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Furlan, R., Petruccioli, A., Major, M.D. et al. (2019) The urban regeneration of west-bay, business district of Doha (State of Qatar): A transit-oriented development enhancing livability. *Journal of Urban Management*, 8 (1). pp. 126-144. ISSN: 2226-5856

<https://doi.org/10.1016/j.jum.2018.10.001>

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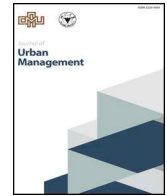
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Research Article

The urban regeneration of west-bay, business district of Doha (State of Qatar): A transit-oriented development enhancing livability



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ARTICLE INFO

Keywords:

Sustainable Urbanism
Urban Sociology
Urban Regeneration
TODs
Urban Fabric

ABSTRACT

Doha, the capital of the State of Qatar, has faced enormous economic growth and rapid urban transformation over the last few decades. More recently, this has been accentuated by the construction of major urban public transit systems in the State and a desire to implement the Transit-Oriented Development (TOD) model in new developments and/or urban regeneration projects along the new ‘Doha Metro’ rail network. A TOD is a mixed-use area planned to maximize access to public transport and encourage transit ridership. Scholars argue that TODs encourage sustainable urbanism via enhancement of livability by better integrating transportation and land-use strategies in urban form. This makes it critical to better understand the challenges and benefits that TODs offer for models of urbanism in formulating strategies and guidelines for the planning of sustainable settlements. This study focuses on one major new transit hubs in Qatar: West Bay, the waterfront business district of Doha, and its surrounding neighborhood. The aim of the research study is to evaluate the extent to which the new West Bay TOD will impact livability in the district and surrounding neighborhood. The findings provide a guide for the design and implementation of the TOD model in other districts of Doha to enhance livability for residents and citizens.

Peer review under responsibility of Zhejiang University and Chinese Association of Urban Management.

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<https://doi.org/10.1016/j.jum.2018.10.001>

Received 2 September 2018; Accepted 11 October 2018

Available online 16 November 2018

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Introduction

Currently, the State of Qatar is making huge investments in the construction of new urban public transit systems, such as the ‘Doha Metro’, ‘Bus Rapid Transit’ (BRT), and the ‘Light Rail Train’ (LRT) systems. This is a significant endeavour considering the rapid rate of economic and urban growth in Doha over the previous three decades. Around the world, researchers and policy-makers are promoting transit investment and transit-oriented developments (TODs) as tools for sustaining an environmentally-resilient lifestyle. By clustering relatively high-density activities around transit stations in pedestrian-friendly environments, individuals can become more independent of the automobile, thereby reducing traffic congestion, fossil fuel-based energy consumption, and pollution (i.e., carbon emissions). A TOD’ urban planning strategy is seen as beneficial for the rapid urbanization process in Doha and the State of Qatar (Furlan, 2015, 2016a; Furlan & ElGahani, 2018; Furlan & Faggion, 2017; Furlan & Petruccioli, 2016).

One of the key factors for long-term success in terms of the sheer number of vibrant, functional and economically vital TODs created is how these new systems integrate with land uses and the extent to which they reduce traffic congestion and attract riders. Over twenty years of TOD research tends to reinforce the need for improved design, density and (land use) diversity around transit stations, i.e., the so-called ‘3 Ds’. Quality urban design treatments are necessary whether stations are above ground, below ground, associated with highway medians, or simple light rail stops in mixed traffic environments (Bernick & Certero, 1997; Calthorpe, 1993; Certero & Kockelman, 1997; Curtis, Renne, & Bertolini, 2009).

The best stations and systems appear to ensure the safety and security of passengers with accessibility for all, but also provide attractive and vital social spaces. They also tend to feature dense, mixed-use neighbourhoods with few obstructions to walking, plentiful sidewalks, and thoughtful street arrangements. Such places don’t happen by accident – they require careful design and planning both before and after – pre-construction and post-occupancy – transit systems are inserted into cities (Alexander, 1987; Brown, Dixon, & Gillham, 2014; Farr, 2008; Kaspurin, 2011; Saliba, 2015).

Qatar’s transit investments are part of continuing efforts to establish Doha as an international service hub. Effective design of stations and planning of their local environments is critical to urban improvements, system patronage gain, and long-term financial viability. Also, there are economic incentives to plan for transport and land use integration around transit as well-designed transit systems worldwide have achieved increased property values for surrounding areas (Besser & Dannenberg, 2005; Brown et al., 2014; Burke & Brown, 2007; Cao, Handy, & Mokhtarian, 2006; Certero, 2000; Furlan & ElGahani, 2018; Givoni, 1989; Hamilton-Baillie, 2004; Kaspurin, 2011; Kent, 1984, 1990, 1997; Lucas, 2012; Zyscovich & Porter, 2008).

The study area of West Bay has been selected for its strategic location, being envisioned as the contemporary Central Business District (CBD) of Doha and for being considered the main financial and economic hub of Qatar (Furlan, 2015; Furlan & Faggion, 2015a). The purpose of this research is to investigate the principles and/or criteria for the formation and/or regeneration of the urban transit village of West Bay by investigating the key challenges and factors possibly affecting its eventual success. This allows to formulate design and planning guidelines, which will support and enhance liveability, sustainability, social cohesion and economic attractiveness of West Bay transit village.

Literature review

Sustainable urbanism

Fifteen core principles of sustainable urbanism provide the framework for the study of the key factors, concepts, or variables and the presumed relationships among and between them (Fig. 1). In turn, this informs and clarifies the phenomena examined in this study.



Fig. 1. The Fifteen Core Principles of Sustainable Urbanism (Source: authors).

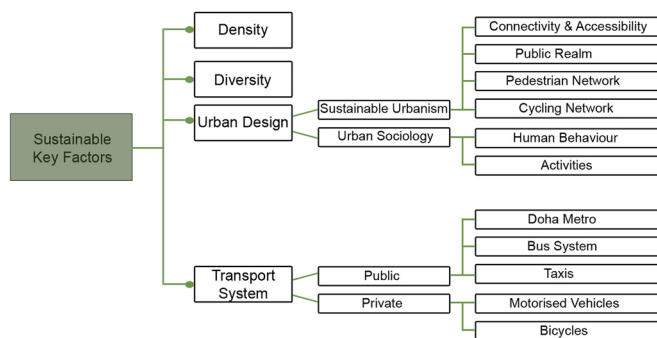


Fig. 2. Integration of Land Use and Transport System (Source: authors).

Contemporary scholars advocate for the formation and/or regeneration of neighborhoods and cities by (1) enhancing livability, (2) creating community, (3) expanding opportunity, (4) promoting equality and (5) fostering sustainability (Brown et al., 2014). The need to design, plan, and regenerate sustainable communities, villages, and/or cities is viewed as important for the future of humanity since it envisions ensuring that the needs of the present does not compromise those of future generations.

The development of sustainable urbanism is seen as addressing the environmental and ecological challenges of climate change where the formation and/or urban regeneration of transit villages and/or neighborhoods is best based on an interdisciplinary planning approach with the flexibility to weather ever-changing demographic, environmental, social and economic issues. Namely, as outlined in Fig. 1, this planning approach is structured around fifteen core integrated principles based on the triple-zero framework, “zero fossil-fuel energy use; zero waste and zero emissions”.

This allows for the (1) abstract conceptualization of a comprehensive model to mitigate current urban challenges and (2) physical formation of sustainable transit villages developed and integrated around public transport systems. TOD aims at designing and planning communities to (A) achieve eco-mobility and low-impact public transport systems, (B) provide spaces for the enhancement of livability, and (C) establish a future model for eco-cities (Altoon & Auld, 2011; Furlan, Zaina, & Zaina, 2016; Heaton, 2015; Newman, 2015; Walker, 2011).

As argued by multi-disciplinary scholars and researchers (Fig. 2), TODs tend to be based on specific common sustainable key factors: density (increasing density around stations within a 400-to-800-meter radius), diversity (mix land use, variety of housing and commuting choices), and design (pedestrian-friendly environments). Successfully addressing these criteria for the development of transit villages allows us to (A) accomplish environmental protection, (B) economic efficiency, and (C) social equality while making an urban development more comprehensively sustainable.

As a result, the TOD can help to (A) restrain sprawling land development in sensitive environmental areas by directing development towards transit stations; (B) invigorate economic efficiency via higher transit ridership, economic development, and location efficiency by planning high-density mixed land use development around transit stations; and, (C) enhance livability through spatial strategies that improve the quality of life.

