

UDC: 711.453(549.14)

DOI: 10.5379/urbani-izziv-en-2019-30-01-001

Received: 13 Aug. 2018

Accepted: 14 Feb. 2019

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Implementing the living streets concept by transforming streets in the central business district of Peshawar, Pakistan

The idea of living streets has recently evolved and is currently being considered in urban planning and development for cities. The main purpose of the living streets concept is to provide safe access for all types of traffic, thus focusing on the overall sustainability of a city. This study investigates the characteristics of urban arteries in Peshawar's central business district (CBD) from the perspective of the living streets concept to form a basis for policy measures that can be adopted to improve the CBD. The study hypothesizes that the living street infrastructure in the CBD does not accommodate the needs of various users (shoppers, residents, employees and those visiting for recreation). A field survey, including an observational survey and questionnaire, was conducted

to identify and analyse basic public infrastructure in the CBD. Issues such as noise, air pollution, litter, a lack of appropriate public transit and pedestrian infrastructure, and poor traffic management were discovered. Strong dissatisfaction was recorded when the respondents were asked about current pedestrian and on-street parking arrangements. The field survey also found that the current pedestrian arrangements were insufficient for pedestrian needs, and the absence of street furniture discouraged community engagement in the study area.

Keywords: living streets, pedestrian safety, liveability, pedestrianization, accessibility, central business districts, sustainability

1 Introduction

Liveability is an integral part of the concept of sustainable urban development (Dempsey et al., 2011). Promoting walkability and accessibility with multiple modes of transport is a main objective of the transportation sector associated with liveability and sustainability (Victoria Transport Policy Institute, 2010). This demonstrates the vitality of walkability for the liveability component in promoting an environmentally friendly and sustainable setting and shaping a liveable place (Shamsuddin et al., 2012). In 2013, UN-Habitat presented the idea of city prosperity, which means a city must have “prosperous streets” as public spaces to encourage social engagement and safety, improve economic and ecological sustainability, and provide accessibility for motorized and non-motorized traffic (UN-Habitat, 2013). The liveable city places great emphasis on introducing sustainable means of transportation to reduce air pollution and noise and to encourage residents to walk. This promotes walkability, which can be achieved by incorporating living streets into the city (Lennard, 2008). The ultimate objective of introducing living streets is to make the city safe and accessible (Dempsey et al., 2011). This concept helps make alternative transport options appealing and encourages authorities to transform public spaces. This ultimately makes the streets safer and vibrant for the community (Dumbaugh & Gattis, 2005). The World Health Organization has reported that globally approximately fifty million people are injured and 1.2 million killed in traffic accidents every year. This report anticipates an estimated rise of 65% over the next twenty years if there are no new interventions to prevent collisions (Gulzar et al., 2012). Today’s roads are not designed as mono-functional entities for use by automobiles alone. They are designed to simultaneously serve multiple modes of transport, such as cycling, walking, and driving (Pojani & Stead, 2015). However, in Peshawar the road network only serves vehicular traffic because the roads have been designed as mono-functional routes and often lack basic equipment (Borthakur, 2017). People face obstructions such as encroachments and illegal parking, which restrict their mobility in the CBD. Hence this research analyses the current infrastructure in the CBD from the perspective of the living street concept. The study hypothesizes that living street infrastructure in Peshawar’s CBD does not accommodate various users (shoppers, residents, employees and those visiting for recreation).

2 Features of a living street

Living streets, also known as complete streets, aim to provide a transportation system that accommodates all users, including pedestrians, cyclists, and drivers. Living streets have elements such as bicycle lanes, pedestrian spaces, street furniture, traffic

calming measures, medians, and pedestrian crossings. Creating a natural, functional, and pleasing streetscape is crucial for creating any living street (Burden & Litman, 2011).

There is no universal design layout for living streets; each layout is distinctive and exclusively caters to its community and its context. The layout of a living street may comprise dedicated bus lanes, pavements, bicycle lanes, median islands, public transit stops, pedestrian signals, crosswalks, curb extensions, narrower lanes, roundabouts, and other such elements (Bain et al., 2012). Over the past few decades, the idea of Living Streets has evolved and is now being considered in urban planning and design around the globe (Chourabi et al., 2012). The concept of living streets is not limited to providing pavements and bicycle lanes; instead, it focuses on the overall sustainability of the city. When designing living streets, focus is shifted toward a micro-scale, which allows urban planners and designers to focus on pedestrians and pavements and to encourage high-density neighbourhoods. This, in turn, prompts residents to choose to walk and cycle rather than drive. Living streets make neighbourhoods safer, more functional, comfortable, and accessible, which encourages interpersonal interactions that help in community development (Gehl, 2013).

