

Research Paper

Walking Towards Tomorrow: Humanizing Urban Spaces in NIZWA Souq, Oman.

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Abstract

This study explores the humanization of public spaces in Nizwa Souq, Oman, by analysing and exploring different Streets within and around souq, which are connecting the multifaceted spaces of shopping, cultural, religious and residential spaces. This research is to understand how Spatial configurations of Nizwa Souq influences walkability with parameters like connectivity accessibility, universal inclusivity, active social spaces with its aesthetic quality and amenities, and how these factors contribute to the humanization of public spaces in alignment with Oman's Vision 2040. Spatial data is gathered including footprints, open spaces and street networks, and possible movement paths are identified by spatial connectivity, spatial integration and its correlation is analysed by Depthmapx with Space Syntax analytical tools. Qualitative methods are used to extract the user preferences and choices with series of surveys and questionnaires with focus group within the delineated study area. The effects of these street patterns are evaluated to understand the spatial dynamics of the Souq on the people's wellbeing, as these spaces at present are more car oriented and less pedestrian friendly with inaccessible to the marginalized groups. The findings provide insights into spatial connectivity and its impact on pedestrians and human life. Findings are compared with similar studies conducted in other GCC countries to highlight best practices and areas for improvement. It informs urban planners and designers in making evidence-based decisions to improve pedestrian flow, enhance safety and form an accessible active public space with overall vitality. By aligning the design strategies with Sustainable development goals, Nizwa souq can evolve into a model of sustainable urban development that preserves its rich heritage while catering to the needs of its contemporary users. Paper also argues the philosophy that prioritizes human life, this research takes a people centred approach to urban revitalization by promoting walkable, liveable, sustainable and resilient public spaces to human life.

Keywords

Humanization, Space Syntax, Walkability, Accessibility, Connectivity Public spaces. Sustainability

1. Introduction

1.1. Structure and limitation of this paper

This Research paper addresses the significance of Nizwa Souq in its first part and the paper aims to investigate the current issues in terms of walkability, accessibility, liveable human activities and the hindrances faced by them due to growing car traffic in its second part and remaining of the paper is structured by the methodological sequence explaining the systematic analysis of the empirical data and the analytical data extracted by the program DepthmapX space syntax (Dezfuli et al., 2024) with plans for future strategies that enhances the vitality of this Souq by providing best practices and aligning the

strategies with sustainable development goals, The limitation of this study include the small sample size in the surveys at micro level, economic impacts are not studied in this research.

1.2. Background (Nizwa Souq)

Nizwa Souq, nestled in the Hajar Mountains, is a vibrant hub showcasing the interplay of culture and urban form in traditional Arabian marketplaces.

Social Hub: It is a social hub fostering community, connection, and belonging.

Cultural Heritage: The souq exemplifies Omani culture, preserving crafts like pottery, weaving, and silverwork while reflecting the nation's heritage.

Economic Importance: Nizwa Souq is a key economic hub where locals sell produce, livestock, spices, dates, and crafts, supporting many families and boosting the economy.

Tourism Attraction: The Souq catches tourists from around the world, providing glimpses of Omani life with 17th-century Nizwa Fort, The Grand Masjid, Traditional residential buildings called haraths (Al Aqar) and the Date palm farms with Falaj system in close proximity to the Souq. at present the Souq area bustled with life, it acts as Nizwa's cultural centre by boosting local economy and enhancing cultural exchange. The Souq has been continuously enhanced

