



DOI: <https://doi.org/10.38027/ICCAUA2025EN0078>

Identifying Key Parameters for Enhancing Urban Resilience in Commercial Spaces: A Comparative Study in Saida, Lebanon

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Abstract

Received: 21 January 2025
Revised: 12 June 2025
Accepted: 18 June 2025
Available online: 5 July 2025

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This article has been selected and peer-reviewed for publication in this journal as part of the 8th International Conference of Contemporary Affairs in Architecture and Urbanism, held on 8–9 May 2025 in Alanya, Türkiye.

Urban resilience plays a vital role in sustaining the functionality and vitality of commercial spaces in the face of evolving socioeconomic and spatial challenges. This research investigates the key parameters that enhance urban resilience in commercial spaces, focusing on the interrelationship between spatial configuration, land use activities, and consumer perception. The study examines Saida's historic commercial street in the old city alongside two contemporary shopping malls, employing a mixed-method approach to highlight the differences in spatial and consumer experiences across these typologies. Space syntax analysis is used to assess spatial configurations, complemented by data from UN-Habitat Geoportal and field observations. The research also incorporates consumer surveys to explore perceptions and behavioural patterns. The findings reveal distinct spatial and consumer dynamics between traditional and modern commercial spaces, offering actionable insights into the urban design variables critical for enhancing urban retail resilience. These insights aim to support urban designers and planners in creating adaptable and sustainable commercial environments.

Keywords: Urban Environment; Urban Resilience; Commercial Spaces; Consumer Perception.

1. Introduction

Urban resilience is increasingly acknowledged as a crucial issue for understanding how urban areas remain viable and thrive in the face of multiple socioeconomic stresses and challenges (Meerow et al., 2016, Amen, Afara, and Nia 2023; Aziz Amen 2022; Amen and Nia 2020). This concept is most relevant in commercial environments, where consumer behaviour, land use, and spatial arrangement immensely affect community cohesion and economic vitality (Softaoğlu, 2019). Urban communities can withstand, adapt to, and bounce back from various shocks, such as social, economic, and environmental issues (Barata-Salgueiro & Cachinho, 2021). In the context of urban design, urban resilience highlights the importance of examining commercial areas like shopping streets and malls to enhance their sustainability and adaptability. Retail has always had a key role in urban development, impacting cities' growth and evolution with time. Urban landscapes have been profoundly altered by the development of retail forms like shopping centres, frequently resulting in the reorganization of urbanized areas and hierarchies (P. Guimarães, 2023). According to Scopus publications, retail resilience is gaining momentum in research, especially in business and management. However, the gap becomes evident when we look at it through the lens of spatial and urban design. In Saida, Lebanon, a city marked by a rich historical legacy and contemporary development challenges, the resilience of its commercial spaces is under examination (UN-Habitat & UNICEF, 2019). The dual existence of traditional commercial streets and modern shopping malls encapsulates a challenge between preserving cultural heritage and adapting to changing consumer demands. Contemporary malls often offer a different shopping experience characterized by convenience, variety, and climate-controlled environments. However, this shift can lead to the decline of traditional marketplaces, which are integral to the city's cultural identity and social fabric. The challenge lies in balancing the preservation of these historic commercial spaces with the need for modernisation and adaptability. This paper aims to identify key parameters that enhance urban resilience within these commercial environments, examining how spatial characteristics and consumer perceptions shape retail experiences. A space syntax analysis, field observations, and consumer surveys are conducted using a multi-method approach to comprehensively understand the spatial and consumer dynamics in Saida's commercial landscapes. Thus, the paper

is organized into several parts, starting with the literature review that examines key studies on urban resilience and its interrelationship with retail resilience, and exploring their characteristics and dimensions. Then, using the analytical methods, previous similar examples analyze thriving commercial environments according to spatial and consumer dimensions to understand their challenges and adaptations. The study evaluates Saida’s historic commercial street with modern malls, focusing on spatial configurations, land use activities in the spatial dimension, and consumer perceptions and behaviours in the consumer dimension. **Figure 1** shows a diagram illustrating the structure of the paper.

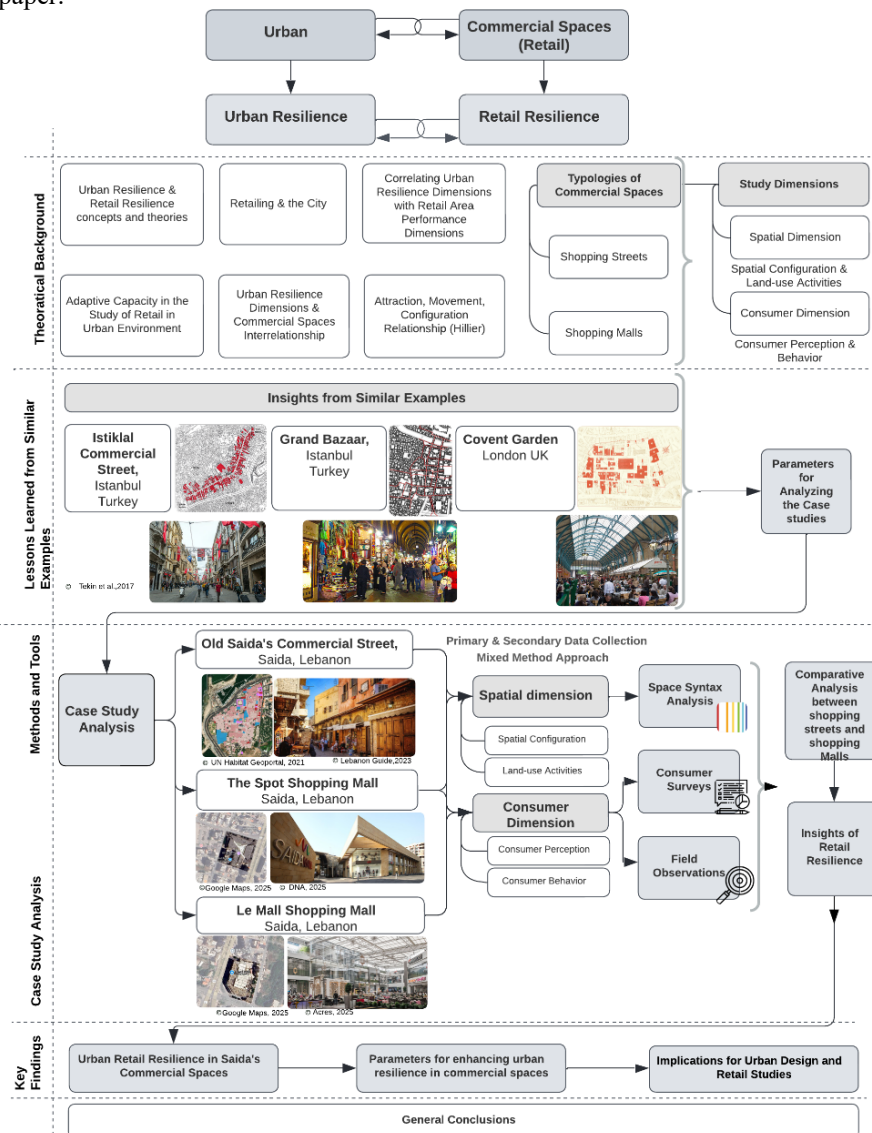


Figure 1. Diagram showing the Structure of the Paper (Authors).

2. Literature Review

The literature review highlights the significance of urban and retail resilience in commercial spaces by offering a fundamental understanding of crucial concepts and previous studies in these areas. It intersects four main concepts: Urban resilience, focusing on how cities adapt to shocks and stresses; retail resilience, the capacity of commercial spaces to sustain economic and social vitality; and the two core typologies—shopping streets and malls, each with unique spatial and behavioural dynamics. All of this operates within the broader context of the urban environment, where design, use, and perception converge to shape resilience outcomes.

2.1. Urban Resilience and Retail Resilience

Although resilience is a crucial term in research and practice, there is no clear definition; the boundaries between the concepts remain vague (McEachern et al., 2021). The idea of resilience originated in physics, describing the ability of materials to return to their original shape after deformation (Barata-Salgueiro & Guimarães, 2020). Resilience has since been adopted by fields such as psychology, sociology, and urban planning, each adapting it to their context (Ribeiro & Pena Jardim Gonçalves, 2019). Holling (1973) defined resilience as the capacity of an ecosystem to preserve its functioning characteristics amid disturbances. The term originates from the Latin word "*resilio*," meaning "to bounce back," emphasizing recovery and adaptation, though it also involves tensions like equilibrium vs. non-equilibrium and adaptation vs. adaptability (Meerow et al., 2016). In urban contexts, resilience refers to the ability of urban systems—including socio-ecological and socio-technical networks—to maintain or quickly resume functions, adapt to changes, and transform systems that limit future adaptability (Datola, 2023).