These lessons first emerging in Western countries, specifically in North America and Europe, due to problems related to traffic congestion, concentration of populations in metropolitan areas, and the rising costs of oil/gas and sprawling urban patterns are largely applicable to the State of Qatar, which faces many of the same challenges. More than \$36 billion in funds have been invested to develop the public transport systems in support of the rapid urban growth while still addressing these challenges for a sustainable urbanism envisioning the urban regeneration of the city (Fig. 3).

Urban sociology: life between buildings

Urban sociology is the scientific study of urban societies including their physical form, namely of the social life of spaces between buildings. Urban sociologists are concerned with exploring the subtle qualities, which throughout the history of human settlements had been related to the social activities of people in urban public spaces as a dimension of urban design and town planning. Intervention in the physical form of settlements is critical for the enhancement of the public realm since it affects livability and the quality of life in settlements (Gans, 2002; Hutchison, Gottdiener, & Ryan, 2014). Despite the changes in the society due to global processes of growth and modernization, urban sociologists argue the essential principles for enhancing quality of life in the public realm are remarkably persistent over time. Gehl argues that outdoor activities are influenced and/or determined by the quality and/

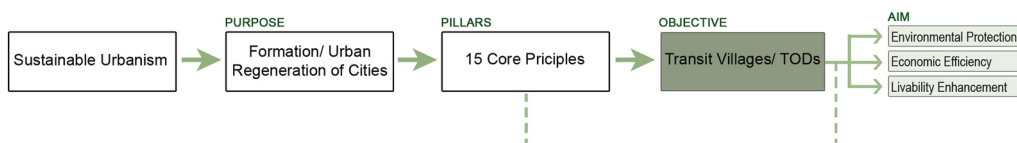


Fig. 3. Sustainable Urbanism's Philosophy (Source: authors).

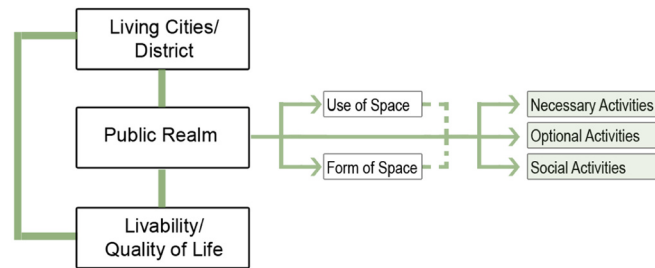


Fig. 4. Living Cities (Source: authors adapted from Gehl).

or urban design as features of the built environment to a significant degree. It is the process of making better places for people, which affects (a) the degree to which people will use the place and, as a result, (b) the significance of the place (Gehl, 2010, 2011; Gehl & Svarre, 2013).

Gehl defines outdoor activities in public spaces into three categories, which places different demands on the built environment: (a) necessary activities, (b) optional activities, (c) social activities. Necessary activities include daily tasks such as going to school or work, where participants have no choice. These activities are majorly related to walking. Optional activities take place when exterior physical conditions related to weather and/or place are favorable. This category, which includes recreational activities, pleasant to pursue within high quality outdoor areas, is related to taking a walk to get fresh air, playing, stopping, sitting, standing or sunbathing. Finally, social activities occur when others are present in public spaces. The most widespread social activity includes greetings and conversations, passive contacts, or simply seeing - and being seen by - others (Gehl, 2010) (Fig. 4).

Gehl defines this last category as ‘resultant’ activities because they spontaneously develop and evolve as a direct consequence from the previous two categories of people moving about and being in the same places. Therefore, social activities are enhanced when necessary and optional activities find better physical conditions in the public realm. Social activities vary according to the physical context where people gather with common interest: in residential streets, near public open spaces, city centers, schools, public offices, or places of work. Physical planning and the ability of architects/planners to create outdoor spaces where social activities can occur affects the possibilities for meeting or interacting: the more time people spend out-doors, the more frequently they meet and talk. The design and construction of high quality open spaces can affect the degree of intensity - from low to high - of people’s social activities, participation, and/or interactions, and therefore their quality of life (Gehl, 2010).

Gehl suggests that public spaces should be allocated and designed within the urban environment to support and facilitate forms of contact, visits, and gatherings where social events can be arranged and/or spontaneously evolve, and daily activities increase chances of developing contacts among people. In turn, this approach encourages the formation of living cities, based on the degree to which people can interact with one other, in contrast to lifeless ones, which deters interaction, primarily via the automobile-centric planning.

The development of TOD villages or settlements along public transport systems aligns with a comprehensive vision or strategy for urban design based on the formation and urban regeneration of cities where livability and quality of life are enhanced in an attempt to diminish the proliferation of lifeless sprawling automobile-centric districts. In such districts, the opportunity for people to interact is scarcely provided due to the lack of livable and vibrant open spaces. This makes the TOD model one of considerable interest to urban sociologists, where their knowledge and expertise can contribute to the success of the urban development (Calthorpe & Fulton, 2001; Dittmar & Ohland, 2012; Heaton, 2015).

‘...a mixed-use community within an average 2,000-foot (or 10-minute) walking distance of a transit stop and core commercial area. TODs mix residential, retail, office, open space, and public uses in a walkable environment, making it convenient for residents and employees to travel by transit, bicycle, foot, or car’ (Calthorpe, 1993).

Calthorpe argues that TODs are high-mixed density villages focused on employment clustering, located directly on rail transit lines, capable to increase transit ridership, and establishing a sense of place at transportation nodes. Namely, he states that transit villages can establish a sense of community through their physical features; for example, by adding new indoor or outdoor public spaces, public amenities such as seating, trees, parks, and plazas, and finally social functions (including community services) (Calthorpe, 1993).

In order to create liveable TOD villages that provide a sense of community and belonging, attention needs to be given to the way of life, human behaviour, and/or activities of the inhabitants. This suggests that an urban planning strategy for TODs in the State of Qatar should also consider factors related to physical form, and economic and financial matters as they pertain to a way of life, human behaviour and/or activities of the users (Furlan, 2015; Furlan & Faggion, 2015b).

Qatar national development framework (QNDF-2032)

Doha is one of the oldest cities in the Gulf Cooperation Council (GCC) of the Persian Gulf region. Since the mid-seventies, Doha has experienced rapid economic growth and a radical transformation of its built environment, which has been facilitated by post-WWII oil and natural gas production and revenues. This has transformed the economy of Qatar from based on fishing and pearling to

