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Pedestrianization AL-Azhar Street as a Method to Preserve the Urban Fabric of the Historic Cairo

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Abstract

The public urban open space is the container that contain human activities, expressing their vitality and distinctive identity. It facilitates various functions, such as providing accessibility to buildings, natural lighting, ventilation, and creating an urban environment (social, urban, and economic). Therefore, it is considered one of the most important components of the urban fabric of any region. Its importance and value increase in heritage and historical areas, where it is regarded as a tangible heritage no less significant than the valuable buildings found in those areas.

Hence, it should receive popular and official attention over time, and its character and identity should only be altered through improvement, restoration, and revitalization. It is an essential part of the community's memory, its assets, and its intellectual heritage, which increases in value over time and cannot be replaced if destroyed or changed.

Historical Cairo has witnessed interventions in recent centuries, some of which had a negative or positive impact. These interventions included the creation of roads for vehicle movement inside these areas to reduce traffic congestion in the city and connect its edges. This occurred in the early last century when Al-Azhar Street was constructed, connecting the city center in the west to its eastern edges, dividing and separating its historical streets and spaces. This had an impact on its urban and social fabric, as well as the economic activities of its residents. This research investigates the impact of the AL-AZHAR road construction on the urban open spaces within the historically valued area of Islamic Cairo. By examining the effects on accessibility, aesthetics, social dynamics, and overall quality of open spaces, this study contributes to the understanding of how contemporary infrastructure development can shape the character and livability of historically significant urban areas. The research explores these effects by posing the question: What if Al-Azhar Street could be restored to its previous state as a wide pedestrian promenade, bustling with human activities, events, and organized activities that serve the residents, craftsmen, and promote tourism?

Keywords: Heritage, Traffic roads, Urban spaces

1. Introduction

Public urban open spaces are considered one of the most important components of the urban environment in city centers and play a central role on urban, environmental, social, and economic levels. They can be defined as the container that holds human activities for residents, visitors, and tourists. In the case of heritage and valuable areas, they are an integral part of the place's identity and character, representing viewpoints and opportunities to enjoy distinctive architectural heritage elements surrounding the urban space. Therefore, they

hold significant value, not less than the value of the buildings themselves, when integrated with architecture and human activities within the space. This integration creates a blend that can be considered a fundamental component of the overall identity and character of the region as a whole.

When intervening in these historically valued areas by making changes to the road network or any alterations to their plans, extreme caution should be exercised, along with comprehensive and integrated studies of all aspects that may have a positive or negative impact on their identity and functional performance. Historic Cairo was once

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characterized by this integration, urban and social fabric unity, and distinctive environmental qualities until a road was constructed during the reign of King Fuad of Egypt in the early 20th century for security reasons during his famous visit to the Al-Hussein Mosque. He faced difficulties traversing the narrow Muski Street with his procession at that time. This road, when built, severed the connection between the two parts of Al-Muizz Li-Din Allah Al-Fatimi Street, one of the most famous and ancient streets in Egypt and Africa. Similarly, the division of the great plaza that once connected Al-Azhar Mosque and the Madrasa of Muhammad Bek Abu Al-Dahab in the south to Al-Hussein Mosque, Al-Mashhad Al-Husseini Street, Khan Al-Khalili area, and the Goldsmiths' Quarter in the north had its effects. These effects included the impact on accessibility and communication between these spaces, visual impacts on the urban image of the area, social effects in terms of cutting off communication between the two sides, environmental effects in terms of air pollution due to vehicular traffic and noise, and economic effects resulting from limiting the flexibility of utilizing urban spaces for economic activities. Furthermore, it had an impact on tourism movement and flow, as the area remains one of the most important tourist destinations to this day.

This research observes these impacts by studying the difference between the presence of Al-Azhar Axis and its absence and by proposing possible alternative solutions, which are already available, such as the existence of the Al-Azhar Tunnel, which replaces Al-Azhar Street while providing other means of accessing the area.

1.1. Research problem

The research discusses a major problem, which is the negative impacts (urban, social, economic) of planning interventions and modifications by creating traffic axes within the urban fabric of historical heritage areas to solve traffic congestion problems in the city, despite the availability of alternative solutions that may have a lighter impact on the urban and social fabric of those areas.

Research Significance: The research addresses an extremely important topic related to one of the most essential components of tangible human heritage, the need to preserve its identity, personality, visual elements, urban fabric, social fabric, economic aspects, and the potential to enhance its vitality and activity while finding alternatives to resolve its

crises and problems without compromising its overall character.

1.2. Research objectives

The research has several objectives, including shedding light on the importance of urban open spaces within the urban and social fabric of heritage areas and the need to study various alternatives for urban planning interventions to ensure the preservation of their personality, identity, and character. Additionally, it aims to find solutions to address the effects of these interventions in the future, with the goal of enhancing the environment of these areas and promoting their role.

1.3. Research questions

- What is the historical and cultural significance of Al-Azhar Street and Al-Hussein Plaza within the context of the city's heritage?
- How has the introduction of an expressway through Al-Azhar Street impacted the physical and cultural aspects of the heritage area?
- What are the characteristics and functions of urban open spaces within Al-Azhar and Al-Hussein areas, and how have they evolved over time?
- What are the perceived positive effects of the expressway passage on urban development in Al-Azhar and Al-Hussein areas, if any?
- What are the perceived negative effects of the expressway passage on urban void spaces, cultural heritage preservation, and the overall urban environment in Al-Azhar and Al-Hussein areas?
- What preservation and urban planning strategies, if any, have been implemented to mitigate the negative impacts of the expressway passage in the heritage areas?
- How do residents, visitors, and tourists perceive the changes brought about by the expressway passage in Al-Azhar and Al-Hussein areas?
- Are there any best practices or lessons learned from other historical cities that have faced similar challenges related to expressway passages in heritage areas?
- What recommendations can be made to balance the need for transportation infrastructure with the preservation of cultural heritage and urban open spaces in Al-Azhar and Al-Hussein areas?

- How can the findings of this case study contribute to a broader understanding of sustainable urban development in historical cities worldwide?

2. Research methodology

2.1. Theoretical approach

In this literary review, the research examines previous literature that focuses on urban open spaces and urban fabric within historical cities, as well as how to address transportation and traffic problems while preserving their identity. It also studies the historical approach of the historical Cairo (the subject of the study) along with studying global models implemented to deal with similar cases.

2.1.1. Inductive approach

The case study of historical Cairo is conducted through field visits, observations, interviews with residents, visitors, tourists, and merchants, along with conducting surveys to determine their views on the problem and the solutions that suit them best.

2.1.2. Analytical approach

Analyzing the problem, its causes, and effects using various analytical methods such as SWOT analysis and Kipling analysis, along with analyzing the results of the surveys conducted with the stockholders affected by the problem and those involved in the solutions.

2.1.3. Applied approach

Is focused on solving problems examining the strategies necessary to provide solutions to the problem through projects, initiatives, or actions to achieve goals.

2.2. Literature review

A literature review on traffic solutions across heritage-valued areas requires an examination of various scholarly articles, research papers, and reports related to the preservation of heritage sites and the management of traffic in these areas. Here's an overview of key findings and themes from existing literature on this topic:

2.3. Challenges of traffic in heritage areas

Many heritage sites are located in densely populated urban areas, leading to traffic congestion, noise, and pollution, which can negatively impact

the heritage value of the site (Ashworth and Tunbridge, 2000).

Increased tourism and urbanization have exacerbated these issues, making it crucial to find sustainable traffic solutions (Timothy and Teye, 2009).