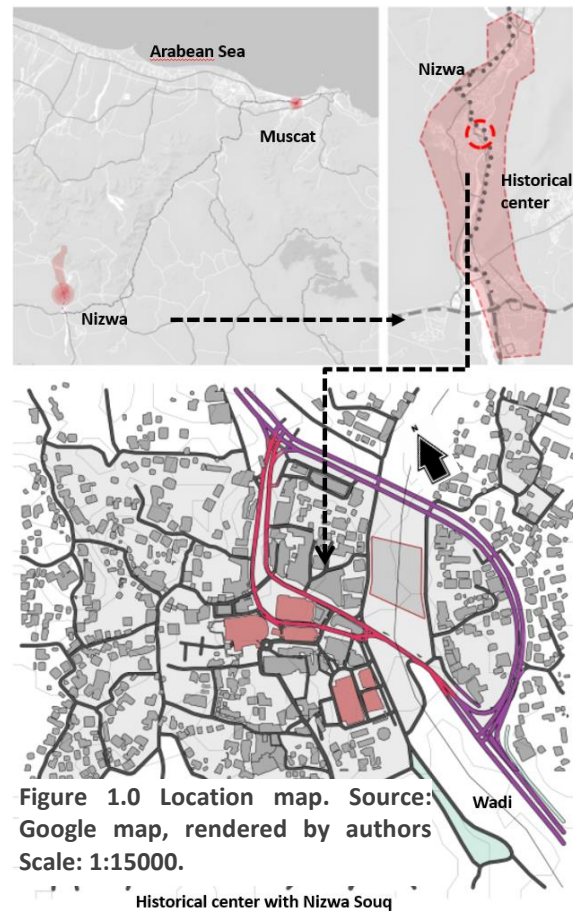


Figure 1.0 Location map. Source: Google map, rendered by authors. Scale: 1:15000.

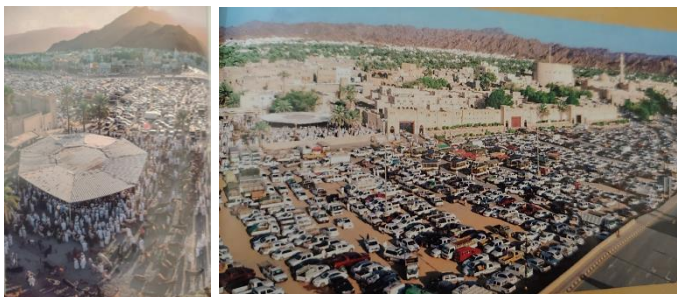


Figure 1.1. The picture on the left shows the Alhabta event of auction and sale of livestock, with a huge crowd in the souq and car parking in the wadi area. The picture on the right is in front of the Nizwa souq. Book Source: Suleman bin Mohammed bin Suleiman bin Suleimani. *Alhara Aqr Nizwa*. [Book], p. 35.

and upgraded with harmonious blend of heritage conservation and progressive change. Nizwa souq is the most important market in the ancient and in the modern times, souq comprises various markets within itself like the eastern Al-Sansra, Silver and craft market, pottery, Gold market, Arms market, Omani dates and sweets market, vegetable, fish and meat market, a large part of which the livestock like sheep and cows are sold in collective auction on Friday mornings starting from 5.00 am to 11.00 am, and Major festival days, this famous business activity in Oman is locally known as Al Habbat, these live stocks are transported from various governorates within Oman, one can see remarkable crowding and variety of goods which spills over the large wadi areas for parking and movement.

1.3. Problem statement

As Oman is witnessing modernization, Nizwa Souq becomes an important case study in understanding the different aspects of urban development, especially in the case of maintaining cultural heritage. The Souq's importance in Nizwa's urban fabric one can witness the resilience, adaptation, and continuity but its importance for urban studies in the field of sustainability, resilient, walkable, human friendly, child safety, elderly accessibility and safety in urban development is hardly seen. Despite its historical significance (Damir et al., 2024) and allure as a tourist destination, Nizwa Souq confronts challenges in walkability and universal accessibility. With the emergence of modern shopping malls and hypermarkets with good accessibility and infrastructure for all user group's shopping comfort has let down the interest of certain groups for shopping in the souq. The population in the souq are not inclusive of all age groups and genders, with added disadvantage from the hot arid climate in summers (Vatani et al., 2024) and the flooding wadis during rains creates a chaos in traffic and movement. This paper aims to show the Souqs usages showing peak activity mainly to weekends and festivals. The sporadic yet intense rainfalls lead to flooding with 2 m higher level of water flow into the Wadi-Al-Musanna where car parking and vendors occupy during non-rainy days, causing closures that disrupt the market's operations however the rains just last 4 to 6 days in a year which is at a very minimum ratio. The insufficient parking spaces is leading to congestion and accessibility issues. These problems, along with the transformation of surrounding harath into commercial hub, have witnessed a demographic shift to newer residential areas for more privacy and spacious localities.