The dynamic and multidimensional process of urban resilience involves physical, social, economic, institutional, and natural dimensions (Kapucu et al., 2021), recognizing cities as complex, interconnected systems operating across various spatial and temporal scales (Amirzadeh et al., 2022). Commercial spaces are integral to urban resilience as they contribute to cities' economic vitality and social fabric. Enhancing their resilience involves diversifying economic activities and ensuring robust infrastructure (Masnavi et al., 2019). Urban resilience encompasses four pillars: resisting, recovering, adapting, and transforming (Ribeiro & Pena Jardim Gonçalves, 2019). A resilient urban environment can withstand, sustain, recover, adapt, or change in response to disruptions, reducing system instability (Yamagata & Maruyama, 2016). By applying these foundational principles of urban resilience, particularly in commercial spaces, urban environments can better prepare for and respond to future uncertainties. Retail resilience is a relatively novel concept, even though resilience in cities and regions has been studied since the 1970s (Popławska, 2021). The Global Financial Crisis marked a turning point, triggering the first research into retail-specific resilience due to a sharp decline in retail and services due to reduced consumption. Wrigley & Dolega, (2011) were the first to analyze how the crisis impacted city centres and high streets using the adaptive resilience concept. Previous studies focused on the resilience of downtown areas and the role of shopping malls in the transformation process, highlighting interrelationships between retail resilience and urban studies (Popławska, 2021). Since then, researchers have combined the concepts of resilience and sustainability to create retail resilience, defined as the capacity of retail systems to absorb shocks while maintaining sustainable functions (Rao, 2019). Understanding retail resilience requires identifying types of disruptions, system characteristics, and the specific dynamics and challenges involved (P. P. C. Guimarães, 2018). Key stakeholders include the local government, the private sector, and consumers (Duchemin et al., 2013). Local authorities optimize public health and economic stability, while the private sector drives jobs, development, and business diversity. Consumers inform communities and shape demand. Retail is considered resilient when commercial spaces remain economically viable and cater to diverse consumer needs, particularly store-dependent users. Awareness among private-sector actors of the economic, social, and environmental impacts of retail planning is crucial to enhancing economic resilience, often in collaboration with the public sector (Cachinho, 2014b). Urban retail systems, including shopping streets and shopping malls, are dynamic, complex economic systems that constantly adapt to market forces, competition, and technological change (Barata-Salgueiro & Guimarães, 2020; Popławska, 2021). Therefore, the adaptive resilience approach represents the basis of the resilience approach in the urban retail system (Cachinho, 2014b).

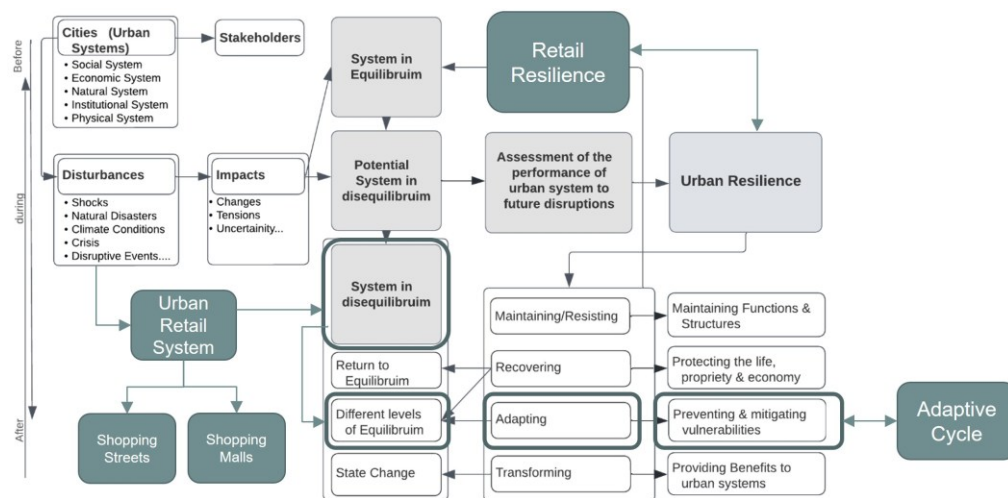


Figure 2. Diagram showing the Interrelationship between Urban Resilience and Retail Resilience
Diagram adapted from (Ribeiro & Pena Jardim Gonçalves, 2019).

2.2. Correlating Urban Resilience Dimensions with Retail Area Performance Dimensions

As an essential part of urban systems, retail contributes significantly to the resilience of cities (Sommella & D'Alessandro, 2021). Retail resilience is considerably influenced by urban resilience dimensions: physical, social, economic, natural, and institutional, which are deeply interconnected. For example, a robust social network (social resilience) supports local businesses (economic resilience), enhancing the liveability and appeal of shopping streets (physical resilience). Likewise, efficient urban planning regulations (institutional resilience) can strengthen social and economic resilience (Meerow et al., 2016; Ribeiro & Pena Jardim Gonçalves, 2019). Understanding these interrelationships is key to developing strategies that improve urban resilience and retail. The adaptability of commercial spaces is greatly influenced by the scales at which they are situated: local, regional, or national (Dolega & Celińska-Janowicz, 2015). These scales interact in two directions: larger scales influence smaller ones, and local systems impact regional and national dynamics. Each retail area is embedded in this nested hierarchy, and its performance is influenced across three key domains: social, economic, and physical (Walker & Salt, 2012). The social domain includes demographic factors like population growth, financial conditions, and unemployment, which shape consumer demand and reflect shifting market cultures. Regional disparities in prosperity or employment can result in varying demand levels and consumer confidence. The economic domain involves local conditions such as rents and business rates, and broader influences like economic trends, global retail competition, and e-commerce (Yamagata & Maruyama, 2016). The physical domain encompasses the retail fabric, including streetscape quality,

anchor stores, and accessibility features like parking spaces, which affect foot traffic (Dolega & Celińska-Janowicz, 2015). The study focuses on the local level, which also has implications for regional and national systems. It connects urban resilience's dimensions to retail areas' performance, emphasizing the physical, social, and economic dimensions. These were translated into spatial and consumer indicators such as land use diversity, spatial configuration, and user perception, to assess the resilience of shopping streets and shopping malls in the selected study area (Figure 3).

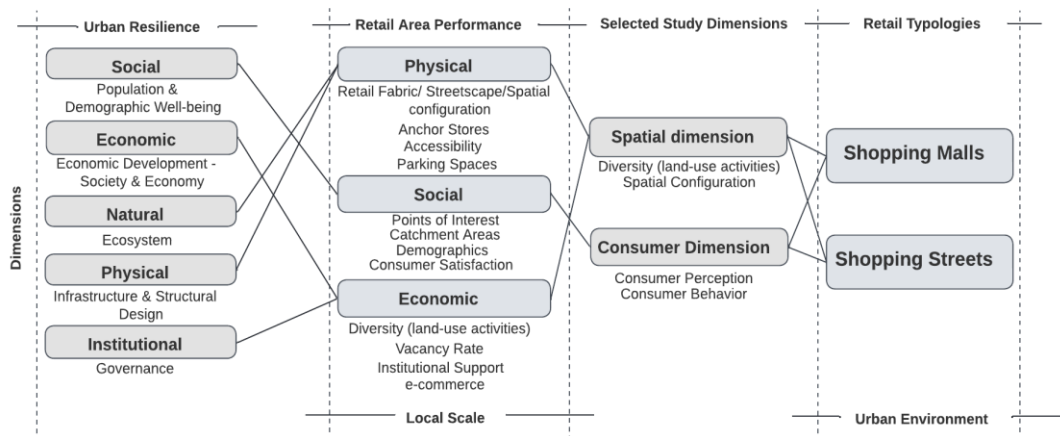


Figure 3. Shows the interrelationship between retail area performance and urban resilience dimensions. Diagram by Authors – dimensions and indicators adapted from (Dolega & Celińska-Janowicz, 2015; Kapucu et al., 2021).

2.3. Shopping Streets and Shopping Malls as part of the Urban Retail System

Shopping streets and shopping malls represent two distinct typologies within the urban retail system, each providing various shopping experiences for consumers (Barata-Salgueiro & Cachinho, 2021). The interrelationship among shopping streets, shopping malls, and e-commerce defines the urban retail system (Popławska, 2021).

Shopping streets, often aggregations of independent retailers and local businesses, foster a lively atmosphere and stimulate pedestrian activity. They are conventional retail spaces that reflect local culture and support small-scale vendors, enhancing the vitality of urban life (Al, 2022). They are perceived as dynamic, complex, and evolving economic systems that persistently adapt to the marketplace, competitiveness, and technology pressures (Carmona, 2022). In contrast, shopping malls are enclosed environments developed by integrated entities, typically combining various retail formats, entertainment, and dining options, offering a distinct spatial and consumer experience compared to street retail (Teller, 2008). Both typologies aim to attract consumers through retail and non-retail activities, but differ notably in spatial configuration, consumer behaviour, and other key factors. However, the global shift from traditional retail to e-commerce has transformed consumer habits and reshaped urban retail landscapes (Figure 4). Traditional shopping streets, characterized by their high spatial and social aspects and offering a moderate range of products, alongside shopping malls that provide a middle ground in terms of space and social interaction but a high product variety, have faced significant redundancy. These physical spaces once thrived on direct social interactions and community engagement (Carmona, 2022). However, the rise of online retailing, characterized by its low spatial and social aspects but high product accessibility, has profoundly reshaped consumer behaviour (Malalгода & Lim, 2023). The convenience and vast selection of products offered by e-commerce platforms have led to declining foot traffic to physical stores. This transformation impacts the local economy and infrastructure, and diminishes social interactions that were once central to the shopping experience (Al, 2022). Consequently, jobs and services linked to traditional retail have been adversely affected, necessitating new approaches to revitalize these urban areas. The urban retail system must address the evolving consumer expectations, emphasizing spaces as leisure and interaction hubs rather than mere consumption points. From a planning perspective, retail must support resilient daily living by contributing meaningfully to the spatial fabric. Thus, it is recommended to examine resilience from a spatial perspective to address emerging challenges more effectively (Kärholm et al., 2014).