2.4. Heritage site conservation

Preserving the heritage value of a site is of utmost importance. Balancing conservation with tourism and accessibility is a central challenge (Tapper, Destination Wetlands - Supporting sustainable tourism 2012).

Heritage-sensitive urban planning is essential to ensure the compatibility of traffic solutions with the preservation of heritage areas (Fu, 2005).

2.5. Traffic management strategies

Traffic management strategies in heritage areas often involve restricting vehicle access, promoting pedestrian zones, and implementing low-impact transportation options (Parkinson, 2018).

Implementing time-based access permits, traffic redirection, and controlled parking are common tactics (Randolph and Troy, 2008).

2.6. Public transportation and shuttle services

Developing efficient and eco-friendly public transportation systems, such as electric buses or trams, can help reduce private vehicle traffic around heritage sites (Gössling et al., 2009).

Shuttle services and park-and-ride facilities can reduce the number of vehicles entering the heritage areas (Richards and Palmer, 2010).

2.7. Visitor education and interpretation

Educating visitors about the importance of heritage sites and encouraging responsible tourism behavior can help reduce the impact of traffic (Mamoon, 2020).

Interpretive signage and audio guides can enhance the visitor experience while minimizing traffic-related disturbances (World Tourism Organization, 2004).

2.8. Technology and innovation

Smart city technologies, such as real-time traffic monitoring and congestion pricing, can be adapted to manage traffic in heritage areas efficiently.

Electric and autonomous vehicles can reduce pollution and noise, improving the overall visitor experience (Halili, 2022).

2.9. Community engagement and stakeholder collaboration

Involving local communities, heritage preservation organizations, and government agencies in decision-making processes is crucial for effective traffic solutions (Clark, 2017).

Collaborative efforts can lead to sustainable solutions that balance heritage conservation and tourism demands (Fatemeh et al., 2022).

2.10. Case studies and best practices

Numerous case studies from around the world showcase successful traffic management solutions in heritage areas, offering valuable insights for future projects (Orbasli, 2004).

2.11. Al-Azhar University and its role

“Al-Azhar in Conflict: Religion, Education, and Politics in Egypt” by Donald Malcolm Reid: This book delves into the history and political role of Al-Azhar University, which is closely related to Al-Azhar Road.

2.12. Urban development and architecture

“Cairo: The City Victorious” by Max Rodenbeck (2000): This book provides an overview of Cairo's urban development, which includes the Al-Azhar area.

The historical approach of valued area of Islamic Cairo And AL-AZHAR road:

The historical evolution of the streets and spaces of historic Cairo throughout the ages:

2.13. Mamluk era (1250–1517)

Carl F. Petry, *The Mamluk Sultanate. A History* (Petry, 2022): This book provides a comprehensive overview of Cairo during the Mamluk period, including its urban development. During the reign of Sultan Ibn Qalawun, urban development expanded beyond the southern walls of Fatimid Cairo. The area beneath the quarter was developed, along with the vicinity of the Elephant's Pool (Birket al-Fil). Prominent princes erected their palaces and residences in the area between Bab Zuweila and Salah al-Din's Citadel. The area was developed from Bab Zuweila to Bab al-Wazir, eventually connecting to the Citadel.

Sultan al-Nasir ibn Qalawun paid special attention to the squares of al-Rumayla and al-Sultaniyya beneath the Citadel. He brought water to them through the use of an aqueduct, and markets

associated with the Mamluk military system thrived around al-Rumayla Square, such as the arms market, horse market, and tent market. Numerous palaces for the princes were constructed around the square, and the road from al-Rumayla Square to the Qanatir al-Siba (Sultan's bridges) was improved. The area between the Dome of Imam al-Shafi'i and al-Qarafa (currently known as al-Sayyida Aisha Square) was also developed, as it served as the route of the Sultan's road used for travel to the Hijaz and the Levant for pilgrimage.

2.14. Ottoman era (1517–1798)

“Cairo in the Age of the Ottomans” by Nelly Hanna (2008) (Hanna, 2008): This book explores Cairo's history and transformation during the Ottoman rule.

In the early Ottoman era and the end of the Mamluk period, the traveler Hassan ibn al-Wazan, known as “Leo the African,” visited Egypt and described Cairo in a way that did not differ much from what it was during the rule of the Ghouri Sultan.

He added that Cairo was not just a city of structures, palaces, and tombs, but it was a vibrant and thriving place with craftsmen and merchants who traveled the world. During this period, some professions emerged to serve the city and its expansions. Each group of service providers had a known area, neighborhood, or street where they lived. For example, there was the “Saqaiyeen” district in the Abbasiya neighborhood (in the center of Cairo), which was a gathering place for water carriers (“Saqqa”). This profession was one of the oldest in Egypt, perhaps the oldest of all. Water carriers would carry water skins made from goat leather on their backs and supply households with water. There was also the profession of “Makaraya,” which involved transporting citizens and ladies within Cairo using donkeys and mules.

Cairo maintained its shape and size throughout the Ottoman era, and most of the travelers who visited Egypt during this period described Cairo's streets and squares. The longest street was the one that connected Bab al-Husayniyah to Bab al-Sayyida Nafisa. In Cairo, there were only four spacious squares: Qara Meydan (located beneath the Citadel), Rumayla Square next to it, Birket al-Fil Square, and Azbakiyah Square.

2.15. 19th century and early 20th century

“Cairo: 1867–1967” by James Aldridge (1969) (Aldridge, 1969): This book provides insights into

the social and urban changes in Cairo during the late 19th and early 20th centuries.

Even in the early 20th century, many streets in historic Cairo had not yet been created. For example, Azhar Street did not exist until recently. The idea of creating Azhar Street emerged during King Fuad's visit to the Hussein Mosque and Al-Azhar Mosque through Muski Street and Juhayr al-Qayyis. The difficulties encountered by his procession at that time led to the decision to create Azhar Street, accompanied by numerous changes in the Hamzaawi and Gouriya districts. This resulted in the severance of the extension of Al-Muizz Li-Din Allah al-Fatimi Street and the separation of Al-Gouriya, and historical squares disappeared along the course of the new street.

The reasons for the creation of Azhar Street date back to the difficulties encountered by King Fuad during his historic visit to the Hussein Mosque. Azhar Street, Hussein Square, and Ataba Square were all established in the same year, which was 1930. When Azhar Street was widened to 26 m, many buildings were demolished, including the Moroccan Mosque, and the famous Awqaf Building, which stood at the entrance to Ataba.

2.16. 19th century and early 20th century

“Cairo: 1867–1967” by James Aldridge: This book provides insights into the social and urban changes in Cairo during the late 19th and early 20th centuries.

Tram No. 19 used to pass by it on its way to Al-Azhar Mosque. It remained in place until it was demolished in 1937 while still structurally sound.

One of the old neighborhoods affected by the opening of Azhar Street was the Hamzawi neighborhood, originally known as Khan Hamzawi, established by Hatem al-Hamzawi, one of the princes of Sultan Selim I during the Ottoman era. The main street in Hamzawi was called Al-Bandaqaniyeen Street and was known for its wholesale spice and fabric shops. This neighborhood experienced multiple fires due to its narrow streets and crowded stores. In 1350 AD, a major fire devastated the area, and in the 19th century, a significant fire in 1863 consumed all the shops, causing great hardship for the merchants. To help them recover, Khedive Ismail provided loans to the merchants to restart their businesses. The remaining Hamzawi neighborhood today is known as “Hamzawi al-Saghir,” while most of the original Hamzawi neighborhood was lost when Azhar Street was widened.

Azhar Street ends to the east at Al-Azhar Mosque. Despite its extension towards Darb al-Darrasa, this

eastern extension is called “Juhar al-Qaid Street,” a historical expression of the extension of Juhar al-Qaid Street that existed before Azhar Street was created (see [Maps 1–3](#)).