Promoting a healthy environment, improving neighbourhood conditions, community development, and encouraging people to use public spaces – these are the core elements of the living streets concept that urban designers and urban planners all around the world are working on (Carmona, 2010; Gehl, 2011). Furthermore, living streets help in designing a more sustainable city to reduce pollution and promote health and happiness among residents (Farr, 2011). Moreover, quality of life is a very distinctive component of liveability; these two concepts are usually used synonymously because they are strongly interlinked. Therefore, taking into account the quality of life is critical when developing a framework for living streets based on the idea of liveability (Miller et al., 2013). The association between these two components demonstrates that there is a profound affiliation between various characteristics of situations and places that affect overall place-making efforts (Appleyard et al., 2014). The literature has pointed out a number of elements of living streets that play a significant role in improving the dynamics of a city and its living conditions. However, not every element can be incorporated into every city because different cities face different urban issues (Eckerson, 2010).

The majority of researchers believe that introducing bicycle lanes in a city is the best way to improve the cityscape because these help reduce automobile dominance in the area (Barnett, 2018). Not only do bicycle lanes reduce automobile dominance, but they also help reduce pollution and congestion,

making the city more accessible and environmentally friendly (Bain et al., 2012). A neighbourhood's streetscape is an ecosystem in itself, comprised of the economic system of the neighbourhood, a social system, urban forestry, and a transportation system along with many other systems. The ecosystem of a streetscape mimics nature and builds reciprocal associations in an interconnected system to improve the local economy, natural environment, and resources of the neighbourhood and its inhabitants in a sustainable manner (Pucher & Buehler, 2011). Benches, lighting elements, landscaping, and trees are also part of a streetscape. They play a vital role in making streets vibrant and add a dynamic element to the neighbourhood. The use of native plants is crucial to a streetscape because local plants grow best in their local environment. Providing seating for pedestrians boosts the local economy and makes streets lively for local residents, giving them a place to walk around, meet friends, shop, and spend leisure time (McPherson et al., 1999). Modern planning often neglects the importance of pedestrianized streets because it focuses on reducing interference from pedestrians on the street. This can easily be achieved by introducing raised pedestrian pavements, constructing pedestrian areas inside courtyards, and other options that ensure that pedestrians are off the streets. Living streets, on the other hand, focus on bringing people back to the streets by designing public spaces in a manner that is attractive for pedestrians (Bain et al., 2012). Similarly, providing street furniture has proven to encourage pedestrians to use the streets more because street furniture creates a friendly environment for non-motorized travel in the neighbourhood (Soltani & Bosman, 2005). The most common elements of street furniture are bollards, benches, news racks, kiosks, public art, flower planters, refuse receptacles, pavements, restrooms, and parking meters. These elements improve the dynamics of street life because they make cycling and walking more appealing. The placement of street furniture depends on the layout of lights and trees, which determine the pattern and rhythm of the street (Dempsey et al., 2011).

2.1 Selected case studies of implementing living streets

The following section examines various cities where the concept of living streets has been implemented. New York is one of the most successful examples of living streets. Although Peshawar is not similar to New York in terms of its population and area, the urban fabric of Peshawar is similar to that of New York. The administration of New York was successful in implementing various elements of living streets such as street furniture and restricting vehicles to encourage pedestrian traffic. Kuala Lumpur, on the other hand, has urban issues that are similar to those in Peshawar, which proved helpful in assessing CBD users' needs in Peshawar.

2.1.1 Transformed public spaces in New York

Pedestrian plazas and "street porches" have been created throughout New York and have replaced parking along the streets. These plazas have been designed to attract people by making use of shade and seating elements. New York has modified most of its vehicle-dominant intersections and replaced them with street porches, which have helped calm traffic and create safer pedestrian routes (Hou, 2010; Shaftoe, 2012). In high-density areas, some streets are completely closed off to vehicular transport and are filled with street furniture, which is essential for street porches where people can sit and relax. Very dense areas have few or no open spaces, which is why these pedestrian plazas provide a space for residents to socialize (Gehl, 2013). These measures can also be implemented to improve the socioeconomic conditions in Peshawar's CBD.

2.1.2 Streets in Asian cities: walkability in Kuala Lumpur

Several studies conducted in Kuala Lumpur have concluded that tourist destinations are quite comfortable for walking but smaller streets have limited space for pedestrians, which affects tourists' overall experience because cars dominate most city streets (Sreetheran et al., 2011). The studies further demonstrated that, in order to create a living street in the city, lighting and crossing infrastructure must be enhanced to improve safety at night and during the day. Other features required to provide pleasant walking for tourists and locals were shaded and wider pavements. Studies have also shown that safe and comfortable walking are the two most essential elements for improving pedestrians' walking experience in the city centre (Zakaria & Ujang, 2015). This study highlights various elements that are necessary for implementing living streets such as lighting and crossing infrastructure, in addition to shaded and wider pavements.