1.4. Aim of the study

The study aims to address the challenges by applying space syntax as an analytical tool to evaluate the spatial configuration of Nizwa Souq. Space syntax provides a quantitative approach to understanding the relationship between spatial layout and social behavior, which is crucial for enhancing the souq's functionality and user experience. To provide a comprehensive context for this research, literature review to explore previous studies on urban design in traditional marketplaces, with a particular focus on the Gulf Cooperation Council (GCC) countries is focused. With this study we can draw concepts from sustainable urban development, aligning with Oman's Vision 2040, which also encourages creating healthy, sustainable urban environments, enhancing walkability and pedestrianization in places like Nizwa Souq is very important for providing a resilient and engaging active urban environment for its people.

1.5. Literature review

The review of scientific papers from GCC using space syntax to analyse the spatial configurations of traditional souqs, can significantly enhance social sustainability and spatial identity by improving accessibility, connectivity, and fostering social interactions (Alalouch, 2024). has provided a guiding framework to assess how spatial layout influences accessibility, social interactions, and overall walkability in Nizwa Souq. the spatial configurations of Sanaa's architecture, analysed through space syntax, reveal how permeability and visibility influence social practices and spatial complexity Araguz, M., & Psarra, S. (2017). These projections can be applied to Nizwa Souq to know how spatial design, road networks can enhance human interactions and create functional flexible and accessible spaces. The study of spatial design in the Souq Matrah in its traditional settings plays a significant role in enhancing urban social interactions and addressing safety concerns. This insight helps in analysis of Nizwa Souq, focusing on how spatial configurations can attract more users and support their needs (Al-Maimani, Salama, & Fadli, 2014). The spatial and functional analysis of Souq Mutrah and Souq Waqif reveals how urban morphology (Javanroodi et al., 2018) and land use influence the socio-economic sustainability of traditional markets. This input guides in the analysis of Nizwa Souq on how spatial configurations can enhance both urban social

interactions and economic viability (Major & Tannous, 2020). The space syntax theory gives a framework for analysing spatial configurations, emphasizing the relationship between space and society through measures like integration and connectivity. Hillier's work demonstrates how spatial layout can predict human spatial behavior, offering valuable insights for designing urban spaces that enhance accessibility and social interactions (Hillier, 1996), Gehl (2013) and Jacobs (1961) both emphasize the humanization of streets and public spaces by designing them to foster vibrant street life and social interactions, which can be applied to enhance the social sustainability and community engagement in Nizwa Souq.

1.6. Humanizing Urban spaces in Nizwa Souq

Many articles and news channels are addressing the rich heritage- culture, architecture splendor, tourists' attractions etc. about the Nizwa souq but the need for prioritizing human needs is minimally addressed, this paper touches the need of the hour to bring in sustainable mobility, healthy, lively, active spaces by replacing major part of public spaces from cars to humans. Pedestrianization converts streets for pedestrian use, eliminate vehicle access, it makes urban areas more resilient, livable and healthy by reducing traffic, lowering of emissions, fostering community and supporting local businesses (2023 ESG Real estate lab, future mobility network). Some studies and news highlight the well-organized shops and products in the souq but what about the well-organized amenities for the safety of the pedestrians. Most of the areas in and around Nizwa souq lack pedestrian infrastructure and forcing people to walk on the road along with cars, bikes and trucks well maintained footpaths are available but they are not connected or they are inaccessible for the required destinations and not inclusive for the diverse needs of humans, hence proper pedestrian amenities is required to enhance accessibility and safety, footpaths can also serve as human space hence shaping human realm in the human space is vital in humanizing active urban human spaces, this can be called as human focused process, An inclusiveness addresses the diverse users, including people with disabilities, elderly, children, male, female and provides detailed information on accessibility features like ramps, public seats , shade, trees, clear pathways to improve human mobility , improvement in human environments aim to increase the humanization. Human mobility, walkability and wheelability pattern should be comfort, safe and accessible. Walking and cycling should encourage all ages and abilities this is the main concept the author is trying to achieve in this paper. Understanding human activities in and around souq area such as pedestrian movement and urban traffic which are shaped by the surrounding structure is important, hence space syntax is one of the unique guiding tool for these assessments.