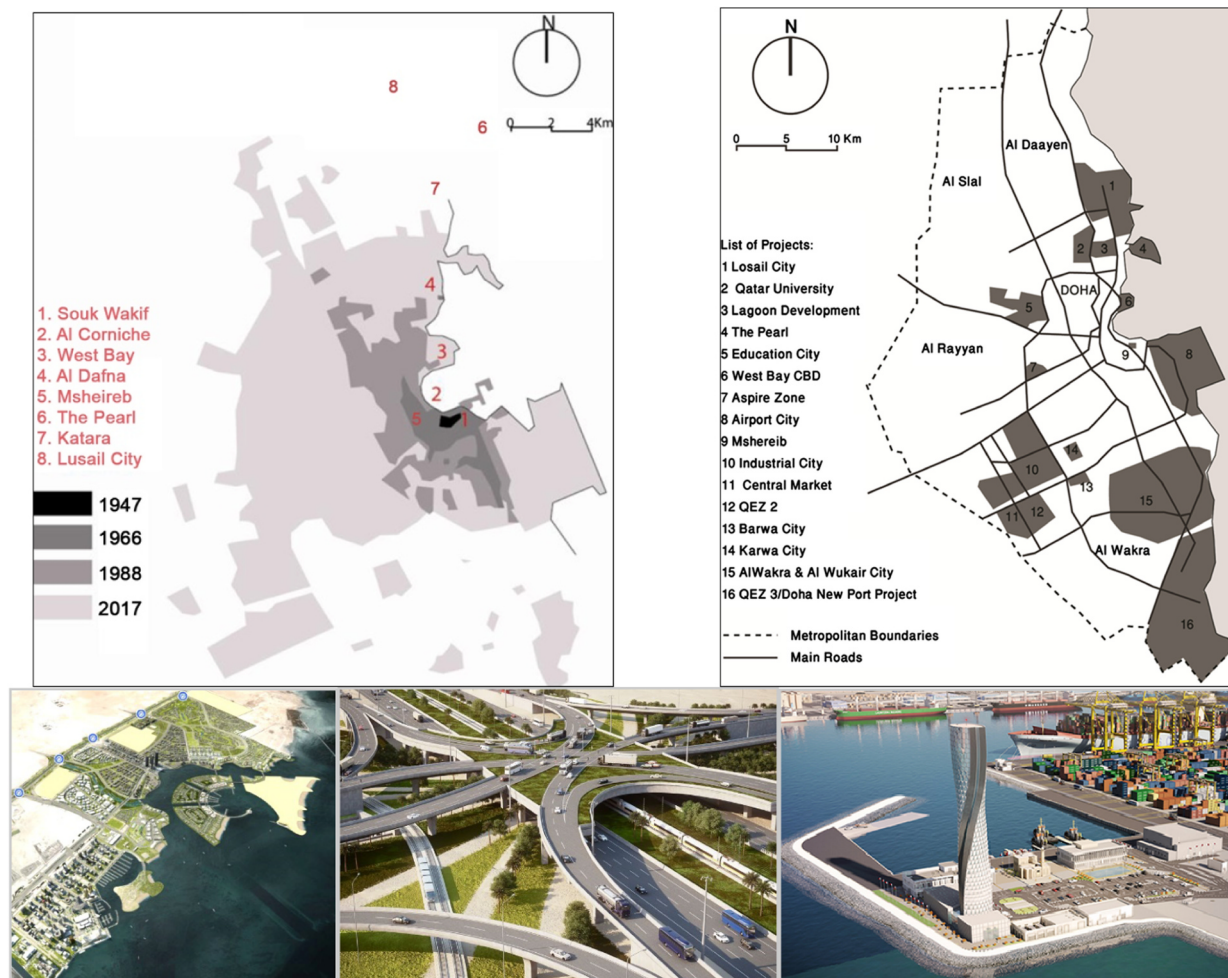


Fig. 5. (Top) Urban Projects (Source: authors) including (middle, left) Lusail City (Source: Lusail), (middle, right) Al Khor Road Improvements (Source: PWA), and (bottom) Hamad International Port (Source: MWANI).

a much more diverse economic base and led to rapid economic growth and demographic changes. Moreover, international events such as the 1995 World Youth Cup, 2005 West Asian Games, 2006 Asian Games, and the anticipated 2022 Fifa World Cup have significantly contributed to this transformation, accelerated by several large-scale urban, architecture and infrastructure mega-projects implemented by the State of Qatar to provide modern urban facilities and expand tourism (Fig. 5). Today, Qatar has become one of the most active economies in the Middle East region with a rapid rate of growth, especially in the construction industry (Wiedmann, Mirincheva, & Salama, 2013).

The futuristic vision of the Qatari authorities to be an economic ‘powerhouse’ in the region was the main motivation to invest in such mega-projects, namely sport facilities in preparation to host the 2022 Fifa World Cup. However, this also includes International marine ports for tourism and commercial trade, widespread adaption of urban infrastructure and service improvements, and the creation of new smart cities such as the Lusail City.

The development of such mega projects in the absence of a national planning framework has contributed to Doha’s urban issues including land value inflation, affordable housing shortages, more traffic congestion and environmental impacts. In 2011, the Ministry of Municipality and Urban Planning (MMUP) launched the Qatar National Development Framework (QNDF-2032) for the purpose of better “managing growth, change, land use and development in Qatar.” The proposed Master Plan established a planning framework tailor to the Qatar National Vision (QNV-2030), an act envisioning the development of an advanced sustainable nation by 2030; capable of sustaining its own development and providing for a high standard of living for the current and future generations (Qatar, 2008). The QNDF-2032 includes the ongoing National Master Plan and Municipal Structure Plans related to the environment, transportation, and utilities, Metropolitan Doha and other municipalities, action area plans for cities’ and towns’ centers, and zoning regulations, planning codes, and urban design guides (Fig. 6). The QNDF-2032 highlights the main challenges and suggests strategies related to rapid urban growth and declining living standards caused by air pollution (prevalent car-based mobility), congestion (lack of efficient public transportation), and urban segregation (Wiedmann et al., 2013). QNDF-2032 also aims to confront declining small settlements, environmental impacts, inefficient use of energy and associated greenhouse emissions, food security, and eroding

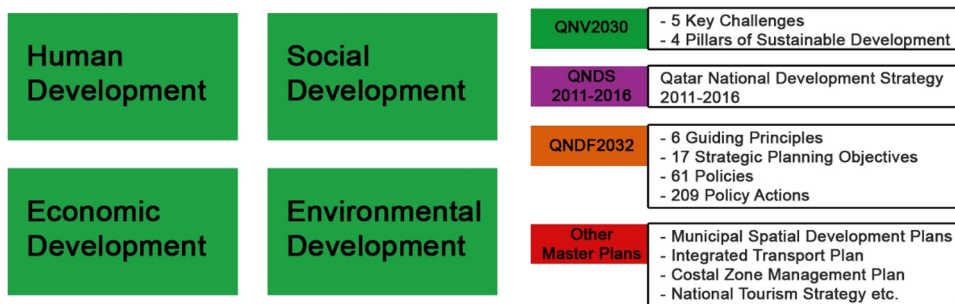


Fig. 6. (left) Qatar National Vision 2030 Four Pillars (Source: QNV2030) and (right) Qatar National Development Framework Hierarchy (Source: MME).

natural/urban landscape quality (Qatar, 2008).

The State of Qatar is currently investing a large amount of funds into the transformation of the Doha built environment with the development of new major urban public transit networks, i.e., Doha Metro, Lusail light rail transit (LRT), and bus rapid transit (BRT). It is anticipated that the new transport systems will be operational before the FIFA World Cup in 2022. In addition, transportation systems were redeveloped and expanded to accommodate the expansion of the city’s urban fabric. The government plans to invest 100 billion USD over the next five years for upgrades to the existing transportation systems as well as development of new infrastructure projects, which aim to better integrate the economic, sustainability, environment, and socio-cultural dimensions of Qatar (Furlan & Alattar, 2017; Furlan & Almohannadi, 2016; Furlan & Sipe, 2017; Shaaban & Radwan, 2014).

The new metro network currently under construction is designed to link together the Hamad International Airport, Doha Port, all major Olympic stadiums sites, urban villages, and major urban districts (Fig. 7). The Doha Metro Network will have 4 lines measuring 300 km in length and 98 stations utilizing underground, ground level, and overhead railways. Line One runs north-to-south from Hamad International Airport to West Bay. Line Two runs east-west connecting Hamad International Airport/Airport City to the western industrial area. Line Three runs south-to-north from the southern industrial areas through the center of Doha to Education City. Line four follows a north-south route along the shoreline from Hamad International Airport to West Bay, the Pearl, and Lusail City. The government sees the development of the metro as essential to the success of the 2022 FIFA World Cup, reducing of traffic congestion, and attractive urbanism (Furlan, 2016a; Furlan & Alattar, 2017; Furlan, Eissa, Awwad, & Awwaad, 2015; Furlan & Faggion, 2015b; Furlan, Eiraiibe, and AL-Malki, 2015; Furlan et al., 2016; Salama & Wiedman, 2013).

Qatar National Master Plan 2032 establishes a framework for short- and long-term goals and objectives for the urban development of the nation. According to the plan, all mega projects must be completed by 2026 including construction of transportation systems/ infrastructure – such as highways, national railway system, urban metro and light rail system – public transportation facilities, and new residential communities or precincts. Lastly, the QNDF-2032 Spatial Strategy envisions a classic hierarchy of urban centers in which the West Bay area, Airport City, and the government district in the city center define the core of Metro Doha while other dense, transit-oriented metropolitan and town centers connect via orbital, transit corridors. The urban growth of the capital region is controlled with an agricultural ‘belt’ to achieve food security while integration between land use and transportation plan is seen as significant for reducing congestion and providing more employment opportunities.

Liveability, identity, and integration of existing/planned mega-projects are identified as the key for the principal policy priorities of the plan. Density, mixed use development, and a hierarchy of centres are seen as the main spatial concepts that will deliver this vision of Doha. Another issue highlighted in the plan is the enhanced use of undeveloped land within the metropolitan area in order to achieve a more compact urban form. In conclusion, the metro network represents an opportunity to design, plan, and/or regenerate vital neighbourhoods and precincts in Doha, enhancing liveability and quality of life standards.