2.1.3 Living streets in India

Efforts to promote walkability and pedestrian infrastructure in six Indian cities in partnership with the Asian Development Bank have shown that large-scale projects other than improving transport are required to transform urban streets (Leather et al., 2011). Follow-up studies observed that, although small-scale projects are being carried out to improve walkability in various cities in India, no large-scale projects are planned for this. Apart from improving a few miles of pavements, no major interventions are planned; instead, the development sector is mostly focusing on expanding roads for automobiles and public transport (Datey et al., 2012). Improving public transport is a waste of capital because accessibility of public transport is not being improved and can result in a decline in ridership for

the new infrastructure being developed (Leather et al., 2011). Underpasses and pedestrian overpasses thirty-three feet long are planned in Surat. In Chennai, the principles of living streets have been adopted by the ITDP (Institute for Transportation and Development Policy) to design bicycle routes for a pilot project in the city. The draft master plan proposes wider pavements along residential and major commercial streets, and seeks to preserve pavements from encroachment by hawkers, vendors, parked vehicles, electrical transformers, hoardings, and other elements. In Pune, IIT-Delhi and CIRT have proposed a master plan for constructing a bus rapid transit system incorporating underpasses for pedestrians along the pilot corridor. Overpasses are also part of the project (Bhattacharyya & Mitra, 2013). This case study is important because the cultural and social setup of Pakistan and India is almost the same and the issues faced by users in the CBDs of both countries are similar. It can be concluded from this case study that small-scale projects cannot improve pedestrian accessibility, and a holistic approach needs to be implemented for this purpose.

2.2 Public space planning and use in Peshawar, Pakistan

For more than two decades, Peshawar, the capital of Khyber Pakhtunkhwa (KPK), has been facing issues such as congestion, increasing road accidents, air pollution, litter, and noise due to urbanization (Hashmi, 2016). The population of Peshawar has increased exponentially over the past decade for various reasons, such as an influx of internally displaced persons, natural population growth, and mass migration due to political unrest. This has led to an unprecedented increase in car owners, resulting in air pollution, noise, increased fossil fuel consumption, and collisions. Apart from urbanization, Peshawar also has been the sole sanctuary for Afghan refugees and Pakistanis internally displaced by the political unrest in the country for more than two decades. Natural population growth along with an influx of Afghan refugees and internally displaced locals is the main cause of Peshawar's rapid population growth. This population growth demanded a well-designed road network, which the city administration provided by building major arteries throughout the city (Peshawar Development Authority, 2017). However, these arteries only serve cars because they were designed as mono-functional roads (Borthakur, 2017). The last forty years have seen a substantial population increase, as well as more cars and the expansion of road networks. This has increased the risk of collisions (Hyder et al., 2000). The total number of collisions in Pakistan in 2010 and 2011 was 9,723; of these, 2,722 occurred in KPK (Pakistan Bureau of Statistics, 2012). In contrast, in 2015 and 2016, the total number of collisions fell to 9,100, of which 4,287 occurred in KPK (Pakistan Bureau of Statistics, 2012). Although the

overall statistics fell over the five years, the number of collisions almost doubled in KPK.

In Peshawar, street design has always tended to facilitate vehicles. This contradicts the concept of liveable and sustainable streets, which supports various modes of transport on a single street and prioritizes pedestrians walking and experiencing the street as a public space (Gulzar et al., 2012). Although the Urban Policy Unit of Peshawar is working on urban development projects to improve the situation, its projects lack a holistic approach and some design aspects associated with principles of sustainability, such as equity and equality, improved quality of life for CBD users and an enhanced environment. These elements need to be integrated into Peshawar's CBD so that the overall socioeconomic prosperity of the study area can be improved by accommodating users of various modes of transport.

3 Materials and methods

This study was conducted using qualitative and quantitative research methods. Data were collected to analyse the streets in Peshawar's CBD. The mixed research method was used because this method was appropriate for answering research questions about the major arteries in the CBD and also helped explain the reasons behind the situation. The aim of this research is to improve the traffic situation in Peshawar's CBD so that non-motorized traffic needs are also met, in which identifying streets that need to be converted into living streets depends on the specific characteristics of each street. A field survey, including an observational survey and questionnaire, was conducted at various locations in the study area to identify and analyse its basic characteristics. A satisfaction index was used to analyse the conditions of the study area and users' satisfaction with various elements.