2.17. Modern era (Post-1950)

“Cairo: Histories of a City” edited by Nezar AlSayyad and Irene Bierman. “Pedestrianization of AL- Azhar Street as a method to preserve the urban fabric of the historic Cairo” (Nezar and Irene): This book covers a wide range of topics related to Cairo's history and development, including contemporary issues.

2.18. Definition of car free cities

A car-free city is an urban environment where private, motorized vehicles are either totally banned or heavily restricted within certain parts of the city (always the C.B.D.). This is done to promote sustainability, to alleviate traffic and to once again priorities people over cars.

The infrastructure usually promotes and priorities more sustainable forms of transport. Can be expect to see bike friendly infrastructure, such as comprehensive bike networks and bike sharing programs.

It's probably better to think of the definition of ‘car-free city’ as more of a scale. Restructuring cities to remove all cars is an enormous task and may have some complex repercussions.

Instead, what you're more likely to see are car-free initiatives in specific areas, where cars are not even necessarily banned, but strongly discouraged.

For example, you might see incentives for using more sustainable modes of transportation, such as heavily subsidized public transit. Or, on the other hand, you might also see disincentives for car usage, like higher parking fees or congestion charges.

Whilst people may be able to dream of a car free city where they can cycle in peace (hooray!) projects like this take time. Rather, they are part of an ongoing process to make urban environments more livable and vital.

Reducing pollution and noise while promoting mobility is not beneficial, for the environment but also contributes to creating more pedestrian friendly cities. The mayor of Paris Anne Hidalgo emphasizes the importance of having cars that cause pollution and utilizing surface parking areas to create sidewalks for pedestrians. Encouraging people to walk or ride bicycles of relying on cars is a key aspect of their city plan to minimize traffic in the city center. This growing trend of limiting or restricting traffic in areas reflects the pursuit of an approach, to urban mobility.

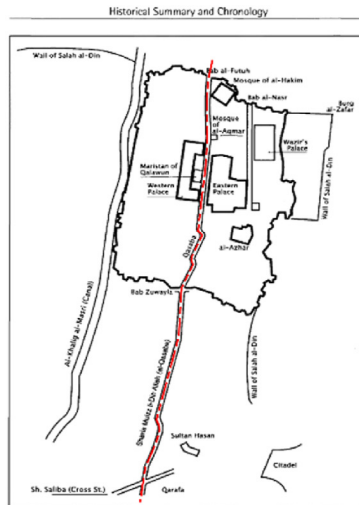


Figure 2: Fatimid Cairo
Map For Fatimid Cairo

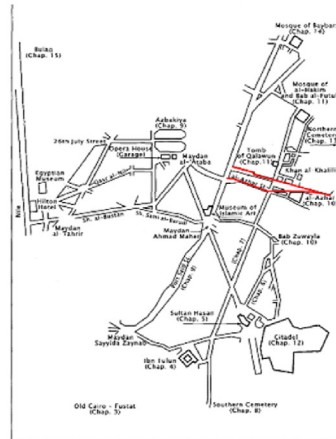
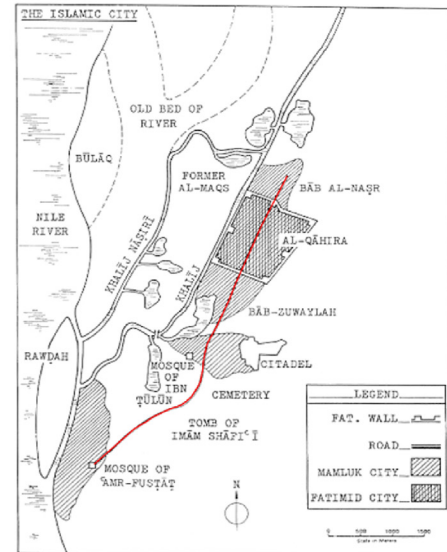


Figure 1: Cairo sketch map
**Sketch Map For Islamic Cairo
And Saranding Districts**



**Map Of Islamic Cairo Befor Mamlouk
The Continuity Of Al-Moez Street**

Maps 1–3. Show the historical Cairo since the Islamic Fateh till the last century.

As observed during the World Economic Forum in February 2017 (www.weforum.org) cities such, as Madrid, Oslo, Paris, Hamburg, Copenhagen, Athens, London and Brussels have emerged as leading examples of mobility in Europe. On a scale Chengdu (China) Vancouver (Canada) Mexico City and New York (USA) stand out for their efforts in promoting sustainable transportation. Over the five years several major cities are expected to remove cars from their city centers. In this regard, as explained by Antonio Quilis, the director of El Mundo Ecológico. It is crucial to raise awareness among all participants, in the transportation network about adopting mobility models. It is evident that private drivers need to be encouraged to utilize transportation while public authorities should facilitate this transition ([On the Road Trends, 2023](#)).

Fabio M. Ciufini, 1990 “a city without cars” ([Ciufini, 1990](#)), in which he declares how a city without vehicles and with a more sustainable mobility, is a calmer and more efficient place, both economically and socially. Yes, very soon and in lots of places, bicycles will be seen all year long.

2.19. Examples for car-free cities

2.19.1. Pontevedra, Spain

Pontevedra is located in the northwest of Spain. It has gained immense international recognition for its achievements in urban planning and is considered a model in the field of car-free urbanization.

Pontevedra suffered greatly from severe congestion. “It was a sad and exhausting place” where people did not want to live in the city center. But all that changed with the appointment of Anxo Fernández Lores as mayor of the city.

Lores, a doctor by profession, revolutionized the city, attracting new residents and businessmen. The changes he implemented had a remarkable impact. The city witnessed a reduction in carbon dioxide emissions by over 70%, and in 2016, not a single speeding ticket was issued by the police in Pontevedra.

Although these initiatives were not without challenges, they succeeded to a large extent. The greatest success? A change in people's mentality. Cars are now viewed as guests on the streets (see [Photo 1](#)).

2.19.2. How Pontevedra became car-free?

In 1999: The realization that traffic congestion was causing pollution and a decline in quality of life prompted an experiment allowing pedestrians on certain streets, limiting vehicle access.

In 2007: The launch of “Peatonalización del Casco Histórico” (Pedestrianization of the Historic Center) gained significant momentum. The largely car-free city center only permits essential services and resident vehicles. Sidewalks and pedestrian squares were expanded.

In 2009: Introduction of the “Zona 30” (30 km/h Zone). Enhancing road safety and encouraging



Photo 1. Shows the car free streets of Pontevedra.

alternative transportation methods. Ongoing: The city remains committed to its car-free vision, continually improving public transportation and sustainable urban planning.

2.19.3. Venice, Italy

Maybe there are no cities more infamously car-free than Venice. Interestingly, the city of love is not car-free due to its modern planning initiatives, but rather, because of its unique nature and enduring urban design.

Venice is a city known for its geography, more specifically, its canals. It was built on a group of islands and marshlands, boats served as the primary method of transportation for both people and goods. The city is composed of more than 100 islands, separated by canals. These islands are largely connected by small bridges and pedestrian paths. Whilst being suitable for bikes as well, this feature made it difficult to construct streets suitable for car traffic. It's considered as a city that wasn't built with cars in mind. It evolved unusually without the need for cars, and ultimately, they weren't widely embraced. On its grounds today, walking and cycling are the preferred modes of transportation along its winding roads (see [Photo 2](#)).

2.19.4. How Venice became car-free?

In the 5th Century: City founded on a series of islands. Absence of land leads to the development of a city built around canals. Middle Ages: Venice grows into a powerful maritime republic, where boats and gondolas serve as the primary modes of transport.