2. Methodology

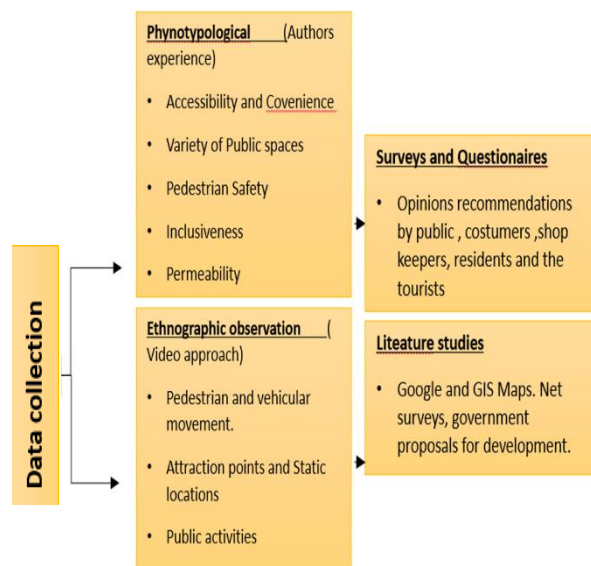
In order to Humanize the spaces in and around Nizwa Souq, it is essential for creating urban areas that supports urban social connections, physical activities, and enhances community well-being along with preserving cultural heritage and promoting economic revitalization. In this research the authors have conducted surveys and questionnaires using selective sampling strategies with stakeholders in Nizwa Souq, such as buggy drivers, local vendors, tourists, and visitors. Utilizing Karimi's (2012) evidence-based design methods, detailed evidence was gathered through questions about their experiences (Omran et al., 2024), preferences, and suggestions for improving walkability in the souq. Additionally, Bill Hillier's Space Syntax methods were applied to analyse spatial configurations and walkability, aiming to revitalize the Nizwa Souq area. With the support of comprehensive literature review on analytical methods and urban philosophies and to identify key challenges and opportunities, for enhancing pedestrian flow with universal accessibility. this research assimilates a mixed-methods approach of combining qualitative and quantitative techniques, this includes producing cad maps, axial maps, collecting data and observations, performing behavioural studies. The proposed design strategies and suggestions aim to promote universal accessibility, pedestrianization, walkability, bicycling, safety, comfort, and resilient spaces in alignment with the

Sustainable Development Goals (SDGs), thereby enhancing the social, cultural, and economic vitality of the souq. This research used AI tool named Copilot to analyze historical data from Nizwa Souq, which allowed us to uncover intricate patterns (Goodarzi et al., 2023) and trends that would have been challenging to detect manually.

SNo	Methodological sequence of study, analyses and proposal
1	Literature study and overview on the proposals given by the development authorities
2	Empirical Data collection by Phenotypological observation, Human behavioural mapping by Ethnographic study, identifying public spaces within delineated area, tracing Pedestrian and vehicular movement.
3	Analysing the data collected and observational analysis in the form of mapping, charts, tables and bubble diagrams.
4	Identifying the problems and SWOT analysis of the delineated study area
5	Analytical tools Space syntax by using DepthmapX, generating spatial connectivity and integration with its correlation.
6	Combining the Empirical data and analysis with the space syntax analysis.
7	Evidence based design solutions and recommendations in the form of sections, illustrations and development strategies.
8	Design output

Table 2. showing methodology followed in this research. Source: Authors.

2.1. Data collection



For the phenomenological data collection, we conducted a hands-on exploration of the Nizwa Souq with our children and elderly mother, traveling by foot and using skates. This method allowed us to personally experience and identify universal accessibility issues, movement challenges and safety concerns faced by different age groups inside and outside surrounding to Nizwa souq.

Table 2.1 Data collection. shows the methods used. Source: Authors.

2.2. Ethnographic study

Data collection with respect to pedestrian and vehicular movement, attraction points, static locations, and urban public activities were done by marking on maps and taking samples at different times of the day, morning peak hours, afternoon, evening, weekends, and working days to analyse the temporal dimensions and traffic patterns. Key observation points at the souq's entries and exiting spaces were focused with its connections to the fort, Masjid and the parking area which is affected by flooding during rains. The observations of pedestrians crossing in this area during rains were monitored along with the traffic congestions during non-rainy days were recorded. At many points inside the souq, Drone footages were available which were published by the news channels we noted that arcaded corridors lack proper accessibility for all users and is not very much activated for the end users. Vendors sitting outside these corridors disrupt the safe movement of pedestrians and force them to walk on the road alongside vehicles, this way highlighting significant accessibility and safety challenges were systematically reviewed.