- **Field survey and observation:** The characteristics of streets in Peshawar's CBD differ, and so the characteristics causing the situation in the study area to deteriorate further were identified. This involved field visits and taking photos. These qualitative data helped in understanding the situation in the study area with a checklist devised using indicators identified based on a literature review. Indicators considered for preparing the questionnaire included street activity, major trip generators, street patterns, accessibility, parking issues, cycling issues, pedestrian routes, lighting, safety, street furniture, and cleanliness (Majeed, 2012; Nilles, 2016). These indicators were selected for their relevance to the study.
- **Questionnaire:** The questionnaire helped determine the socioeconomic status of the local people, their concerns about the current situation and their preferences for a

living streets model in the study area. Because the spatial segment selected for the survey was a part of the commercial hub of the city, the sample size was calculated based on the formula given by Krejcie and Morgan (1970). The sample size for this study was 123 for this formula. The confidence level for this survey was 95% so that the accuracy of the research would not be compromised. The sample comprised people visiting the study area; they were selected through systematic random sampling to avoid bias. Every tenth person was asked to complete the questionnaire developed for primary data collection.

- **Satisfaction index:** Satisfaction was calculated using the satisfaction index first developed by Yeh (1972); this index was used in this study to compare respondents' satisfaction regarding parking in the study areas. A score of +1.00 indicates complete satisfaction; 0.00 indicates acceptable satisfaction, and -1.00 indicates dissatisfaction (Yeh, 1972, 1975). This index has been used in various studies (Anwar et al., 2008) and has proven effective in reflecting levels of satisfaction or dissatisfaction (Abdu et al., 2014). Variables such as pedestrian routes, parking, cycling infrastructure, pedestrian infrastructure, its accessibility and maintenance, safe crossings, traffic calming measures, plants as buffer zones, street furniture, safety, and cleanliness were used to measure users' satisfaction. Assessing users' satisfaction helped in understanding their needs and requirements for improving accessibility.

Data from the field survey and observational survey were entered into Statistical Package for the Social Sciences (SPSS) for analysis. The frequency of responses was assessed. The tabular results of the SPSS analysis were converted into graphic form using MS Excel. The satisfaction index was then applied to analyse respondents' satisfaction with safety, visibility, ease of use, and other indicators. This index was also used to analyse respondents' priorities concerning potential future street furniture, crosswalks, improved pavements, and so on.

4 Peshawar case study: results and discussion

In terms of traffic conditions, Peshawar is one of the most congested and polluted cities in Pakistan. Excessive traffic on small roads and the encroachment of markets has increased congestion on the already busy road network, making walking impossible for pedestrians, especially children and women, because pavements are mostly occupied by street vendors. This has played a significant role in increasing air pollution and noise in the city because there are few green areas (Ali et al., 2012). Due to high population growth, there is rapid growth in the number of vehicles registered every year (The

Urban Unit, 2016). Furthermore, non-motorized modes of transport, including walking, constitute only 2% of the total modal split. The reasons for such a small percentage of pedestrians and other non-motorized modes of transport are deficiency of suitable infrastructure (pavements and pedestrian signals), safety concerns due to a poor traffic control system, few or no connections between the public transport network and various urban land uses through pedestrian infrastructure, and inadequate enforcement by the authorities (The Urban Unit, 2016).

Data from 2003 to 2012 show that the number of collisions in commercial areas like the Saddar neighbourhood increased over ten years. Thirty-nine fatal road accidents and 155 non-fatal accidents were reported in the Saddar area during this period. Forty fatalities resulted due to these accidents, of which 70% were pedestrians. Moreover, 189 people were injured in non-fatal accidents, 50% of whom were pedestrians (Shah, 2014). The evidence indicates that mobility is strained due to poor accessibility and connectivity of various land uses, the predominant socioeconomic dynamics of the region, unpremeditated city planning, and deficient public transport infrastructure. This is why it is important to understand the current situation and concerns of the people in the study area (The Urban Unit, 2016). The commercial area selected for this study was Peshawar's Saddar neighbourhood, which is the largest commercial hub of the city, measuring 17.5 hectares. Figure 1 shows the roads (Saddar Road running from northeast to southwest) that were chosen for the field survey.

The questionnaire helped in collecting demographic data from respondents, shown in Figure 2. Figure shows that the majority of visitors to the study area were male. The mobility of females was limited in the commercial area and was quite apparent because less than one quarter of the respondents were females. The main reason for this gender inequity in the commercial area was the poor conditions of pedestrian routes, as cited by many female respondents. Perhaps the female-to-male ratio would increase if conditions in these commercial areas were improved. More than half of the respondents were between twenty and forty years old, whereas a very negligible percentage of people over sixty were seen and interviewed in the study area. Table 1 shows the results of data collected during the observational survey. Various elements of selected segments of study area were observed, including street activity, parking, pavements, crosswalks, street shoulders, traffic conditions, street furniture, bicycle/motorist parking spaces, and cleanliness.