Figure 4. A diagram illustrating the evolution between traditional retail (shopping streets and malls) and e-commerce (online retailing). Adapted from (Guimapang, 2020).

2.4. Understanding Retail in Urban Environments: Attraction, Configuration, and Movement Interrelationship

The relationship between urban configuration, attraction, and movement is critical in urban planning and design studies. Hillier et al., (1993) includes foundational theories showing how spatial configuration influences pedestrian movement and the location of attractors, such as retail spaces, essential for creating vibrant urban environments that balance land use and mobility. Space syntax, developed by Bill Hillier (1937–2019), offers an operational approach to analyze spatial interactions between built elements. It uniquely integrates intangible aspects (such as behaviour and cognition) with tangible ones (like movement and land use), offering tools to understand the interaction between space and society. These techniques help simplify the complexity of sustainable spatial analysis, though applying them in planning remains a challenge (Yamu et al., 2021). Space syntax analysis provides a valuable tool for evaluating the spatial dimension of retail resilience in urban environments (Al-Sayed, 2014). By quantifying accessibility and connectivity, it reveals how the spatial configuration influences pedestrian movement, social interaction, and economic activity, guiding urban designers and decision makers in enhancing urban resilience. It can identify poorly connected areas and suggest targeted improvements to street layouts, pedestrian routes, or public spaces (Rao, 2019). In this context, attraction refers to features like shops or cafés that draw people in but do not alter spatial layout. Configuration, the spatial structure itself (e.g., corridor layouts or entrances), significantly influences how people move through space. Movement can be categorized as "through movement" (passing through with intention) and "to movement" (heading toward a specific attractor). Hillier emphasizes an asymmetrical relationship: while configuration influences attractors and movement, neither can alter the configuration. This underscores the importance of spatial design in predicting and shaping pedestrian behaviour (Figure 5). Urban designers should therefore focus on enhancing connectivity and integration to foster natural movement and support the vitality of commercial and public spaces (GARIP et al., 2015; Narvaez et al., 2014).

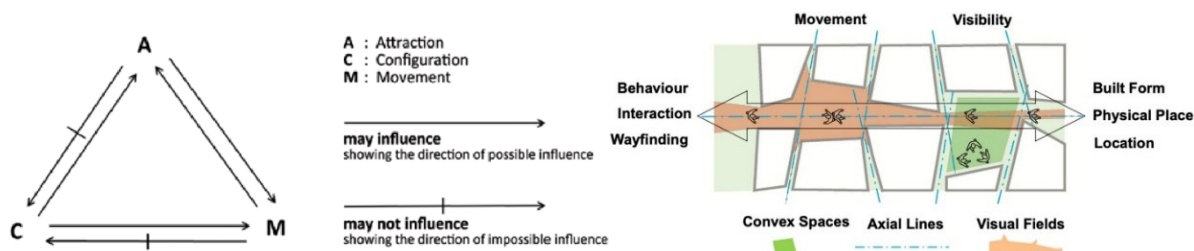


Figure 5. Attraction, Configuration, and Movement Interrelationship (Hillier et al., 1993).

2.5. Spatial Dimension: The Role of Spatial Configuration and Diversity of Land Use Activities in Retail Resilience

From a planning standpoint, retail must be a part of a framework that supports resilient daily living because it constantly occurs somewhere and has a spatial form and context. Rethinking resilience from a more geographical viewpoint is necessary to address resilience issues (Kärholm et al., 2014). Accordingly, analyzing the spatial dimension of commercial spaces is essential to understanding their resilience. Retail spaces are classified through various dimensions, each providing a unique perspective on the complex dynamics of the retail environment. These classifications may be based on the types of goods, the purpose of the shopping experience, the size and type of store, the ownership structure, and more (Guy, 1998). While all these approaches offer valuable insights, this paper particularly emphasizes a goods-based classification system as a leading framework for analysis of the diversity of land use activities. Diversification reduces the risk of economic downturns and changes in consumer behaviour since various sectors can respond differently to changes in the market. Moreover, diverse land uses can improve community involvement and foot traffic, creating a feeling of stability and place in urban areas (Orr et al., 2023). This classification system enables a targeted investigation into how goods types and shopping purposes relate to the spatial configuration of commercial typologies, deepening our understanding of retail adaptability (Rao, 2019). Types of goods in commercial spaces directly address consumer demand and their purpose for shopping (Cachinho, 2014b; Sommella & D'Alessandro, 2021; Teller, 2008). Efficient classification thus requires a deep understanding of consumer behaviour (Guy, 1998; Orr et al., 2023). Land use activities and consumer perceptions emerge as interlinked factors shaping the resilience of commercial spaces in urban environments.

2.5.1. Spatial Configuration of Commercial Spaces

Their spatial configuration significantly influences the resilience of commercial areas (Cumming, 2011; Rao, 2019), as the layout and design of shopping streets and malls impact pedestrian movement, consumer satisfaction, and economic sustainability. Therefore, it is essential to understand the different forms of commercial spaces and their effects (Figure 6). The spatial configuration of shopping streets, as defined by Mehanna & Mehanna, (2019); Rao, (2019) and Rao et al., (2018), includes linear, a straight street with stores on both sides offering clear pedestrian flow and strong business visibility; ramified, a tree-like pattern with a main street and minor side streets that create a more exploratory shopping experience; and aggregated, dense clusters of interconnected streets and shops, typically in old centres, which promote social interaction and pedestrian activity. Likewise, shopping malls' spatial configurations influence tenant mix, consumer behaviour, and the viability of the commercial environment (Derya Arslan & Ergener, 2023; Rao & Pafka, 2021). These include dumbbell, where two anchor stores are connected by

a central corridor to encourage movement between them; cartesian, a grid-like design with interconnecting passageways that offer multiple points of access and movement paths; branch, with a primary corridor with branching extensions that balance access and circulation; and cluster, a looser layout centred around an atrium or open space that encourages exploration and interaction.

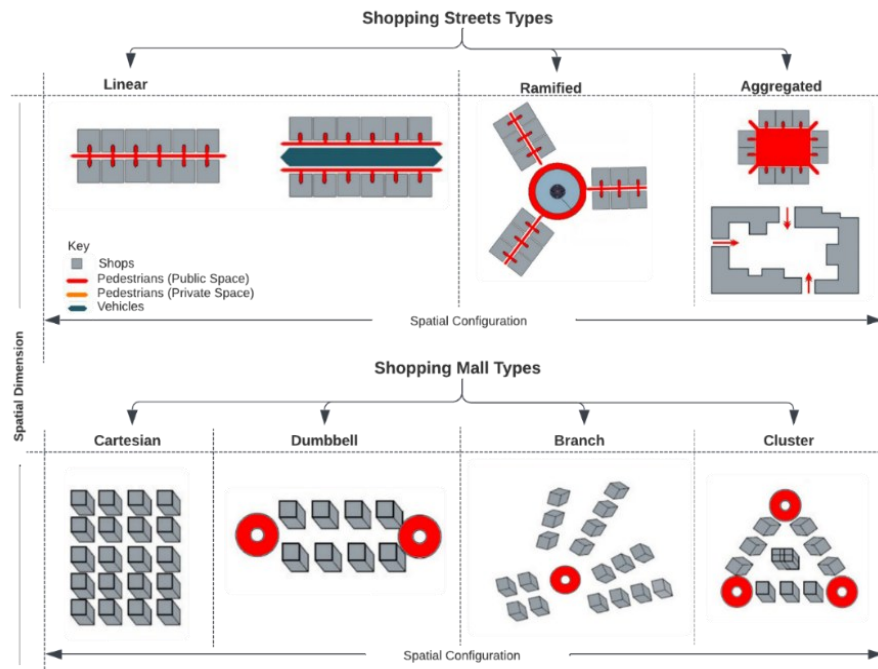


Figure 6 shows the types of spatial configurations of shopping streets and shopping malls. The diagram by the authors is adapted from (Derya Arslan & Ergener, 2023; Mehanna & Mehanna, 2019; Rao, 2019; Rao et al., 2018).