Fig. 7. Diagrams and aerial view of Doha Metro Network (Source: the Authors).

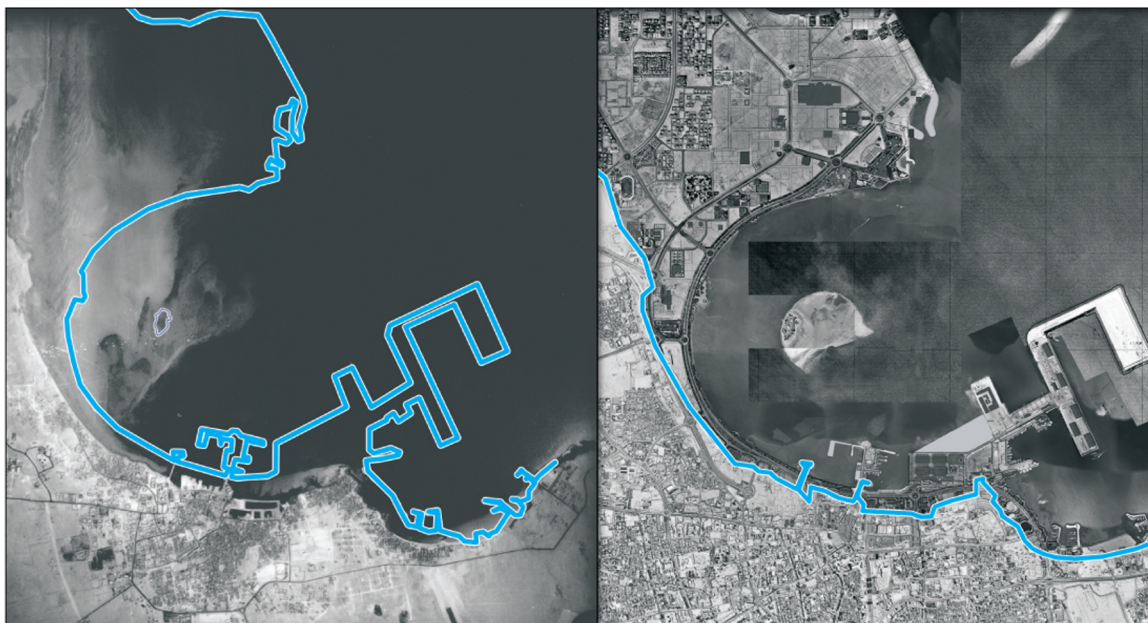


Fig. 8. (left) Doha in 1956 and Waterline in 2003 (Source: Demystifying Doha, Salama); and, (right) Doha in 2003 and Waterline in 1956 (Source: Demystifying Doha, Salama).

West Bay, Doha’s central business district

The 1950s marked the beginning of extensive oil exploitation and increasing allocation of government revenues to fund major urban projects in modernizing Doha. In 1975, the American planning consultancy William L. Pereira Associates was commissioned to develop a new master plan for an extension area in the North District of Doha (NDOD) known as West Bay (Figs. 8 and 9). West Bay is Doha’s contemporary Central Business District, which is composed of high density, mixed-use development consisting of high cost, high-rise skyscrapers. The larger master plan included the development of Qatar University, coastal development at the northern end of the Corniche, hotel developments, and several embassies. As West Bay district area was developed, consultants were engaged to review and adjust the zoning plan for existing urban areas to accommodate future population growth and improve the urban environment (Rizzo, 2014).

West Bay extends along the northern part of the Corniche. The district became the contemporary focal point of investment with government buildings erected as modern landmarks. In the 1980s, Doha’s first large-scale public spaces were created: Al Montaza Park/Gardens and promenade along the Corniche. Later, in the 1990s, Al Bidda Park was built along a large stretch of land opposite of the Corniche (Furlan, 2016b; Furlan, AlMohannadi, Zaina, & Zaina, 2015; Gunay, 2003; Rahman, 2014).

Since 2001, ‘City Center’, one of Doha’s largest shopping malls has constituted the commercial heart of this Business District despite on-going construction/renovation projects in the area. Some of the most important landmarks include the 232-metre high Burj Qatar, 215-metre high Al Bidda Tower, and 200-metre high Tornado Tower. Other tall buildings of note in the district include

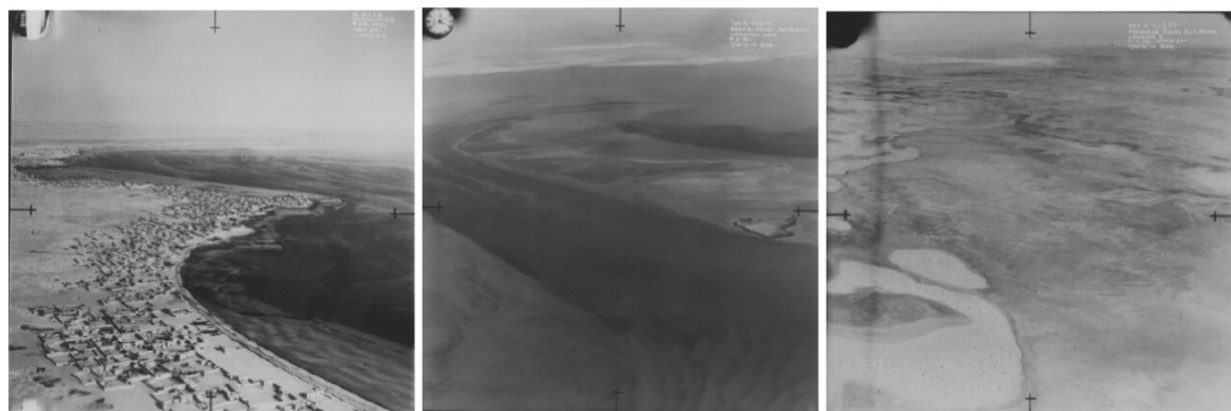


Fig. 9. Historical (year) views of the waterline in Doha (Source: West bay in 1934, Source British Library: India Office Records and Private Papers).



Fig. 10. West Bay District (Source: Google earth and the authors).

Kempinski Residence and Suites with a height of 254 m, and the 245-metre high Palm Towers. Today, the imposing, futuristic West Bay skyline is the iconic image around the world of contemporary architecture in Doha (Fig. 10). However, West Bay experiences several major deficiencies. The planning has led to an unrelated mass of skyscrapers suffering from a lack of integrated public spaces, alternative transport options for migrant workers, services for local residents, and increasing issues with parking needs/requirements.

West Bay is located on the red transit line as a major TOD (Fig. 10). The new rail way will contribute to the regeneration and/or revitalization of the district, which is currently inactive due to under-utilization of abundant open space at the base of skyscrapers, a lack of connectivity between building frontages and circulation paths, inadequate provision of green space, and so on. Thus, the new TOD West Bay requires careful design and planning to enhance a more liveable, social, and vibrant urban district (Figs. 11–13).

The research design

‘Urban designing is an argumentative process in which participants in it learn as they go along. They learn about goals and means as perceived by different stakeholders, they learn from the evidence that each provides for its views’ (Coleman, 1988, p. 127).

Urban design is the practice of conceiving and planning groups of buildings, streets and the public realm in between buildings, neighbourhoods and/or districts, or in broader terms the built environment of cities, according to the users’ needs, which are determined by multifaceted factors such as way of life, human behaviour, and/or activities. The ultimate goal of urban designers is to make urban areas shaping cities to be more liveable, functional, attractive and sustainable. This makes urban design an inter-disciplinary subject, which demands an understanding and knowledge of a wide range of variables and subjects from inter-disciplinary scholars, ranging from urban planners and economists to engineers and social scientists. Concurrently, it is of cardinal importance to learn from the users and stakeholders’ views in order to shape the built environment per the needs of people. A thorough, comprehensive investigation and understanding of the effects of the built environment on the users or the mechanisms linking users to the built environment will allow urban designers to conceive and plan liveable urban areas and ultimately cities (Creswell, 1994; Crotty, 1998; Ragin, 1994; Stake, 1994; Yin, 2003; Zeisel, 1984).