19th-20th Century: Steam and subsequent motor powered boats threaten cities' delicate canal architecture. Efforts to restrict usage are part of 'preservation' of Venice. Ongoing: Still, predominantly, a water-dependent lifestyle. The absence of cars is celebrated, and helps to preserve its cultural heritage.

2.19.5. Hydra, Greece

Hydra is one of the Greek islands located directly on the Aegean Sea, but it differs from other islands due to the complete absence of car traffic. Its streets are very narrow and its terrain is intensely mountainous with steep slopes, making it difficult to use cars in general.

Despite many attempts to introduce cars onto the island, the local community rejected it in order to preserve the island's tranquility and maintain its historical charm. Hydra has taken clearer measures; in the 1950s, a presidential decree was issued banning the use of all wheeled vehicles, including bicycles.

However, Hydra faces some challenges due to the absence of fire trucks. Yet, its people have a famous saying in case of fires: "Take a bucket full of water and help." This is to ensure that their island maintains the peace and tranquility they are accustomed to.

Therefore, it is always praised as a distinguished, quiet, and peaceful city.

2.19.6. How did Hydra transform into a car-free area?

In the eighteenth century, Hydra was one of the major naval powers and an important center for maritime trade. In the early twentieth century, cars became very popular in Athens. Despite attempts to



Photo 2. Shows Venice as a model of car free city (a boatable city).

introduce cars to Hydra, the residents resisted. Eventually, a presidential decree was issued banning any vehicles, contributing to making it a wonderful and distinctive tourist destination for those seeking tranquility. Donkeys and boats have become the primary means of transportation in the city (see [Photo 3](#)).

2.19.7. Vauban/Freiburg, Germany

The city of Freiburg is located in southwest Germany and has a long history in urban planning and

design. Its population numbers around 220,000 inhabitants. Since the 1960s, cars have been excluded from its center, as its planning is directed towards the community, serving their comfort and well-being as if the city were built from scratch. Consequently, cars are allowed but with a speed limit not exceeding three miles per hour, nearly the speed of a human, making car rides almost comical, primarily used by the elderly and the disabled. In the city center, anyone can witness children playing and learning to



Photo 3. Shows donkeys as Hydra's traditional transportation methods.

ride bicycles in the middle of the road. Parking spaces have been completely removed, adhering to the principle that, just like in Oslo, removing cars necessitates removing parking spaces first. Thus, the city has transformed into a utopia prioritizing humans, comfort, and tranquility (see [Photo 4](#)).

2.19.8. How Vauban/Freiburg Became Car-Free

During the period between the 1950s and 1960s, the city served as a French military base and remained occupied until the early 1990s. After the French forces withdrew, plans were made to replace the military zone with residential areas devoid of car traffic. The planning aimed to reduce vehicular movement, prioritize pedestrians, and uphold sustainability principles. Parking spaces were minimized, and speed limits were lowered to match walking speed, rendering car rides unnecessary. Consequently, the area, known as Vauban district, transformed into a car-free zone. It has become a model not only in Germany but also worldwide.

Car-Free Cities: Advantages and Disadvantages

3. Applied studies

3.1. Study area and impact determination

The study area encompasses the surroundings of Al-Azhar Street (north and south) within the

historical region of Cairo, particularly Al-Muizz Street, Al-Hussein Mosque Square, and Al-Azhar Mosque. The study delves into the urban, social, and economic environment surrounding these locations.

3.2. Field visits

Multiple field visits were conducted to the study area, documented through photographs and current maps illustrating land uses, building conditions, heights, valuable structures, and urban voids. Population studies were also undertaken to understand the nature of the residents and visitors. Additionally, economic activities of the population, available economic opportunities, and potential prospects for the area were explored.

3.3. Survey study

A comprehensive survey was conducted, involving approximately 841 participants, including residents, merchants, and visitors from diverse age and social groups. The survey gathered opinions from beneficiaries and those affected by the potential conversion of Al-Azhar Street into a pedestrian-friendly thoroughfare, accommodating recreational, commercial activities, open squares, green areas, and other potential uses (see [Map 4](#)).



Photo 4. Shows bicycles as Vauban's traditional transportation methods.



Map 4. Shows AL-AZHAR street within the compacted fabric of historical Cairo.

3.4. Data collected about the study area and its fabric

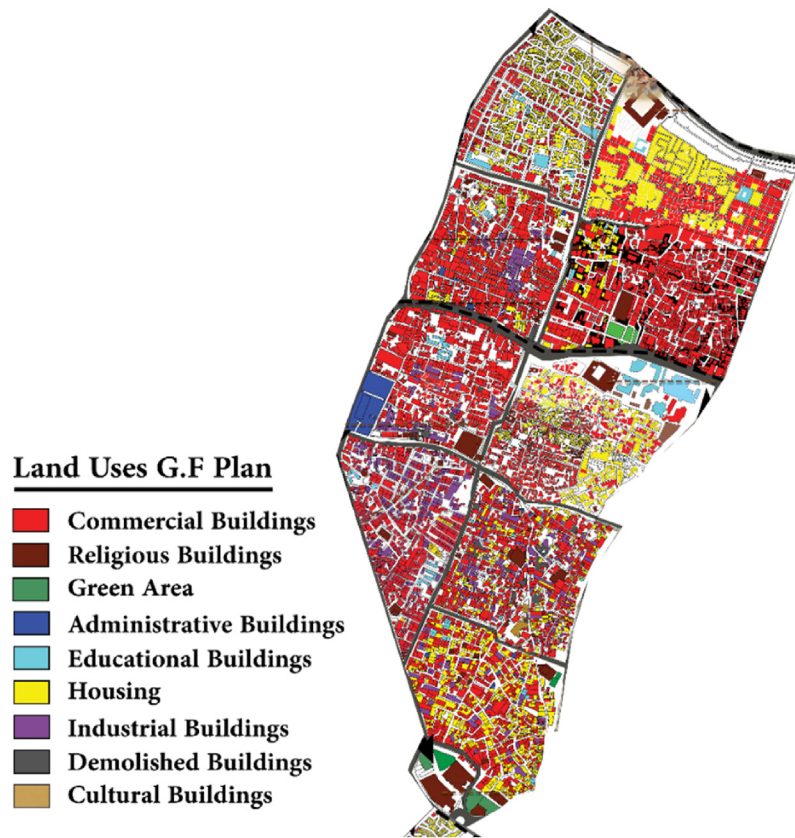
A comprehensive urban survey of the area has been conducted, including building conditions and ground floor land-uses, as well as land uses on typical floors and building heights, and the study of urban open spaces. Through the urban survey maps of the area, its fabric can be identified, which is a compacted fabric with narrow streets, some of which are closed from the end, and relatively few urban voids within residential blocks due to the region's hot climate conditions. It

can be observed that the urban fabric of the area aligns with the social fabric of its residents, as there is a strong social cohesion among them due to their families having a history as old as the area itself (see Photo 5).

