University of Bahrain

College of Engineering

Department of ARCHITECTURE & INTERIOR DESIGN

Livability of Streets and Sidewalks in Bahrain

A thesis submitted to the Department of Architecture and Interior Design of the University of Bahrain in partial fulfilment for the degree of Master of Architecture in Urban Design

Submitted by:

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Associate Professor of Architecture, University of Bahrain

Kingdom of Bahrain

June 2022

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Defence Committee’s Approval

Abstract

Liveability is generally assumed as the degree to which a place is suitable for living. However, due to its complexity, this definition varies from one person to another. Good cities are liveable. In a liveable city, one can commute and perform their everyday activities harmoniously There are several principles required to classify a place as “liveable”. Some of these are promoting walkability, enhancing communities, providing transportation, and fostering economic growth and well-being. In terms of the public realm, a city is liveable when its streets are liveable. Well-designed streets and sidewalks can enhance the liveability of the area. A “liveable street” is a concept that focuses primarily on people: pedestrians and cyclists. It also implies that streets, along with nearby neighbourhoods are safe and comfortable to live in. This is a common issue that relates to all cities. However, cities in different parts of the world may have specific issues that emanate from their unique circumstances.

In Bahrain, there exist several issues related to pedestrian safety where mobility within the city is in support of vehicles, resulting in alarming fatalities of pedestrians. Moreover, in the historic city centres where traditional narrow streets exist, the absence of vehicle restrictions results in congestion and inconvenience. Moreover, the lack of proper sidewalks and crosswalks also causes a safety hazard to pedestrians and cyclists. Improper usage of pedestrian crossings and overspeeding of vehicles has also led to fatalities and accidents on pedestrian crossings on highways. Urban design aims to promote walkable, high-quality public realms. Therefore, the liveability of a street is directly linked to urban design and through successful urban design and planning, a place can be made liveable.

Publications

Job, S.R.A., & Elghonaimy, I.H. (2022). Experiencing Public Parks through Phenomenology: Case of Riffa Walk Park, Bahrain. *Civil Engineering and Architecture*, 10(1), 224 - 235. DOI: 10.13189/cea.2022.100119

Job, S.R., & Al Khalifa, F.A. (2021). Evaluating Sustainable and Smart Urbanism in Bahrain. In Proceedings Volume of the 4th IET International Smart Cities Symposium, 4th SCS-2021 (pp. 319 – 324) Bahrain. DOI: 10.1049/icp.2022.0363

Dedication

Dedicated to my parents for their unconditional love and prayers.

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I thank Almighty Father for guiding me day by day, for helping me get where I am today and keeping me safe in your hands.

Firstly, I would like to express my warmest gratitude to my supervisor Dr. Ranjith Dayaratne, Department of Architecture & Interior Design, University of Bahrain, who constantly guided me in the right direction and helped me produce a fruitful thesis. I thank him for his dedication and continuous support to help me accomplish this. I am extremely grateful for his valuable insights and feedback throughout the various stages of the thesis. I am deeply indebted to you for your commitment, wisdom, and patience.

I also express my gratitude to all my professors in the M. Arch program for inspiring me throughout the semesters and helping me reach here.

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Lastly, I thank all the participants for their sincere input during the data collection stage.

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List of Abbreviations

FHWA- The Federal Highway Administration

CABE-Chartered Association of Building Engineers

PSC- Partnership for Sustainable Communities

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Appendix (1) Manama- Interviews

Appendix (2) Muharraq- Interviews

Appendix (3) Riffa- Interviews

Chapter One - Introduction

1. Chapter One: Introduction

1.1 The Research:

This research focuses on investigating the liveability of streets and sidewalks in Bahrain. The study focuses on identifying the various characteristics, factors and indicators that contribute to liveability in a street. Further, it proposes to decipher how these characteristics shape the liveability of streets and sidewalks in Bahrain. By identifying the concerns and drawbacks in fulfilling the characteristics, by identifying which characteristics or indicators are fulfilled and applying different methods, a conclusion is produced.

The different characteristics that define the liveability of streets and sidewalks according to this research are: Physical, Visual, Social, Economic, Environmental, Functional, Safety, Walkability and Urban Qualities. Characteristics are drawn, combined and modified from significant literature and new characteristics are introduced to fulfil the definition of liveability. The research also investigates how the movement and activities of users are affected by the liveability of streets and sidewalks.

In other words, it proposes to investigate how streets and sidewalks contribute to shaping cities into vital human habitats. The research problem is to be examined by employing conceptually-driven research, based on person-environment relationships. Pedestrians and cyclists are selected as target groups as they are the most affected by the inefficiency in the design of streets and sidewalks.

1.1.1 Research Problem Statement

There are several issues reported regarding pedestrian safety in Bahrain. Mobility within the city is in favour of vehicles, at the cost of pedestrians. Moreover, in the historic city centres with narrow streets, vehicles are not even restricted. The case of the expansion of Bab Al-Bahrain is no different. However, most of the accidents are with smaller injuries as the speed of cars is comparatively lower (Ben-Hamouche et al., 2011).

Besides, the oldest cities of Bahrain have a dense road pattern. This includes Muharraq and Manama. Riffa also has a similar level of street density. The street patterns in Muharraq are irregular, whereas Manama has a rectangular street grid. On the other hand, Riffa has a combination of regular and irregular grids. Some streets lack sidewalks. This implies a lack of continuity of pedestrian flow, thus, making it difficult to commute by walking (Silva et al., 2018).

Research conducted previously on Streets in Bahrain discusses various issues such as Cultural Movement Patterns and Social Implications in Space of Villages by Al Ghatam (2012), Transcultural Conviviality Al Madani (2018), Street Orientation by Silva (2017) and Traffic Accidents by Ben-Hamouche et. al, (2011). The studies conducted focus on specific issues occurring in a street. The studies conducted touch on different aspects of streets and urban spaces. They also use certain indicators of liveability to investigate the streets.

However, liveability comprises various categories, principles and characteristics that shape cities and streets into liveable spaces. Urban liveability aims to cater to the needs and expectations of the users in terms of quality of life and human wellbeing (Martino et al., 2021) However, a “liveable street” is a

human-centred concept. The question that arises is whether our cities today are liveable or not.

1.1.2 Statement of the research sub-problems (Pedestrians & Cyclists)

Issues faced by pedestrians: Lack of proper walkway infrastructures such as sidewalks and crosswalks, cause a safety hazard to pedestrians. This arises as pedestrians require to walk through busy streets and highways to commute within the city (Rashid, 2016). Besides, since the 1920s, there is a rise in concern about pedestrian safety. This is predominant since pedestrian fatalities constitute all fatalities related to traffic (Campbell et al., 2004). Moreover, pedestrians show their safety concerns and consider it an essential factor while commuting (Bahari et al., 2013; Weinstein Agrawal et al., 2008; Rashid, 2016).

The fatalities due to pedestrians in Bahrain comprise 29% of the total road fatalities as of 2018 (WHO, 2018). In Bahrain, this issue needs to be addressed extensively to identify the issues faced by pedestrians on the streets and sidewalks of different towns.

Issues faced by Cyclists: In Bahrain, there are no policies implemented in favour of cyclists. This results in adverse effects resulting in the fatalities of cyclists in Bahrain. The fatalities due to cyclists in Bahrain comprise 7% of the total road fatalities as of 2018 (WHO, 2018). Besides, there are regular accidents including fatalities of pedestrians that involve cyclists on the highway between Ma'Ameer and Eker. Being a critical issue affecting cyclists, there are also no studies conducted to analyse the issues faced by cyclists or factors that affect cyclists in Bahrain.

1.2 The Issue in Street

Every street has its character. This character varies based on different purposes and functions of that location, physical form and aesthetics. This character is also altered by several other factors such as socioeconomic factors and the culture of the users and inhabitants. Hence, the requirements and perceptions of the users vary in terms of addressing the streets in different countries (Appleyard, 1981; Wan Ismail, 2010; Abdul Rahman, 2018). City streets foster a variety of purposes apart from paving roads for vehicles. Similarly, city sidewalks foster several other purposes beyond containing pedestrians. Indeed, as Jacobs (1961) has pointed out, good streets and sidewalks must exist for the proper working of cities.

There exists a change in the social life of cities nowadays. High-density neighbourhoods and mixed land use are necessary for the growth of vital and social spaces (Farahani et al., 2015). Moreover, the quality of urban life and built environments together play a role in fostering social life in public places. Unfortunately, the human dimension is often neglected in the field of urban design. As Farahani et al. (2015) show, the increase in car-dominated cities and lack of human-centred environments contribute negatively to public life in cities. Walking is considered the most important mode of transport. Walking not only acts as a significant factor for inter-modal transfer but also satisfies one's recreational and utilitarian ventures. Hence, it is necessary to consider that walking is not just a crucial part of a network, but a mode through which several activities can take place in a sustainable manner (Sarkar, 2002).

1.2 Background to the Issue

1.2.1 History: Evolution of Streets & Sidewalks

The primary function of a street is to foster movement. The small, dirt roadways in Mohenjo-Daro and Harappa, which date back to the river valley civilizations, were built at right angles within a larger block. Streets were designed to be functional. They concentrated on the transportation of people, then vehicles, including animal carts, which required broader highways (Turaga, 2022).

The Romans, Spanish, Persians, and other western cities began to pave their roadways with brick and stone throughout the Medieval era. This was done to improve the car ride quality and offer better walking paths for people. With time, streets began to evolve into locations where commercial activity could take place, and so emerged. A street's function had evolved to include a variety of activities (Turaga, 2022). According to Abrams (2013), our first roads were built by humans following the same trails over and over to get water and locate food. Networks of pedestrian trails became more formal roads as small groups of people merged into villages, towns, and cities.

Longfellow (2017) claims that the earliest roadways discovered to date exist in what is now Iraq, once Mesopotamia. These stone-paved roadways first appeared in the Mesopotamian towns of Ur and Babylon around 4000 B.C. The Sumerian people's homeland provided lush soil, and crops and livestock were successfully raised using irrigation. For construction, the Sumerians used precise brick-making abilities, constructing identical mud bricks. They would carry them to a temple site and lay them in place with bitumen when they had dried. Asphalt contains bitumen, a naturally sticky black material. Asphalt were not used in Europe or America for centuries.

According to Sohail (2016), pedestrians on the road had to navigate their way through animals, horse-drawn carts, carriages, wagons, and street vehicles before the invention of the sidewalk, which occurred in the early nineteenth century. Pedestrians put their lives and health at peril every time they walked out of their dwellings because of the filthy horse excrement and human urine that flowed like a torrent on the roads. He claims that the first sidewalks were discovered around 2000 BCE in Anatolia, which is present Turkey.

1.2.2 Role of Streets and Sidewalks

"Streets are not just infrastructure for moving people; they are places in and of themselves"- Matt Pinder, 2020

Pinder (2020) argues that a significant function of a street is to provide access. He states that in a residential street, the access is from houses to the street networks and in a commercial street, the access is for the businesses. Rashid et al, (2017) add that the role and design of the street have changed over the centuries. It was created with pedestrians in mind, with features such as a marketplace, town meetings, and military parades. Technology brings both opportunities and risks, and advancements in mobility have made people more reliant on automobiles and motorcycles. This shift in transportation has changed the nature of the street as a public space, making it less safe for pedestrians. Vehicles have taken over the public domain, and pedestrians are no longer the primary users.

Sohail (2016) remarks that the Parisian bourgeoisie can be credited with converting Paris's streets into a site that altered people's perceptions of exuberant urban life. However, the innovation was also motivated by a real need for public health and a desire to build a healthy city with less traffic, more fresh air, and

people who could freely move around on artery-like roads. The notion of pedestrian and automobile separation was developed during this period, as was the invention of sewer and water systems to reduce the amount of liquid slime floating around on the streets.

The 8 principles of sidewalks listed by Santos et al., (2019) are adequate sizing, accessibility, safe connectivity, legible signage, attractive spaces, security, quality and proper drainage. He claims that sidewalks are like open veins that carry the lifeblood of a city. They are democratic and open to everyone, regardless of who utilizes them. They are the foundation for the bulk of people's daily trips and have a direct impact on the entire population, influencing the quality of life, culture, business, and place identification.

Urban Street Design

There is no doubt that to provide healthy street circulation, it is necessary to adopt green modes. This includes walking and cycling (Sarkar, 2002). It is said that, if a city's streets look interesting, the city by itself is interesting, whereas, if a street appears dull, the city appears dull (Jacobs, 1961). On the other hand, Farahani et al. (2015) suggest that social interactions in public places can be encouraged by qualities such as walking residents, or engagement in stationary activities.

Walking behaviour can be encouraged through density and development on a human scale (Amick and Kviz, 1975; Gehl, 1987; Langdon, 1997), mixed land use (Alexander, 1977; Audirac and Shermyen, 1994; Jacobs, 1961; Mehta, 2013; Montgomery, 1998), better pedestrian access (Cooper Marcus and Francis, 1998; Gehl, 1987; Gehl, 2010; Gehl and Gemzøe, 2004) improved conditions for cyclists and implementing soft facades (Gehl, 1987; Amick and Kviz, 1975;

Franck and Stevens, 2007; Gehl, 1987; Jacobs, 1961; Pendola and Gen, 2008; Talen, 1999).

Urban Sidewalks

Urban sidewalks also play an equally important role as the urban streets affect user behaviour. Farahani et al. (2015) point out that to foster stationary activities in public places, seating facilities and designated areas can be implemented. Moreover, by providing community gathering areas and developing sidewalks and building edges, sidewalk activities can be improved. Besides, greening of spaces and considering a fine hierarchy can be beneficial to foster social behaviour on sidewalks. Having said that, there exist certain criticisms regarding the usage of sidewalks that border uses and users who take part in the misuse of cities. Hence, it is understood that a city's streets and sidewalks play a crucial role in the safety of the city (Jacobs, 1961).

1.2.3 Dominance of Vehicles

Nowadays, city streets are commonly thought of as primarily a place for automobiles. Bikes, on the other hand, are considered a relatively recent encroachment (Stromberg, 2015). Khisty (2003) states that even though the automobile is the least energy-efficient, least space-efficient, and one of the most expensive forms of transportation to operate, it has dominated our cities for the past 50 years and has significantly lowered its quality. Traffic congestion, widespread air and noise pollution increasing fuel consumption, higher infrastructure expenses, and higher accident rates have all resulted from our growing reliance on automobiles.

However, Stromberg (2015) claims that cyclists were the ones who first lobbied for cities in the United States and Europe to pave their streets and build new roads in the 1890s and early 1900s. The bicycle's essential role in what is now known as the Good Roads Movement was largely forgotten as vehicles became more practical and wealthier, and privileged people adopted the car as their preferred leisure play.

1.2.4 International Context

Appleyard (1976) states that the global trend toward developing safe pedestrian infrastructure has continued for decades. Gehl (2006) adds that encouraging walkability promotes street liveability. It has been found that the typo-morphology of the streets and commercial streets also play a significant role in affecting the social life of the streets variously. An example is the case of strip shopping areas, where the activities of sidewalks often repel people from them due to the location of the car park.

Streets like Highton and Geelong West in Australia have a design where car parks have been designated behind the prominent streets. This results in high pedestrian activities in commercial streets. Furthermore, it is suggested that the layout of streets can be designed in a way that vehicle speed is reduced in commercial streets (Farahani et al., 2015). In countries such as the Netherlands, Norway, Sweden, Singapore, and the UK, the fatality rate due to vehicular accidents is less than 5.5 (Al-Madani, 2008; Ben-Hamouche, 2011).

Having said that, Shamsuddin (2011) states that the behaviour of users in the streets is affected by cultural values. Hence, pedestrian responses to the environment are affected directly. Thus, streets require to be designed to suit pedestrian activities. Arguably, in a commercial street, the street design must

enable pedestrians to commute well to the shops, cross the roads and achieve other static and recreational activities (Davies, 2000). These include chatting, lingering around the shops etc. Developing a successful community and a public realm requires having a mixture of activities (Shamsuddin, 2011; Shohoohi et al., 2012; Abdul Rahman, 2018).

1.2.1 The Regional context

Contrary to the values mentioned internationally, the fatalities due to road accidents for a population of 100,000 in Kuwait is 17.2, UAE, 20.0, Qatar, 22.7, Saudi Arabia, 23.0 and Oman, 35.0 (Ben-Hamouche, 2011). In UAE, due to alarming road accidents, half a billion dollars is claimed by the Ministry of Planning (Al-Madani, 2006; Ben-Hamouche, 2011).

