city.

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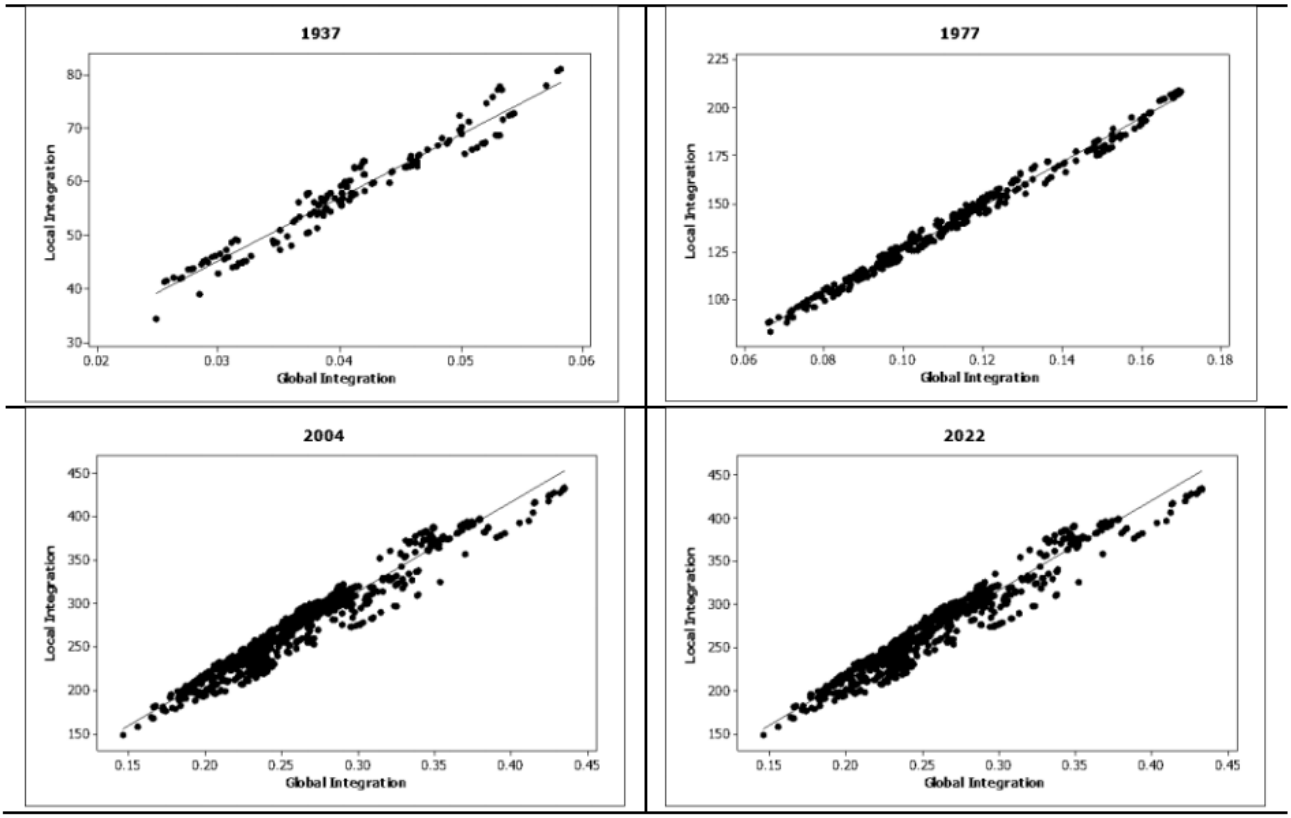

Figure 10: Scattergrams showing the Global and Local intelligibility across the Four periods, source by AuthorC

4. CONCLUSION

This paper studied changes in the street network in the city of Tartous. Tartous is a small city in western Syria. The study looked at changes from 1937 to 2022. Data were collected, and ethnographic monitoring was done using traditional methods. These methods start with field observation and review of historical documents. The theory of space Syntax was applied. Two methods form the basis of the analysis. They show trends and patterns of growth in Tartous. The city extends from the north and south, by the sea in the west and the highway connecting the Syrian cities in the east. Results showed that the neighborhoods near the Center are integrated locally and globally regarding the street network. The new neighborhoods that resulted from the city's expansion are connected to the old neighborhoods by streets perpendicular to the sea. However, they remain separated from the center because of the presence of the railway line and are, therefore, less integrated.

Therefore, this study can distinguish between several years considered pivotal in the history of the city's compositional structure and the factors that accompanied these changes. Most importantly, it was economic and had social and natural consequences. However, the city's main streets, which have a social character, still maintain their importance throughout history; the change began after the port was operated in the city, and job opportunities were provided for residents between 1985 and 1992. The jump that occurred in 2005 was due to increased private-sector activity. The study also showed the stagnation of the city's expansion and the absence of significant changes between 2008 and the decision to allow vertical expansion after 2008, today, due to the war in Syria, which affected the administrative decisions to complete. Such a study that combines the ethnographic method and the theory of space Syntax represents a flexible framework that can be repeated in different contexts, old and modern, and is directed to planners in Tartous to benefit from these characteristics in new areas and in Syria in reconstruction operations, where the main question is where do start? The starting point may be to restore the spaces that witnessed the seeds of social life. This examination of the morphological transformation in a Port city contributes to social sustainability. It helps researchers identify the most critical spaces influencing communities' social and economic life. This helps to understand the city through its spaces, as it is a sustainable form of social interaction and a method for documenting the city, especially in a fragile environment in the Middle East that witnesses many conflicts and challenges.

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