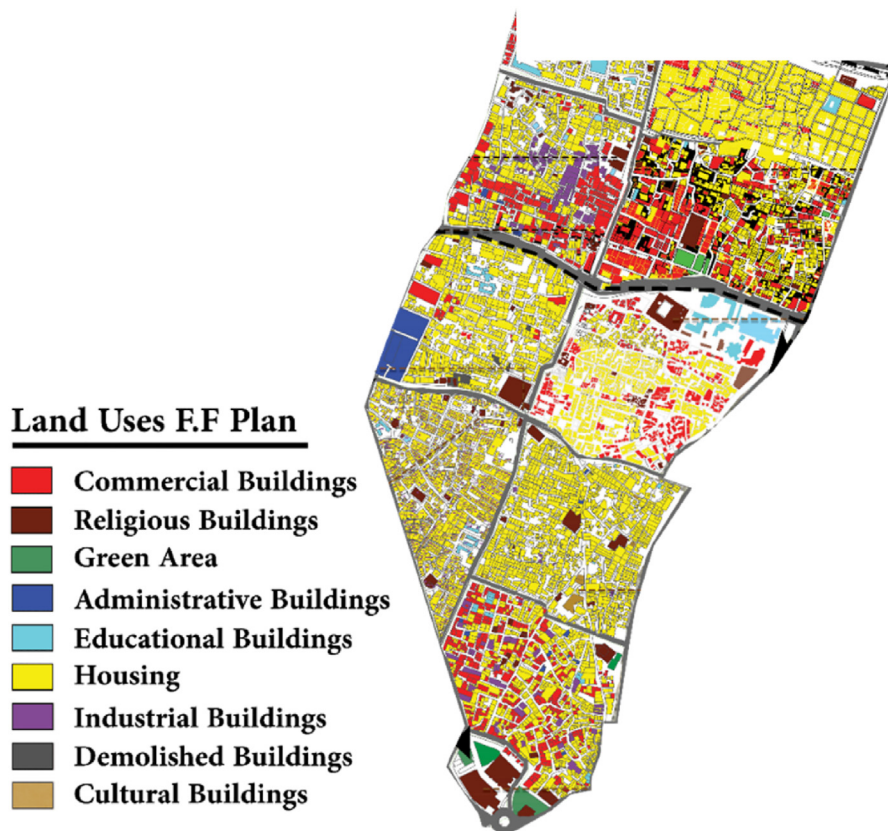
This fabric has been fragmented by the traffic axes that were constructed during past decades. Through the study of the land use map at the ground floor level, commercial use predominates, accounting for 72% of the land use, along with traditional industries workshops and factories for gold and metals for 7%, while on upper floors, residential use predominates (see Maps 5–7).



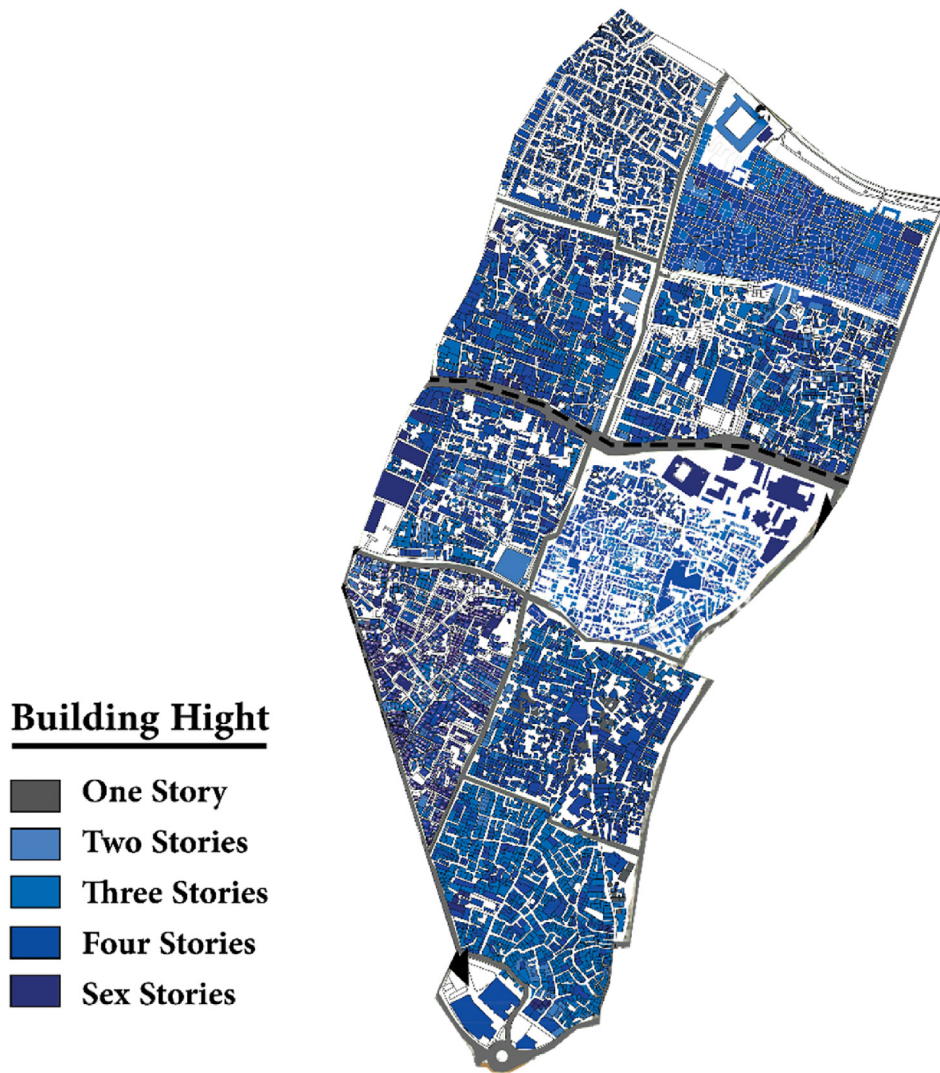
Photo 5. A physical model for the Islamic Cairo showing its compacted fabric.



Map 5. Shows the land uses of ground floor of the historical Cairo (by author & his team).



Map 6. Shows the land uses of typical floor of the historical Cairo (by author & his team).



Map 7. Shows the land uses of typical floor of the historical Cairo (by author & his team).

By studying building heights, four-story buildings predominate due to the steep rise in land prices, as most buildings were initially composed of one or two floors and were later raised.

And by studying building conditions it was found that most building conditions are considered safe (see [Map 8](#); [Photos 6 and 7](#)).

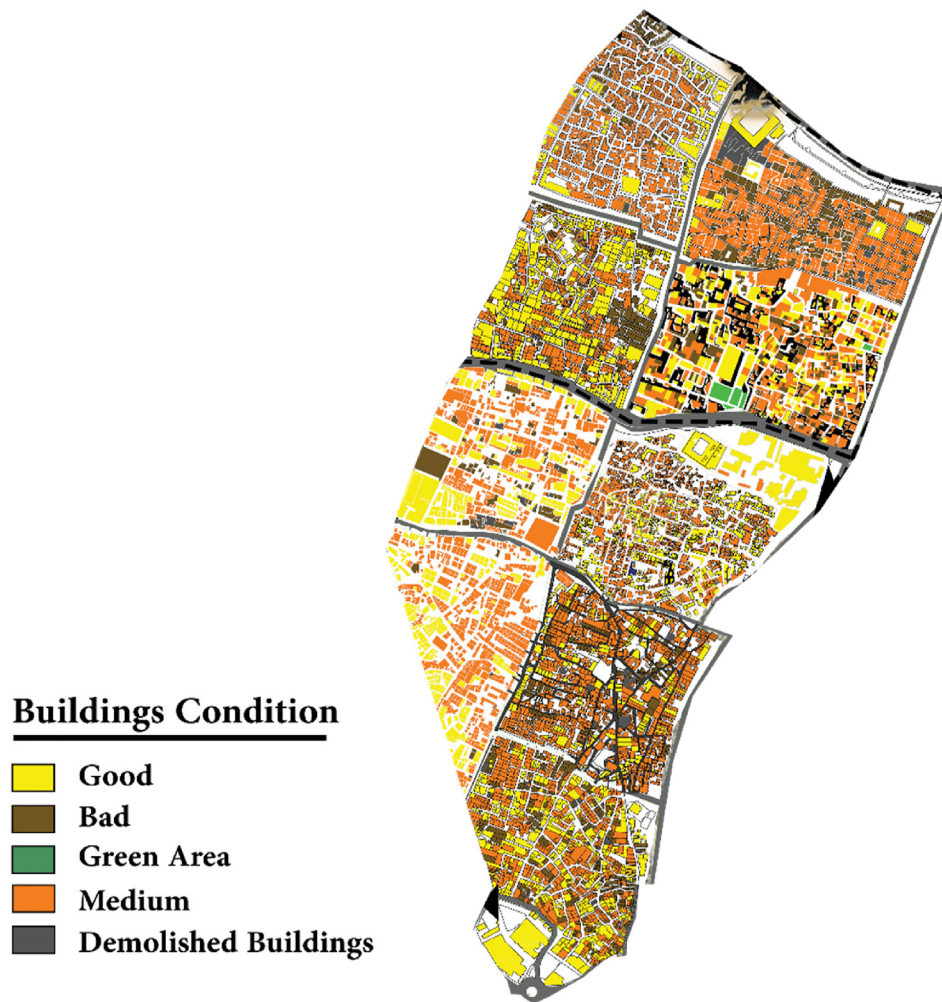
A survey was conducted, involving samples of residents, visitors, merchants, and tourists in locations where the survey was conducted, with a total of 841 individuals. The results are as follows:

Most people from various age groups and different types of stakeholders in the area, whether

residents, vendors, customers, or tourists, agree to convert Al-Azhar Street and Gohar Al-Saqly Street into pedestrian and bicycle paths and recreational and social activities by 69 %.

People's opinions were also surveyed on activities and uses and the proportions that could be done in open spaces, such as cafes, restaurants, open markets, children's areas, green spaces, shaded areas, areas designated for events, and activities. The proportions were as in [Table 1](#).

Additionally, most participants in the survey believe that closing Al-Moez Street and dividing it into two parts by Al-Azhar Street is illogical and





Map 8. Shows the building conditions of the historical Cairo (by author & his team).



Photos 6&7. Show the vehicle traffic density at Al-Azhar Street and Mohammed Abo Al-Dahab Plaza (the priority for cars not pedestrian and people activities).

Table 1. Pros and cons of car free cities.

Pros: 	Cons: 
<p>Improved health: modern car-free areas encourage exercise through cycling and walking.</p> <p>Safer: Fewer cars mean fewer road traffic fatalities.</p> <p>More green space: A greater sense of community and communal living – more plazas for activities.</p> <p>Tourist attraction: A lack of cars can be a great attraction to tourists and isn't just beneficial for locals.</p> <p>Reduced Infrastructure Costs: Whilst initial investment may be high, reducing the number of cars can save a huge amount of money on road maintenance and construction.</p>	<p>Initially disruptive: an initial period of disruption for residents and commuters alike.</p> <p>Complex: it requires complex plans to overcome difficult logistical questions.</p> <p>Limited Accessibility: Do car-free cities do enough for those with mobility issues or particular transportation needs?</p> <p>Emergency Services: it has to consider access requirements and infrastructure to support emergency services.</p> <p>Local Business Impact: Businesses' relying on car traffic may have to alter their models to avoid economic shortfalls.</p>

affects tourism and population movement negatively. Most participants in the survey also believe that the Al-Azhar Bridge and the pedestrian bridge linking its sides negatively affect the picturesque visual image of the area's distinctive urban and architectural landscape (see Table 2).

Moreover, most participants in the survey believe that unused spaces and urban open spaces should be utilized, and health and educational services, as well as centers for traditional crafts neighborhoods, should replace environmentally polluting factories and workshops as shown in Table 1.

4. Analytical studies

Various analytical methods were employed to identify the problem, analyze its causes, and assess its outcomes as follows (see Diagram 1):

Problem analysis was conducted using the SWOT method to identify strengths, weaknesses, opportunities, and threats (see Diagram 2).

The problem was also analyzed using the Kipling method to pinpoint its core issues.

Conclusive Studies and Solution Presentation Strategies (see Diagram 3):

Table 2. Shows the questionnaire results for people in the place of Al-Azhar area and their opinions and suggested solutions.

No 262 (31%)	Yes 579 (69%)	Are you in favor of or against converting Al-Azhar Street into a pedestrian walkway with shaded seating areas and the creation of alternative traffic routes?			
Events and festivals Area 118 (14%)	Open market Places 415 (49%)	Kids Areas 51 (6%)	Shaded& Green Areas 168 (20%)	Cafes and Restaurants 89 (11%)	What are the best uses for the street after restricting vehicular traffic (Car Banning)?
No 190 (22%)	Yes 651 (78%)	Do you believe that the Al-Azhar Bridge has a negative visual impact on the value of buildings in the vicinity?			
No 611 (73%)	Yes 230 (27%)	Do you think blocking off the historical Al-Muizz Street with Al-Azhar Street is suitable?			
Educational and Health Services 66 (6%)	Stores and Bazaars 451 (53%)	Handcrafts Training Centers and Exhibitions 3 24 (41%)	What are the best uses for environmentally harmful areas (workshops, factories) when removed?		
Other 105 (12%)	Electric Tram 201 (24%)	Public Transportation 125 (15%)	Traditional and Heritage Means 107 (13%)	Electric Cars 303 (36%)	What are the best means of passenger and cargo transport after closing Al-Azhar Street to cars?

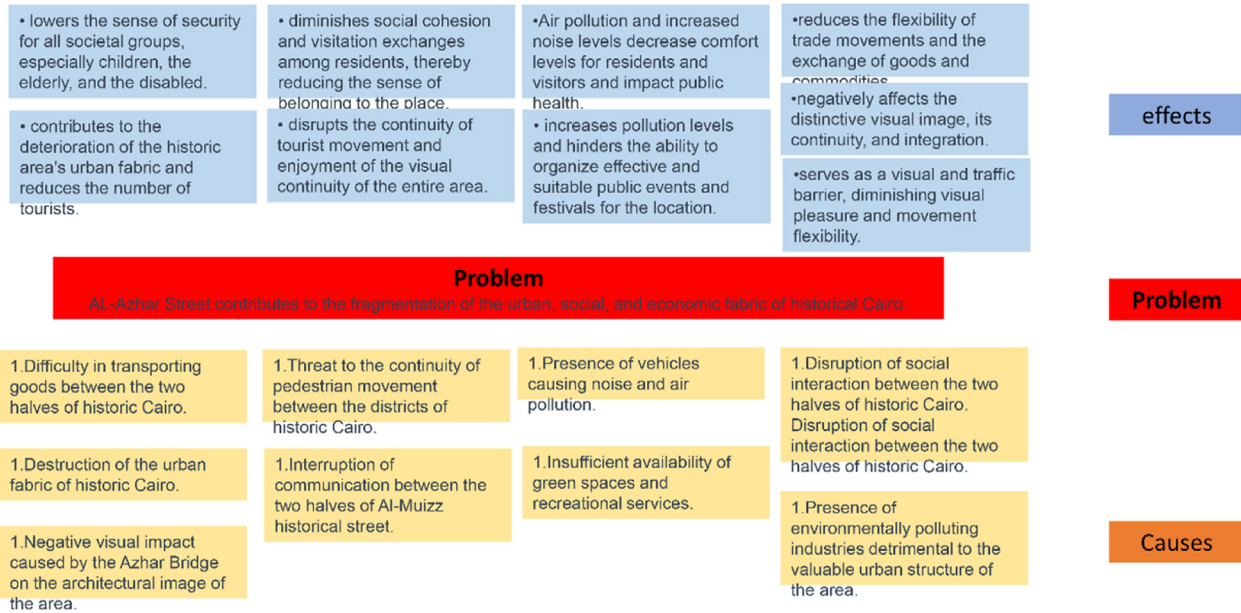


Diagram 1. For problem analysis (causes and effects).