This research study aims to investigate and assess the existing conditions of West Bay against the criteria of TOD in order to define a strategy for regenerating the district and making it more liveable for all users. This is achieved through (1) a review of the relevant literature, which highlights the key-factors to be addressed for the formation of TODs, and (2) a thorough analysis of the data collected from practitioners, users, and stakeholders, whose views and needs indicate the necessary criteria to be addressed in the implementation of the selected TOD.

The overall research design for the collection of data for this research study is structured into the following two stages:

- 1) Review of the literature on the multi-disciplinary context: Sustainable Urbanism, Urban Sociology and transit villages, and its relevance to Qatar National Development Framework (QNDF-2032).
 - a. Identification of the key-factors to be addressed for the formation of TODs, such as land use mix (diversity), land use density, urban design, connectivity, walkability, public realm and transport systems.
- 2) Exploration of the selected case study of West Bay (contemporary Central Business District of Doha).
 - Oral data is collected through the following methods:
 - a. Focus group and semi-structured interviews with urban designers, planners, social scientists and practitioners from the Ministry of Municipality and Environment (MME), Qatar Rail (QR) and Ashghal-Public Works Authority.
 - Visual data is collected through the following methods:
 - b. Historic maps (the process of formation was deduced based on comparative analysis), cartographic sources (site maps), site visits and observation, architectural drawings and photographs.

Following this procedure, data analysis, assessment, and discussion is offered in response to the aims of the research study, i.e.,



Fig. 11. West Bay Location Map and Landmarks (Source: the authors).

the definition of strategies for the urban regeneration of the West Bay’s TOD where the ultimate goal is shaping the urban area so liveability is enhanced.

Findings

Site analysis

Diversity

West Bay has a mixture of commercial/residential land uses and public space within an urban fabric characterised by wide streets. Approximately, the land use includes 50% commercial office, 10% multi-family residential, 15% single family residential, 15% special use, and 10% community infrastructure/open space of the total area (Fig. 14).

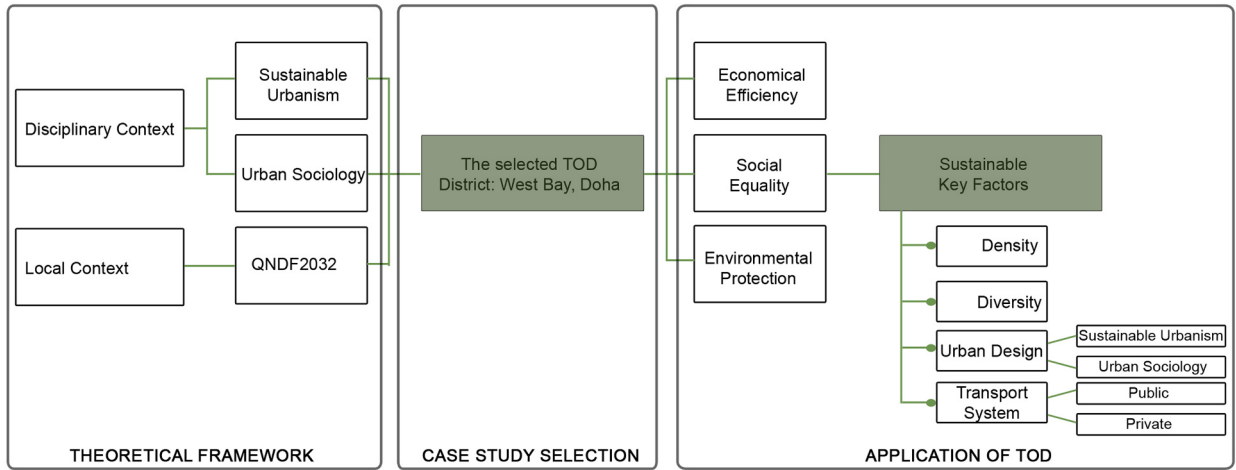


Fig. 12. Context Diagram (Source: authors).

Density

The diagram below shows the density-level within the investigated area. The high dense envelopes are evident within the main south corridor comprising commercial use and the medium density envelopes are apparent in the north, consisting of mainly residential units. Low density is emphasized in the light grey symbolising the vacant green land. Also, Fig. 15 illustrates the physical conditions of the buildings: only new/good condition structures are present within the 400mt radius of the West Bay station (Fig. 15).

Street and pedestrian connectivity

West Bay is characterized by contemporary design high-rise buildings, which provide a consistent and distinct visual aesthetic for the neighborhood at a distance (Fig. 16). However, the district lacks shaded pedestrian pathways, streetscape design, and street furnishings. Several roads are lacking pedestrian walkways, which are unsafe and provide hazardous connectivity options for pedestrians (Figs. 17–18).

Public realm (Paved and green open nodes)

The district is lacking small-scale public open spaces among and adjacent to the buildings. The large Sheraton park is located 1.3 km away from the new train station. In addition to the lack of integrated open spaces, the existing green areas are utilized for decorative purposes only and the paved area covers approximately 45% of the total area of the district (Fig. 19).

Cycling network/lanes

The site analysis reveals the non-existence of cycling routes in West Bay. A cycling network is evident along the Cornice only. Therefore, it is a necessity to connect the existing cycling network to a new pedestrian network within the district, which is either safely disconnected from the major roads or the major roads are modified to accommodate a new dedicated to pedestrian and/or cyclist use (Fig. 20).

Public transport systems

Qatar envisions sustainable urban development sustained by the construction of new public transportation systems, Doha metro, and the bus system. Therefore, it is of cardinal importance to integrate the two major public systems under development in order to reduce dependency on private vehicles (Fig. 21).

SWOT analysis

Strengths

- West Bay area is a transit place;
- Contemporary financial hub of Doha;
- Mixed-use buildings;

Weaknesses

- No adequate setback;
- Inadequate infrastructure (i.e., tight ramps, poor street conditions, narrow roads, lack of pedestrian access);
- Increase of traffic caused by commercial and retail areas, dead ends (no connectivity), lack of parking spaces, stuck in transit, more allowances for private cars than public transit options;

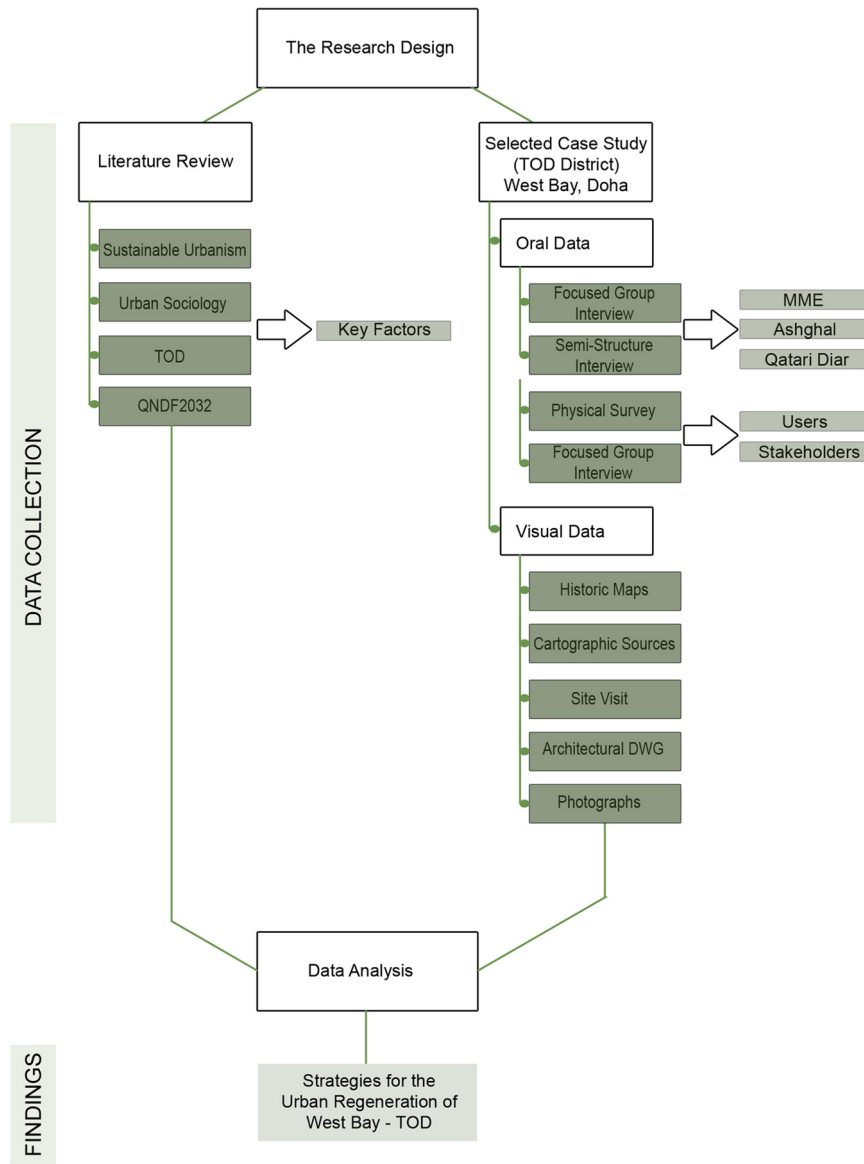


Fig. 13. The Research Design Diagram (Source: authors).