Figure 2. shows the green vegetation of Date palm farms intervened with the surrounding built forms of the Al Harath, most visited destination and attractions, and Figure 2.1. Showing the footprint. Source: Authors. Scale: 1:15000

2.3. Empirical Data collection by Phenotypological observation within Souq Nizwa

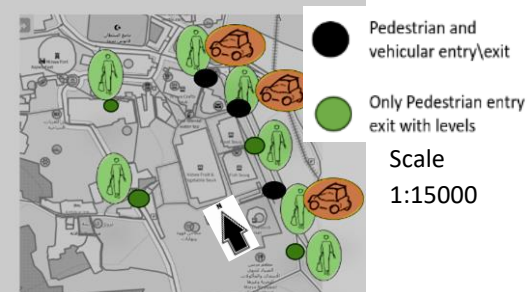
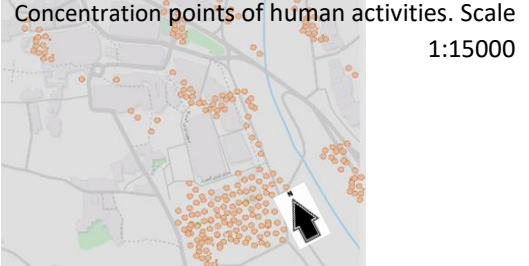
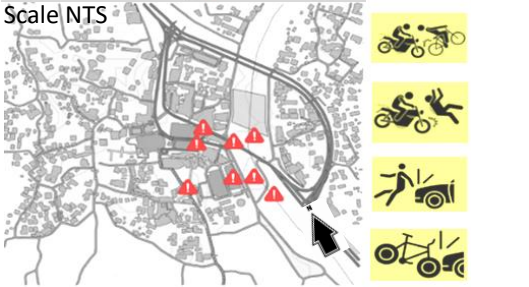
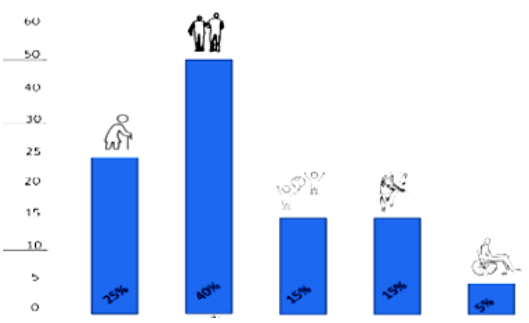
Parameters	Observation	Readings	Scenarios
Accessible and convenience	Vehicular and Pedestrian Entry-Exit points		
Active Public spaces	Quality of the space, shaded not shaded, distance		
Pedestrian Safety	Risk of Pedestrian vs vehicular Conflict points		
Inclusiveness	Age group gender and special needs		
Permeability	Access to public spaces outside the souq	Linkage of public spaces outside the market surrounding, access to the Al-Aqra Village, Grand Masjid and the Nizwa fort. The steps and different levels without ramps, this makes some inconvenience	

Table 2.3. shows Empirical Data collection by Phenotypological method at Souq Nizwa. Source: Authors

solutions, for this reason the authors in this research have adopted space syntax as their tool to focus on the spaces between the physical objects and its connectivity and accessibility to all other spaces in the built environment within and around the Nizwa souq area. By understanding human activities in and around souq area such as pedestrian movement and urban traffic which are shaped by the surrounding structure, space syntax plays a vital role as a tool for these predictions. The Ethnographic and phenomenological data is then co related with the spatial analysis data generated by space syntax tool which provides us with the understanding of how space and society affected each other, the measure of spatial connectivity and spatial integration with its correlation is analyzed.

3.2. Application of space syntax to Nizwa Souq: Geometry to Syntax

We developed spatial connectivity and spatial integration maps using DepthmapX for the souq and its surrounding study area to understand the formation and identity of Nizwa Souq based on Islamic geometry (Ranjazmay Azari et al., 2023). This analysis highlighted the spatial connectivity and integration, revealing sight lines that interconnect open spaces and facilitate visual and physical access to urban areas. We then explored the correlation between spatial connectivity and spatial integration to gain insights into the urban structure and its impact on human behavior

3.3. Spatial connectivity analysis



Figure 3 DepthmapX-based spatial connectivity analysis rendered by authors, Scale 1:9000.