2.5.2. Land Use Activities

Classifications of land use activities can vary considerably across sources and previous research. No single widely recognized standard for identifying and categorizing these tasks makes the process complex. According to Dolega et al., (2021), classification analysis fulfils four purposes: monitor retailing patterns, inform investment decisions for retailers and developers, support policy development for commercial land use, and enhance academic understanding of retail’s evolving role in urban centres. Despite the lack of standardization, several academic contributions provide practical frameworks for analyzing the resilience of commercial areas through land use diversity. Notably, Guy, (1998) and Dolega et al., (2016) offer relevant insight into goods-based classification, which informs the system selected in this study, as shown in **Table 1**.

Table 1. Shows the classification of land use activities selected in the study (Dolega et al., 2016; Guy, 1998).

Classification of Land Use Activities	
Main Category	Sub-Category
Comparison	Antique Shops; Art & Art Dealers; Booksellers; Carpets & Flooring; Charity Shops; Chemists & Drugstores ;Children & infant wear ;Clothing General ;Craft, gifts & glass ;Cycles & accessories ;Department & variety Stores; Electrical & durable goods; Florists; Foot wear; Furniture general; Gardens & equipment; Hardware & Household goods; Jewellery, watches & silver; Ladies wear & accessories; Leather & Travel Goods; Men Wear & accessories; Music & musical instruments; Music & video recordings; Newsagents & stationers; Office Supplies; Sports,; Camping goods; Telephone & accessories; Textiles & soft furnishings ; Cosmetics & Beauty Products; Toys, games & hobbies; Vehicles motorcycle sales; Vehicle accessories; Shoe Repairs
Convenience	Bakers & Confectioners; Butchers; Groceries; Fishmonger; Frozen foods; Health foods; Markets; Off-licenses supermarkets
Retail Services	Clothing & Fancy-dress hire; Dry cleaners; Launderettes; Filling Stations; Health & Beauty; Opticians; Photo Studio; Post offices; Repairs, Restorations; Travel agents; TV, cable, & Video Rental; Vehicle Rental; Vehicle Repair and services; Video tape rental
Leisure Services	Bars; Amusement Cafes; Cinemas and theatres; Clubs Fast-food & takeaway; Hotel and guest houses; Restaurants; Sports & Leisure
Financial & Business Services	Building Supplies & Services; Business Goods & Services; Employment & Careers; Financial services; Legal Services; Property Services; Retail Banks
Vacant Outlets	Vacant Retail and Services; Other Vacant Outlets

2.6. Consumer Dimension: The Role of Consumer Perceptions in Retail Resilience

Consumerscapes are the social and cultural landscapes influenced by consumers' commercial spaces and behaviours. Considering consumer satisfaction, the dynamics of urban retail systems, including the durability of retail establishments, depend on these settings. They capture the physical characteristics of retail areas and the social and cultural environments in which consumers engage with them. In this way, assessing the resilience of urban retail systems requires an awareness of the cultural dimensions of how consumers behave (Cachinho, 2014b). Retailers must understand that customers are not just passive consumers but also actively shape the retail environment. Rapid changes in urban retail systems can cause imbalances in how they serve various consumer groups. According to Cachinho, (2014a), retailers and other influential stakeholders must constantly modify their plan of action to be relevant and adaptable to these continually changing expectations. By showing the resources that various shopping areas provide to customers, which are essential for assisting with their life projects and raising general satisfaction, consumers play a critical part in comprehending the dynamics of urban economic activity. Creating sustainable and resilient urban areas requires stakeholders, including retailers, consumers, and authorities, to cooperate in rethinking retail practices (Teller, 2008). Consumer perception is essential for evaluating the performance and adaptability of commercial spaces. Using proven frameworks from previous researchers, a consumer perception survey was conducted to examine spatial and behavioural dimensions. **Table 2** shows the selected questions focusing on aspects like navigation, retail diversity, user needs, behaviour types, and preferred typologies, highlighting the intricate relationship between users and their surroundings (Cachinho, 2014b; Teller et al., 2008; Wrigley & Brookes, 2014; Zhou et al., 2023).

Table 2. Consumer Perception questions.

Question Number	Question	Purpose	Reference
Q1 (Navigation)	<i>How would you describe your experience navigating this commercial space?</i>	To understand user perception of spatial configuration, clarity, and visibility.	(Barata-Salgueiro & Cachinho, 2021; Cachinho, 2014a)
Q2 (Diversity)	<i>Do you feel this commercial area provides a good mix of shops, services, or other uses?</i>	To assess perceived land use diversity and economic flexibility.	(Cachinho, 2014b; Jacobs, 1961; Orr et al., 2023)
Q3 (Activity Type)	<i>Which types of activities do you usually do here? (Jan Gehl Typology)</i>	To identify behaviour types (necessary, optional, resultant)	(Carmona, 2022; Carmona & Tiesdell, 2007)
Q4 (Area Attractiveness)	<i>Which areas do you feel most drawn to?</i>	To correlate spatial preference with visibility hotspots and anchor influence.	(Dolega et al., 2016)
Q5 (Needs)	<i>What do you think this commercial space still needs?</i>	Identify perceived spatial or service-based deficiencies.	(Cachinho, 2014b; Carmona, 2022)
Q6 (Preference)	<i>Which commercial typology do you prefer when shopping?</i>	Understand typological preferences based on form, function, and identity.	(Rao et al., 2018; Xie et al., 2024)




2.6.1. Consumer Behaviour: Type of Activities

In assessing consumer behaviour, *Jan Gehl* classified public life activities into necessary, optional, and resultant. Necessary activities—like shopping for essentials or going to work—occur regardless of the quality of the space. Optional activities—such as strolling or window shopping—depend heavily on the spatial quality, comfort, and visual appeal. Resultant activities, or social interactions, are triggered when the space fosters gathering, standing, or pausing, often emerging from the overlap of necessity and optionality. This framework of activities helps interpret how commercial spaces perform, not just in function, but also in how they support various user behaviours across different environments (Carmona & Tiesdell, 2007).

2.7. Insights from Similar Examples of Commercial Environments

To better understand how spatial configuration, visibility, functional distribution, and consumer experience contribute to the resilience of commercial spaces, insights were drawn from a selection of similar urban retail examples. These examples, including Istanbul's *Istiklal Street*, *Grand Bazaar*, and London's *Covent Garden*, were chosen for their diverse approaches to blending cultural heritage, public engagement, and adaptive commercial strategies. By analyzing these typologies, key aspects of successful urban resilience were identified, particularly the integration of social spaces, the visibility of businesses, and the flexibility of land use. These examples provide valuable benchmarks for understanding how commercial environments can thrive over time while maintaining relevance to both local and tourist populations. **Table 3** compares these examples based on these parameters, illustrating how they have achieved resilience through effective spatial and consumer strategies.

Table 3. Similar Examples of Thriving Commercial Environments.

	Istiklal Street Istanbul, Turkey	Grand Bazaar Istanbul, Turkey	Covent Garden London, United Kingdom
			
Spatial Aspect	Dense-pedestrian focused network	Enclosed-organized market layout	Open piazza with surrounding arcades
Visibility Aspect	High visibility of stores and cultural landmarks	High visibility of central and major pathways	Central focal point with clear sightlines
Functional Distribution	Balanced mix of retail, leisure, and cultural spaces	High concentration of traditional and comparison retail	Diverse mix of retail, leisure, and cultural spaces
Consumer Experience	High social interaction, an active street with performances	Cultural immersion, social shopping	High footfall, social interaction, and street performances
Resilience Impact	Thrives on social engagement, cultural heritage, and adaptive reuse of spaces	Resilience through historical significance and functional diversity	Supports resilience due to the integration of leisure, shopping, and cultural tourism, with flexibility to change market needs.

3. Methodology

The research adopted a multi-method approach, beginning with an inductive method to review relevant concepts and theories. An analytical method was then applied to assess three selected typologies: the Historic Street (HS), Shopping Mall Type 1 - *Le Mall* (SM1), and Shopping Mall Type 2 - *The Spot* (SM2). Each commercial typology was analyzed through two primary lenses: functional distribution and spatial configuration, using data from the UN-Habitat geoportal interactive tool (ArcGIS, 2024) and field investigation. Space syntax analysis, conducted with DepthmapX, was applied at both the urban and building levels, tailored to each typology. The Historic Street was analyzed at the urban level, while the malls were examined at the building level. A correlation between functional distribution and space syntax results was then explored to gain deeper insights into their interrelationship. In addition to spatial analysis, consumer perception surveys were conducted using a field method, with consumers and retailers (94 samples), to capture user experiences and behaviours. Following this, a deductive approach was employed, integrating the findings to evaluate the resilience status of Saida’s commercial landscape. Comparative insights across the typologies were drawn, identifying key urban parameters that enhance urban resilience in commercial spaces (Figure 7).