1.2.2 The local context of Bahrain

Fatalities in Bahrain however are thankfully much less at 12.3 for a population of 100,000 (Ben-Hamouche, 2011). Though this value is lower than the neighbouring Gulf countries, it is higher than most developing countries around the world. Unfortunately, due to the alarming road accidents in Bahrain, insurance companies have had to pay off more than 50 million dollars as of 2002 (Al-Madani, 2006; Ben-Hamouche, 2011). As in the case of every other Gulf country, in Bahrain, due to an increase in motor vehicles and a decrease in usage of public transport, there is an alarming rise in traffic accidents. In 2007, the vehicle population in Bahrain increased to 369,000 from 184,000 in 1997 (General Directorate of Traffic, 1997, 2007). Despite the high standardization of road networks, accident rates are alarming compared to many developed countries (Ben-Hamouche, 2011).

Accidents and Walkability

It has been estimated by The Federal Highway Administration (FHWA) of the USA that 4500 pedestrians are killed due to traffic accidents annually. It has also been concluded that 88% of these incidents could have been avoided if there were separate walkways from travel roads for the pedestrians (Rashid et al., 2016). Moreover, due to rapid urbanisation, there has been a decline in social life between buildings. This is a result of an increase in automobile dependency, large-scale design and rationalized processes (Farahani et al, 2015). To foster walking and encourage other physical activities and behaviour, constituent components of a built environment play a prominent role (Lee & Moudon, 2006; Nagel et al., 2008; Owen et al., 2004; Pikora et al., 2006; Saelens et al., 2008; Saelens et al., 2003; Suminski et al., 2005 cited in Sarkar et al., 2015).

Though liveability is measured quantitatively in many countries, it needs to be studied qualitatively as every street has its character and the relationship between streets and the users is crucial in determining the vitality of a street, which cannot be quantified.

1.2.3 Walkability

It has been universally accepted that to achieve successful liveable streets, the streets must adhere to basic human needs in urban spaces, where the underlying attribute is ‘comfort’ (Carr et al., 1992; Jacobs,1996; Carmona et al., 2003; Abdul Rahman, 2018). Pedestrians require to be made comfortable in urban streets as they walk, beyond driving. Hence, engineers, architects, urban designers and policymakers play a huge role in promoting walking in a city (Kim et al., 2011). Walking is considered the most desired mode of transport to foster sustainability. In this context, professionals can inspire users to improve their

walkability through the design of pedestrian-friendly urban streets (Kim et al., 2011).

Functionality

Reduction of access to street-spaces results in the reduction of access to other public facilities such as information and services which are available in the urban streets to the pedestrians (Bolten et al., 2016). Activities in the streets are crucial as the user's needs and requirements in the streets depend on these activities and usability reasons. Gehl (1987) argues that outdoor spaces are altered by the quality and character of these spaces. Moreover, activities and functions will be improved if the qualities are improved. This can vary between countries as certain activities are not acceptable in certain countries/cultures.

Safety, Walkability & Movement patterns

The dimensions of sidewalk pavements require to be walking-friendly. Professionals require to focus on providing attractive sidewalks, which are at the same time wider than the minimum dimension specified in the design standards of highways (Kim et al., 2011). Streets and sidewalks need to be sustainable. In the case of urbanization patterns in Bahrain, historical constraints are the major components that dictate accident patterns at territorial levels.

Commuting is essential for the day-to-day activities of any individual. To plan to commute adequately, a pedestrian with limited mobility requires to know if the pathway is blocked by any means of construction. The pedestrians require to know whether the sidewalk is too steep or unusable due to poor maintenance. Moreover, movement can also be affected depending on whether the street can

be crossed, whether a highway is blocking the path or whether there is a sidewalk (Bolten et al., 2016).

In a study conducted in Bahrain regarding the movement rates, different villages showed the highest movement in the surrounding urban context. The complexity of village spaces and lack of internal coherence of spaces in the village were found to be linked to low movement rates. The study analysed RasRuman village and Samaheej village. It was found that there is a strong embedded spatial pattern in RasRuman, which is not the case in Samaheej (Al Ghatam, 2012). Having said that, there are no sufficient studies based on movement patterns altered by streets and sidewalks in Bahrain.

1.3 The Research Questions, Aims & Objectives

1.3.1 The Research Questions

Q.1. What are the factors that affect the liveability of streets and sidewalks in Bahrain?

Q.2. How Liveable are the Streets and Sidewalks of Bahrain?

1.3.2 Aim

This research aims at investigating the liveability of streets and sidewalks in Bahrain.

1.3.3 Objectives

To evaluate the liveability of streets and sidewalks in Bahrain

- Ascertaining user perception of liveability
- Identifying characteristics that affect the liveability of streets in Bahrain.
- Identifying the specific concerns and issues (indicators) in the streets and sidewalks.

1.4 Formulation of the Research

This research intends to evaluate the liveability of the streets and sidewalks of Bahrain. The evaluation is made by examining walkability, and various other characteristics that contribute to the liveability of streets. The aspects examined include physical characteristics, environmental factors, and economic and social factors. Different aspects are addressed under each characteristic such as usability, perceptions, movement, legibility, and safety. By conducting extensive fieldwork in different streets of Bahrain, through walking, observing, mapping, photographing and engaging in interviews with pedestrians and cyclists, an in-depth analysis is made.

1.5 Structure of the thesis

Chapter one of the thesis begins by introducing the research issue, the background, the aims and objectives and the formulation of the research. Chapter two provides an overview of the theoretical background defining the inquiry and orientation, by conducting a review of the literature. Chapter three articulates the research methodology. The approach to the research and the research paradigm is introduced following an introduction to the tools and techniques. Once there is sufficient understanding of the mode of conducting such research, relevant tools, techniques and methods are selected from significant literature. In Chapter four, data collection and analysis of the first case study; Manama is presented. Chapter five presents the second case study; Muharraq. Chapter six presents the third case study; Riffa. Lastly, chapter seven presents the discussion, conclusions and recommendations.

Chapter Two- Theoretical Background

2. Literature Review and Theoretical Foundation

2.1 The Inquiry

2.1.1 Concept of 'Liveability'

Liveability is a concept that has emerged during the last decade of the 20th century (Mahmoudi et al., 2015) in the fields of urban design and planning. It is defined as the degree to which a place meets the quality of life, health, and the well-being of people living, working or visiting there, whether the place is in a neighbourhood, town or a city. (Chartered Association of Building Engineers (CABE, 2007). Hence, it is recognised as an outcome of social, economic, health and environmental interactions related to human well-being (Elsawy et al., 2019). Indeed, Jacobs and Appleyard (1987) argue that one of the goals to achieve in a city is a liveable and quality urban environment (Mahmoudi et al., 2015). Mahmoudi et al., (2015) point out that improving the quality of urban places in modern cities is the aim of this concept. Thus, often, liveability is linked to long-term goals by policy by community planners involved in the planning of cities. Needless to say, liveable places are highly desired by people (Kotus et al., 2013).

Liveability is measured using different indices. Transportation is a significant indicator of liveability (Elsawy et al., 2019). Liveability principles developed by the Partnership for Sustainable Communities (PSC) for the Sustainable Communities programs include: providing more transportation, promoting equitability, enhancing economic competitiveness and so on. Among them, the sixth principle stating "valued communities and neighbourhoods" emphasises enhancing the characteristics of communities by investing in safe, healthy and walkable neighbourhoods. This includes rural, urban and suburban neighbourhoods. Yet other definitions of liveability include accessibility, equity and participation (Dalhberg, 2006). A liveable city is one in which people have

the opportunity to commute easily by foot, bicycle, public transportation or even car when there is no other option (Jain, 2014). Hence, it can be understood that liveability is a broad concept and encompasses various aspects of community well-being, safety and sustainability pillars such as social, economic and environmental aspects. However, the most widespread keywords commonly linked to liveability are places, people, communities, commuting, safety and walkability.

2.1.2 Places in a City

There are different types of places within a city, like houses, buildings, hotels, restaurants, banks, shopping facilities, streets and roads etc. (Useful English: Places in the City, 2021). Mehta (2007) describes that while modern urban societies no longer depend on the town square or piazza in their settlements for basic survival needs, there is a growing acceptance that good urban public spaces are necessary for the social and psychological well-being of the modern communities. He also adds that streets, plazas, squares, parks, and other urban public spaces have the potential to help, encourage, and foster public life, which is an integral counterpart to our homes and workspaces. Emphasise on streets here.

2.1.3 Streets as places that connect people, activities and movement: Streets & Sidewalks (International Context)

2.1.3.1 Streets

Sidewalks and streets are considered a city’s main public space' and 'its most vital organs,' (Jacobs,1961). In fact, streets are considered the lifeblood of a city (Riggs et al., 2015). As Jacobs (1993) point out, streets allow people to be outdoors. It is known to shape different aspects of life in neighbourhoods such as

housing, health, safety and so on (Riggs et al., 2015). Mehta (2007) has a similar idea that streets are places people rely on for functional, social, and leisure activities, as well as for transportation, shopping, playing, meeting, and interaction with other people.

The word street is derived from the Latin word “str”, which is connected to building and construction. The term street is also connected to different European languages such as “Strada” in Italian, “Strasse” in German and so on. According to Rhywert (1991), it often refers to an area set apart for the use of the public and consists of simple demarcations. According to him, streets don’t necessarily lead anywhere. They may end at a plaza or a blind alley. Kostof (1992) refers to the street as an entity made of a roadway. It is usually considered a pedestrian way flanked by buildings. In the Oxford English Dictionary, a street is defined as “a road in a town or a village that runs amidst two lines of houses. These generally include the sidewalks and carriageways (Ellis, 1991; pp:115). Often, the terms streets and roads are used interchangeably. However, it is necessary to note how streets meet the needs of users and roads the needs of vehicles.

Contrary to the above notions of a street, Jacobs (1993) argues that streets are more than these, more than public utilities, traffic conduits, physical spaces and so on. Jacobs (1993) states that a street is related to “movement”; a place where people can watch other people pass. One can watch what happens in a street by standing or sitting. Different activities can be observed in a street, and different people may perceive a street differently. In a street, one can be alone, in a group, exchange goods, do business etc. However, the same street can be used and interpreted differently from one person to another. Dissanayake (1998) in Dayaratne (2010b) provide an example of this when he explains how the concept and nature of the street have changed in Sri Lanka when it was used by either one of the village's two prominent figures: the monk or the peasant (*Upasaka*) and

demonstrates that references to the monks' movements in spaces are conceived as having no directions, while the peasants' do. Dayaratne (2010a), suggests that measures to improve the walking environments can turn cities into treasured places, discouraging migration to the outskirts. The ease with which one can walk is a good indicator of urban health. The steep decline in children walking unaccompanied to school, for example, is a sign of urban decay.

2.1.3.2 Sidewalks

Jacobs (1961) states that a sidewalk, by itself is nothing. When it intercedes with buildings and other functions surrounding it, it becomes meaningful. Similarly, a street also caters to the needs of various functions apart from "wheeled traffic". Blumenberg et al., (2008) state that sidewalks have a variety of purposes. They serve as places of trade, sites of political resistance and democratic action, and spaces for other types of social interaction. They promote pedestrian circulation; they are public spaces in which other important aspects of community life take place; they serve as places of commerce, sites of political resistance and democratic action, and spaces for other forms of social interaction. According to Jacobs (1961), the main qualities of a successful city neighbourhood are that there should be a significant separation between public and private zones, that there must be people watching over the street, and have users on them. She also adds that some people entertain themselves by watching street activities.

Another space that is connected to the sidewalks, and that is used in an everyday routine are the crosswalks. Muraleetharan et al., (2004) distinguish the spaces within the crosswalks. This includes space for pedestrians that are moving and another space that accommodates those pedestrians that are waiting. During the rush hours, there is an influx of cyclists in the urban streets of Europe and several other developing nations. There has been an expansion of cycling lanes

which are colour coded and designated in several countries for the safety of their cyclists (Pucher et al., 2008).

2.1.4 History

2.1.4.1 History of Streets & Sidewalks

The purpose of a street can be explored through different categories. Mainly, as channels for traffic, a place for the exchange of goods, social exchange and communication. All three characteristics are considered inseparable from the form of the street. A street also hosts a complex level of social engagement (Moudon, 1991). Cities are places where culture, ideas and knowledge are exchanged. The city streets are considered the stage where these take place. For centuries, streets were places where dynamic functions occurred. Streets constituted the social (movement) and economic life until the mid 20th century.

Werf et al, (2016) points out that until the 1850s, social and economic activities took part in the city streets. With an increase in traffic and activities, busy streets were paved using cobblestones. This period also resulted in the implementation of regulations for buildings, windows and building heights, to allow sunlight to the streets. From the 1850s-to 1940s, new areas and separated functions led to an increase in traffic. As a result, in 1861, sidewalks were created to give pedestrians a place for themselves amidst the crowded streets. However, there was a shift in this as large-scale interventions came in during the 1960s and 1970s. During this period, academics like Jane Jacobs, Kevin Lynch and Gordon Cullen highlighted the human scale of the streets. A growing awareness of the viability of the city and the scale of the city came on the rise during the early 1980s.

According to AlMahdy (2020), Riyadh's streets were alive and well and they were the city's most important common gathering place for buying and selling goods, for children to play, and for celebrations. Furthermore, there were always eyes on the streets, which contributed to the streets' public safety. Furthermore, in traditional Arab culture, it is unusual for people to be outside from noon to mid-afternoon (roughly 12 pm to 3 pm) because this is when the desert reaches its peak heat. People begin to come out and walk on the streets once enough shade has developed along the roadside. They were already quite narrow to provide shading and improve thermal comfort. People were also required to maintain their Arabic Islamic manners on the streets, which included lowering their gaze, not causing harm, responding to greetings, removing harm from the road, assisting people in lifting their bags, directing a passer-by, and enjoining good and prohibiting evil.

2.1.4.2 History of Streets & Sidewalks in Bahrain

The identity of urban areas in Bahrain and the structure of building components changed after the second world war. Many places were added while other places changed their functions (El-Ghonaimy, 2020). Moreover, since 1921, the capital of Bahrain was Manama and was a trading centre for the Gulf area. The area was considered a place of rest, where different religions co-existed door-door. Bab Al Bahrain Avenue was also a significant destination, passing by and transitioning (El-Ghonaimy, 2020). During the Pre-Islamic and early Islamic times, there was a dependency on the harbour in Bahrain for its prosperity (Brice 135, 1983). However, the situation has changed with time and the intervention of automobiles in Bahrain. Al Khalifa (2018) argues that the more people use their cars for mobility, the less active they are, physically. This does not benefit the overall health of Bahrainis.

2.1.5. Type of Streets & Sidewalks

There are different examples of streets. Some of which consist of pedestrian streets, alleys and city-centre streets. There exist different types of streets. Some of which are classified in the table given below.

No.	Street	Definition	Main Activities	Examples
1	Boulevard	Typically, a wide street with trees on one or both sides. (McManus, 2020) Boulevard are multi lane streets and has divider in the middle (McManus, 2020).	Vehicle movement is slow. (Njogu, 2019)	 **Fig. 2. 1 Boulevard** Source: Walsh, 2012
2	Avenues	An avenue is also a straight road with trees (Njogu, 2019).	Vehicle movement is fast (Njogu, 2019)	 **Fig. 2. 2 Example of an Avenue** Source: Njogu, 2019
3	Alleys	An alley is defined as a narrow lane that located between or behind buildings for pedestrians (Fialko et al., 2011).		 **Fig. 2. 3 Example of Alley in Morocco** Source: Laucht, 2015

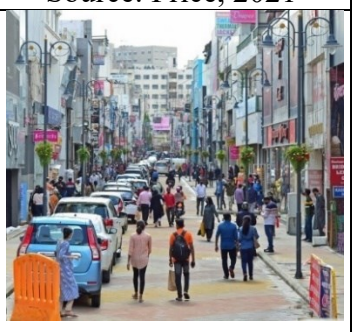
4	Shared streets	A street which does not segregate vehicles, pedestrians and cyclists (Shared Streets – 2030 Palette, 2022).	One that fosters a vibrant streetscape by combining the social activities (Shared Streets – 2030 Palette, 2022).	 **Fig. 2. 4 Shared Space** Source: Kodranksy, 2022
5	Residential streets	Generally, these are small streets with less modes of movement (Residential Street,2022).		 **Fig. 2. 5 Residential Street in Cotswolds, England** Source: Price, 2021
6	Commercial streets	In simple words, it is a street with retail shops. There are also shared commercial streets (Li, 2015).		 **Fig. 2. 6 Commercial Street, Bangalore** Source: Ranju, 2021

Table 2. 1 Different types of Streets
Source: Author, 2022

In addition, there are other terms interlinked to streets such as a boulevard, street, promenade, avenue etc. They too have similar meanings and are often used interchangeably. A road mainly focuses on the transportation of goods on foot, by pack animal or by vehicle. The word road is derived from “Ride” or “Rue” in French or “via” in Latin and Italian (Rykwert, 1991). On the other hand, According to Moughtin (1992), streets refer to a road in a town or village, that is comparatively wide and different from a lane or alley. Alley, refers to a narrow passage, while an avenue refers to a wide street with one or more lines of trees. On the other hand, a boulevard is simply a wide street with trees (Boulevard, 2022). Rykwert (1991), suggests that there can be three groups in this classification. This includes a terrace, row, arcade, and embankment as the first group, path, track, and parade as a second group and vehicular traffic and highways as the third group.