A situational analysis of the Saddar neighbourhood was carried out, showing that a variety of commercial uses were present, including offices, retail and wholesale shops, restaurants,



Figure 1: Map of study area (source: Google Maps, 2019).

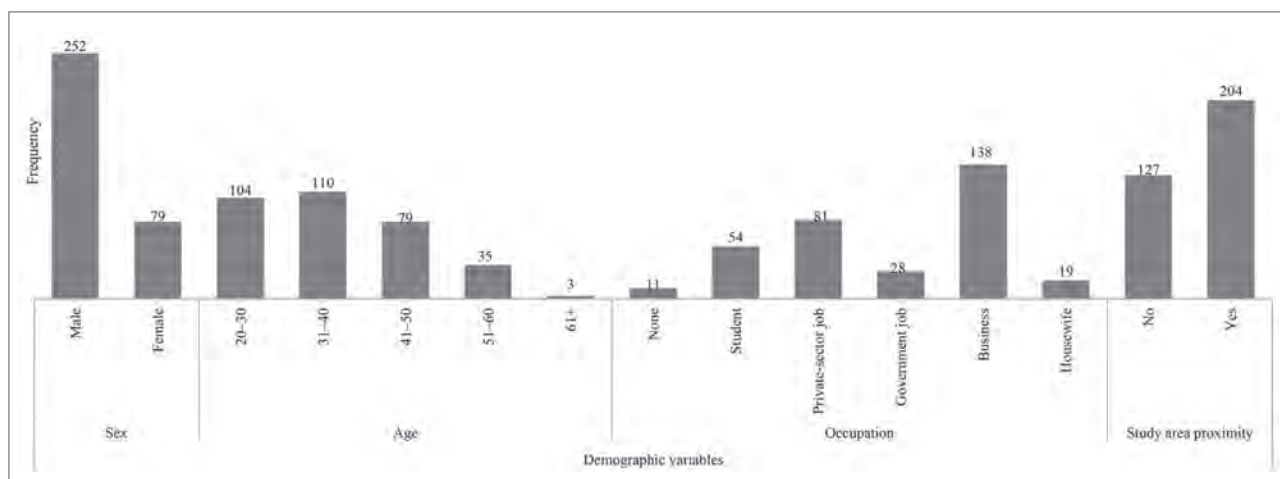


Figure 2: Demographic profile of respondents (source: field survey).

Table 1: Availability assessment of basic road and traffic characteristics.

Activity	Attribute	Yes/No
Street activity	Street cafe / outdoor seating	No
	Encroachments by street vendors	Yes
	Pedestrian signage	No
Traffic	Traffic speeds compatible with pedestrian safety	No
	Basic traffic calming efforts	Yes
	Extra traffic calming measures	No
	Conflicting conditions between various modes	Yes
	Vehicular speed for safe walking	No
	Risk of pedestrian collision	Yes
	Separate mode availability	No
	Bus stops	No
	Transit links	No
	Pedestrians leaving buses conflict with vehicles, etc.	Yes
Median strips / crosswalks	Intersections with curb extensions or pedestrian refuge islands	No
	Median strips	No
	Crosswalks	No
	Adequate lighting	No
Street shoulder	Designated shoulder	No
	Overpass /underpass for crossing road	No
	Drainage for rainwater runoff	No
	Marked parking spaces on shoulder	Yes
Parking	On-street parking	Yes
	Off-street parking	Yes
	Parking creates buffer	Yes
Bicycle/motorist parking	Separate bicycle lanes	No
	Bicycles on road	Yes
	Conflicts between drivers and pedestrians	Yes
Pavements	Adequate separation between vehicular traffic and pedestrians	Yes
	Pedestrian crossings available	No
	Measures needed for safe crossing	Yes
	Adequate lighting for pedestrians	No
	Safety concern during peak time	Yes
	Building entrances accessible	Yes
	Pavement continuity	No
	Obstructions on pavement	Yes
Street furniture	Sidewalk furniture	Yes
	Amenities (dustbins, benches, etc.)	No
	Streetlights and traffic signals	No
	Plants	No
	Taxi stands	No

Source: field survey (2018).

healthcare facilities, museums, places of worship (mosque, church, and temple), and shopping plazas. After carrying out an empirical investigation of the selected segment of the study area, it was determined that there is little or no street activity in terms of street cafes, outdoor seating for pedestrians, and availability of newspaper racks. These are the main activities that make a commercial area vibrant and attract people from the surrounding neighbourhood, which eventually leads to social equity and economic vitality of the CBD. In the study area the pedestrians sat on the pavement, creating obstacles alongside vendors' carts also crowding the already narrow pavement (Figure 3).