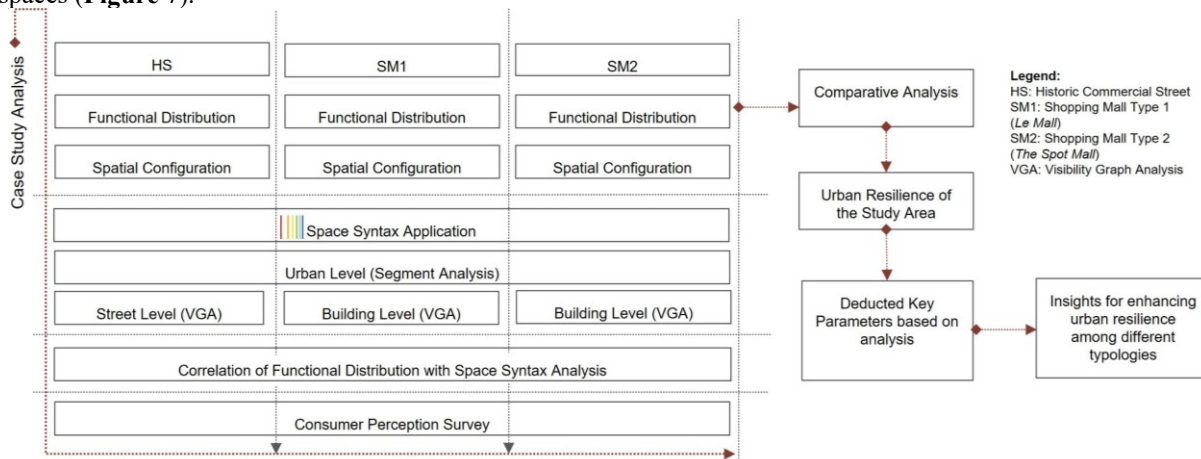


Figure 7. Methodology Flow Chart (Authors).

2.8. Introducing the Study Area: Saida’s Commercial Landscape

The case study is located in Saida, a coastal city in South Lebanon. It focuses on two key hubs of commercial activity: the urban center, home to contemporary shopping malls, and the historic core, which forms part of Old Saida, one of the oldest continuously inhabited cities in the world (UN Habitat & UNICEF, 2019). The historic district, primarily residential, is renowned for its religious and cultural landmarks and continues to serve as a vibrant commercial spine within the old city fabric. The selected study area includes Saida’s key commercial typologies: the historic shopping street within the old city core, and two contemporary shopping malls, each reflecting a distinct spatial layout. This selection provides a comparative analysis of urban resilience across different urban retail environments within the same city context (Figure 8).

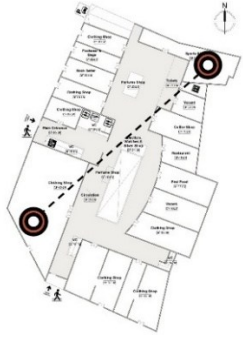

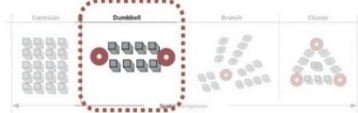
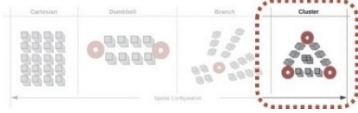




Figure 8 Saida’s Commercial Landscape (map created by the Authors, base map from Google Earth).

2.8.1. Saida’s Contemporary shopping malls

Shopping malls type 1 and 2, both located along major thoroughfares in Saida’s urban centre, represent two distinct contemporary commercial typologies. Le Mall is a closed shopping mall offering a mix of retail outlets, entertainment, and dining options with anchor stores placed for maximum visibility, with vacant upper floors and a basement commercial floor. The Spot Mall, also located along the same thoroughfare, is a semi-closed shopping centre featuring international brands, a cinema, and casual eateries. **Table 4** highlights the key characteristics of both shopping malls. The location of anchor stores and the spatial configuration of the shopping malls reveal that Shopping Mall Type 1 (Le Mall) has a dumbbell layout, where two anchor stores are positioned at opposite ends of a central circulation corridor. This layout helps create a directional flow between anchors but limits spatial distribution. In contrast, Shopping Mall Type 2 (The spot Mall) features a clustered configuration with three anchor stores spread across different wings. This type supports more even foot traffic and better space utilization, with retail activities radiating around the anchors. These spatial arrangements directly influence each mall’s internal movement dynamics and commercial vitality.

Table 4. Key characteristics of Saida's shopping malls, including Shopping Malls Type 1 and Type 2 (Authors).

	Shopping Mall Type 1 (<i>Le Mall</i>)	Shopping Mall Type 2 (<i>The Spot Mall</i>)
Ground Floor Plan		
Spatial Configuration Type	Dumbbell Type 	Cluster Type 
General Views		
General Information	Construction Year: 2010 Number of tenants: 37 Parking Spaces: 200 Area: 10,000 sqm.	Construction Year: 2010 Number of tenants: 45 Parking Spaces: 300 Area: 27,000 sqm.
Number of Stories	Commercial Ground Floor, two commercial upper Floors (Vacant), First Basement commercial Level (Vacant), Second Basement Level (Parking)	Commercial Ground Floor, one upper floor (cinemas), two Basement Levels (Parking)

2.8.2. Saida’s Historic Commercial Street

The selected street lies at the heart of Saida’s historic core, where touristic trails intertwine with specialized Souk and heritage landmarks. It connects notable historical nodes located at the centre of the historic core. It reflects a synergy between heritage, commerce, tourism, and cultural continuity making it a key urban spine in the old city. It offers a varied range of enterprises, including food, furniture, tailoring, and traditional crafts, with shops and workshops integrated into the urban fabric. The street is a major commercial spine because of its direct visibility and accessibility due to its linear classification. Its proximity to historical sites highlights its cultural and commercial value, while its connectivity to the surrounding aggregated urban fabric further improves pedestrian circulation and access (Figure 9).



Figure 9. Saida's Old Historic Fabric with General views from the old city (Map by authors, Photographs(UN Habitat & UNICEF, 2019).

2.9. SWOT Analysis

This SWOT analysis highlights Saida’s strengths, including its dense heritage landmarks and active public spaces. Weaknesses include the fragmentation between the historic and modern urban fabrics, limited integration, and the presence of border vacuums that interrupt spatial continuity. On the other hand, opportunities emerge from tourism potential and active local hubs, while threats involve disconnection, neglected heritage, and rising commercial vulnerability. The study area dissects through these contrasts, offering a key zone to explore resilience-driven urban strategies. The Study Area cuts through multiple border vacuums, which causes physical and social borders resulting in spatial and socioeconomic segregation (Figure 10).



Figure 10. SWOT analysis of Saida’s Selected Study Area (Authors).

2.10. Functional Distribution

The functional distribution of the main retail category is analyzed across the different typologies, Historic Commercial Street (HS), Shopping Mall Type 1 (SM1), and Shopping Mall Type 2 (SM2, as shown in Figure 11.

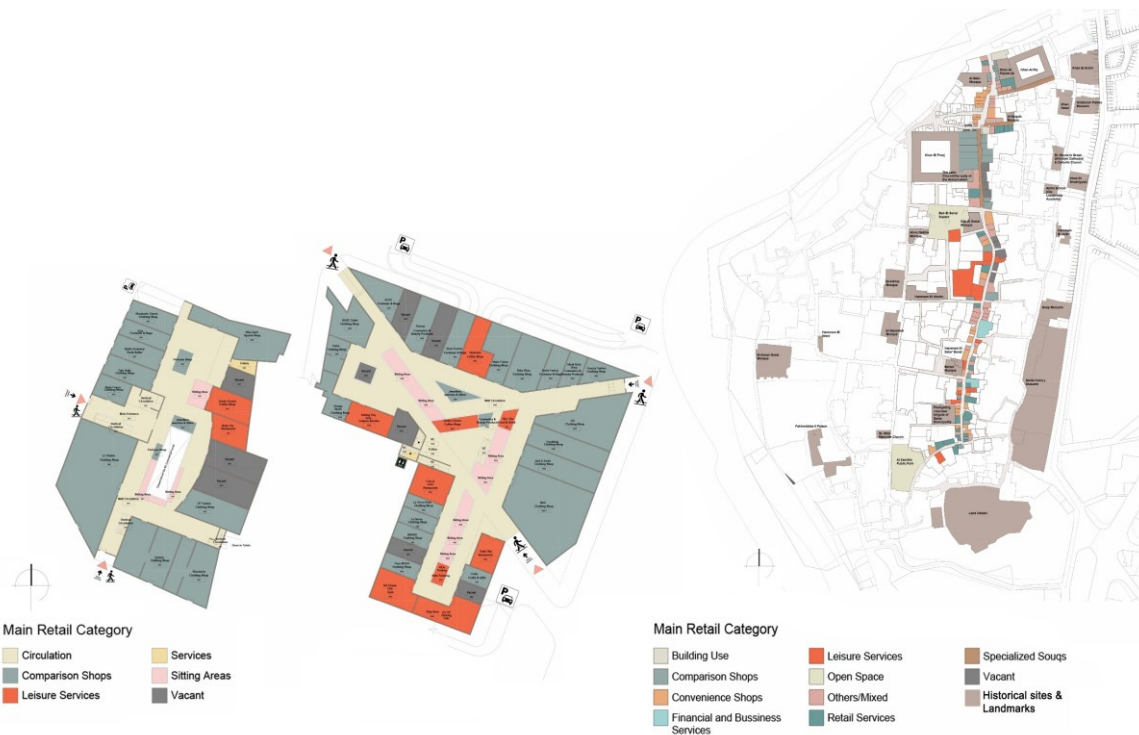


Figure 11. On the Right, the Functional Distribution of shopping malls (types 1 and 2) and a historic commercial street on the left, with main retail categories (Authors).