2.1.5.1 Activities in a Street

Within a street, various activities can take place. According to Dayaratne (2010b), the Sri Lankan streets facilitate travel and transportation: the movement of people and goods from one location to another. The different types of streets observed in Sri Lankan streets are traditional rural streets, traditional urban streets and modern westernised urban streets (Dayaratne, 2010b).

2.1.5.2 Transportation

According to Ellis (1991), roads, highways and freeways, are outside the multiple nature of streets. However, today the transportation role of the street is the most significant among the others. Dayaratne (2010b) says that the inevitability of the automobile has been acknowledged, and social life has been carefully orchestrated on both sides of the street: the sidewalks and pedestrian

boulevards. Although the street is divided into two, they frequently support both travel and living as separate activities.

2.2 The Orientation

2.2.1 Previous Research on Streets and Theoretical Ideas

There exist numerous publications on different types of places and liveability. Literature that stands out about the liveability of streets and sidewalks includes the works of Jacobs-1993. Jacobs (1993) focuses on the rhythms of streets and argues that by knowing the rhythm of a street, the users, places and periods that belong to it can be known, thereby making it possible to see someone or avoid them. On the other hand, Wood (2010) draws attention to Kevin Lynch's ground-breaking work, most notably, his book “Image of the City” where Lynch uses a psychological approach to assessing and examining cities. The emphasis is on rhythms, emotions, and mental representations of urban environments. Both authors have touched upon the idea of the “rhythm” of a place and have linked users to it.

Extensive research has been conducted on traffic movements on sidewalks to measure pedestrian flow characteristics (including pedestrian walking speed, flow and density). For example, Older (1968) has researched pedestrian movements on footways in shopping streets in England and has found that pedestrians used narrower footways more effectively than wider ones. Polus et al. (1983) have found that gender and density parameters were important in determining pedestrian walking speed on sidewalks in Haifa, Israel. Similarly, Tanaboriboon et al. (1986) have investigated the characteristics of pedestrians in Singapore and have concluded that Singaporeans walk slower than their American counterparts. Lam et al. (1995) have studied the characteristics of pedestrian movements in Hong Kong and have shown that the speed–flow–

density models developed for Hong Kong were identical to those developed for Singapore for similar types of facilities.

Al-Azzawi and Raeside (2007) have modelled pedestrian walking speeds on sidewalks in Edinburgh (UK) and have found that when gradients were steep, walking was hindered, and speeds often declined with age. Parida et al. (2007) have established a connection between different physical characteristics of sidewalks and user satisfaction. Laxman et al. (2010) have performed an extensive analysis of the flow characteristics on sidewalks in mixed traffic flow situations, and have discovered that the free-flow speed was 80 m/min, which was affected by age and gender. In comparison, Rastogi et al. (2011) have investigated the design implications of walking speed for various types of pedestrian facilities based on function and width. Thus, they have discovered that the mean speed on sidewalks and wide sidewalks were higher than that on precincts and that different flow characteristic was needed for facilities of various widths and operating conditions (Banerjee et al., 2019). As it can be seen, walking speeds, rhythms and flow patterns in streets have been the focus of most studies on streets and walkways.

2.2.2. People in a City

2.2.2.1 Pedestrians

Yet another dimension that has been often examined relates to movements, particularly walking. Urban walking is a phenomenon that is intrinsically linked to both subjectivity and spatiality. Being a pedestrian in a variety of spatial agglomerations necessitates the creation of subjectivities that are formed by habit and bound by effect. Spatiality, in essence, forms both effect and habit. Thus, during the practice of urban walking, there is a dialogic phase between the self and space that comes to the fore. Furthermore, the extent to which the city's

spatiality applies to the pedestrian's subjectivity is a question of city citizenship and the right to create the city as well as the pedestrian. The city influences the pedestrians in the same way as the pedestrians influence the city (Rana, 2018).

Lo (2011) adds that surface-sensitive pedestrians, risk-averse pedestrians, distance-minimizing pedestrians, and stationary pedestrians are all examples of pedestrian activity types. Moreover, for the new urbanism, the local order of fluidity and movement is just as important as the global order. The city is defined as much by small, mundane, and everyday urban movements of people doing the same things over and over as it is by transglobal movement circuits like the ones described (Sassen, 2005). As a result, the micro geographies of everyday life pique as much interest as much larger mobility systems (Rana, 2018). On the other hand, Mehta (2007)’s study focuses on commercial streets. He claims that most of the public and social life in mixed-use areas now takes place on neighbourhood commercial streets.

2.2.2.2. Cyclists

It is argued that, while people may prefer walking for short-distance travel, other modes of transportation, such as cycling, should be combined with walking to make them more appealing. Slow travel allows people to fully experience and appreciate the delights of a location, allowing them to form emotional attachments to places where they could ‘dwell poetically' (Heidegger, 1980,1985: Schultz, 1985). As it is pointed out, people cannot be expected to love places and contribute to their positive growth unless they are given opportunities to experience them, and form emotionally charged attachments to them. (Lynch, 1960 cited in Dayaratne, 2010a.). For providing such opportunities, pedestrians, as well as cyclists, must be facilitated in safe streets.

2.2.3. Liveability of Streets & Sidewalks

According to the Liveability Index 2021, the 10 most liveable cities in the world are as follows; Auckland in New Zealand; Osaka in Japan; Adelaide, in Australia; Wellington, in New Zealand; Tokyo in Japan; Perth in Australia; Zurich in Switzerland; Geneva in Switzerland, Melbourne and Brisbane, Australia. It is crucial to note that these cities were included in the list due to two categories: healthcare and culture & environment (Russell, 2022). According to the "Global Liveability Report," in 2021, 140 cities have been considered the best places to live (The Economist Intelligence Unit, 2022). Interestingly, the cities that appear on this list followed 5 categories. This included “stability, healthcare, culture & environment, education and infrastructure” (Nast, 2022).

The concept of liveable streets has been advanced recently through the book “Livable Streets” by Appleyard in 1981. (Appleyard, 1981 in Mahmoudi et al., 2015). Indeed, livable streets or lively streets is a street concept that focuses on pedestrians and cyclists (Yu, 2017). Clemente (2015) ascribes a liveable urban open space to perceptions of well-being. Appleyard (1981) rightly states that one may walk anywhere on a road and a child may play anywhere, but the one who drives a car must not impede the pedestrians. It can be understood that streets must have safe and comfortable environments for one to commute or do other activities. According to Yu (2017), a liveable street is one in which pedestrians can walk and children can play safely and comfortably. Moreover, it is also a one in which disabled people can move freely and use the amenities. He also adds that motorized vehicles require to restrict their speed. Therefore, it can be concluded that a liveable street is a human-centred concept that focuses on the residents and users of that street.

Clemente (2015) adds to his description of a liveable place, using terms such as legibility, way-finding, and psychological comfort. He also adds that a liveable place is connected to the possibilities of doing some activities. The idea of a liveable place stands out from "liveliness" where a place is linked to culture, behaviour and recreational activities within it. Similarly, Sidewalks are a part of our everyday encounters. The moment one steps out of his/her house, movement occurs. One may also stop, and observe the public spaces (Jain, 2014). Though the role of a sidewalk is to help one get from one point to another, several other factors affect one's movement. This includes spatial configurations, distribution of attractions and the social environment (Jacobs, 1972).

2.2.4. The Issues of Streets & Sidewalks

Though Jacobs (1972) and Sennet (1970) suggest that pedestrianism and the streets are liberal forces, Bauman (1994) argues that in the city streets, there is a lot of anxiety. Studies have also found that in one-way streets, as motorists speed from one destination to another, pedestrians are exposed more to safety concerns (Riggs et al., 2015). Scholars are increasingly advocating for thinking of the street as a social space rather than just a means of transportation (Mehta, 2007).

Mehta (2007) highlights that a physically well-designed street for people, with generous sidewalks, ample seating and other street furniture, tree cover and other landscape elements, articulated street façades of buildings built to the sidewalk, and so on, become much more useful and meaningful for people when there are community gathering places and a variety of activity-supply options. In agreement, Dayaratne (2010a) also states that people prefer more planned encounters that involve car journeys because there are fewer spontaneous encounters on the streets. Hence, it can be observed how the street environments deteriorate, even more, creating a vicious cycle.

Moreover, many city sidewalks serve non-pedestrian purposes, such as accommodating street sweeping equipment or cars entering parking garages. As different sidewalk parts serve different purposes, they require different structural requirements (Oliver-Solà et al., 2009). Though the sidewalks are used for a variety of purposes, Blumenberg et al., (2008) argue that these different sidewalk users do not always get along. As a consequence, one of the tasks of municipalities is to mediate between competing users and uses of sidewalks, thus controlling public life. Lo (2011) highlights the possible reasons behind shared street practices include poor surface conditions, such as holes, broken pavement, or rocks (15%), poor drainage and muddy conditions (11%), dirty or polluted conditions (9%), circuitous routing or a lack of proximity to key destinations (8%), narrow or windy streets and alleys (9%) and sluggishness (3%).

2.2.5. Research Evaluating the Liveability of Streets & Sidewalks

The liveability of streets and sidewalks has been evaluated using different indicators. Mahmoudi et al. (2015) have evaluated the liveability of streets through a visual examination of the streetscape. Various physical attributes have been used as variables, observed and studied. Some of the variables used in his study include paving, seating, lighting, signs, proportions of space, accessibility, parking space, facilities for disabled people, traffic management and maintenance and cleaning. Elsawy et al., (2019), on the other hand, have evaluated the liveability of the streets based on physical, social, economic and environmental aspects.

Likewise, Jain (2014) has studied the liveability of sidewalks by investigating the different pillars of liveability drawn from the research such as environment, sociability, walkability, motivation, comfort, safety and amenities. Results of the

walk-by observations have revealed that some parts of the street were better suited to stationary, lingering, and long-term activities (Mehta, 2007). These activities were not mutually exclusive and included sitting, standing, lying, eating/drinking, reading, using a laptop, shopping, window-shopping, playing a game or performing, smoking, walking pets, pushing a stroller, and vending. It can be observed that different methods of evaluating liveability in city streets have been employed in different contexts.

2.2.6. Streets & Sidewalks in the Arabian Gulf

Although many studies exist in the European and international contexts, studies of streets in the Arabian Gulf are generally hard to come by. However, some particularly related to Saudi Arabia and Dubai exist. According to Al Mahdy (2020), Riyadh's streets were primitive dirt roads surrounded by traditional compact mud buildings that accommodated human and animal traffic. He points out that the network of narrow and winding alleyways' irregularity helped to break the force of the desert wind. Furthermore, because the prevailing wind comes from the North, most major roads and open marketplaces did not face North. In other words, the street layout aided in the protection of people from the desert's hot, arid climate. Again, streets were kept to a certain proportion to provide shaded paths for pedestrians.

The minimum width of public thoroughfares was set at 3.23 to 3.50 meters to allow two fully loaded camels to pass (10 to 11 ft). Some streets, on the other hand, were narrower and intended solely for pedestrians. Other public thoroughfares, on the other hand, were wider, particularly those that passed by major public buildings, such as the Friday Mosque or the government fortress. The street system was constructed not only to meet socio-cultural objectives but also to meet environmental objectives. The fina' is another important component

of a traditional street. It is the area on the street adjacent to the property over which the owner has control. In other words, the owner can load and unload items in a designated area, which effectively extends the house into the public realm. The owner has the right to use the space, but he or she cannot obstruct the street's traffic (Al Mahdy, 2020).

Salama et al. (2016) have examined the streets in Qatar. They add that in the modern era, the Sheraton Hotel and the Msheireb Enrichment Center on the Corniche, as well as the Jean Nouvel-designed Burj Doha Tower, are among the area's landmarks, which are divided into a pedestrian-friendly and open corniche area and a car-dominated and disconnected business district in Doha. On the other hand, a study conducted by Al-Thani et al., (2019) aimed at examining the sustainability and liveability at the neighbourhood level in a low-density city, Doha in Qatar. In the study, a survey was used as a tool to examine the attitude of people towards walkability and smart technology. Further, a Chi-Square test was also conducted to clarify the data.

2.3 Case of Bahrain

2.3.1 Streets & Sidewalks in Bahrain

In Bahrain, to improve the road networks, a Road Master Plan 2021 is followed by the Ministry of Works (MOW, 2015). The ministry has developed and maintained a “safe, efficient and convenient road network. This aims to enhance the quality of life for all road users. The streets and sidewalks of Bahrain have received attention recently and some studies that examine the social aspects exist. Fuccaro (2005) for example points out that Manama city served as a crossroads for cultural and socioeconomic exchanges, fostering strong relations between local, regional, and international residents, and serving as an active commodity trading centre. Al Kubaisy (2010) shows that Asian employees swarm

the Manama souq, where they work or look for work, while senior citizens congregate mostly in typical coffee shops or front of shops. Sahat's no-traffic zones and pedestrianized streets provide opportunities for people to meet, sit, walk around, and exchange pleasantries. Moreover, the parking plans for across-the-street parking have been created in Manama. This was once the location of the old city wall and gate.

Among more recent studies, Al Khalifa (2018) highlights the dependence on car-centric infrastructure in Bahrain, as neighbourhoods have little to no sidewalks, public parks or availability of other modes of transport. According to Al Madani (2018), both Muharraq's Pearling Trail and Manama's Bab Al-Bahrain Souq are partly pedestrianized, under-renovated sites in historic neighbourhoods. In a comparative study between Bab Al-Bahrain and Amwaj, Madani (2018) states that while the Pearling site is much quieter than Bab Al-Bahrain, the latter's regular pattern as a city centre area is more distinct. Al-Madani (2018) also adds that Bahrain has a distinct and vibrant street culture. In some cities, sidewalks are used for recreation, gathering, socializing, as well as walking and exercise. The areas in front of local shops (cold stores or mini-supermarkets), ‘Karak' (tea shops), and ‘Khabaz' (traditional bakeries) are popular meeting spots for young males or migrants, as well as locals.

On the other hand, Silva et al. (2018) emphasize that the solution to rising activity levels by increasing the mode share of walking and cycling can be restricted by the environment when applying modern urbanism and smart growth concepts to the Arabian Peninsula. In addition to the above studies, alarming road accidents in Bahrain, have received attention since they have led to increased fatalities. As of 2002, insurance companies have had to pay off more than 50 million dollars (Al-Madani, 2006; Ben-Hamouche, 2011). As in the case of every other Gulf country, in Bahrain, due to an increase in motor vehicles and a decrease

in usage of public transport, there is an alarming rise in traffic accidents. In 2007, the vehicle population in Bahrain increased to 369,000 from 184,000 in 1997 (General Directorate of Traffic, 1997, 2007).

Despite the high standardization of road networks, accident rates are alarming compared to many developed countries (Ben-Hamouche, 2011). Al Khalifa (2018) highlights the need for more research and tougher regulations by city planners to study mobility infrastructure and sustainability for cities. Though some studies in Bahrain have focused on streets and sidewalks, they have not examined the "liveability" of streets comprehensively. Most studies have focused on street orientation, culture and behavioural factors of streets. Studies conducted on movement patterns have focussed on movement within streets of villages. Therefore, it is necessary to investigate legibility, way-finding, usability, movement and most importantly, safety within the streets and sidewalks of different cases in Bahrain, to comprehend the liveability of the streets and sidewalks.