Reviewing a range of diverse measures, including projects, initiatives, or legislations that can be adopted or implemented to achieve specific urban, social, environmental, and economic objectives, entails the following (see Table 3):

Through conducting studies that encompass essential projects, it is possible to outline a plan for the short and long term and illustrate their anticipated impacts (see Table 4).

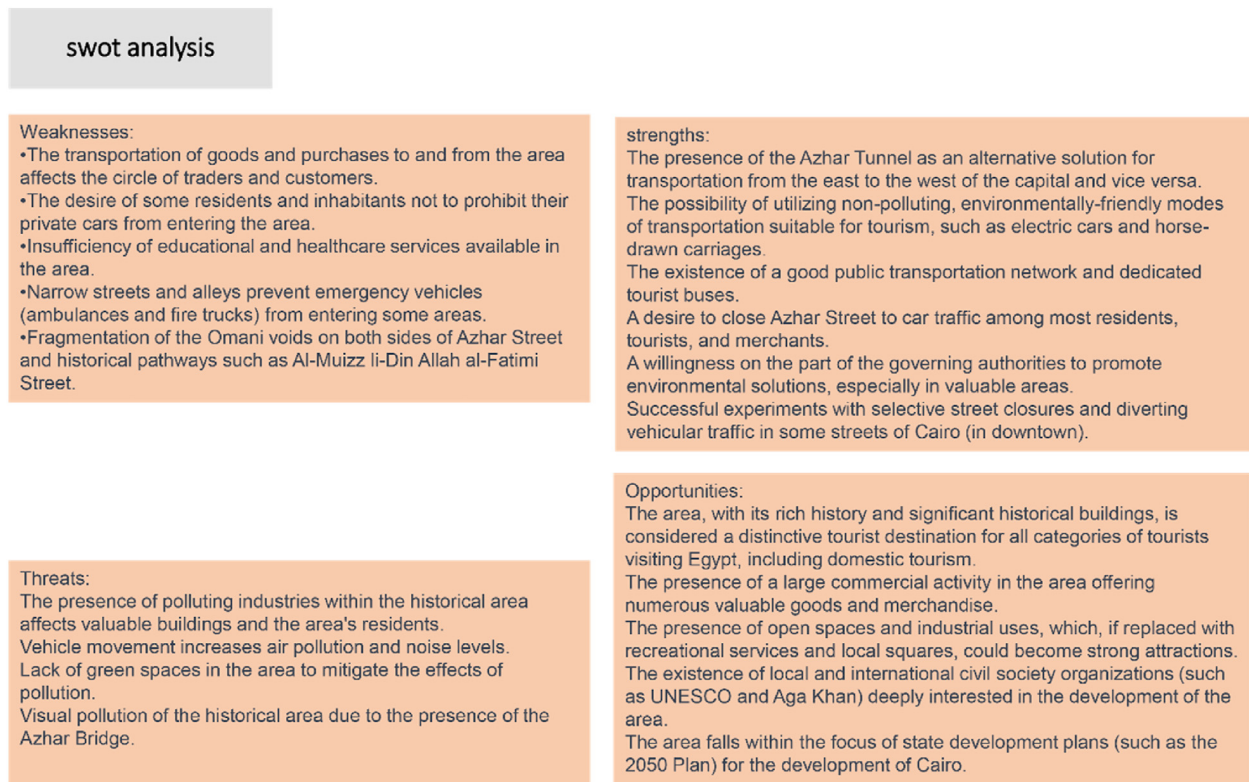


Diagram 2. For problem analysis using SWOT analysis method.

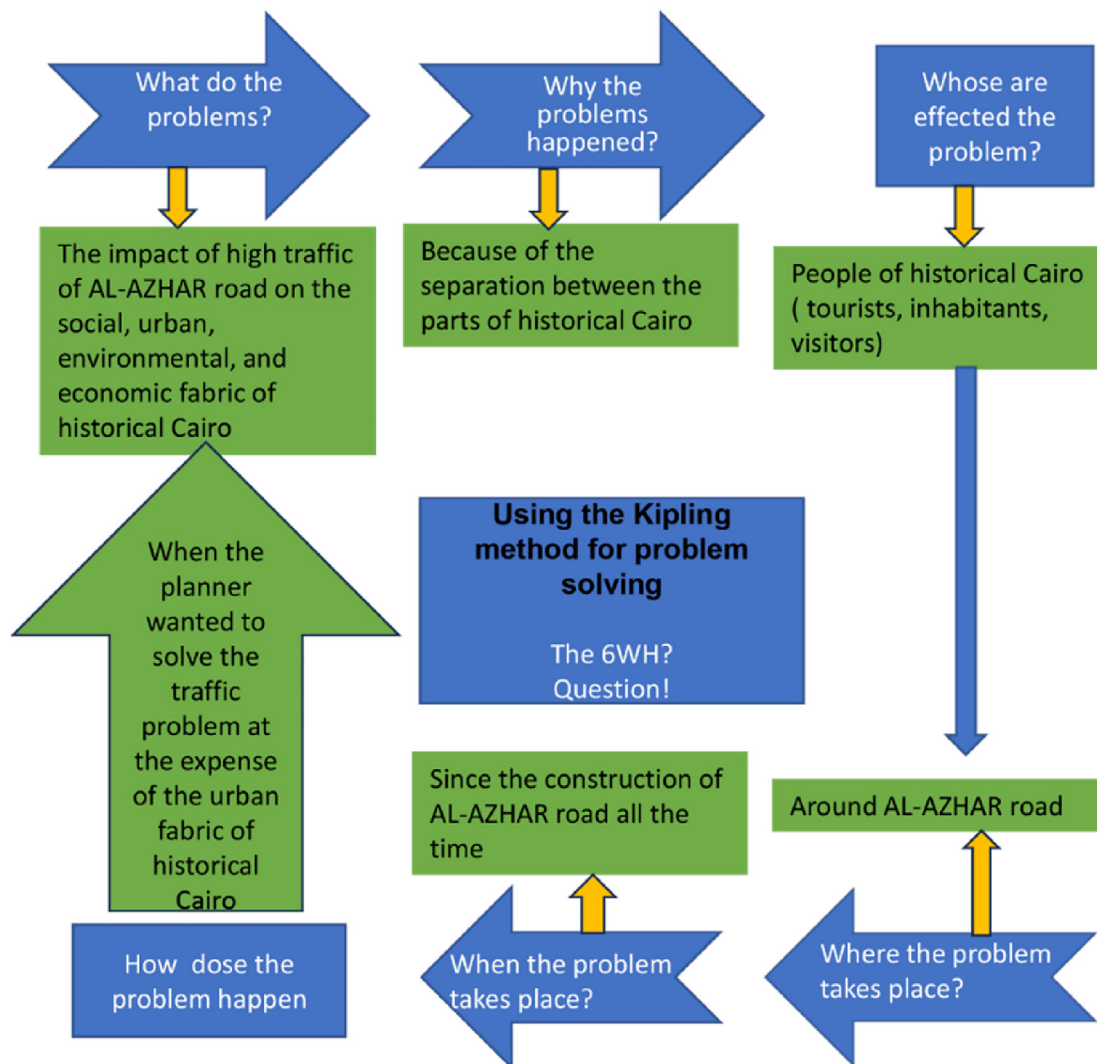


Diagram 3. For problem analysis and solving using Kipling analysis method.