- Absence of green areas;

Opportunities

- A pedestrian environment could be enhanced to greatly improve connectivity;
- The new transit system can contribute to decreasing traffic congestion;
- The public realm can enhance livability and/or quality of life;

Threats

- Traffic Congestion;
- Lack of safety and privacy;

The transit village of west bay: place making and liveability's challenges

The usual image of West Bay's skyline from the Museum of Islamic Art that has risen dramatically since the seventies is the mirror

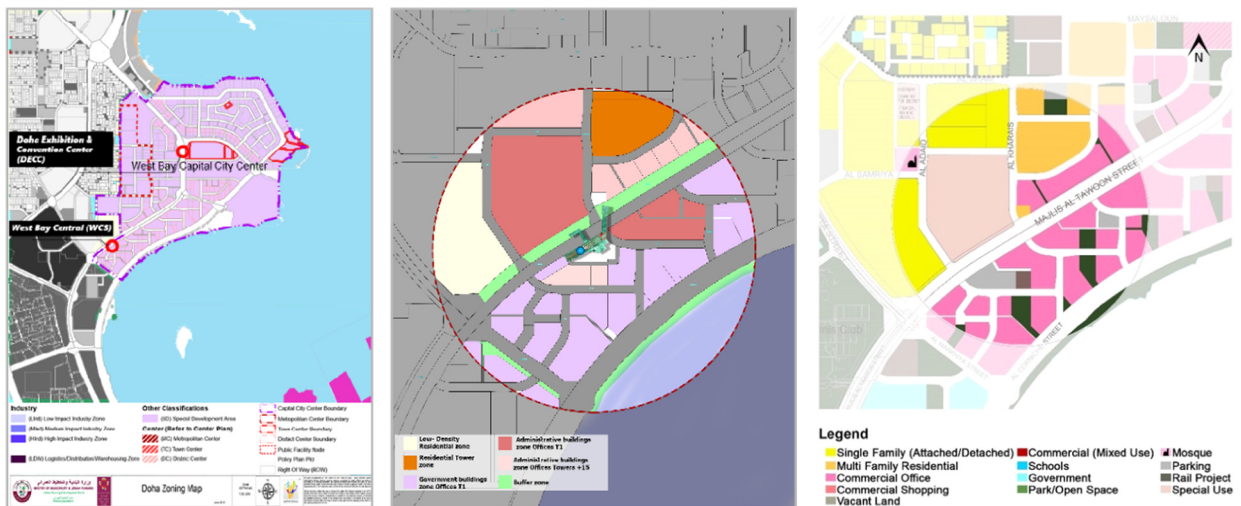


Fig. 14. Land Use Map (Source: The authors).

of the contradiction about the jewel district of Doha. The progressive growth of the skyscrapers is accompanied by an image without formal structure in which the skyscrapers are grotesque simulacra of global neo-liberalism. West Bay suffers from structural deficiencies caused by initial indecision about the role of the neighbourhood: from the establishment of luxurious villas, crossed by large regional traffic infrastructures, which divided it into three separate disconnected parts, then the conversion into the contemporary City Center Central Business District with minimal adjustments, and, finally, a hybrid condition between a city and a residential area of apartments/hotel houses. City Center has turned into a ‘vertical village’ with a radical change in typology in favour of individual towers without functional or formal relation to each other and only nominally regulated by a schematic zoning scheme (Fig. 22–23).

The traffic crisis is further attenuated by the impressive road sections allocated not only in Majlis main arteries at Taawon St., Omar al Mukhtar St. and the Corniche in its northernmost section, which prevents connectivity between these three sectors including any functional and/or visual relationship but also generates convoluted spirals in local traffic flow.

The regulations only specify the minimum height of the towers as G + 15, a territorial density or footprint of 50% at the base and 30% at the upper floors, and a minimum distance from the boundary of the lot at 12.5 m. In spite of the extravagance of the forms, this results in a monotonous landscape of very dense buildings with an approximate base of 45 × 40 m surrounded by parking lots and mostly deprived of any commercial activities at the base. The indifferent arrangement in the lot also prevents any regular alignment to the road, which only functions to maintain the high-speed flow of vehicles.

What public spaces, streets, alleys, sidewalks, parks, and squares exist are those that suffer the most. The streets of the individual sectors often have an inconsistent, convoluted design that tends to lead to T-crossings, lack any accommodation for pedestrians such as sidewalks, shaded paths, rest areas. Some alleys among unshaded buildings can make for adventurous walkability. With the exception of the recent park of the Sheraton Hotel, attached to the continuous green strip of the Corniche, the green pockets are scraps of the fabric often left over from tower construction site and used improperly as parking lots. The squares and the relative function of social aggregation is generated by the two shopping centers of City Center and Gate Mall, or else in the halls of the large hotels. However, the hunger for successful public outdoor spaces has been demonstrated by the recent success of the Lavazza at the corner of the Gate Mall where all the small space cuttings were equipped by private individuals with terraces using the common methods of Tactical Urbanism. It is imperative to increase the number of these spaces, endowing them with public services as part of a continuous pedestrian network.

If the role of the TOD as a node of the Transit Regional System is undisputed, its place-making function remains open to debate, meaning its ability to modify the current structure of the city, introduce and spread public services throughout the area, structure the urban form, and generally raise the liveability of the neighbourhood. The West Bay north station located at the front of the new convention center in Omar al Mukhtar St. has created the conditions for the formation of a large service node, which is based around the City Center Mall and the Gate Mall, where the three structures are connected by a minimum of ground-level of upper-walkway pedestrian routes. A similar multifunctional node does not represent a big novelty. It is based on the same logic with which the contemporary CBD was conceived, concentrating the functions in mega-container structures, which does not contribute to raising the quality of public spaces, let alone the empty ‘leftover’ spaces in the current urban fabric. The West Bay station at Majlis al Taawon St. offers a more indefinite urban condition, i.e., without services and characterized by the presence of voids. It could be a laboratory test case for the redevelopment of all the areas in the district without detracting from the minimalist retrofitting proposals providing equipped sidewalks, shady open spaces, parking areas, and road shafts, and the abolition of fences, etc. Both the Ministry of Planning and the Municipality as well as scholars in the academic world agree on the need to accompany the presence of the TOD with a greater increase in density and intensity. A solution that limits itself to a substantial increase is tower height and concentration of services and commercial activities in mega-container structures in the hopes that the spontaneous activities of private developers can fill the large voids. In-filling open spaces at the base of the towers and better provision of public non-vehicular functions does not