No traffic signals were observed in the study area; this can be linked to the many accidents that have occurred in this area. During the public opinion survey, the majority of respondents expressed dissatisfaction with pedestrian infrastructure. No signage for drivers or pedestrians was visible, which is another important factor in collisions between vehicles and pedestrians. The corner radius in the study area was quite wide, which encourages high-speed right turns, leading to collisions between vehicles and pedestrians. Respondents were highly concerned about poor traffic management in the study area and felt that many problems could be resolved through diligent enforcement of traffic rules. Only the most basic traffic calming measures were seen in the form of speed bumps; other measures such as pedestrian refuges, curb extensions, or median islands were absent. Figure 4 shows only a narrow divider separating two lanes of traffic.

This situation called for the introduction of additional traffic calming measures because there were no signals for vehicles or pedestrians in the study area, increasing the risk of collisions with pedestrians. Introducing table-tops and median islands has become common practice internationally because it facilitates pedestrian traffic and helps in avoiding traffic collisions. As shown in Figure 5, on-street parking was being utilized to its full capacity all day long in a selected segment of the study area. This created a buffer zone between pedestrians on the pavement and vehicles on the road, which made it easier to walk on the pavement but quite difficult to cross the road in heavy traffic. Off-street parking was available at multiple locations, which was also being used to its maximum capacity. The maximum use of on-street and off-street parking reflects the heavy use of cars in the locality. Use of private vehicles in commercial zones is discouraged globally and pedestrianization is being encouraged, and introducing public transit in the study area will play a major role in reducing the use of cars.

Improving public transit would play a vital role in decreasing car use in this area. There were no on-street handicapped parking spaces in the study area, which is a major concern because



Figure 3: Encroachments on pavements (source: Maryam Aman).



Figure 4: Traffic management situation (photo: Maryam Aman).

the current parking does not accommodate handicapped drivers. Perpendicular and angled on-street parking was observed in the study area; although this provided a buffer zone for the pedestrians, it also occupied a substantial portion of the road. This poses a threat to drivers as well as oncoming traffic due to limited visibility of drivers exiting the angled parking spot. Parallel parking can also serve as perpendicular parking for two-wheelers. Introducing pavements in urban centres plays a major role in improving the dynamics of a city by improving living conditions (Seskin & McCann, 2012). The condition of pavements was quite poor because major surface problems were observed in these areas. Poor conditions of pavements made it quite difficult for pedestrians, as stated by the respond-

ents. The ramps at the ends of each pavement were quite steep, which made it difficult for people in wheelchairs to use the pavement. The width of the pavement in the study area was approximately four to five feet and pedestrians faced difficulty walking because encroachment by vendors and shopkeepers obstructed the pavement and left little or no space for pedestrians.

Concerning street furniture, no amenities or open spaces were provided in the study area. Huge billboards were displayed at every shopping plaza, which respondents felt was a distraction for drivers and could cause collisions between pedestrians and vehicles. The markings for the on-street parking spots were worn and needed repainting to distinguish the parking spots from the street. Street furniture plays a significant role in attracting people to the CBD by creating a friendly environment for visitors. This leads to improved community development and better socio-economic conditions of the CBD and the city as a whole. The overall cleanliness was quite poor, which can be linked to pollution in the study area, as shown in Figure 6. Provision of dustbins in the study area was demanded by the respondents because this element of street furniture will help reduce pollution.

Living streets are predominantly based on the concept of providing all the elements needed by users. On-street parking is one of the most important components of living streets in a commercial zone (Bain et al., 2012). Figure 7 shows respondents' satisfaction with parking in the study area. Strong dissatisfaction was recorded regarding on-street parking. The main reason for this was insufficient on-street parking in comparison to the heavy influx of traffic. Even people living nearby drove to the commercial area because the public transport system was insufficient and people preferred to drive. Difficulty crossing the road was another reason that demonstrated the failure of traffic-calming measures; this calls for measures to solve the problems related to heavy traffic in the study area.

In addition, over half of the respondents were dissatisfied with walking and crossing the road in heavy traffic, as shown in Figure 7. There were no traffic signals directing drivers when to stop and let pedestrians cross. Over half of the respondents expressed satisfaction with walking on the pavement. Because on-street parking was located right beside the pavement, it gave pedestrians a sense of safety during heavy traffic. Pavements were provided along the line of shops in the study area, making it easy for visitors to go from one shop to another. The respondents were also fairly satisfied with the street crime situation and walking on the pavement at night; over two-thirds of the respondents felt the area was safe. Because the study area had mixed land uses, some activities were still underway in the evening, making it safe for people even at night. In addition,



Figure 5: Commercial area parking (photo: Maryam Aman).