2.4 Key ideas discussed in the chapter

Through this chapter, different theories, concepts and issues from relevant literature is discussed. The chapter begins with an inquiry and investigating the concept of liveability in different contexts. Various definitions and key points that surround the concept are identified. These include quality of life, health, well-being of people, safety, promoting community and neighbourhood wellbeing, walkability, fostering use of public transportation and bikes and sustainability.

Further, the idea of a place in a city is looked into. Streets are places that connect people, activities and movement. Streets shape various aspects of life. These are functional, social, and leisure activities, transportation, shopping,

playing, meeting, and interaction. Similarly, a sidewalk caters various functions. When it intercedes with buildings and other functions surrounding it, it becomes meaningful. A historic overview of the evolution of streets are examined, which led to academics such as Jane Jacobs, Kevin Lynch and Gordon Cullen highlighting the significance of human scale of streets. Further, identifying the types of streets and sidewalks and their characteristics. These are Boulevards, Avenues, Alleys, Shared Streets, Commercial and Residential Streets.

Previous research on streets and sidewalks are explored and their theoretical foundations. The role of people in a city is touched upon. This leads to the understanding of liveability of streets and sidewalks, the issues that exists in different contexts, such as international examples and the cases of the Arabian Gulf, and finally, the chapter examines the case of Bahrain. The historic overview of the urban areas in Bahrain and how the dependency on automobiles have affected the physical health of Bahrainis are noted.

Through the studies that were previously conducted on streets and sidewalks in Bahrain, the research gap is identified. It is observed that though studies have been conducted previously, they do not study different aspects of liveability and are focussed on specific issues in a street. Thus, a major research gap is identified and taken into consideration for this study.

Chapter Three- The Research Methodology

3.1 The approach and the research paradigm

3.1.1 Introduction

A research methodology gives research credibility and makes the results scientifically valid. It also includes a precise plan that aids in keeping a researcher on track, resulting in a smooth, efficient, and manageable procedure (What Is Research Methodology and Why Is it Important, 2022). This chapter discusses the methodologies selected from relevant literature along with selected research methods, tools, and techniques. This chapter establishes the most suitable research methodology for the research. It also presents the selection criteria for the case studies, the streets and the respondents. The selection of the method is justified together with strengths and weaknesses.

3.1.2 Research methods

This study employs a qualitative research approach to generate data. The primary method is case studies. Case studies are used often to generate qualitatively rich insights although they cannot be easily generalizable. Case studies can also generate quantitative data, but this research does not do so.

3.1.3 Case Study as a Method- Introduction:

A case study method helps to explore an issue within a defined context. By using a case study method, a good understanding of various characteristics within that case can be achieved when compared to a generalized study. A case study method helps to be specific within the given area/ zone while conducting the research. It also helps to gain perspectives from different users than from the researcher alone.

In this thesis, a general understanding of the areas of Bahrain can be produced by selecting prominent areas within Bahrain. Therefore, three areas of Bahrain are selected for this study due to their prominence, population size, and land area. Afterwards, different commercial and residential streets within each case study area are selected.

The streets are selected based on their type, significance and usage. In each street, different strategies, techniques and tools are employed to generate data on liveability. These are observations, interviews, mapping and evaluation of liveability indicators. Through this method, the liveability of different types of streets in different is determined.

Merits: The advantage of employing a case study method is that it offers a holistic approach. Research can be conducted in-depth. The research is realistic and specific to the given context. Most importantly, a wide range of variables can be investigated. It also helps to gain details of the process (Karlsson, 2016).

Demerits: Such research may also have certain demerits. This includes researcher bias which may arise in observation bias, interpretation bias, not being able to see and take note of everything around etc. Moreover, such a method can also provide low generalisability. Therefore, case study samples from 3 cities of Bahrain are selected for this study with 4 sample streets in each case. In this way, the study can be reasonably generalized to construct an understanding of the liveability of streets in Bahrain.

3.1.4 The methods

Different tools and techniques have been employed by researchers to study the streets. Methods relevant to the area of study have been considered to accomplish this research. Observations are widely used to study the streets. Through observations, one can gain a comprehensive insight into the street and identify various factors affecting its liveability or liveliness. El-Ghonaimy (2019) evaluated the streets of Bab Al Bahrain by using observation as the main tool, thus being able to study various aspects such as the pavement, lighting, furniture, structures water features and so on observed in the streets.

Methods to study the liveability of streets based on relevant literature are photographic mapping, walking, interviews etc. Through walking, observations are made. This includes walking, photographing and making field notes on usability, perceptions and safety. The mapping of indicators is constantly carried out during field studies. Interviews of users found in the streets are conducted to get an understanding of users' perceptions of the streets and sidewalks and help to gain new insights. By employing these methods, a qualitative understanding of how the streets and sidewalks function and how it affects the liveability were assessed. Employing the above indicators based on literature can help in deriving an appropriate conclusion.

3.1.5 The Three Cases: Manama, Muharraq, Riffa in Bahrain

Three cities of Bahrain have been selected as case studies. They are the biggest cities and most populated ones.

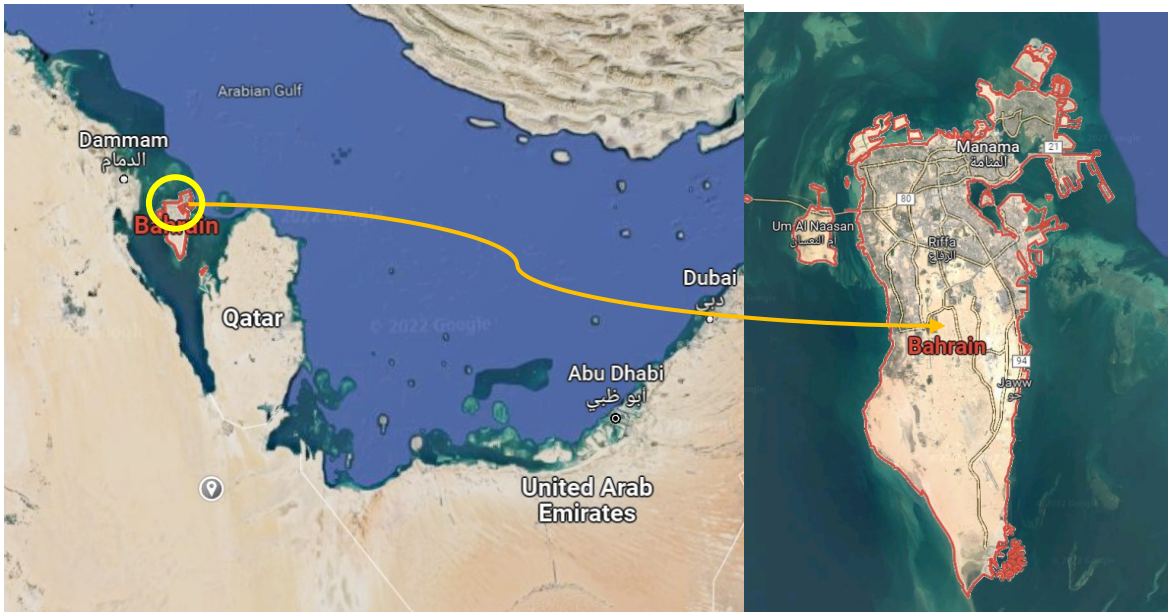


Fig. 3. 1: Location of Bahrain among the neighbouring Gulf countries.

Source: Google Maps, 2022

They are:

1-Manama

2-Muharraq

3-Riffa

No.	Cities Selected	Reasons for Selection
1	Manama	Capital of Bahrain. City known for tourism, investment, finances and its culture.
2	Muharraq	Muharraq consists of heritage sites that are being conserved and maintained.
3	Riffa	It is the second largest city of Bahrain. The city consists of famous souq.

Table 3. 1 Classification of Selected Case Studies

Source: Author, 2022

1. Manama



Fig. 3. 2: Manama, Bahrain

Source: Google Maps, 2022

Manama is the capital city of Bahrain. It is a city known for tourism and investment (El-Ghonaimy, 2019). Manama became the capital of Bahrain in 1936. It is a major port in the Arabian Gulf and financial hub (El-Kholei et al., 2019). It is selected for this study as it is also home to different nationalities, services, historic landmarks and a large population. According to (Ben Hamouche, 2004), the first settlement that shifted from an endogenous system to an exogenous system is Manama.

2. Muharraq

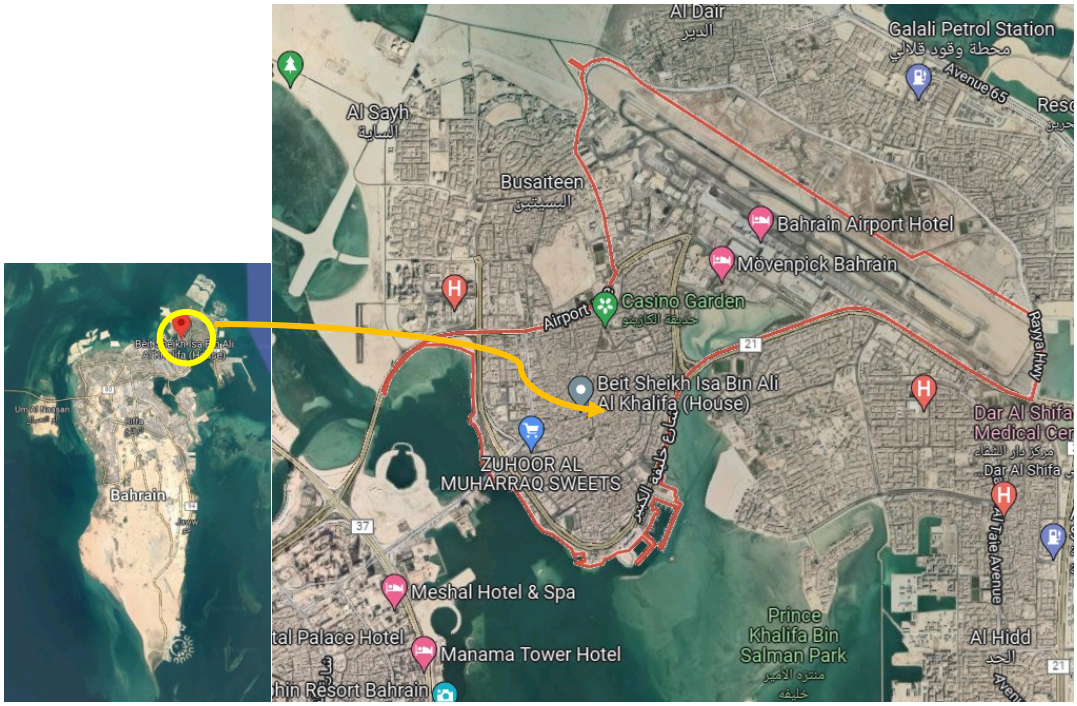


Fig. 3. 3: Muharraq, Bahrain

Source: Google Maps, 2022

Muharraq is selected for this research as it consists of heritage sites, which are being conserved and maintained. According to Hamouche (2004), Social structure, political system, economic pattern and physical setting are the parameters that shaped the morphology of Muharraq. Moreover, by studying the historic streets of old Muharraq, a comparison can be made with the case of the newer developments in Bahrain.

3. Riffa



Fig. 3. 4: Riffa Bahrain

Source: Google Maps, 2022

Riffa is selected because of its complexity as well as density. According to Al-Nabi (2012), East Riffa and West Riffa are twin towns that overlook the central basin of the island. The freshwater springs of Bahrain are in Hanainia in Riffa Ash-shirqui and Umm Ghuwifa in Riffa Al-Gharbi. The streets of the Riffa Souq and the Bokowara Souq are populated and are known for catering to everyday needs.

Two different types of streets within each of the case cities have been selected. They are:

1-Commercial Streets- A commercial street is known for involving or relating buying/selling of goods. Commercial streets also include residential buildings as shops and other retail outlets are found on the ground floor of these buildings with upper residential floors. Typically, it is a street, which has an influx of users walking, buying, selling, gathering etc.

2-Residential Streets- A residential street is defined as a secondary street adjacent to properties that serve as family homes, apartment buildings, or other comparable dwelling structures. When compared to a commercial street, it is generally shorter in span. Moreover, the activities, movement, and usability in such a street are different.

3.1.6 Case study selection criteria

The research examines 3 case studies in Bahrain. 2 Commercial and 2 residential streets of these three cities are selected to cover different types of commercial and residential streets in Bahrain. Thus, a total of 12 streets are examined in this research.

Case Study 01: Manama

Type	Street No.	Street Name	Length	Reason
Commercial Street	**Street 1**	Zubara Avenue	~0.3km	One-way Avenue, often causing difficulties for vehicles to cross other streets + Populated street.
	Street 2	Isa Al Kabeer	0.3km	Popular street among pedestrians + Overcrowded
Residential Street	**Street 3**	Zubara Avenue (Residential)	0.26km	Extension of the avenue to a residential zone.
	Street 4	Road 807	0.17km	A congested, tertiary road.

Table 3. 2: Streets Selected from Manama

Source: Author, 2022

Commercial Streets:

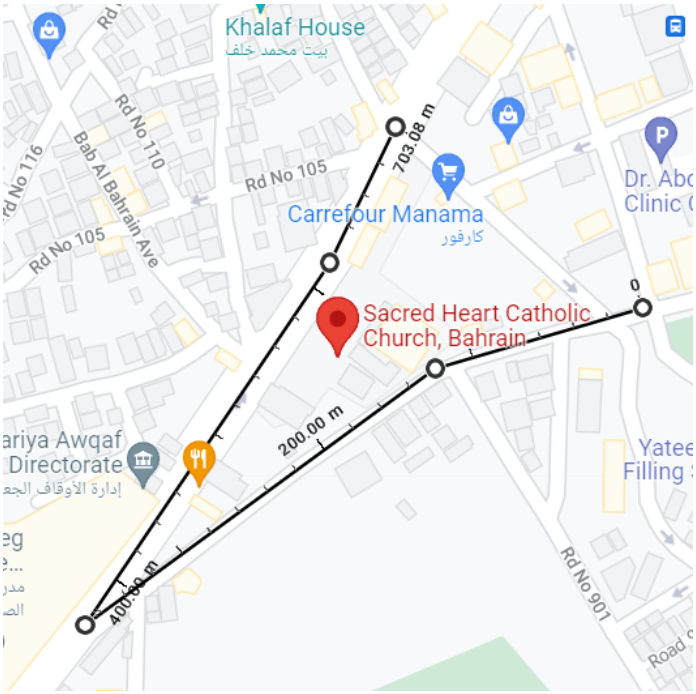


Fig. 3. 5: Manama Street 1 & 2 (Commercial)

Source: Google Maps, 2022



Fig. 3. 6: Manama Street 1 (left) and Street 2 (right).

Source: Author, 2022

Residential Streets:

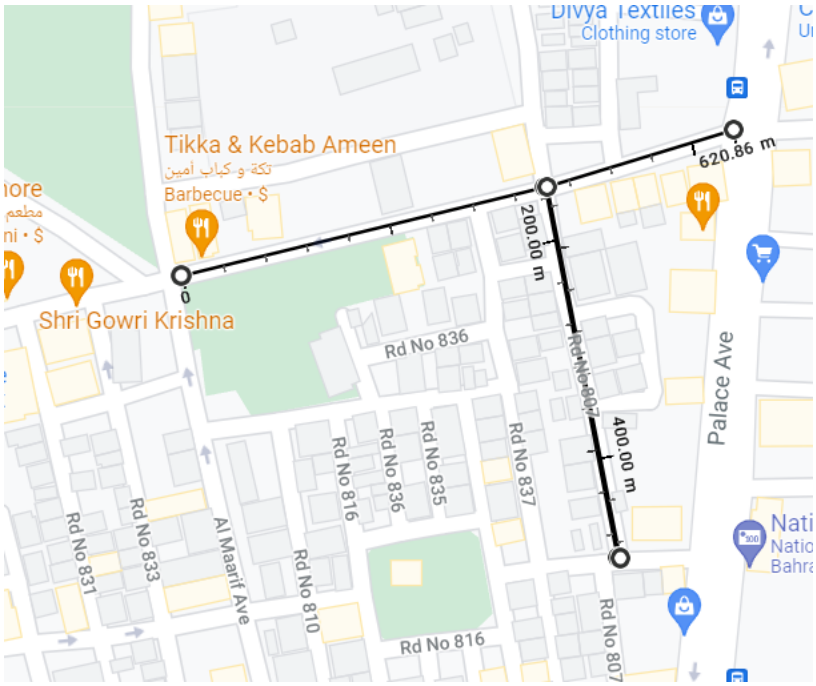


Fig. 3. 7: Manama Street 3 & 4 (Residential)

Source: Google Maps, 2022



Fig. 3. 8 Manama Street 3 (left) and Street 4 (right).