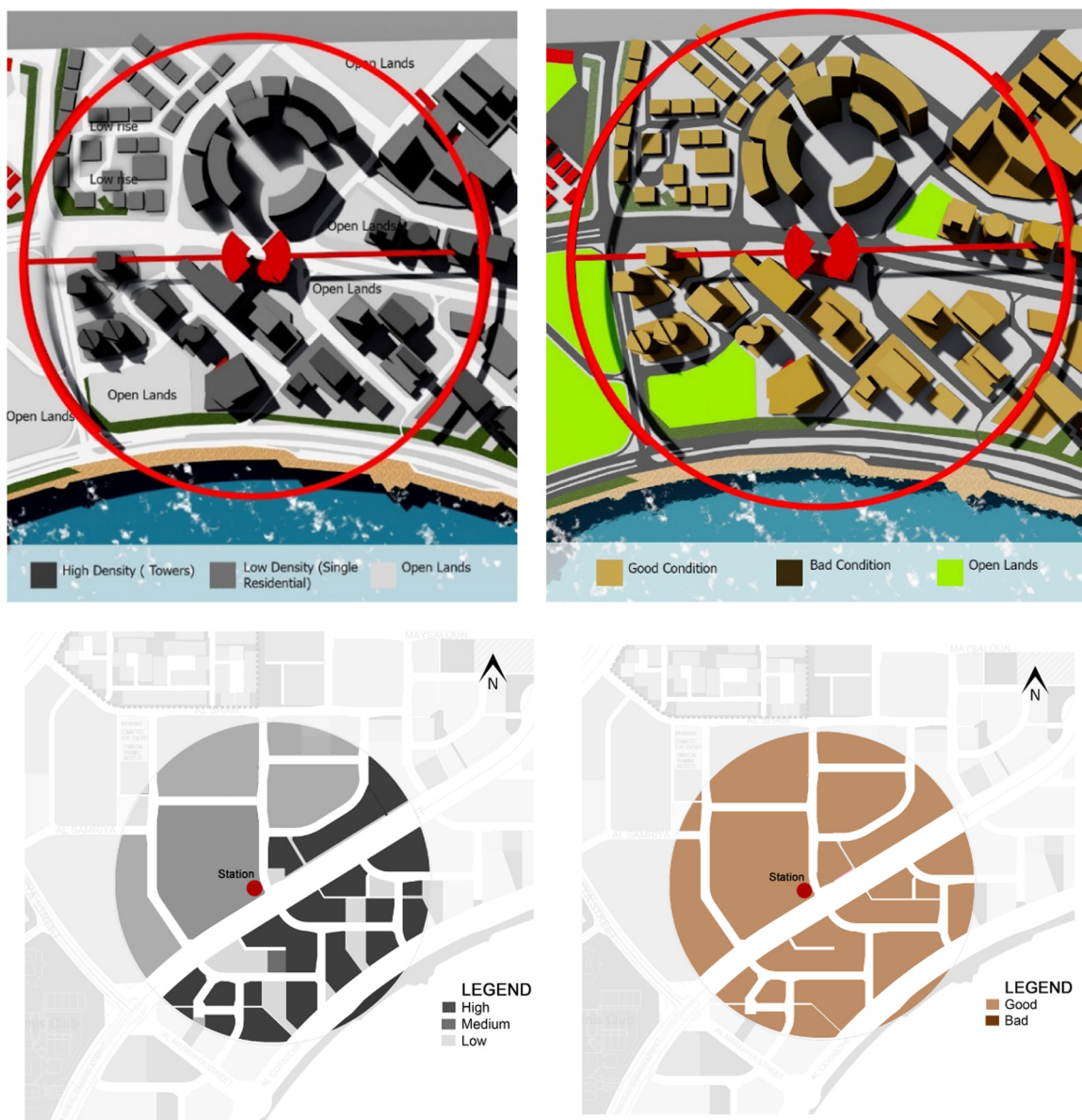


Fig. 15. Density (left) and Building Condition (right) (Source: authors).

necessarily guarantee an organic result and it might be counterproductive due to the concentration of high-speed vehicular traffic and the point load of vertical people flows discharged to the ground by the towers. Such a scheme focused on increasing residential populations could lead to a *dramatically increase* in residential densities with synergetic effects for subsequent organic transformation of the neighbourhood profile through an increase in demand for local services and uses (Fig. 10).

An alternative model in China is that of a continuous three-four-story podium at the base of the towers, extending for an entire block, containing public services, retail and parking (Yuen, B., 2011). One such a solution is based the Ezdan Towers hotel and house complex consisting of a four-storey basement of car parks, covered by a roof-garden equipped with services and meeting/leisure spaces of the residents: 4 towers of 35 floors. Recently, retail shops with restaurants, a small shopping center, and pharmacy were opened at the base on the street frontage that runs around the entire complex, which seems to have not only increased options for residents but also attracted use from other areas of the neighbourhood. The solution of the large-scale podium could represent an improvement in the current situation but offers some serious problems:

1. Impenetrability: the podiums are characterized by blank facades at the street-level and most the open public space is limited to the ground floor. Circulation patterns are limited to the podium and poorly integrated with large-scale urban routes.
2. Retailers are oriented towards internal space, which affectively privatizes public space.



Fig. 16. Modern Buildings (Source: authors).



Fig. 17. No Shading Devices on Main Streets (Source: authors).



Fig. 18. Poor Pedestrian Walkways, Connectivity and Infrastructure (Source: authors).

3. Continuous walls at street level prevent air circulation and promote pollution.
4. Unlike Ezdan Towers, the towers in West Bay pre-exist at any bases or podiums, making implementation and integration of functions much more difficult.

Conceptually, despite the great ideological and geographical distance, the revitalization of the two sectors gravitated around the node of West Bay Station South does not differ much from the problem associated with rehabilitation of the Soviet residential neighbourhoods - called Khrushchevski - after the fall of the Berlin Wall. All the proposals of the 1990s aimed at the recovery of these Soviet neighbourhoods provided for densification and multiplication of services with infill development.

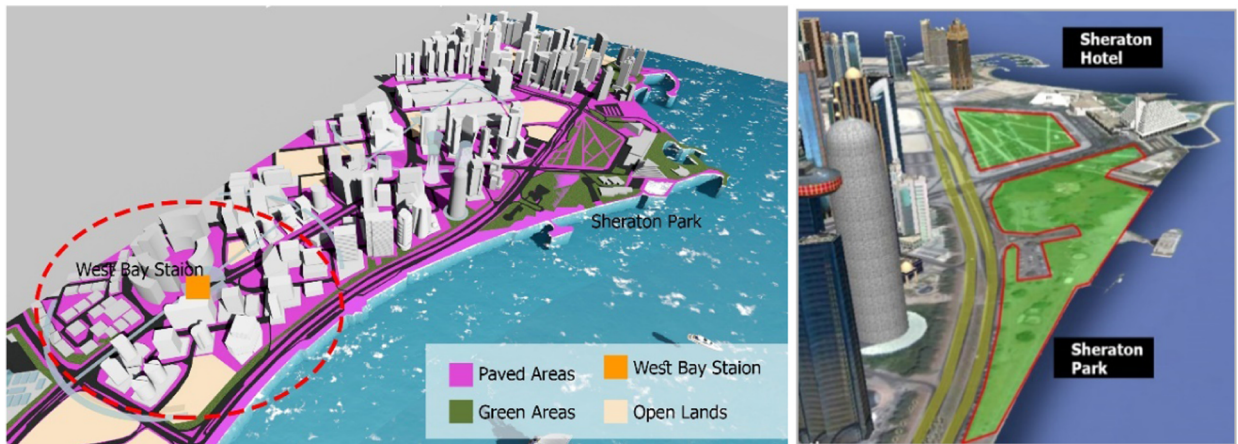


Fig. 19. : The public Realm in West Bay.



Fig. 20. The Corniche Cycling network.

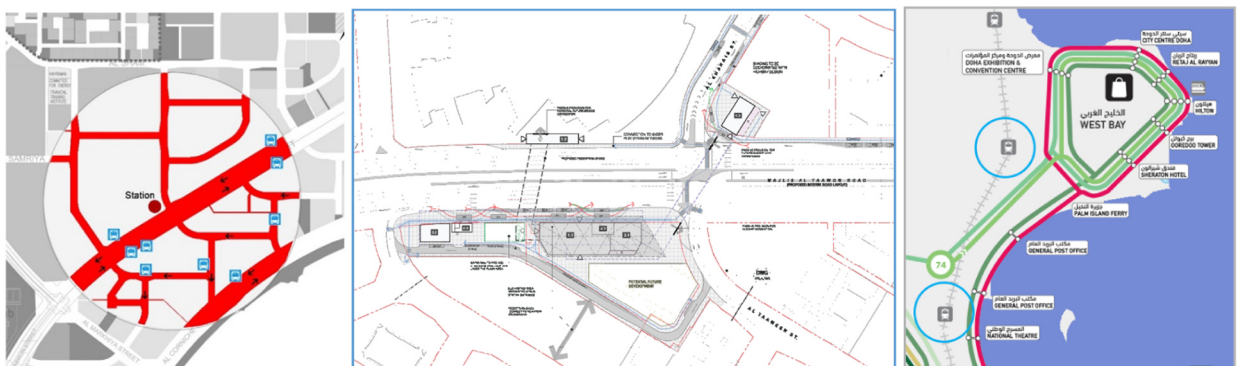


Fig. 21. West Bay Main Metro Station and routes of public transport systems (Source: authors).