Figure 6: Lack of cleanliness (photo: Maryam Aman).

Figure 7 shows that more than half of the respondents were dissatisfied with the current pedestrian infrastructure. Although the respondents were satisfied with walking on the pavement, they were not happy with its infrastructure. The main issue with the pedestrian infrastructure was that it was not continuous and did not accommodate wheelchair users visiting the study area. The ramp of the pavement was also very steep at the ends, which made it difficult for the elderly and people in wheelchairs to use the pavement. The standards provided for ramp angles should be applied in the study area to encourage people of all ages and abilities to access the CBD. Figure 7 shows respondents' satisfaction with the current infrastructure in the CBD. Negative values show dissatisfaction, and positive values show satisfaction.

Living streets focus on bringing people back to the streets by improving seating options with public spaces designed to be attractive for pedestrians (Bain et al., 2012). Pavements play a major role in facilitating pedestrian movement. When designing a pedestrian route, it should complement the surrounding streetscape and avoid cutting across streets (Bain et al., 2012). Data were collected from respondents on the current pedestri-

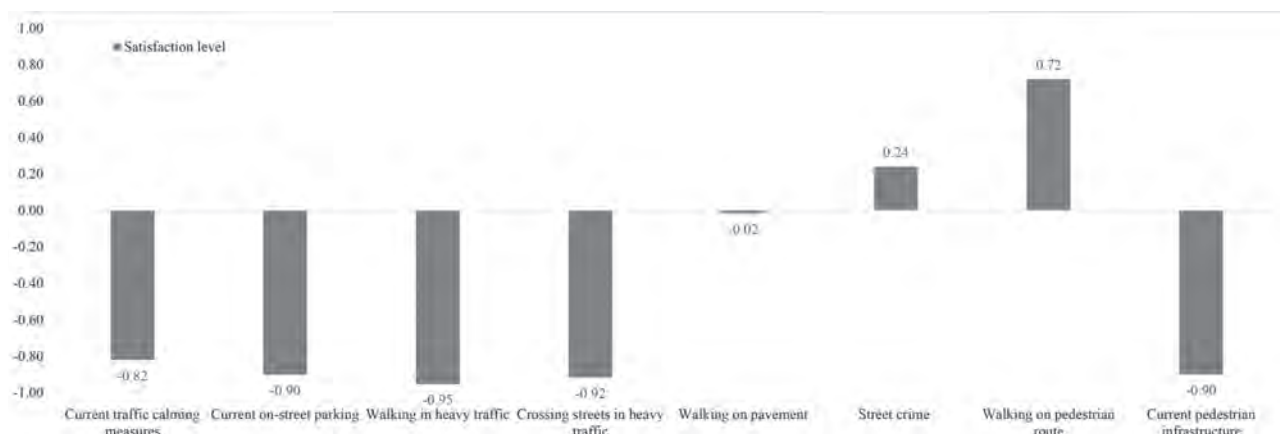


Figure 7: Public satisfaction with current infrastructure in the CBD (source: field survey).

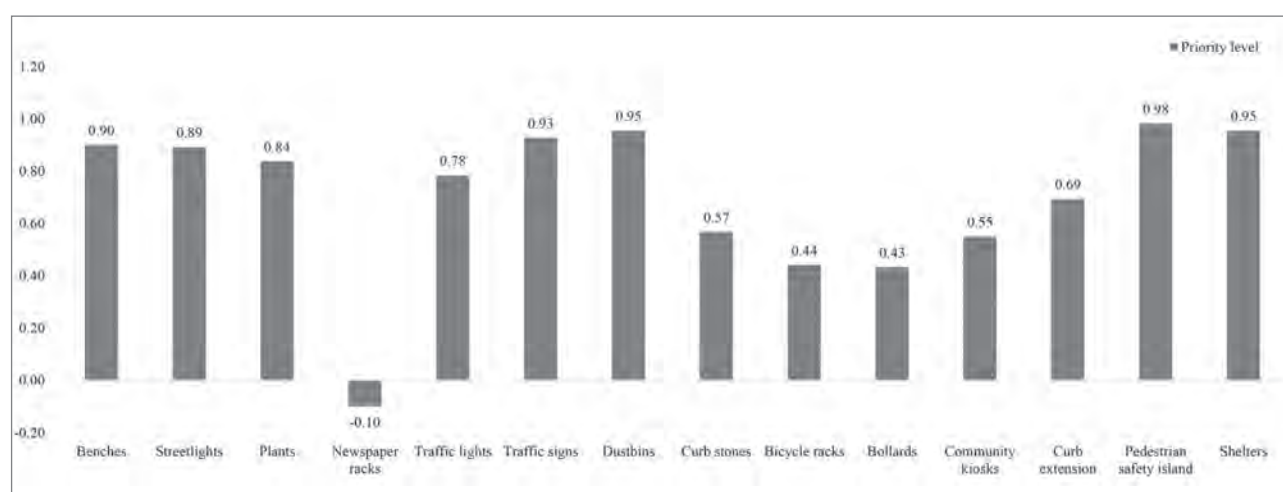


Figure 8: Public priorities for living streets in the CBD (source: field survey).