Source: Author, 2022

Case Study 02: Muharraq

Type	Street No.	Street Name	Length	Justification
Commercial Street	**Street 1**	AbdulRahman Al Fadhel Avenue	0.3km	A commercial street of Muharraq with well-designed secondary roads and sidewalks
	Street 2	Road 1021	0.9km	Adjacent street with different retail amenities
Residential Street	**Street 3**	Road 611	0.28km	A tertiary street in old Muharraq.
	Street 4	Road 615	0.26km	A congested, poorly maintained street.

Table 3. 3: Streets Selected from Manama, Bahrain
Source: Author, 2022

Commercial Streets:

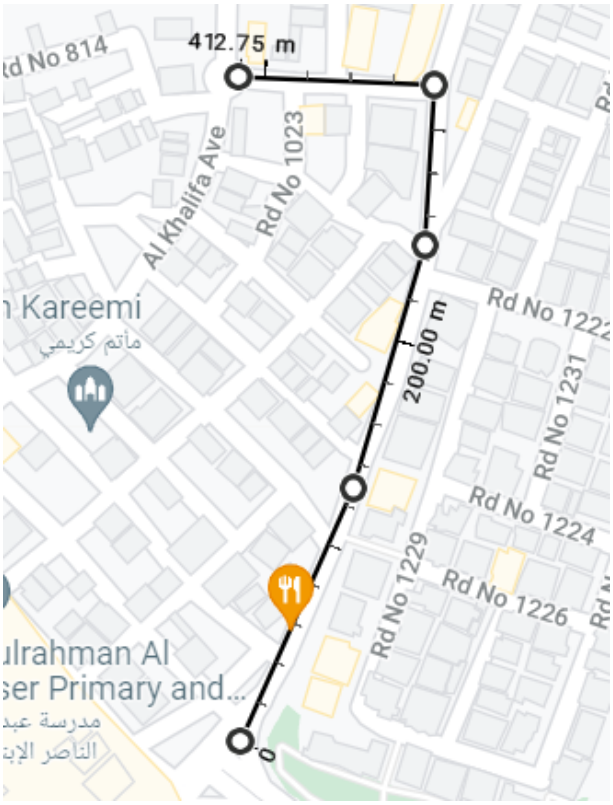


Fig. 3. 9: Muharraq Street 1 & 2 (Commercial)

Source: Google maps, 2022



Fig. 3. 10: Images of Muharraq Street 1 (left) and Street 2 (right).

Source: Author, 2022

Residential Streets:

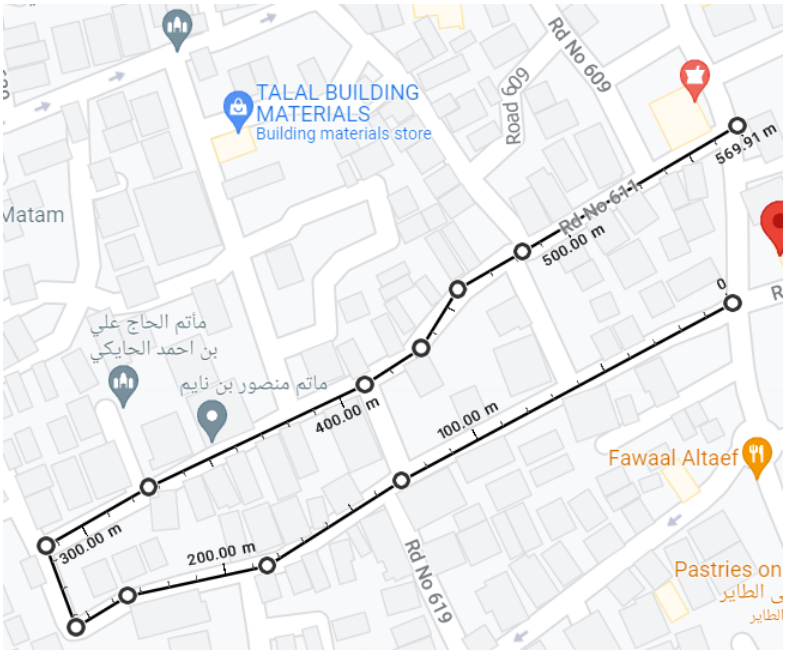


Fig. 3. 11: Muharraq Street 3 & 4 (Residential)

Source: Google maps, 2022



Fig. 3. 12: Images of Muharraq Street 3 (left) and Street 4 (right).

Source: Author, 2022

Type	Street No.	Street Name	Length	Reason
Commercial Street	**Street 1**	Riffa Souq	0.6km	A populated commercial market road is known for various amenities.
	Street 2	Bokowara Street	0.82km	A well-designed and functioning commercial street.
Residential Street	**Street 3**	Road 977	0.17 km	A tertiary residential street with a retail complex.
	Street 4	Road 973+974	0.14 km	A congested, poorly maintained street.

Table 3. 4 List of Streets Selected from Riffa, Bahrain
Source: Author, 2022

Case Study 03: Riffa

Commercial Streets:

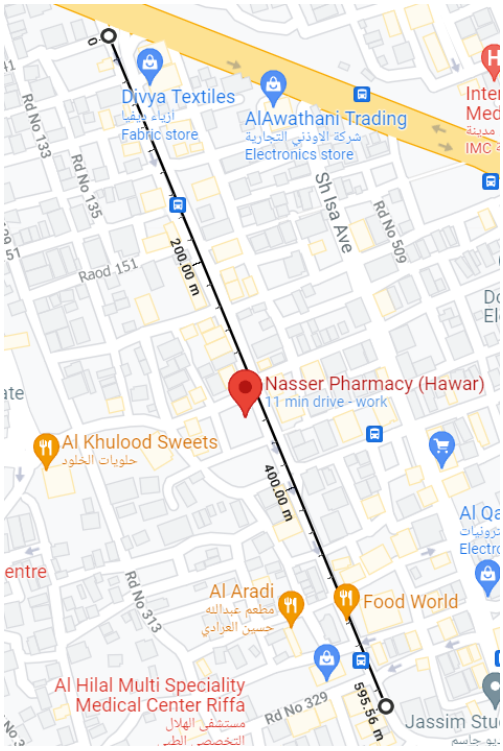


Fig. 3. 13: Riffa Street 1 (Commercial)

Source: Google Maps, 2022

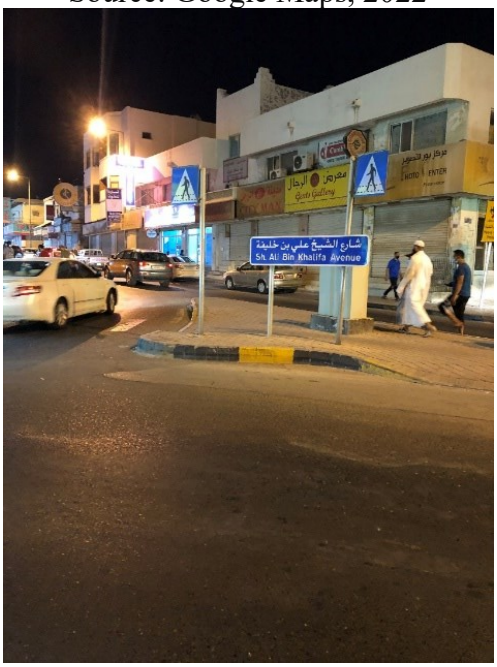


Fig. 3. 14: Riffa Street 1.

Source: Author, 2022

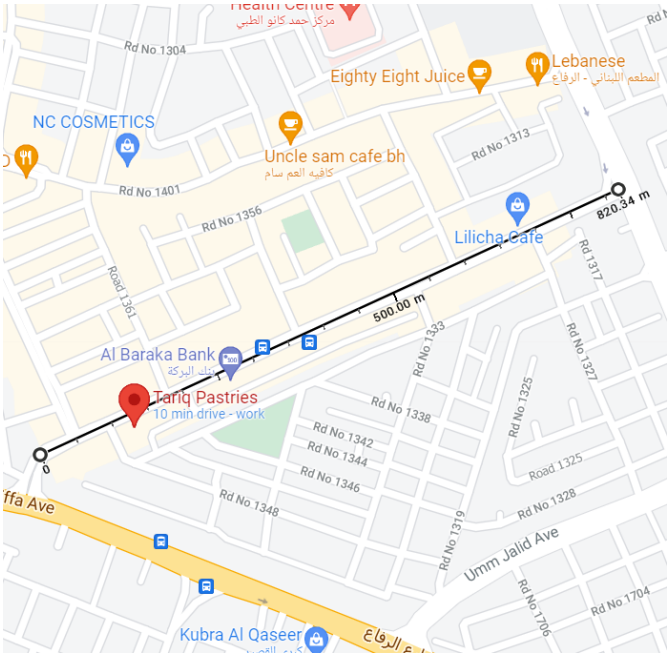


Fig. 3. 15: Riffa Street 2 (Commercial)

Source: Author, 2022



Fig. 3. 16: Riffa Street 2

Source: Author, 2022

Residential Streets:

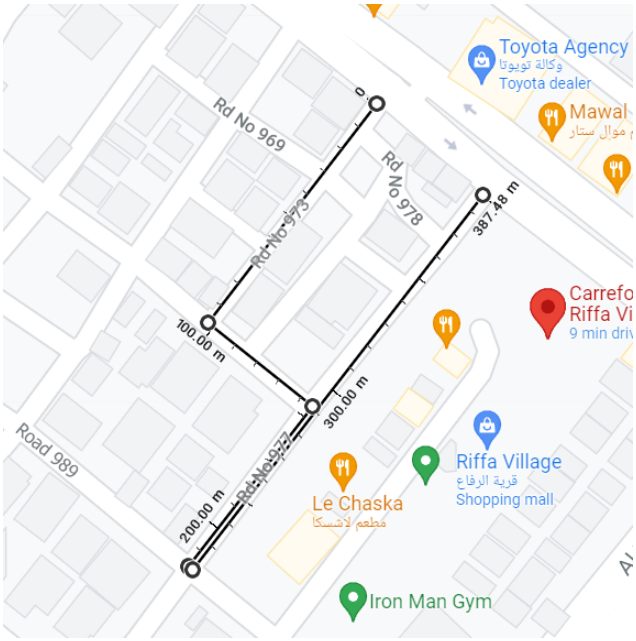


Fig. 3. 17: Riffa Street 3 & 4 (Residential)

Source: Author, 2022



Fig. 3. 18: Riffa Street 3 (top) and Street 4 (bottom).

Source: Author, 2022

3.2 Research Tools

Within the case studies, many research tools and techniques are employed to generate data. They are:

1. Evaluation of Liveability Indicators using a semantic differential scale
2. Interviews
3. A Questionnaire
4. Mapping of movements in streets

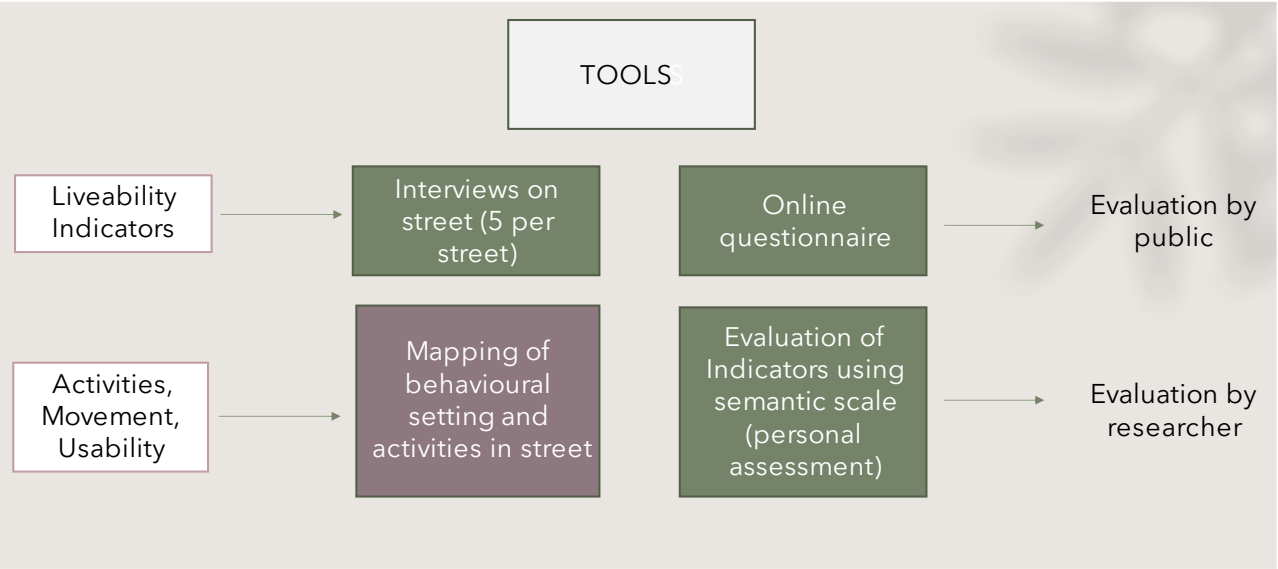


Fig. 3. 19: Research Tools Adopted

Source: Author, 2022

3.2.1 Evaluation of liveability indicators using a semantic differential scale

The most important tool employed to generate data is the application of a semantic differential scale. The liveability of streets and sidewalks is evaluated by employing evaluations using liveability indicators (Table 1). This table lists the selected liveability indicators derived from examining previous research.

3.2.2 Tools adopted in previous research: Liveability indicators

Previous research shows that there exist different tools employed in analyzing the Liveability of streets. Among them, one of the most adopted involves the use of indicators. However, there is no single, commonly adopted set of indicators. In fact, different research has adopted different sets of indicators to evaluate liveability. They generally include physical factors, design factors, social and cultural factors as well as the functionality of streets. This research is designed to study the liveability of the streets and sidewalks of Bahrain. To do so, it employs indicators to ascertain and assess liveability. Therefore, an appropriate set of indicators must be selected based on previous research.

According to Al Abdullah (2010), the type of streets for pedestrians should be considered, when applying indicators. He identifies these types as a destination, transitional and passing-by. His methodology was based on functions, siting and layout, form and appearance, durability and cost. On the other hand, the method adopted by El-Ghonaimy (2020) to study the Bab-Al-Bahrain avenue considered factors such as social, cultural, physical urban characteristics, and economic and environmental factors. El-Ghonaimy further considered locals, retailers and tourists as focused groups. The categories, criteria and their uses were classified into social, cultural, aesthetic, human behaviours, physical, environmental and economic factors. Time, place and activities of each factor is evaluated and studied separately for tourists, locals and retailers.

Abdulmughni et al. (2021), have investigated the liveability of streets by studying the physical aspects of two Streets in Riyadh. There, he focused on aspects such as street segment length, availability of retail shops in the façades of streets, the average number of doors on the streets, crossing facilities, widths of

sidewalks, street greenery, densities of streetlamps, seating, shelter and canopy and facilities for the disabled.

On the other hand, Elsawy et al. (2019) have evaluated the livability of residential streets in Egypt using physical, social, environmental and economic aspects. These aspects are classified based on criteria such as comfort, design, accessibility and livability. Indicators employed were security/crime safety, traffic safety, pedestrian and child use, good lighting, active buildings, shared street concepts, cycling lanes, sidewalks, crossings, paving, materials, intersections, furniture, styles, shading elements and play spaces. Significant characteristics, factors and indicators used in the above studied are adapted and modified to conduct the evaluation of liveability indicators for this study. Additional characteristics and indicators are added as well. Moreover, evaluation of liveability is conducted using a 6 point semantic scale evaluation with qualitative observations.

3.2.3 Aspects and indicators adopted through different methods

3.2.3.1 Evaluation of Indicators

The aspects so evaluated include physical, social, economic, environmental, functional, visual & urban qualities. Within the physical characteristics, physical attributes such as availability of name boards, signs, seating, sculpture and canopies & overhangs are identified. In addition, the availability of parking spaces, vehicular traffic, and accessibility from adjacent streets are observed and evaluated.