Table 3. Shows the required projects and its results to solve the problem.

Project	Results
Closure of Azhar Street and its conversion into a pedestrian walkway with open green spaces.	<ul style="list-style-type: none"> Restoring connections between districts of historic Cairo.
Relocating environmentally polluting industries outside. Historic Cairo.	<ul style="list-style-type: none"> Decreasing air pollution rates. Utilizing its spaces to provide green areas and cultural and recreational services.
<ul style="list-style-type: none"> Removal of the Azhar Bridge and pedestrian overpasses. 	<ul style="list-style-type: none"> Enhancing the visual image of the area and restoring it to its original state.
Removal of surrounding walls around squares and along. Azhar Street.	<ul style="list-style-type: none"> Increasing the flexibility of urban spaces and ease of movement between them.
<ul style="list-style-type: none"> Establishing recreational and cultural services, organizing events, and increasing green spaces and public squares. 	<ul style="list-style-type: none"> Improving urban and social life quality.
Allocating traditional local transportation means and electric cars.	<ul style="list-style-type: none"> Boosting tourist influx while reducing pollution rates.

Table 4. Shows the required actions and strategies to solve the problem.

Subject	Required actions Objectives	Field of action
<ul style="list-style-type: none"> Managing car traffic interference with pedestrian movement. 	<ul style="list-style-type: none"> Partially car banning traffic. 	<ul style="list-style-type: none"> Procedures
<ul style="list-style-type: none"> Ensuring pedestrian historical pathways are unobstructed by Azhar Street. 	<ul style="list-style-type: none"> Partially car banning traffic. 	<ul style="list-style-type: none"> Procedures
<ul style="list-style-type: none"> Addressing environmentally polluting industries. 	<ul style="list-style-type: none"> Relocating industries to industrial zones outside the historic area and replacing them with green spaces. 	<ul style="list-style-type: none"> Project
<ul style="list-style-type: none"> Handling commercial activities requiring goods transportation. 	<ul style="list-style-type: none"> Scheduling specific times with low activity density for goods transportation. 	<ul style="list-style-type: none"> Procedures
<ul style="list-style-type: none"> Facilitating access for tourist groups. 	<ul style="list-style-type: none"> Providing special buses for tourist transportation. 	<ul style="list-style-type: none"> Available
<ul style="list-style-type: none"> Providing adequate green spaces and open plazas. 	<ul style="list-style-type: none"> Replacing environmentally polluting industries and closed car pathways with green spaces and open plazas 	<ul style="list-style-type: none"> Project

Studying and analyzing the constraints and supportive factors necessary to achieve the desired objectives serves as a strategy for addressing

existing problems, as illustrated in the following diagram (see [Diagram 4](#)).

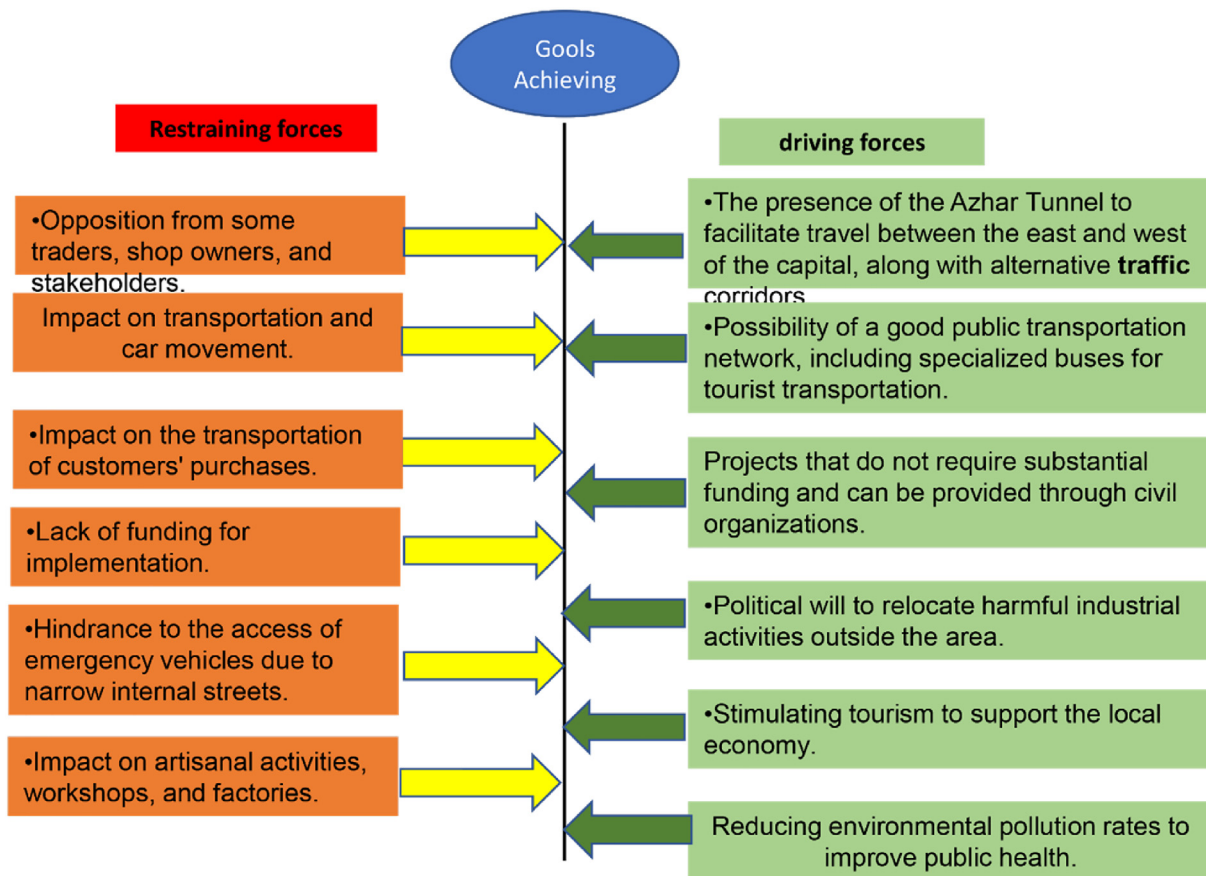


Diagram 4. Shows the forces (driving & restricting) as a strategic action for goals achieving.

5. Conclusions

Through the previous studies, the following conclusions can be drawn:

- Partially removing cars from the historic Cairo area and relying on the surrounding traffic corridors, in addition to the Azhar Tunnel, can be achieved.
- Partial closure and banning cars imply closing them during the day (the proposed activity period) with the possibility of opening for a few hours at night for cargo transportation, while remaining open at all times for emergency vehicles (ambulances, fire trucks, police).
- Banning cars will improve the environment, thereby increasing quality of life and contributing to an increase in tourist numbers.
- Environmentally friendly and heritage transportation modes will attract tourism and improve the environment.
- Closing Azhar Street to car traffic and removing the Azhar and pedestrian bridges will enhance the urban landscape and allow historic buildings to be well presented.
- Trade and commerce, as well as the movement of goods, will not be affected by specific operating hours; merchants and customers will adapt.
- This will enhance social interaction among residents, visitors, and the enjoyment of open and green spaces.
- Replacing environmentally polluting factories with activities will attract more tourists and enhance the vitality and activity of the area, while significantly improving the urban, social, economic, and environmental aspects.
- Most stakeholders and beneficiaries from the area do not object to partial closure and removal of cars outside the area's boundaries, provided that free parking spaces are provided for their private vehicles within its limits.

Ethics information

This paper adheres to the ethical guidelines set by the COP.

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Conflict of interest

There is no conflict of interest as per the separate letter submitted to the journal.

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