Thus, comparison shops dominate both shopping malls SM1(52%) and SM2(58.2%) while HS includes fewer comparison shops (18.25%). Convenience shops are significantly more present in HS (18.25%) than malls (0%), which supports the streets’ role in providing daily needs. Vacant shops are notable in SM1 (40%), including basement and upper floors, compared to HS (9.49%) and SM2(16.67%), which reflects poor vertical distribution and underutilization of space in SM1. Leisure Services are higher in SM2(25%) compared to SM1 (8%) and HS (8%). Financial and Business services are minimal, at just 1%, only present in HS, highlighting the traditional and informal character of the Souq. HS has a higher proportion of mixed-use spaces (29.2%) while SM1 and SM2 focus on more specialized retail (**Figure 12**). This shows that both malls rely heavily on comparison retail, where SM2 offers a functional mix that enhances user experience, and SM1 suffers from vertical fragmentation and limited variety.

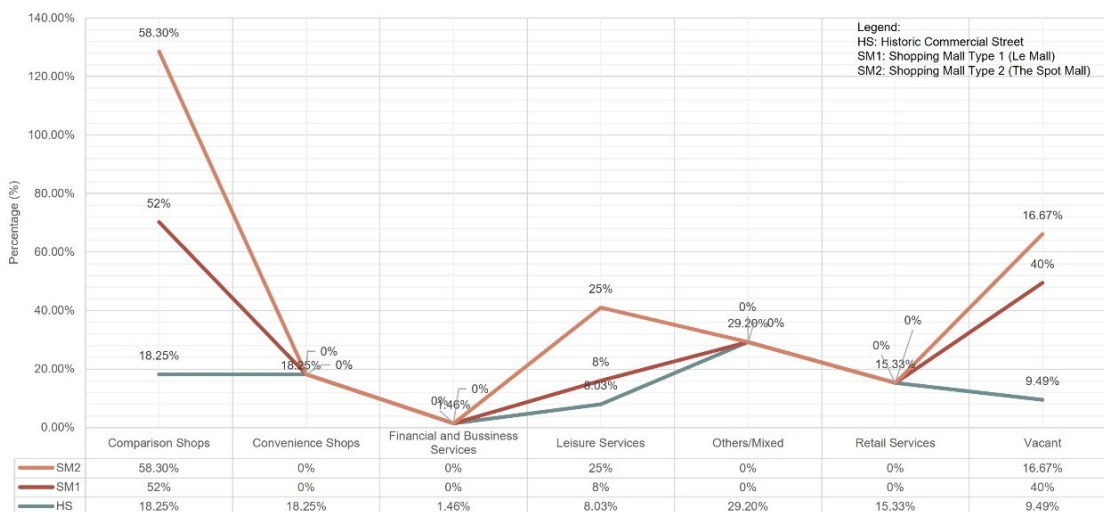


Figure 12. Comparison of the Functional distribution of the Main Retail Category between Historic Commercial Street, Shopping Malls Type 1 and 2 (Authors).

2.11. Space Syntax Application: Segment Analysis and Visibility Graph Analysis

Angular Segment analysis focuses on urban-scale movement patterns across the street network. It reveals how spatial configuration shapes movement, access, and commercial potential. It helps compare Pedestrian-based historic cores (Saida’s Souq) with vehicular-access malls (Shopping Mall Types 1 and 2). This multi-layered spatial analysis helps correlate spatial configuration with commercial activity and contributes to understanding how resilience is shaped by spatial structure. **Table 5** shows the selected syntactic metrics applied to Saida’s commercial landscape.

Table 5. showing the syntactic metrics used in the study, with its purpose (Derya Arslan & Ergener, 2023; Yamu et al., 2021).

Space Syntax Analysis	Syntactic Metric	Purpose	Why it matters
Segment Analysis	Integration (Rn)	Measures global accessibility in the entire network	Identifies if a space is easily reachable across the city, crucial for mall visibility and citywide access
	Integration (Rn400)	Assesses local walkability within a 5-minute pedestrian catchment	Reveals how well integrated the Souq is in the neighbourhood’s walkable structure
	Connectivity	Measures through-movement potential (how often a segment is used as a connector)	Captures how often segments are used on routes between other places; this is key to comparing the Souq’s embeddedness in walking routes with malls’ isolation.
	Choice (Rn)	Measures global choice, which counts the number of immediate connections each segment has	Highlights how the Souq’s fine-grain structure promotes adaptability and footfall, while malls have limited entry points and fewer spatial connections
Visibility Graph Analysis	Connectivity	Evaluate how visually connected each location is within the space	An essential factor for user perception, wayfinding, and understanding enclosure and spatial experience at the scale of commercial activity

4. Results and Discussion

4.1. Space Syntax Application Results

The results of the segment analysis (**Figure 13**) for global integration (Rn) show that the warmer the color, the more integrated and accessible a segment is within the city’s overall network. The main vehicular axis, where both shopping malls are located, shows high levels of integration, appearing in red. This highlights its importance for vehicular connectivity and through-movement. In contrast, the historic commercial street is not on this main thoroughfare but is still well integrated at the pedestrian scale. It appears in warmer tones—orange to yellow—suggesting it’s locally well-connected and embedded in a walkable, human-scaled fabric. This supports its role as a resilient pedestrian commercial spine, even if it doesn’t serve through-traffic. Thus, Spatial configuration reveals the resilience of both typologies—vehicular malls benefit from macro connectivity. At the same time, the Souq thrives through its embeddedness in the local pedestrian grid. However, at Rn400, the historic street becomes much more integrated, revealing stronger connections within the surrounding pedestrian network. This suggests that the historic core supports better walkability and local commercial flow. In contrast, the malls remain less integrated at both radii due to their enclosed, inward-oriented structure and minimal external street interaction. Thus, the Souq exhibits strong local integration—it is walkable, connected, and accessible. In contrast, the malls remain spatially segregated from local pedestrian networks despite being on a main road. Regarding connectivity, it shows how many direct connections each street segment has with others, which is essential for understanding spatial permeability. Historic Commercial Street shows higher connectivity, especially in the central sections (yellow-green tones). This reflects a fine-grain network with multiple access points, supporting active pedestrian flow and resilient adaptive use. While shopping malls appear in blue-green hues, indicating lower connectivity. Their enclosed structure limits street interaction, reducing urban permeability and spatial integration. This contrast highlights the importance of spatial openness in supporting resilient, socially interactive commercial environments. Global Choice analysis highlights which streets are most likely to be used in through-movement across the entire network — a key factor in commercial visibility. Historic Commercial Street shows low global choice (dark blue), confirming it's not a city-scale shortcut but a local destination with strong pedestrian and cultural appeal. Despite being along main roads, shopping malls also show moderate choice values (cyan), meaning people drive directly to them rather than passing through—they're isolated nodes, not integral to the broader movement network. So, while both function as destination spaces, the Souq depends on local walkability and historical relevance, and the malls depend on vehicular access but are spatially disconnected from surrounding flows. Visibility graph analysis (VGA) analyzes spatial awareness, co-presence, and the potential for interaction vital for commercial activity in Saida’s commercial spaces (**Figure 14**). Shopping Mall Type 1 shows the highest visibility (red zones) around the central atrium and main circulation spine, where activity is concentrated, drawing foot traffic toward anchor stores. However, the entrances and peripheral corridors show low visibility, contributing to vacancies in these areas. High-visibility zones in Shopping Mall Type 1 are primarily occupied by leisure and comparison retail stores, which thrive on exposure, while lower-visibility areas tend to have vacant units. Shopping mall Type 2 exhibits a more balanced visibility distribution, with clear entrances and better visibility across most spaces. This results in a more resilient configuration, as more areas are visually connected, improving orientation and exposure. Like Shopping Mall Type 1, high-visibility areas are occupied by comparison retail and leisure activities, while less-accessible zones experience vacancies, confirming the vulnerability of spaces with low spatial exposure. In contrast, the Saida Historic Souq displays fragmented, but richly connected visibility, with medium-value spaces spread throughout the fabric. This dispersed visibility enhances walkability and resilience, as visitors experience continuous, gradual spatial discovery. Convenience and specialized Souq functions align with well-visible paths, particularly around cultural and historical landmarks, which drive foot traffic. The Souq’s fabric adapts through tenant change rather than vacancies, emphasizing the importance of visibility in supporting commercial activity and sustaining long-term resilience in heritage environments. Thus, Malls have controlled, focused visibility — good for targeted retail but limited adaptability. The historic street offers a more prosperous visual network, enhancing resilience through permeability, social interaction, and distributed footfall.