Visual characteristics of the streets are also evaluated. This includes observing the existence of a variety of retail shops and lighting, the composition

of facades, proportions of space, scale and proportion of building heights to street facades and legibility of street elements. The next characteristic of Liveability is social characteristics. To understand this, indicators are selected based on democratic public spaces. The indicators include general public spaces, Facilities for the disabled, gathering nodes & face-to-face communications, socializing spaces nearby/ play spaces (for residential streets), and recreational facilities (for residential streets). Regarding the environment, weather conditions are considered as the factors under which sunlight, sound, greenery and cleanliness are selected as the indicators.

The economic character of the streets is also considered, with complexity as the factor. Within this, the indicators selected are based on the availability of a variety of shops and a variety of services. The most important characteristic is the functional characteristics. The different factors within functionality include safety & security, connectivity to city level amenities/ legibility and easy access to public level amenities and wayfinding. The indicators selected for safety & security are the availability of pedestrian crossings, street furniture, lighting (safety), signs, crossing facilities (safety), and the width of the sidewalk and cycling lanes. For evaluating the connectivity to city level amenities and legibility, the indicators used are easy access to parking, connectivity to street systems and road hierarchy. To evaluate the last factor of easy access to public level amenities and wayfinding; the indicators used are signalised intersections, identity, landmarks, and directional and informational.

Though much research has been conducted and various indicators have been used to evaluate the liveability of streets, urban quality aspects of a street have not been evaluated. To evaluate the urban qualities, indicators such as imageability, enclosure, human scale, transparency and complexity are used.

Characteristics	Factors	Indicators	Images	Observations- Qualitative Evaluations	Evaluation
Physical	Physical attributes	Floor surfaces - paving			
		Name boards			
		Signs			
		Seating			
		Sculpture			
		Canopies & Overhangs			
		Traffic			
		Parking spaces			
		Accessibility			
Visual		Variety of retail shops			
		Scale and Proportion (building heights to street facades)			
		Variety of lighting			
		Compatibility of facades - Compositions			
		Proportions of space			
		Scale and Proportion (building heights to street facades)			
		Legibility of street elements			
Social	Democratic public spaces for all	General public spaces			
		Facilities for the disabled			
		Gathering nodes & Face-to-face communications.			
		Socializing spaces nearby/ play spaces (for residential street)			
		Recreational facilities (for residential streets)			
Environmental	Weather conditions	Sunlight			
		Sound			
		Greenery			
		Cleanliness	.		
Economic	Complexity	Availability of various types of shops			
		Availability of various types of services.			
Functional	Safety & Security	Availability of pedestrian crossings			
		Street Furniture			
		Lighting (Safety)			
		Signs			
		Crossing Facilities (Safety)			
		Width of Sidewalk			
		Cycling Lanes			
	Connectivity to city level amenities/ Legibility	Easy access to parking			
		Connectivity to Street Systems			
		Road Hierarchy			
		Signalised in			

	Easy access to public level amenities/ Way Finding				
		Identity			
		Landmarks			
		Directional			
		Informational			
Urban Qualities of Street	Imageability				
	Enclosure				
	Human Scale				
	Transparency				
	Complexity				

Table 3. 5 Criteria and indicators to evaluate the liveability of streets and sidewalks in Bahrain for this research.
Source: Author, 2022

Each of these characteristics was segregated based on different factors, further, introducing various indicators within each factor. To evaluate these indicators, several visits to each street are made, on both weekdays and weekends. The evaluation was conducted using a semantic differential scale, -3 to +3; where -3 is poor and +3 is excellent. The indicators are listed in a table along with the evaluations and justifications for the evaluations. Images of the site where each indicator was observed are presented.

3.2.3.2 Interviews

The second tool to investigate the liveability of streets and sidewalks is face-face interviews. A semi-structured questionnaire is administered with the interviewee encouraged to share their thoughts and views elaborately. This encourages the participants to share their personal experiences of using the street. When the questionnaire was administered to users of selected streets as listed above, the questions were slightly modified while keeping the essence intact, depending on the setting of the environment and users' responses to each question. The respondents selected were those found using the street as well as the shopkeepers or workers of the shops on the street. Their consent was observed

to participate before administering the questionnaire. 5 participants from each street were selected and interviewed. Thus, the total number of responses was 60 from the 12 streets.

3.2.3.3 The Online questionnaire

The third tool employed to evaluate the liveability of streets is a semi-structured online questionnaire. The questionnaire was prepared on google forms employing the different liveability indicators as shown in Table 4. The respondents were able to select the case (the city- for example; Manama) and the street (for example- Zubara Avenue) and submit their entries for the specific street.

The questions are semi-structured. Those respondents willing to express their opinions on each indicator were encouraged to do so. Through both the interviews and the online questionnaire, the participants were asked to evaluate liveability based on the liveability indicators. The rating was based on a semantic differential scale of -3 to +3 where -3 is unliveable and +3 is liveable. Tools 2 and 3 were aimed at gaining evaluations of the users of the streets and understanding what people on the streets experienced functionally. Their views on the other factors such as safety, economy, environment and urban qualities were also evaluated. The data so gathered from the public were corroborated by the evaluations made by the researcher.

3.2.3.4 Mapping of movement and activity observations

Method 3 is different from the three other methods selected. Most of the literature published on the liveability of streets focuses on various aspects of liveability such as visual effects, functionality, orientation and so on. However,

movement patterns in a given interval and the activities are often missed out, though it plays a significant role in understanding how liveable a street is. The users of the streets are its pedestrians and therefore, this method intends to analyze the movement patterns of each street and identify the activities in it.

To conduct this method, streets are divided into different gates. By standing at each gate, the activities and movement of the users are observed. They are then noted in maps identifying the common/unique patterns in various streets. The "liveability" of a street is affected by these patterns. Method 3 and Method 4 rely on the researchers' experiences. Individual assessment is done for these two methods. By doing so, a comparative analysis can be made from individual assessments and data derived from the respondents. Individual evaluation can also help understand why the respondents experience or evaluate a street in a specific way.

3.2.4 Sampling Technique & Sample

A stratified random sampling technique is employed for the study. Strata from the population are selected (pedestrians and cyclists). Then, a random sample within these strata is selected for the study. Moreover, convenient sampling is employed to interview residents of the streets. This will enable obtaining insights from both users on the streets as well as those who don't use it widely.

3.2.5 The sample size for Interviews

5 random samples from each street for interviews. 60 interviews in total from 12 streets were conducted. The participants selected for the study were those above the age of 18 who were found on the streets. This included people found walking,

standing, shopping and shop keepers. Participants were approached and enquired of their willingness to participate in the interview.

The sample size for Online Questionnaire:

10-40 entries from each street were collected, making it around 200 entries.

3.3 Data generated from these instruments

3.3.1 Tools and techniques- Detailed research instruments

a. Interviews-Open ended interviews
b. Observations & Mapping
c. Photographing

	Activities performed by the researcher	**Format**
1	Walking in the street	Walking on sidewalks, using crosswalks.
2	Observing the activities	Observation of indicators selected as in Table 1
3	Mapping indicators on plans	This process will require the most time and will be conducted on different days to fulfil the mapping of all the indicators on the plan.
	Mapping the movement and activities.	
4	Photographing	
5	Making field notes and sketches.	Any significant information or activity observed for each street will be noted.
6	Interviewing pedestrians, cyclists and shopkeepers on the streets.	The open-ended questionnaire is intended to be flexible and not restricted. The format intends to engage in fruitful conversations with the users.

Table 3. 6: Step by step detail of prospective research instruments

3.3.2 Research plan

<table>
<tr><th>Date</th><th>Selected Site</th><th>Weekend</th><th>Weekdays</th></tr>
<tr><td>June 11-18</td><td>Manama Street 1</td><td>Morning
Evening</td><td>Data Collection on 2 days to cover different timings.</td></tr>
<tr><td>June 18-25</td><td>Manama Street 2</td><td>Morning
Evening</td><td>“</td></tr>
<tr><td>June 25-July 02</td><td>Manama Street 3,4</td><td>Morning
Evening</td><td>“</td></tr>
<tr><td>July 02-09</td><td>Muharraq Street 1, 2</td><td>Morning
Evening</td><td>“</td></tr>
<tr><td>July 09-16</td><td>Muharraq Street 3&4</td><td>Morning
Evening</td><td>“</td></tr>
<tr><td>July 16-23</td><td>Riffa Street 1&2</td><td>Morning
Evening</td><td>“</td></tr>
<tr><td>July 23-30</td><td>Riffa Street 3&4</td><td>Morning
Evening</td><td>“</td></tr>
<tr><td colspan="4">Due to a lockdown during the summer months, site visits had to be conducted before and after the lockdown.
<table>
<tr><td rowspan="3">June-October</td><td>Transcribing interviews</td></tr>
<tr><td>Analysing photos</td></tr>
<tr><td>Collecting interviews</td></tr>
</table>
</td></tr>
</table>

Table 3. 7: Time scale and weekly activities breakdown for data collection

Data collection included observation during weekends and weekdays separately, in different time intervals (Day vs Night) for each street during the summer months of June-July 2021. A weekly breakdown for data +collection is as in the table below. The months from August-December were utilized for data analysis and the observation of any gaps in the data collected. Interviews recorded previously were transcribed and analyzed. Maps and sketches collected were developed. Moreover, personal interviews through phone calls were collected from residents of these cities that use the selected streets. This would help achieve a comprehensive analysis of the street liveability.

3.3.3 Strengths and Weaknesses of Methods Adopted

The strengths of the various method adopted are being able to investigate various aspects of a broad issue. By collecting interviews, user perception of the liveability indicators is produced. Hence, it is not based on the researcher’s

perception alone. By collecting online surveys, a large group of people from different localities are approached randomly. Thus the results do not only reflect people found in a street and the researcher alone but a larger group of users located in different parts of Bahrain. By observing the activities and movement patterns in a street, an understanding of general movement patterns is derived, thus able to identify the point of interaction. Finally, the last and the most significant method is to evaluate liveability using indicators. By doing so, any missing gaps in the previous methods are filled, a deeper understanding of the phenomena is obtained and each characteristic is critically evaluated using many more indicators, unlike the previous methods. Thus, through the method of Triangulation, a credible and reliable result is produced.

The weakness of the Methods adopted include not being able to fully focus on each indicator in-depth, as this will result in not covering other indicators. Using surveys, not everyone may be able to fully express their views.

3.3.5 Problems Encountered

Problems encountered with the methods in this research are respondents in surveys being able to select and answer only one street. A pattern viewed in general was that the respondents only answered the first street (commercial streets) under a selected city, and neglected the residential streets.

3.3.6 Impact on Findings

The data collected and analysed has tremendously benefitted the findings. A comprehensive understanding of the status of the liveability of each street is obtained.

Chapter 4 | Data Analysis | Case Study 1 | Manama, Bahrain

4.1 Introduction

Based on the discussion in the previous chapter on the relevant methodologies to be adopted, this chapter focuses on the application of these methodologies.
The chapter presents three case studies. These are:

1. Manama
2. Muharraq
3. Riffa

Within each case study, the data collected is analysed and interim conclusions are drawn.
Each case study includes data gathered through four methods. These are:

1. Interviews
2. Mapping of movements and activity observations
3. Survey of Liveability Indicators
4. Liveability Indicators

Each case study examines the streets based on these four methods. i.e., The interview data collected from the 4 streets employing the interviews (1st method) is analysed first, then the same 4 streets examined employing mapping of movements (the 2nd method), followed by data generated through the survey (the 3rd method) and the final assessments generated using the liveability indicators (4th method).

After the data from each method is presented, conclusions drawn from the analysis of this data are presented. Similarly, for each street under a method, conclusions are drawn.

Manama: The case study 1

The first case study is Manama. The following table presents the 4 streets selected: 2 Commercial and 2 Residential Streets.

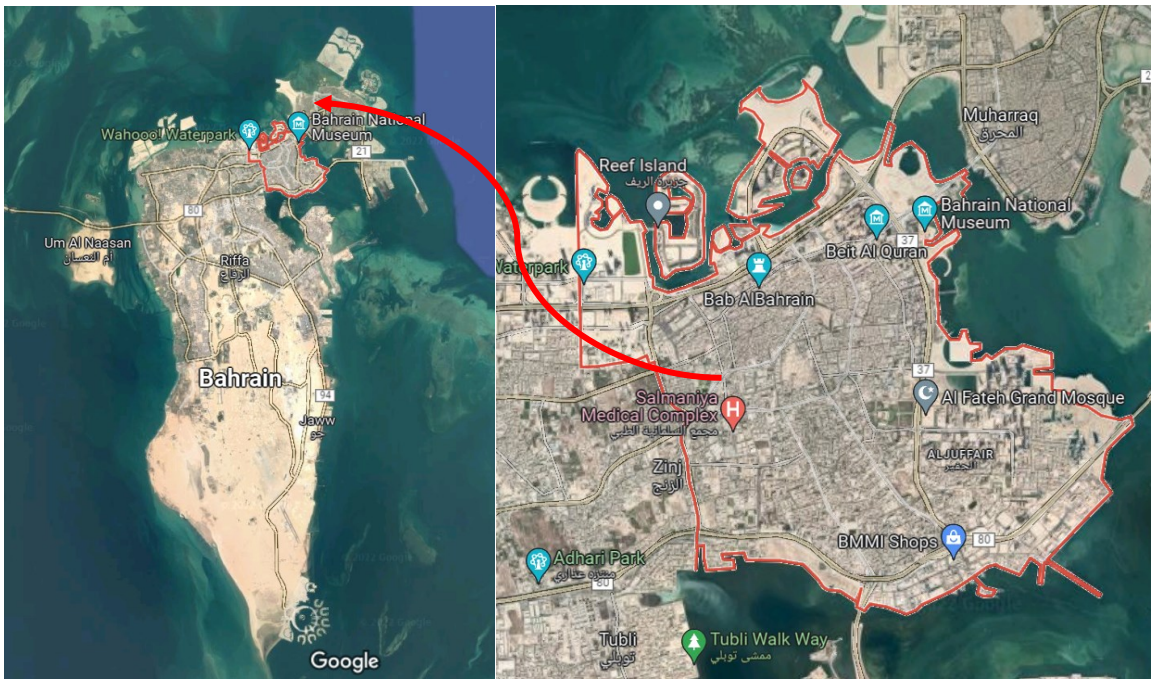


Fig. 4. 1 Manama, Bahrain (Google Satellite Image)

Source: Google Maps, 2022

Type	Street No.	Street Name	Length	Reason
Commercial Street	**Street 1**	Zubara Avenue	~0.3km	One way Avenue, often causes difficulties for vehicles to cross other streets + Populated streets.
	Street 2	Isa Al Kabeer	0.3km	Popular street among pedestrians + Overcrowded
Residential Street	**Street 3**	Zubara Avenue (Residential)	0.26km	Extension of the avenue to a residential zone.
	Street 4	Road 807	0.17km	A congested, tertiary road.

Table: 4. 1: Streets studied.