The areas with higher connectivity as shown in warm colors (red and orange) in figure 3, has opportunity for better walkability and accessibility, enhancing these spaces may give overall urban experience. But, areas with lower connectivity, as depicted in cooler colors (green and blue) in figure 3, highlights the need for improved pedestrian pathways and amenities. This spatial connectivity map analysis helps to identify key areas for interventions, allowing us to propose solutions such as creating more pedestrian-friendly zones and enhancing public spaces to foster a vibrant, accessible, and walkable environment.

3.4. Spatial integration analysis



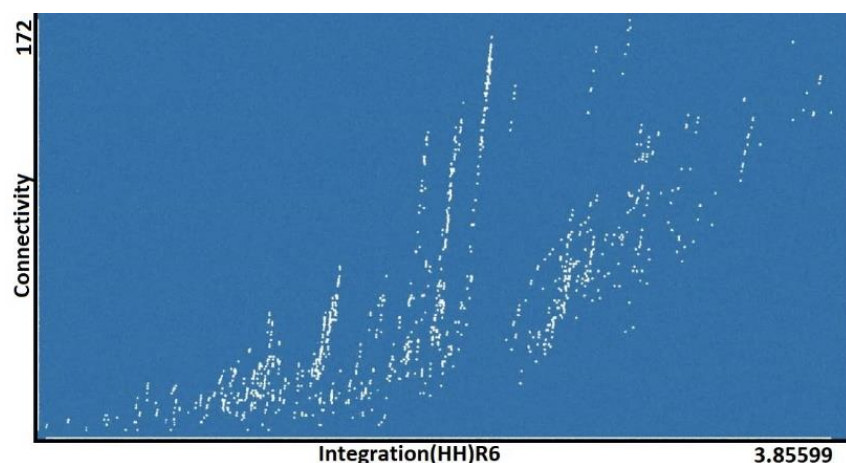
Figure 3.1 DepthmapX-based spatial Integration analysis (Source: Authors), Scale 1:9000.

The Integration Index, extracted from DepthmapX software (Figure 3.1), is another key metric for the study area. Warmer colors (red and orange) on the map indicate higher degrees of integration within the studied urban fabric. Conversely, cooler colors (green and blue) represent lower integration, suggesting weaker connections.

3.5 Correlation Analysis

By correlating spatial connectivity and spatial integration, a deeper insight about how the physical layout of the Souq influences movement patterns and human behavior is analyzed. This analysis suggests to create spaces that are both well-connected and well-integrated to enhance usability and attractiveness. This encourages walking and cycling by ensuring that key destinations can be easily accessed and this in turn could Support Community activity spaces that support a variety of activities, making the Souq a vibrant and dynamic place.

Figure 3.2 Correlation of Spatial Connectivity Index and Integration Index in and around Nizwa Souq (Source: Authors)



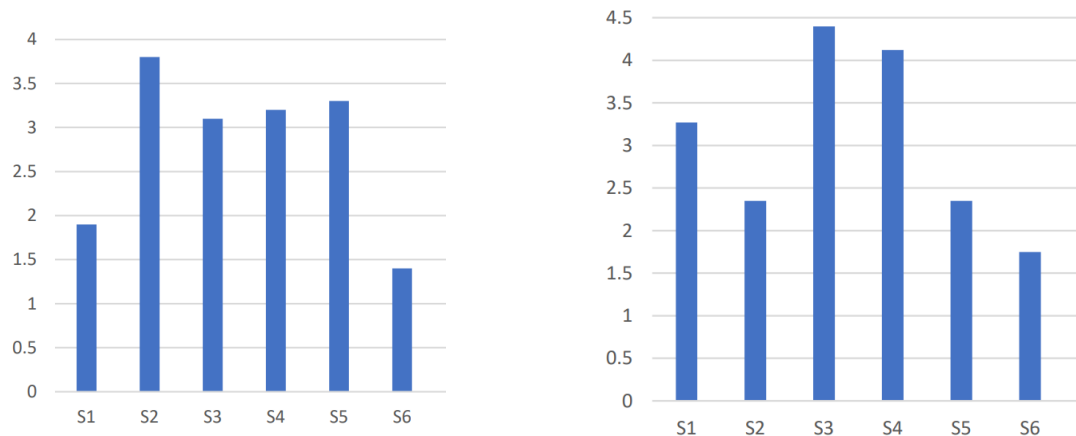


Figure 3.3 Graph showing Connectivity level and Integration level in six different selected streets in and around Nizwa souq (Source: Authors)

The connectivity levels in six different streets range from a minimum value of 2 to a maximum value of 4.4. The integration levels in these streets range from a minimum value of 3.1 to a maximum value of 4.8.