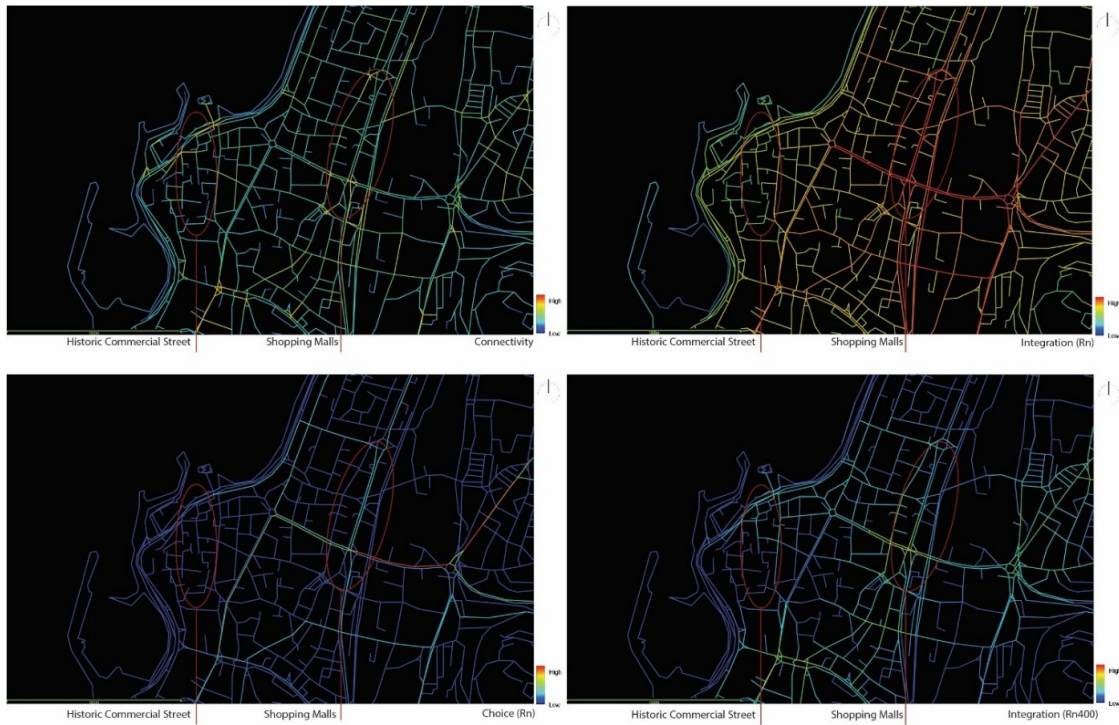


Figure 13. Segment Analysis of Saida’s Commercial Landscape, including the Historic Core (Historic Commercial Street) and the contemporary malls (Authors).

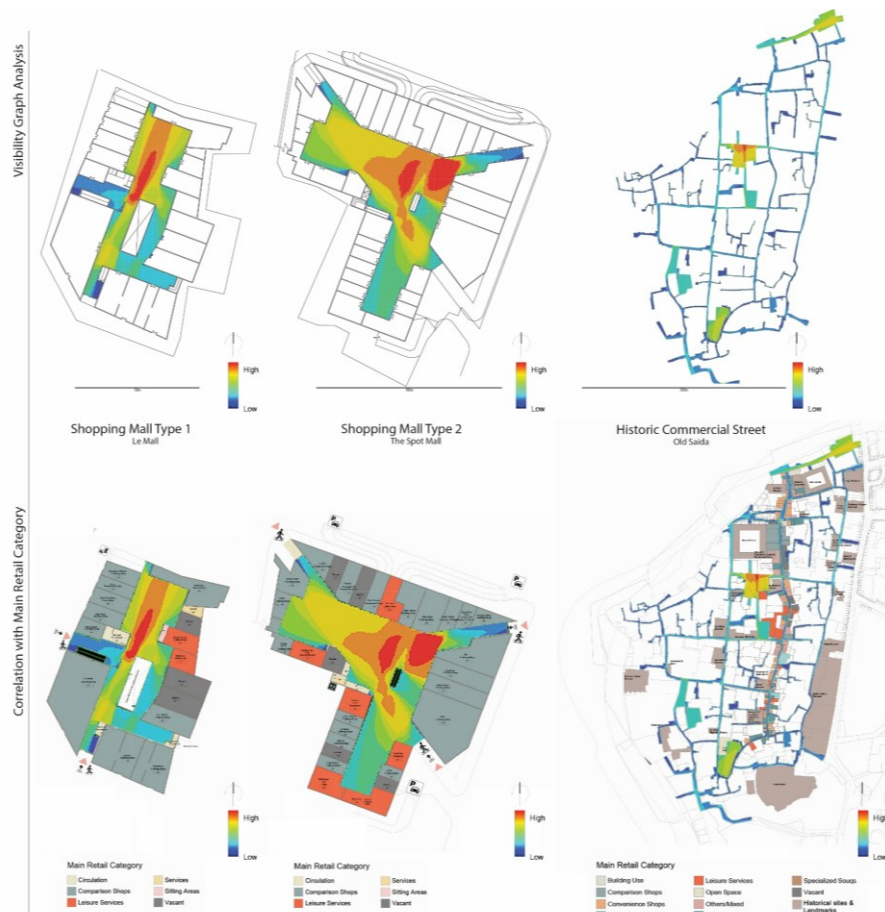


Figure 14. Visibility Graph Analysis of Saida’s Historic Commercial Street and Contemporary Malls with its Correlation with Main Retail Category (Authors).

4.2. Consumer Perception Survey Results

The consumer perception survey, conducted through face-to-face interviews with 94 respondents, revealed valuable insights into user preferences and spatial performance across the three commercial typologies. Regarding navigation clarity (Q1), The Spot scored the highest (4/5), benefiting from its linear layout and visible anchor stores. At the same time, Le Mall was rated 3/5 due to confusing upper and basement levels with limited signage. Despite local

familiarity, the Historic Street, rated the lowest (2/5), faced challenges with narrow alleys and a lack of wayfinding. This emphasizes the importance of straightforward navigation in modern malls and heritage environments. Regarding the diversity of shops and services (Q2), The Spot was perceived as the most diverse (4/5), offering a broad mix of anchors, cinemas, and cafés. The Historic Street followed with a strong base of convenience and comparison retail (3/5), while Le Mall rated lowest (2/5), attributed to vacant commercial floors and limited cultural or leisure offerings. Based on Jan Gehl’s typology, activity types(Q3) revealed that The Spot (4/5) supported various activities, including social and leisure, while the Historic Street (3/5) provided moderate activity, especially at public nodes. Le Mall scored the lowest (2/5), indicating a focus on shopping with few optional or resultant experiences. Regarding area attractiveness (Q4), Le Mall’s central atrium and anchor stores attracted users (30% and 45%, respectively), while The Spot witnessed a more balanced attraction between anchor stores (40%) and leisure zones (25%). The Historic Street’s public nodes (50%) and Historical sites (50%) were the strongest spatial magnets, emphasizing cultural context over retail functions. Regarding consumer needs (Q5), Le Mall users called for more anchor stores and activation of vacant areas, while The Spot Mall requested more cultural events and daily-use services. Historic Street respondents emphasized more precise wayfinding, visible leisure spaces, and preservation of traditional retail, highlighting the need for cultural continuity. Preferences (Q6) were distributed as follows: Le Mall (33%), The Spot (42%), and Historic Street (25%), with Le Mall being preferred for comfort and anchor stores, The Spot Mall for its leisure activities, and the Historic Street for its cultural experiences and relevance to daily use. This indicates that user preferences are shaped by spatial identity, comfort, and lifestyle resonance (Figure 15).