Source: Author

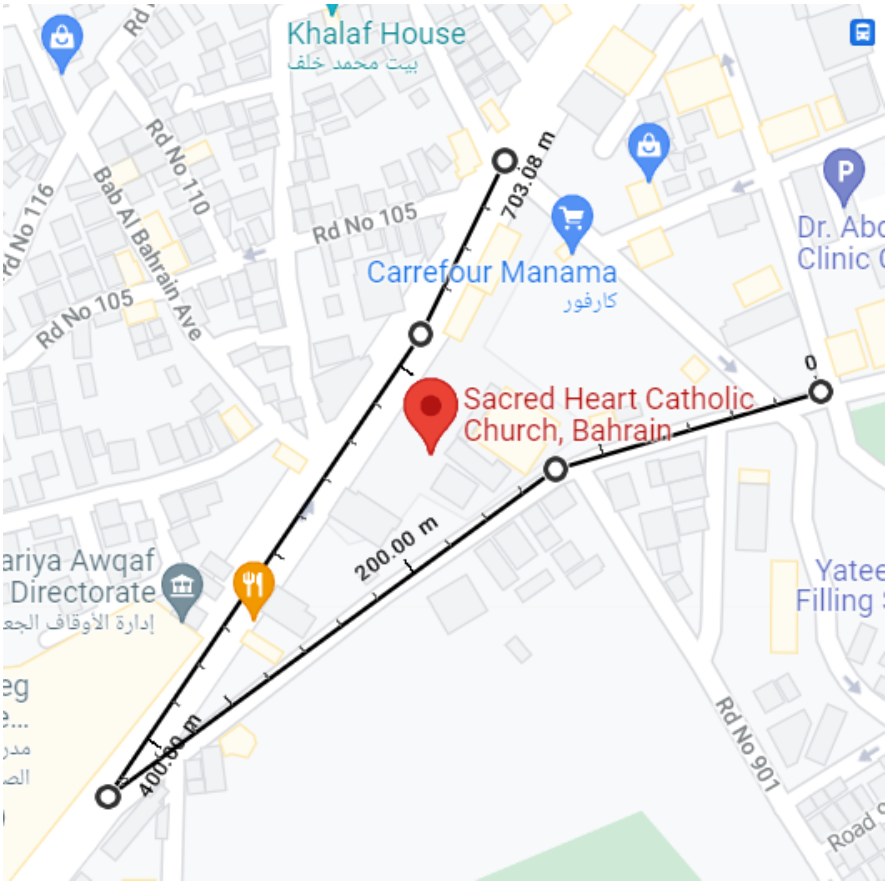


Fig. 4. 2 Google map screenshot of Manama Street 1 & 2 (Commercial) marked by author

Source: Google Maps, 2022



Fig. 4. 3 Manama Street 2 (left) and Street 1 (right). (Author, 2022)

Source: Author, 2022

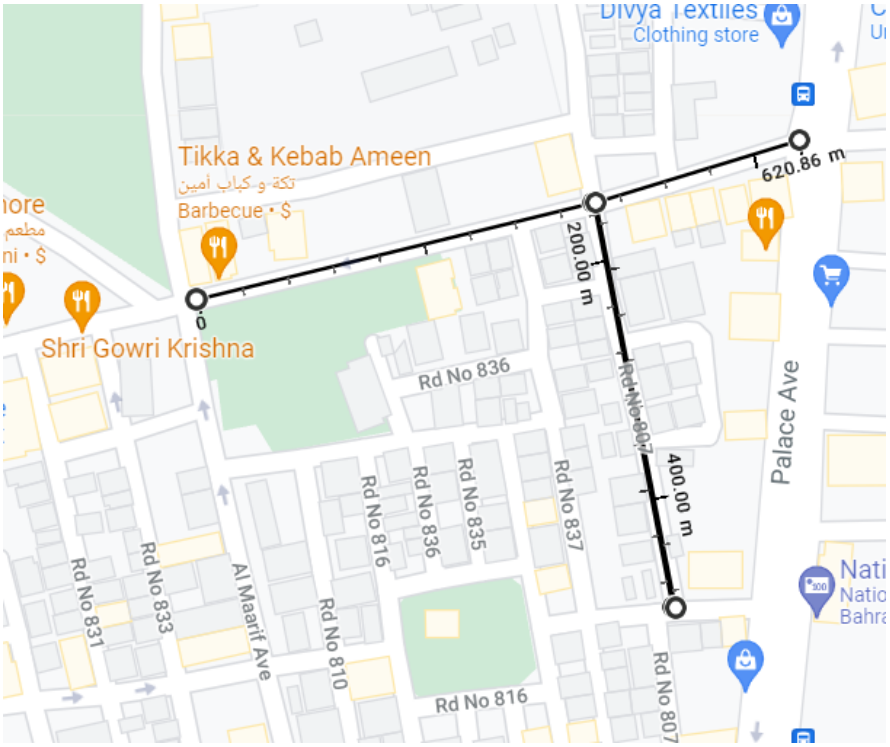


Fig. 4. 4 Google maps image Manama Street 3 & 4 (Residential) marked by author

Source: Google Maps, 2022



Fig. 4. 5 Manama Street 3 (left) and Street 4 (right)

Source: Author, 2022

4.2 Method 1: Interviews

4.2.1 Manama Commercial Street 1 – Zubara Avenue

Five random users of the street were interviewed. The interviews were conducted on 5th July 2021 at 8 pm and on 22nd July 2021 at 1 pm. The different aspects of liveability assessed are: Physical, Economic, Environmental, Functional, Social and Urban Qualities.

Data and Analysis:

1. Physical

a. Accessibility

The general question: "Do you find the street is accessible from adjacent streets, i.e., is it easy to access?

Respondents	Reponses
1	"Yes"
2	"It is a one way. But I have customers from Hoora, regular customers who come always. It is easy for them to find this place."
3	"Yes. It is very accessible."
4	"To travel by car, it is difficult because it is a one-way road and we need to go through other streets to exit this area"
5	"Yes. But we usually don't take this road to go to restaurants when we drive, we take the main road near central café"

Table: 4. 2: Interview Response

Source: Author

Conclusion: The street is perceived as accessible but is accessed only by regular visitors/customers.

b. Cleanliness

The general question: "Do you find the street clean?"

Respondents	Reponses

1	"Yes"
2	"It is 95% bad."
3	"It is good."
4	"I think it's neat"
5	"There are some water leakages on the walkway"

Table: 4. 3: Interview Response

Source: Author

Conclusion: A mixed response is observed. It is also found to have water leakage.

2. Social

The general question: "Are there good seating facilities/ gathering spots in the street that you use? (shelters/canopies/benches)

Following are the responses:

Respondents	Reponses
1	"No"
2	"No. But there are issues here. There are always gatherings from church. This affects us. They always used to gather here before covid."
3	"Yes, the street is lively from here to the garden"
4	"There are people found here in the morning and weekend" "People gather as a group near restaurant"
5	"The main social activity in this street is from the church on weekends. There are also customers to shops in this lane, mainly, it is vehicles."

Table: 4. 4: Interview Response

Source: Author

Conclusion: Overall, the street is found to be a very sociable street. It is found that the main activity in the street is church, people gathering near a restaurant and customers using the street.

3. Economic

The general question: "Does the street cater to your different needs such retail/restaurants/recreation/services etc?

Following are the responses:

Respondents	Reponses
1	"Yes. I use the street regularly for my needs."
2	"Yes. I am happy with it. But the problem is that now the church is closed because of covid. This is a problem here."
3	"No. They don't have any good shops or restaurants. There is no branch of KFC/ McDonalds and food chains here in this area. There are only other shops. No coffee shops. There is church, mosque, ATMs here."
4	"It's good. All facilities are available in walking distance"
5	"Shops, cafes and restaurants are nearby. It's a crowded area. This street is bit dull but overall, the area is excellent for economic facilities."

Table: 4. 5: Interview Response

Source: Author

Conclusion: It is found that the users are satisfied with the facilities the street provides. Participants have also highlighted the impact of the overall area in terms of economic activities though the specific street appears to be dull. However, the lack of international food chains in the overall area is highlighted by one participant.

4. Environmental

The general question: Are there any considerations for the weather conditions? i.e., Shadings/Trees/Shelters to protect from the weather.

Following are the responses:

Respondents	Reponses
1	"No, I don't think so."
2	"No."
3	"No."
4	"No, there are no shadings in this street, in the next street there are trees and garden"
5	"It is missing here, it should be more green"

Table: 4. 6: Interview Response

Source: Author

Conclusion: There are no environmental considerations; shadings or greenery in this street.

5. Functionality-

a. Usability

The general question: Do you travel by your car or walk in the street? Are there any problems you face in general in terms of usability of this street?

Following are the responses:

Respondents	Reponses
1	"The main problem is the parking facility. It is difficult to find parking. Before covid, the road was blocked."
2	"The people don't follow the rules in this street. It is a big problem. Before only my shop was here from 20 years. Now there are other shops, and I am not getting business. Before 16 years it was good place. We need police to come and check here and make the people follow the rules.
3	"The police must come here. I don't know why they are going in the other road. (Isa Al Kabeer) They need to stay in this road. The thieves steal from 7-8 pm. There is no CCTV or nobody checks it here. When there is no church, more thieves come here it is not safe."
4	"I don't find any problem with the functionality"
5	"For me, I feel scared to walk alone because it's very dark in the evening and nobody is near me"

Table: 4. 7: Interview Responses

Source: Author

Conclusion: In terms of functionality, parking is found to be an issue here. Users are unable to find parking. Yet another factor highlighted by a participant is that the users of the street does not follow the rules, which affects them. The safety issue is also highlighted in terms of thefts and lighting at night.

b. Walkability

The general question: Is the street walking-friendly?

Following are the responses:

Respondents	Reponses
1	"Yes. Before covid it was different. Now there are less people using the street."

2	"No. Let me tell you honestly. This street is very bad for walking. There are always people on cycles, and they walk here (Indian, Bangladeshi, Bahraini Nationalities) It is very difficult to walk because of them."
3	"It is not safe to walk here."
4	"It is good to walk"
5	"I think for walking it is fine"

Table: 4. 8: Interview Responses

Source: Author

Conclusion: A mixed response was received when asked about the walkability. 3 participants found it good whereas 2 didn't, of which, one participant highlighted that there are people on cycles, and it causes difficulty for a person to walk. Another pointed out that it is not safe here.

c. Safety

The general question: Are the street and sidewalks safe to walk?

Following are the responses:

Respondents	Reponses
1	"Maybe"
2	"It is safe but There are thieves here who steal. 5-6 times they stole from my shop. They even steal from people walking in the road. They stole from my friend, her bag. One time they stole mobile phone."
3	"There are many thieves here. Once they stole my purse. They always steal from here, from the shops. I was walking here in this small road. I told the police, but they didn't catch."
4	"It is safe here, there is always people in these roads"
5	"After hearing stories and from news about ladies who are followed, I am scared to walk alone here." "It is also very silent here in this side, so its not safe to be alone" "No, I didn't have a personal bad experience"

Table: 4. 9: Interview Responses

Source: Author

Conclusion: Based on the 5 interviews, safety is found to be a serious issue on this street. Theft has been highlighted by two participants. Lack of police or security involvement is highlighted. Fear of being alone and previous incidents

of women being followed in streets is one factor which makes a user feel the street is unsafe as it is silent/isolated.

4.2.1.1 Interim Conclusions on Street 1

1. **Physical- Accessibility-** Accessible but is accessed only by regular visitors/customers.

   Physical- Cleanliness- A mixed response. It has water leakages.
2. **Social:** Overall, the street is very sociable. It is found that the main activity in the street is church, people gathering near a restaurant and customers using the street.
3. **Economic**: Users are satisfied with the facilities the street provides. Participants have also highlighted the impact of the overall area in terms of economic activities though the specific street appears to be dull. However, the lack of international food chains in the overall area is highlighted by one participant.
4. **Environmental:** There are no environmental considerations; shadings or greenery in this street.
5. **Functionality: Usability:** In terms of functionality, parking is an issue here. Users are unable to find parking. Yet another factor highlighted by a participant is that the users of the street do not follow the rules, which affects them. The safety issue is also highlighted in terms of thefts and lighting at night.

   Functionality: Walkability: A mixed response. 3 participants found it good whereas 2 didn't, of which, one participant highlighted that there are people on cycles, and it causes difficulty for a person to walk. Another pointed out that it is not safe here.

   Functionality: Safety: Based on the 5 interviews, safety is a serious issue. Theft has been highlighted by two participants. Lack of police or security

involvement is highlighted. Fear of being alone and previous incidents of women being followed in streets is one factor which makes a user feel the street is unsafe as it is silent/isolated.

4.2.1.2 Conclusions on Liveability of Street 1 | Zubara

The street is accessible and clean to an extent. An issue that needs careful consideration is water leakage. This is a social street with several social activities taking place. In terms of economics, it caters to the needs of its users, however, there is a scope for improvement for the benefit of all types of people. In terms of functionality, usability, safety and walkability, parking is a serious issue here. Thefts occur regularly. Walkability is affected due to the bicycles. Therefore, the functionality of the street is poor. A much more in-depth conclusion of the liveability of this street can be made only after analysing the remaining 3 other methods.

4.2.2 Manama Commercial Street 2

- Isa Al Kabeer

1. Physical

a. Accessibility

The general question: "Do you find the street is accessible from adjacent streets, i.e., is it easy to access?

Following are the responses:

Respondents	Reponses
1	"Yes, it is accessible"
2	"Yes. No issues."
3	"Yes"
4	"Yes."
5	"Yes, it is accessible from nearby streets. It connects them."

Table: 4. 10: Interview Responses

Source: Author

Conclusion: All the participants found that the street is accessible.

b. Cleanliness

The general question: "Do you find the street clean?"

Following are the responses:

Respondents	Reponses
1	"Yes"
2	"Yes, every day it is cleaned."
3	"Yes"
4	"Yes"
5	"There are some water leakages on the walkway"

Table: 4. 11: Interview Responses

Source: Author

Conclusion: Though four participants agreed that the street is clean, it is found that the street has some water leakages based on one interview.

2. Social

The general question: "Are there good seating facilities/ gathering spots in the street that you use? (shelters/canopies/benches)

Following are the responses:

Respondents	Reponses
1	"It is. I use this street every day."
2	"I work here. I come here every time."
3	"I use it on a daily basis, there is lot of people here always."
4	"There is always traffic here and people shopping, eating. The customers are coming here by car."
5	"I go by Car and Walk" "Customers walk and come and customers from other places come in the car"

Table: 4. 12: Interview Responses

Source: Author

Conclusion: Based on the 5 interviews, it is found that these users access the street on a regular/daily basis as they work in this street or come for shopping in this street. It can be understood that most of the socialization occurs here with buying and selling. Hence, it is filled with people always.

3. Economic

The general question: "Does the street cater to your different needs such retail/restaurants/recreation/services etc?

Following are the responses:

Respondents	Reponses
1	"Yes. I use the banks."
2	"Yes."
3	"Yes"
4	"There is no bank here."
5	"Yes"

Table: 4. 13: Interview Responses

Source: Author

Conclusion: The street caters to the economic needs of the users.

4. Environmental

The general question: Are there any considerations for the weather conditions? i.e., Shadings/Trees/Shelters to protect from the weather.

Following are the responses:

Respondents	Reponses
1	"Not much"
2	"No considerations."
3	"No shading."
4	"No."
5	"No, I don't think there's any shading or considerations."

Table: 4. 14: Interview Responses

Source: Author

Conclusion: All the interviewed participants responded that there were no environmental considerations of any kind in this street.

5. Functionality

a. Usability

The general question: Do you travel by your car or walk in the street? Are there any problems you face in general in terms of usability of this street?
Following are the responses:

Respondents	Reponses
1	"No, I am very happy."
2	"No issues"
3	"I am here for 6 years. Didn't find any problem here."
4	"Traffic from car. Need to improve."
5	"The only problem is that it becomes congested while driving. Also, people are crossing the road every time causing difficulty to drive."

Table: 4. 15: Interview Responses

Source: Author

Conclusion: Traffic and congestion is found to be an issue affecting functionality. People crossing roads is also found to cause difficulty for a person driving.

b. Walkability

The general question: Is the street walking-friendly? Are the street and sidewalks safe to walk?

Following are the responses:

Respondents	Reponses
1	"It is."
2	"It is. Evening there is traffic."
3	"Yes" "I am here for 25 years. No problem."
4	"Before I used to walk 3 times, but not now. Difficult to cross the road."
5	"Yes"

Table: 4. 16: Interview Responses

Source: Author

Conclusion: 4 participants shared that the street is walkable. However, one participant found that it is difficult to cross the roads now, and walks less now.

c. Safety

The general question: Are the street and sidewalks safe to walk?

Following are the responses:

Respondents	Reponses
1	"Yes"
2	"No issues"
3	"Yes, it is safe."
4	"Unsafe."
5	"I mainly use this street for its restaurants and hospital. When I walk, I feel there's no privacy as people from cars stare at those walking. It makes me uncomfortable to use the footpath."

Table: 4. 17: Interview Responses

Source: Author

Conclusion:

Though three participants found the street to be safe, two others reported it to be unsafe, wherein one case it was found that as the user walked, there were privacy issues due to people staring from cars. This portrays that there exist safety concerns to an extent.

4.2.2.1 Interim Conclusion on Isa Al Kabeer Avenue based on 5 Interviews Collected

1. **Physical- Accessibility:** All the participants found that the street is accessible.

   Physical- Cleanliness Though four participants agreed that the street is clean. It is found that the street has some water leakages based on one interview.