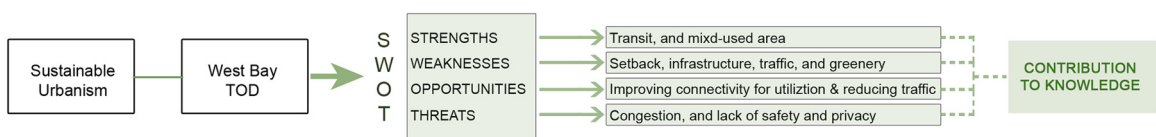


Fig. 22. SWOT Analysis Diagram (Source: authors).



Fig. 23. (left) Footprints of built forms in West Bay district in 2016 and (right) design concept to in-fill open space at base of the towers with 3–4 story built forms, which replicate the typology of the older residential area to the northwest (Source: Dina Saleh/Qatar University).

Conclusions and discussion

The ideal solution should result in a new fabric of human scale unencumbered by the current road network, aimed at reconstituting a new structure of the city, which privileges nodes and connections and the principle of hierarchy, re-linking ignored relations first among the main nodes, significant points for the capacity of social clotting more than for the superficial image of the district. Such an urban fabric would favor the recovery of non-places, that is interstitial spaces between towers and voids or discontinuous systems, by layering together a complex, hybrid aggregation of buildings and infrastructures as well as green areas that are the spaces of everyday life, i.e., the normal of traditional urbanism. To consign what happens now in West Bay to the identification and reinterpretation of non-places means, in fact at the same time, losing the memory of the city and the image of its future.

One goal is to change priorities by shifting attention from a road project dedicated to high-speed motorized traffic flow to an integrated process that takes pedestrians, cyclists, and motorists into account with an infilling operation within the circle of influence of 400 m radius from the station to form a horizontal and extended fabric, sprayed by a network of roads of conformal section, of height $G + 3/4$ alternative to the point of the towers, but capable of establishing points of contact at different levels (Lotus, 1984; Trancic, R., 1986). The coverage of the different blocks could have a function of public or private green, effectively doubling the public areas on land and at altitudes at about 20 m. The new urban fabric contrarily to the podium is fragmented by covered paths and open roads whose design does not always respond to the disposition on the ground of the towers and banal dictates of real estate. The towers become almost “natural obstacles” to human connectivity, and the traces of the new building fabric move according to a spontaneous logic that responds to the energies of the whole district and of the entire community. The functions included in the small blocks of the new building fabric meet the criteria of a flexible mixed development that sees together the presence of multi-storey car parks, offices, trade and health centers, special residences and street level religious activities, public exercises for leisure, entertainments, social and cultural activities, retail etc. but also small open spaces for meeting or contemplation. The coverage plan could include green areas, children playgrounds, sports, and public gathering areas. The towers would not be indifferent to this radical transformation of the urban landscape and would be induced to modify its vertical land use profile. The economic stresses of the new building fabric will lead in most cases to the definition at the base of the towers, where the retail floor is located on the ground floor, then three-to-five storey floors of residences. The access from the adjacent multi-storey car parks could take place directly from the roof of the fabric, granting residents autonomy with alternative access from the garage.

Close to the West Bay South station in the building fabric that occupies the interstitial spaces, the freed area should also find a share of affordable housing. If this type of settlement is unwelcomed by private developers, who prefer to invest in high-rise luxury building types performance, the positive impact for government policies would be the injection of middle class expatriate resident, which will have a notable reduction in transport costs favored by TOD and diversify the resident profile in the district.

Contribution to knowledge

The excavation and works associated with the underground could be an opportunity for a revolutionary proposal to reorganize the entire neighborhood. The burial of the Omar al Mukhtar - Majlis al Taawon fast-flowing axis in the stretch between Al Markhiya Street and Ambassadors Street would have the effect of healing a deep wound in the fabric of West Bay, freeing a large linear area with strategic value. It is an urban operation of great financial and technological commitment, which has a precedent in the Big Dig of Boston, in which the I-93 Central Artery - connected to the national highway system cutting the center in two of Boston - was completely buried in the nineties and there have been several attempts to imitate this initiative in five American cities. Freed from the fast traversal traffic, the vast linear surface, in addition to a huge recovery of monetary land value for the municipality, would be the backbone of a system to promote the pedestrian and cycling connectivity of the neighborhood in an integrated system, which would

include slower vehicular traffic with access to multi-storey car parks. Whether you want to turn this surface into a continuous park like the Rose Kennedy Greenway in Boston with the function of civic promenade, cultural plaza, and four seasons garden at the same time or use it partially to build the parts of the building fabric necessary to integrate the two sectors west and east of the artery, the operation would have the merit of uniting the area of influence of West Bay North with West Bay South with a high density of housing and services while diluting the mega node of City Center- New Convention Center and avoiding a concentration of services and commerce in a huge box above the West Bay South station. The results would be a real city center; alive and active 24 hours a day and 7 days a week. The expressway along the northern part of the Corniche Diplomatic street could receive similar treatment with alternating parts of the underground artery and uncovered parts similar to the swimming of the dolphins, - for example, a technique used on the Paris along the Senna - where the sections in the tunnel would favor the creation of squares or green surfaces, able to put in direct contact the northern sector of the district with the water of the bay.

Implications for practice and advancement of research

Scholars and professionals from a number of disciplines – architecture, planning, psychology, sociology, social psychology, geography, ethology, psychiatry, and so on - have begun to address questions about how environments have been shaped and how they should be designed, what effects environments have on people and what are the important mechanism linking people and environments.

This research study investigated the existing land use diversity mix, density, streets and pedestrian connectivity, cycling network and modes of transport within the West Bay district in order to identify the strengths, weaknesses, opportunities and threats of the district for the implementation of the new TOD with the ultimate purpose of enhancing livability into the foreseeable future. The neighborhood of West Bay has numerous strength and opportunities for improvement. Strengthening the quality of the community would increase the neighborhood land value and desirability to use transit in the area. Improvements centered towards pedestrian convenience and comfort within the neighborhood by providing sidewalks, shaded provisions, street furniture, improved infrastructure and more choice of sustainable transport was seen as key to this transformation. Also, the study proposed the adoption of urban design principles aiming at reducing vehicular congestion and carbon emissions by enhancing the use of public transport systems and creating opportunities for walking and cycling.

Currently, Qatar has several challenges in shifting from its recent history of car-based culture towards a more sustainable, low carbon future. Large funds have been invested in the development of public transports in Doha for hosting mega events such as 2022 FIFA World Cup and meeting Qatar National Vision 2030. Therefore, it is crucial to plan for the Qatar Transit Oriented Developments, whose urban form could greatly enhance the quality of life and/or livability in the city. Our findings sought to contribute to the discussion about reshaping urban planning policies, guidelines and strategies for the formation and implementation of TODs in Qatar with the ultimate goal of implementing livability, envisioning the collaboration of multi-disciplinary consultants, such as architects, urban and transport planners, sociologists, and other social scientists.

Acknowledgements

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The authors would like to acknowledge the support of Qatar University for creating an environment that encourages scientific research. This research study was developed as part of two research project schemes: (1) QUST-2-CENG-2018-20 titled “*Post-2022 FIFA World Cup: Urban Regeneration Strategies for the Sustainable Master Planning of Doha*”, awarded and funded by Qatar University; (2) UREP 19–181-5–041 titled “*New Built Forms Integrated into the Urban Fabric of Doha: The Transit Oriented Development (TOD) in West Bay*”, from the Qatar National Research Fund (QNRF, a member of Qatar Foundation). Also, the authors would like to express their gratitude to the Government of Qatar, especially to the Ministry of Municipality and Environment (MME), the Qatar National Council for Culture, Arts and Heritage, Qatar Rail and Ashghal Public Works Authority of Doha for their collaboration, for participating in the meetings, handling relevant visual data and cardinal documents to the research aims and finally to discuss the conclusive results of this investigation. Finally, the authors thank the anonymous reviewers for their constructive comments, which contributed to the improvement of this paper. The authors are solely responsible for the statements made herein.

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