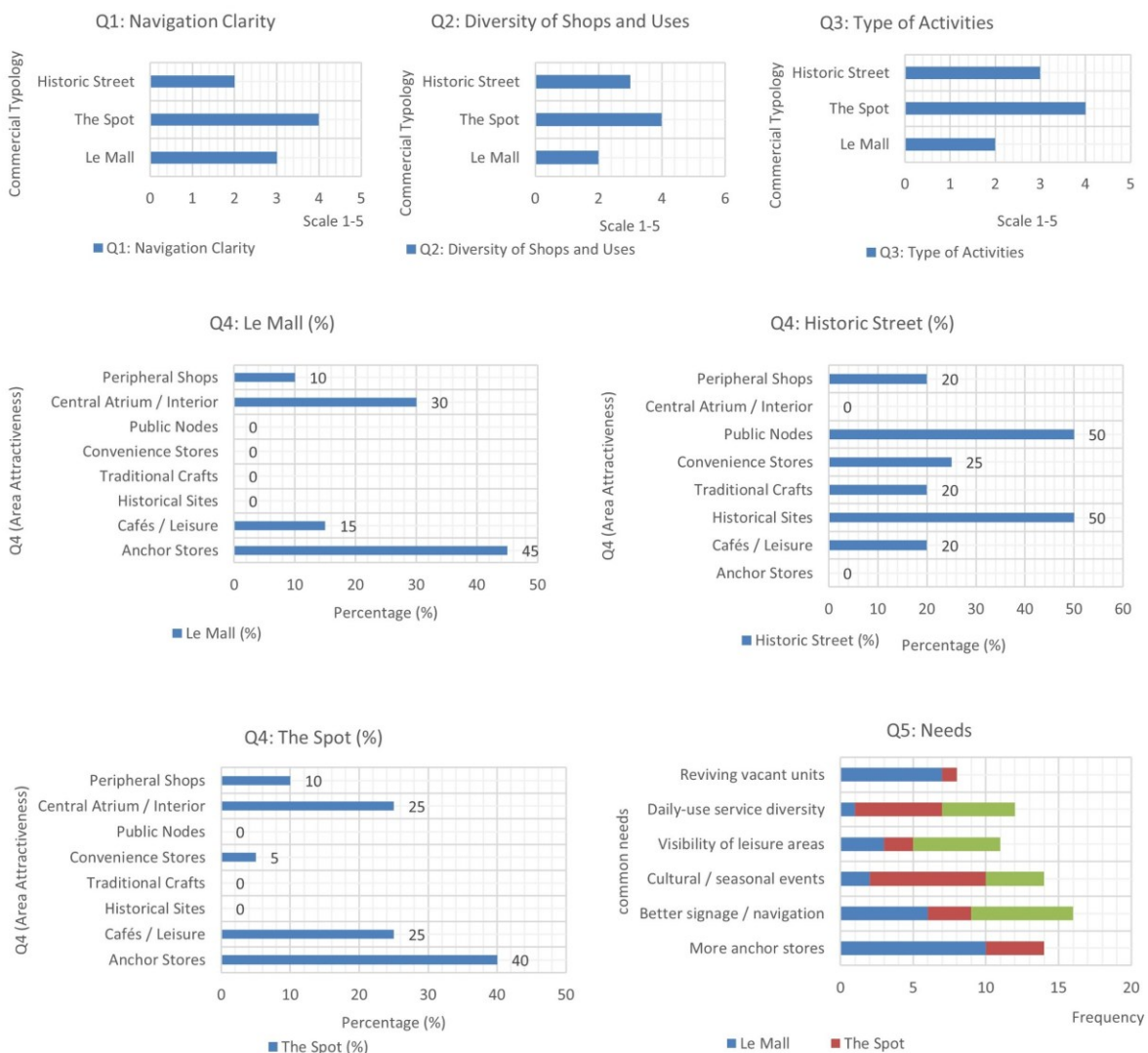


Figure 15. Consumer Perception Interview Results Consumer Perception results of Q1(Navigation Clarity), Q2(Diversity of shops and uses), and Q3(Type of Activities), Q4 (Area Attractiveness) and Q5 (Consumer Needs) (Authors).

4.3. Key Parameters for Enhancing Urban Resilience in Commercial Spaces

Based on the analysis conducted in this study, a set of key parameters that substantially contribute to the urban resilience of commercial spaces has been identified, particularly across typologies like traditional pedestrian-oriented spaces (like historic streets) and contemporary vehicular-access malls. Table 6 highlights the deduced parameters across physical, social, and economic dimensions with the relevant resilience characteristic, impact, measurement tool, and its reflection in the study area.

Table 6. showing the deducted key parameters for enhancing urban resilience in commercial spaces and their reflection in Saida’s Selected Study Area (Authors).

Dimension	Deducted Urban Parameter	Urban Resilience Characteristic	Impact	Measurement Tool / Indicator	What It Reflects in Saida’s Study Area
Physical	Spatial Connectivity and Permeability	Robustness, Adaptability	Positive	Segment Analysis (DepthmapX: Connectivity, Choice)	Historic Commercial Street's organic pedestrian system supports local connectivity, while malls rely on vehicular corridors with limited integration.
	Land Use Complementarity	Redundancy, Flexibility	Positive	Land Use Mapping & Overlay Analysis (GIS/Field Survey)	Historic Commercial Street demonstrates a mix of convenience, comparison, and cultural services; malls concentrate on comparison retail and leisure.
	Spatial Configuration Typology	Robustness	Positive	Segment Analysis (DepthmapX: Integration, Choice, Local Rn)	The historic commercial street follows a linear spatial typology, supporting continuous pedestrian flow and legibility. In contrast, malls follow internalized cluster or dumbbell layouts, affecting circulation clarity and visibility. These contrasting configurations directly impact footfall, adaptability, and spatial resilience.
	Visibility-Function Correlation	Adaptability	Positive	VGA Analysis (Depth-mapX) overlaid with Land Use Mapping	VGA analysis revealed that areas with higher visual integration correspond to zones with active tenant types (e.g., anchor stores, leisure), while vacant areas often lie in visually segregated zones. This correlation highlights the influence of spatial visibility on commercial land use patterns and tenant viability.
Social	Cultural Experience Anchoring	Inclusivity, Cultural continuity	Positive	User Perception Interviews & Proximity to Cultural Landmarks	Users frequent the Historic Commercial Street for seasonal and heritage-driven purposes, reinforcing its identity-driven commercial activity.
	User Activity Range	Social cohesion, Behavioural diversity	Positive	Survey Analysis using Jan Gehl's Activity Typology (Necessary, optional, resultant)	Street users perform necessary and optional tasks; mall users lean toward optional and resultant activities tied to leisure anchors.
Economic	Flexible Use of Space	Redundancy, Risk mitigation	Positive	Land Use Layering (GIS), Time-based Use Mapping	Functional overlap in the Historic Commercial Street sustains constant user engagement; malls show isolated mono-functional zones with time-bound use.
	Presence of Anchor Stores	Redundancy, Robustness	Positive	Land Use Mapping, Survey Data, Proximity Analysis	Anchor stores in malls are major footfall drivers, attracting diverse socioeconomic users. Their placement affects circulation, visibility, and the commercial reach of adjacent units.
	Adaptive Occupancy Potential	Adaptability	Positive	Vacancy Mapping, Interview Data, Field Observations of Usage Turnover	High vacancy in Le Mall contrasts with more dynamic usage in Spot Mall; user input confirms a need for adaptive, flexible reuse strategies such as pop-ups, co-retail, or community-oriented

The key parameters that enhance urban resilience in commercial spaces are interrelated aspects that contribute to the space's overall flexibility, sustainability, and vibrancy. Spatial connectivity and permeability enable accessibility and ease of movement, essential for sustaining foot traffic and promoting economic activity. Land Use Complementarity creates a dynamic environment that draws a wide range of users by facilitating various activities. Spatial Configuration Typology optimizes the space's functionality and long-term flexibility by influencing its flow and arrangement. Visibility-Function Correlation ensures high-visibility areas are used efficiently by supporting notable occasions and increasing foot traffic. Cultural Experience Anchoring establishes an intrinsic sense of place by tying the area into the community through cultural and social elements. User Activity Range supports various activities promoting communal interaction and economic activity. Flexible Use of Space ensures the space's robustness by enabling it to adjust to shifting market conditions. The existence of anchor stores increases foot traffic, fostering stability and maintaining financial stability. Finally, adaptive occupancy potential supports long-term sustainability by guaranteeing that the space can be repurposed or reoccupied as market circumstances change. These parameters collectively improve a commercial space's capacity to prosper in shifting social, economic, and environmental circumstances, enhancing its ongoing viability and vibrancy.

5. General Conclusions

The paper ends up with a set of general conclusions, which include the following:

- Spatial analysis revealed that Integration, visibility, and spatial configuration considerably impact commercial activity and user movement, indicating a direct connection between spatial form and resilience.

- Commercial areas with various functions, active anchor stores, and prominent leisure components were discovered to be more flexible and resilient across different typologies.
- A correlation was found between the findings of consumer surveys and the findings of spatial analysis, which confirmed that resilience is influenced by both the physical design of spaces and the experiential quality of those settings.
- To ensure long-term resilience, individual commercial typologies require interventions that balance the preservation of cultural uniqueness with fulfilling contemporary retail demands.
- Spatial performance requires clear wayfinding, especially in historic districts where orientation difficulties may restrict user participation. Diversity in socioeconomic status and behavioural patterns among user groups highlights the need for inclusive planning, considering a wide range of usage patterns and user desires.

6. Recommendations for Future Research

The paper results in a set of recommendations for future research, which include the following:

- *Broaden Space Syntax Application in Urban Retail Studies*: Expand the application of space syntactic analysis to investigate factors such as choice and local integration in conventional and contemporary retail settings. This can offer insightful information for efficient spatial planning.
- *Test Spatial Scenarios with Consumer Behaviour Insights*: Test alternative spatial layouts based on consumer surveys to evaluate design decisions and ensure that places meet user demands.
- *Promote cross-contextual design guidelines*: Create design frameworks that reconcile cultural preservation in historic streets with the changing demands of modern malls, resulting in a flexible and adaptable urban retail strategy.
- *Inform Decision-Makers with Resilience-Oriented Urban Metrics*: To improve the long-term viability of commercial spaces, urban planners and local authorities must be encouraged to employ evaluation methodologies based on urban resilience.
- *Integrate Real-Time Data and Smart Monitoring in Commercial Planning*: Use real-time data collection technologies to track business operations and pinpoint resilience issues. This strategy ensures that retail areas continue to adapt to changing urban conditions.

Conflict of Interests

The authors declare that there is no conflict of interest.

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