4. Conclusion:

Considering the spatial connectivity, integration, and correlation between the six streets analyzed using space syntax, the authors, propose to align their strategies with SDG 11,11.2,11.7. This proposal fosters sustainable resilience through universally accessible and inclusive spaces, along with robust pedestrian and bicycling infrastructure and promoting green vehicles and enhanced public transportation to have a dynamic urban environment that encourage diverse social interactions and vibrant community life near the souq area.

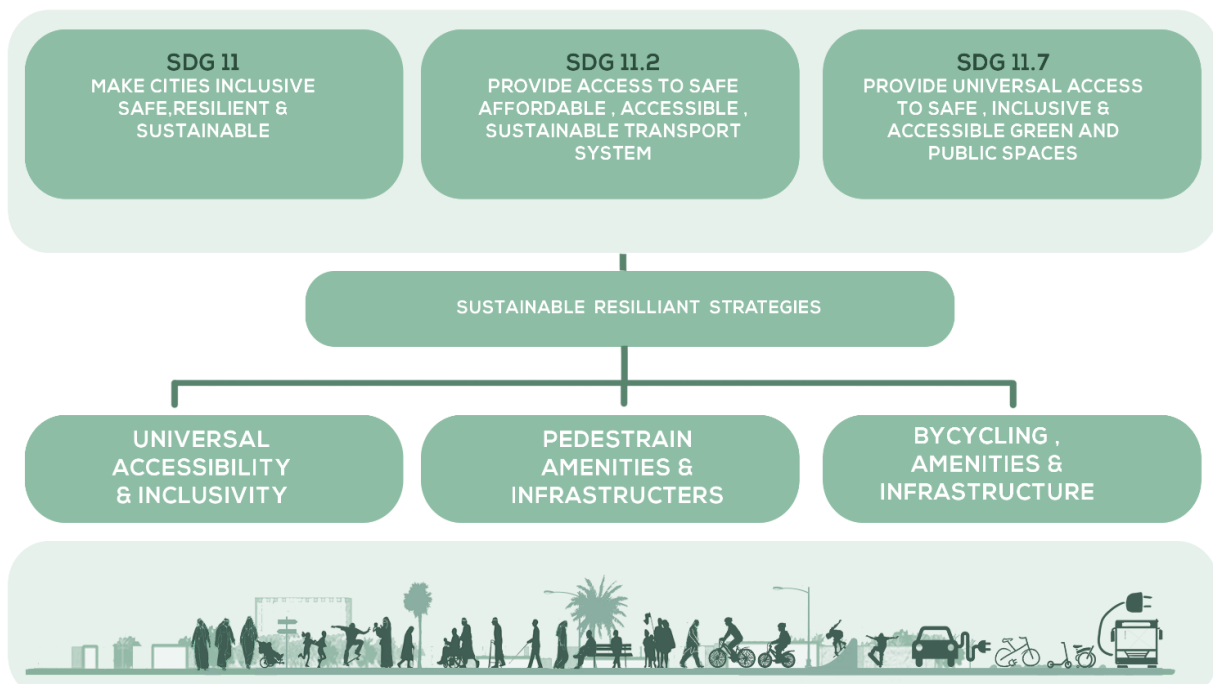


Figure 4. Pictures depicting the existing scenarios of Nizwa Souq precinct (Source: Authors)

This paper has analyzed the walkability and accessibility of Nizwa Souq using space syntax tool, it is highlighting the importance of humanizing urban spaces and aligning with SDGs 11.1, 11.2, and 11.7. The study proposes the creation of vibrant public spaces, such as pedestrian plazas and boulevards, to enhance social interaction and universal accessibility. In order to foster human interaction, it is necessary to transform these streets in and around the Souq into welcoming, user-friendly areas where people can stroll, shop, eat, and converse by walking, cycling, skating or wheeling without being interrupted by passing cars. The stronger the relationship between people and the city, the better the public spaces. The authors suggest the future research that could explore the use of advanced technologies and innovative software to further enhance walkability and public space utilization. Additionally, expanding the scope to include the entire historic area of Nizwa will provide a more comprehensive understanding of urban connectivity and human behavior. Continued investigation into spatial design and human behavior will help develop more inclusive and vibrant urban environments.

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