an routes. This study shows that high-speed vehicles and a lack of zebra crossings are some of the greatest problems encumbering pedestrians in the commercial zone. These factors can be attributed to the insufficiency of pavements in the study area. The pavements were too narrow for pedestrians to make their way through the crowd. In addition, temporary encroachment by street vendors also makes it difficult for pedestrians to use the pavement. Living streets allow neighbourhood residents to access various social activities, which are encouraged by introducing various street furniture (Bain et al., 2012). Opinions about street furniture were also recorded in the survey. Figure 8 shows the responses regarding future street furniture. The respondents demanded benches and streetlights. Because there were no benches in the study area, several people were seen sitting on the edge of the pavement. This highlights the need for benches and other street furniture.

To create a living street in the city, lighting and crossing infrastructure must be improved to enhance safety at night and during the day (Zakaria & Ujang, 2015). There were very few

streetlights in the study area, which resulted in poor visibility at night. This explains the participants' desire for more streetlights. The majority of respondents also wanted traffic lights and traffic signs because there were none in the study area. Most respondents favoured installing dustbins because these were also missing. The absence of dustbins in any commercial zone can create difficulties for visitors due to increased litter, which discourages visitors and makes the CBD less accessible. Over half of the respondents agreed that bicycle racks should be installed. This shows that people are willing to use bicycles for transport. It will also make it easier for them to park their bicycles. Most respondents agreed with installing bollards, community kiosks, curb extensions, pedestrian safety islands, and shelters because there were none. Providing these elements in a CBD can help create a visually and functionally attractive environment for achieving social equity. Figure 8 shows respondents' level of priority for various street furniture.

In addition to walking, cycling is one of the healthiest modes of transport because it helps address several problems related

to the environment and the community, including quality of life, climate change, air pollution, and noise. However, cycling opportunities are limited due to traffic in urban centres (Steinbach et al., 2011). Adopting cycling as a mode of transport was favoured by most respondents if the infrastructure is improved. One-third of the respondents lived in areas not in the immediate vicinity of the study area, and so they did not agree with adopting cycling as a mode of transport due to the distance they would have to cover to reach the commercial hub of the city. Instead, they felt that well-planned public transit was a better option.

The respondents were fairly satisfied with safety while walking on the pavements, but they were not satisfied with safety when crossing the streets because high-speed vehicles dominated the roads. Moreover, respondents were also concerned about poor traffic calming measures. Because there were no curb extensions in the study area, pedestrians found it quite difficult to cross the road in heavy traffic. Introducing curb extensions will ensure safety for pedestrians crossing the road. Almost all of the respondents agreed that appropriate steps should be taken to direct pedestrians to safe crossing points because the increased number of traffic accidents made such measures crucial for visitor safety.

5 Conclusion

This study analysed commercial streets in Peshawar to identify current issues and the potential to create liveable and sustainable urban streets. Peshawar is a city in Pakistan that lacks much infrastructure to meet the needs of all transport modes in its commercial zone. As a result, the city's development is unsustainable, which affects the quality of life for visitors due to issues such as air pollution, noise, poor traffic management, lack of street furniture, poor pedestrian infrastructure, and a lack of cycling infrastructure for CBD users. These issues are not covered in the city's planning documents because they primarily focus on provisions for motorized traffic. This can be attributed to a lack of understanding by the authorities regarding the significance of pedestrianization. The ultimate objective of introducing living streets in a city is to make the city lively and accessible for its inhabitants. This concept will help make alternative transit options appealing to the public and encourage transformation of public spaces, which will ultimately make the streets safer and more vibrant. This study assessed the situation in a major commercial hub of Peshawar, which can serve as a basis for policy measures that can be adopted and implemented to improve the city's environmental and social conditions. This study identified issues related to noise, air pollution, litter, lack of appropriate public transit, poor traffic management, and lack of pedestrian infrastruc-

ture for the disabled and senior citizens. This confirms the hypothesis that inadequate infrastructure in Peshawar's CBD has adversely affected overall socioeconomic prosperity.

In conclusion, implementing the living street concept in the study area will help promote healthy communities, better quality of life, and improved neighbourhoods, and it will also encourage local people to transform their public places. Therefore, incorporating living streets into Peshawar's cityscape will help achieve a sustainable environment in the city.

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