2. **Social:**

   Based on the 5 interviews, it is found that these users access the street on a regular/daily basis as they work in this street or come for shopping. Most of

the socialization occurs here while buying and selling. Hence, it is filled with people always.

3. **Economic:** 4 participants agreed that the street caters to the economic needs of the users.
4. **Environmental:** All the participants reported that there were no environmental considerations of any kind in this street.
5. **Functionality-Usability:**

   Traffic and congestion are found to be an issue affecting functionality. People crossing the roads cause difficulties for people driving.

   Functionality-Walkability:

   4 participants agreed that the street is walkable. However, one participant found that it is difficult to cross the roads, and walks less now.

   Functionality-Safety

   Although three participants found the street to be safe, two others reported it to be unsafe. In one case, it was reported that as the users walked, faced privacy issues due to people staring from cars. This portrays that there exists some safety concerns.

4.2.2.2 Conclusions on Liveability of the Isa Al Kabeer Avenue:

Based on the interviews, the liveability of the Isa Al Kabeer Avenue was evaluated on 5 main characteristics of Liveability.

- In terms of the physical characteristics, the street is accessible and clean. It is highly sociable where users work, shop and commute.
- The street is also a good economic destination and caters to the essential needs of its users.
- Although the above four characteristics of liveability are found to be excellent in this street, it still cannot be considered highly liveable. This is

due to certain drawbacks in the functionality of the street. One such issue is traffic and congestion affecting the usability and the walkability. This includes difficulty crossing roads and difficulty driving. Yet another problem with the functionality of the street is safety. Privacy concerns from people staring from cars are raised. It can be understood that the overcrowding of users and vehicles in the street can be a reason for these issues.

If the functional aspect of the street is checked upon and traffic influx limited, it can be considered liveable. However, other methods are needed to arrive at a conclusion, which will be discussed further in this chapter.

4.2.3 Manama Residential Street 1

1. Physical

a. Accessibility

The general question: "Do you find the street is accessible from adjacent streets, i.e., is it easy to access?

Following are the responses:

Respondent	Response
1	"Yes. There is no issue.
2	"It is accessible. But the main issue here is the traffic block. Usually, you will find the roads blocked in the junction making a congestion to this street. This is because of the cars coming from the other street, especially during evenings."
3	"It is okay. But I walk in other streets in other parts of Manama."
4	"Yes. There are no access issues."
5	"Yes."

Table: 4. 18. Interview Responses

Source: Author

Conclusion: One point highlighted was how traffic blocks the junction causing the congestion on the street. Apart from that, it is found to be accessible.

b. Physical- Cleanliness

The general question: "Do you find the street clean?"

Following are the responses:

Respondent	Response
1	"Yes."
2	"Yes, it is clean."
3	"Yes."
4	"Yes. It is well maintained."
5	"Yes."

Table: 4. 19: Interview Responses

Source: Author

Conclusion: It is observed that the street is found to be clean by the users interviewed.

2. Social

The general question: "Are there good seating facilities/ gathering spots in the street that you use? (shelters/canopies/benches)

Following are the responses:

Respondent	Response
1	"During weekends, there are more people found on this street."
2	"Yes, its used by many people"
3	"People come to eat as family, buy fruits and vegetables every day"
4	"Families who stay here, they come to buy for their needs, other customers come in car and pass."
5	"There is gathering near cafes" "It's a good place to meet other people"

Table: 4. 20: Interview Responses

Source: Author

Conclusion: The street has the socialization of residents staying nearby, mainly it is found that users access the street to meet their everyday essential needs. Gatherings are found near cafes (shawarma stalls).

3. Economic

The general question: "Does the street cater to your different needs such retail/restaurants/recreation/services etc?

Following are the responses:

Respondent	Response
1	"Yes, it is excellent. There are all facilities available here."
2	"Definitely. I stay here for more than 15 years, and every facility is nearby. Even Shifa hospital is very close."
3	"Yes, there are all facilities here and I like to shop in this street."
4	"Yes. It is perfectly okay here. There is every facility available."
5	"Yes. Facilities are available."

Table: 4. 21: Interview Responses

Source: Author

Conclusion: Based on the 5 interviews, the users are satisfied and find the street economic facilities are good.

4. Environmental

The general question: Are there any considerations for the weather conditions? i.e., Shadings/Trees/Shelters to protect from the weather.

Following are the responses

Respondent	Response
1	"No. No greenery or any shadings found. If we need some green space, we need to travel to another street."
2	"No."
3	"No."
4	"No."
5	"No."

Table: 4. 22: Interview Responses

Source: Author

Conclusion: All the respondents mentioned that there were no environmental considerations for this street.

5. Functionality

a. Usability

The general question: Do you travel by your car or walk in the street? Are there any problems you face in general in terms of usability of this street?

Following are the responses:

Respondent	Response
1	"No."
2	"There isn't enough parking."
3	"No."
4	"No. it is perfect."
5	"The only problem and the biggest problem is the parking itself. It is very difficult to find parking. Even if you want to go to a restaurant. It's difficult to park."

Table: 4. 23: Interview Responses

Source: Author

Conclusion: 3 participants shared that there are no issues. It is found that parking is an issue in the street. If there is a person with a vehicle wanting to visit a restaurant, it is difficult to park here.

b. Walkability

The general question: Is the street walking-friendly? Are the street and sidewalks safe to walk?

Following are the responses:

Respondent	Response
1	"It is good. There is no issue with the street."
2	"Yes. It is good for walking, especially for those who live here."
3	"It is okay. But I walk in other streets in other parts of Manama."
4	"Yes. It is very good."
5	"Yes."

Table: 4. 24: Interview Responses

Source: Author

Conclusion: The street is found to be good for walking.

c. Safety

The general question: Are the street and sidewalks safe to walk?

Following are the responses:

Respondent	Response
1	"There are no safety concerns."
2	"Yes. There is not safety issue here."
3	"There are no streetlights sometimes at night. This is a concern."
4	"Yes."
5	"Yes."

Table: 4. 25: Interview Responses

Source: Author

4.2.3.1 Interim Conclusion from Street 1:

1. **Physical- Accessibility**

One point highlighted was how traffic blocks in the junction cause congestion to the street. Apart from that, it is found to be accessible.

Physical- Cleanliness

The street is found to be clean.

2. **Economic**

The users are satisfied and find the street economic facilities are good.

3. **Environmental-** All the respondents mentioned that there were no environmental considerations for this street.

4. **Functionality- Usability**

Although 3 participants said that there are no issues, it is found that parking is an issue. If there is a person with a vehicle wanting to visit a restaurant, it is difficult to park here.

Functionality- Walkability The street is found to be good for walking.

Functionality- Safety 4 participants found that the street is safe. However, one has highlighted a concern due to the lack of streetlights at night.

4.2.3.2 Liveability of Street 3 | Manama Residential Street 2 based on Interviews:

All in all, there exists several limitations to this street and cannot be considered liveable due to certain issues, one of which is parking. It was also found that more people are in the street during weekends. The street proves to have social factors within it, especially during the weekends. In terms of the economic facilities, the residents are satisfied with the facilities the adjacent street provides. The lack of green spaces and shadings proves that there is no consideration for environmental characteristics. In terms of walkability, it can be found that the participants do not face any issues. Moreover, it was good for walking for the residents of the street. However, there exists safety concerns. This is during the night when there are no streetlights.

Moreover, traffic issues have been highlighted, where traffic from the junction is found to cause congestion. The serious issue is parking. This is also the case with customers who come to dine in at the restaurants. This further causes congestion and affects the liveability in terms of physical factors and economic factors as businesses face issues due to the unavailability of parking. Overall, there are several drawbacks to the street affecting its liveability, which include environmental, functional, safety, and walkability. Although there are restaurants and few retail facilities, the lack of proper parking and control over traffic affects the economic characteristics of this street.

4.2.4. Manama Residential Street 2

1. Physical

a. Accessibility

The general question: "Do you find the street is accessible from adjacent streets, i.e., is it easy to access?

Following are the responses:

Respondent	Response
1	"I think it is accessible."
2	"Yes."
3	"I face difficulty to exit the road as it's a one-way road and there are cars from opposite direction that are coming (from the other road)"
4	"I think for a new person it is bit hard to find the road, for me it is not difficult to access"
5	"Yes, it's very easy and connected to main road"

Table: 4. 26: Interview Responses

Source: Author

Conclusion:

Overall, it can be concluded that the users find it easy to access the street. However, there exists an issue with exiting the street (To the nearest main road) through vehicles, as it is a one-way road.

b. Cleanliness

The general question: "Do you find the street clean?"

Following are the responses:

Respondent	Response
1	"It is."
2	"Yes."
3	"It is clean"
4	"No problem here"
5	"Sometimes there are construction works here in the opposite building, and its not clean"

Table: 4. 27: Interview Responses

Source: Author

Conclusion:

The street is clean in general.

2. Social

The general question: "Are there good seating facilities/ gathering spots in the street that you use? (shelters/canopies/benches)

Following are the responses:

Respondent	Response
1	"There are informal gatherings here. But I don't use."
2	"Our neighbours usually gather outdoors with tables and chairs. They sit in the roadside. But we usually don't use the outdoors for gathering."
3	"Whenever I come here, I see people standing and talking outside the shop (laundry)"
4	"After praying in the mosque, people go as group"
5	"Nothing special, as a family it's good to go out here"

Table: 4. 28: Interview Responses

Source: Author

Conclusion: Residents find the street a good place to socialize. One family has an informal seating area outside with tables and chairs.

3. Economic

The general question: "Does the street cater to your different needs such retail/restaurants/recreation/services etc?

Following are the responses:

Respondent	Response
1	"Not in this street. But every facility is accessible and is nearby."
2	"Yes. Everything is nearby for us."
3	"All things are available here"
4	"There is cold store near my house with available items, and other shops I can walk from my house"
5	"It is good place for businesses. Our road is near the main road, which has many businesses"

Table: 4. 29: Interview Responses

Source: Author

Conclusion:

Due to the proximity of the street to an adjacent street with several businesses, the residents are satisfied with the economic factors. The street also has a suitable cold store.

4. Environmental

The general question: Are there any considerations for the weather conditions? i.e., Shadings/Trees/Shelters to protect from the weather.

Following are the responses:

Respondent	Response
1	"No, there are no considerations."
2	"No."
3	"Some plants are here outside my building"
4	"We have trees here"
5	"No shading"

Table: 4. 30: Interview Responses

Source: Author

Conclusion: Few trees and plants grown by the residents are available.

5. Functionality

a. Usability:

The general question: Do you travel by your car or walk in the street? Are there any problems you face in general in terms of usability of this street?

Following are the responses:

Respondent	Response
1	"No. I find it comfortable to use."
2	"No. There is a lack of parking. However, it doesn't affect us as the residents are cooperative and adjust the vehicle whenever required. So, there is no problem with the parking patterns. However, the street is quite congested in the evenings during weekends as there are more visitors here."
3	"It is difficult to drive here and park"
4	"There is congestion when cars come in the wrong way. It is a one-way road"
5	"It is good. But needs more space to walk because cars are parked here on the road"

Table: 4. 31: Interview Responses

Source: Author

Conclusion: Parking is a significant issue. Being a one-way street, congestion is caused due to cars travelling from opposite sides. Moreover, the width is narrow for a person to walk while the vehicles move.

b. Walkability

The general question: Is the street walking-friendly? Are the street and sidewalks safe to walk?
Following are the responses:

Respondent	Response
1	"The only problem and the biggest problem is the parking itself. It is very difficult to find parking."
2	"It is walking friendly. I do go for walks when whether is not too hot."
3	"It is a good place to walk, I go for a walk every evening"
4	"Difficult to walk because of cars parked on both sides and cars coming in both directions"
5	"Needs more space to walk"

Table: 4. 32: Interview Responses

Source: Author

Conclusion: The street is walking-friendly. However, it requires additional space to segregate between sidewalks and the road for cars. Vehicles parked on the road affect walkability.

c. Safety

The general question: Are the street and sidewalks safe to walk?

Following are the responses:

Respondent	Response
1	"Yes."
2	"I feel unsafe to walk or step out of my house alone usually. This is because I have had previous experience where I found neighbour from opposite flat watching me for long period. But it is not the case when I am with my family. Hence, it is unsafe for a woman who is alone."
3	"It is very safe"
4	"Not safe for children to play, there's construction in the opposite building and people"
5	"It is okay. Sometimes there is no streetlights in the end of the road, this is an issue"

Table: 4. 33: Interview Responses

Source: Author

Conclusion: A mixed response was received. Construction in the area causes safety concerns for children. Yet another issue is the lack of proper streetlights throughout the street. However, 2 participants didn't find any concerns and found the street to be safe.

4.2.4.1 Interim Conclusions from Street 1

Physical- Accessibility Overall, it can be identified that the users find it easy to access the street. However, there exists an issue with exiting the street (To the nearest main road) through a vehicle as it is a one-way road.

Physical- Cleanliness The street is clean.

Social: Residents find the street a good place to socialize. One family has an informal seating area outside with tables and chairs.

Environmental- Few plants are available

Functionality- Usability Parking is a significant issue. Being a one-way street, congestion is caused due to cars travelling from opposite sides. Moreover, the width is narrow for a person to walk while the vehicles move.

Functionality- Walkability The street is walker-friendly. However, it requires additional space to segregate between sidewalk and road for cars. Vehicles parked on the road affect walkability.

Functionality- Safety

A mixed response was received. Construction in the area causes safety concerns for children. Yet another issue highlighted is the lack of proper streetlights throughout the street.

4.2.4.2 Liveability of Manama Residential Street 2 based on Interviews

Overall, street liveability was analysed through 5 characteristics. Based on Physical characteristics, the street is accessible. However, there exists a critical issue of users accessing the road from the wrong direction (in the one-way road). This affects the physical characteristics of a street as well as its functionality. In terms of cleanliness, it is good according to the interviews. There are social activities in the street.

Parking is a common issue in all the previous three streets. However, a critical issue is vehicles entering the road from the opposite direction. Though the residents find the street walking-friendly, the lack of proper segregation between sidewalks and road is a concern as cars are parked on either side. There also exist safety concerns. These issues affect the functionality of the street, which further affects its liveability.

4.3 Method 2: Survey

4.3.1 Manama Commercial Street 1 – Zubara Avenue

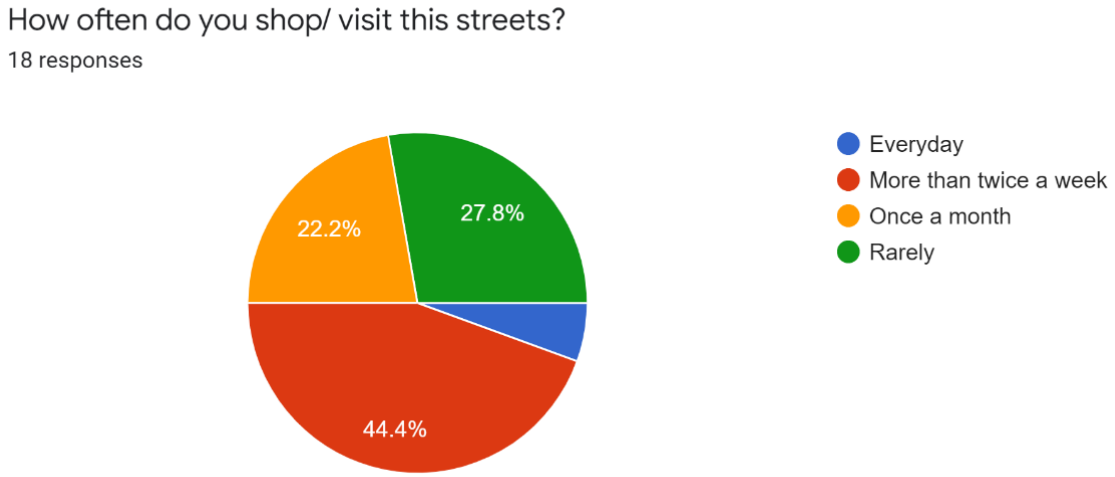


Fig. 4. 6 Survey responses - Street 1

Source: Author, 2022

Response	Percentage
Visit the street on an everyday basis	less than 10%
Use the street more than twice a week	44.4%
Visit the street rarely	27.8%,
Visit the street once a month	22.2%

Table: 4. 34: Frequency of visiting the street

Source: Author

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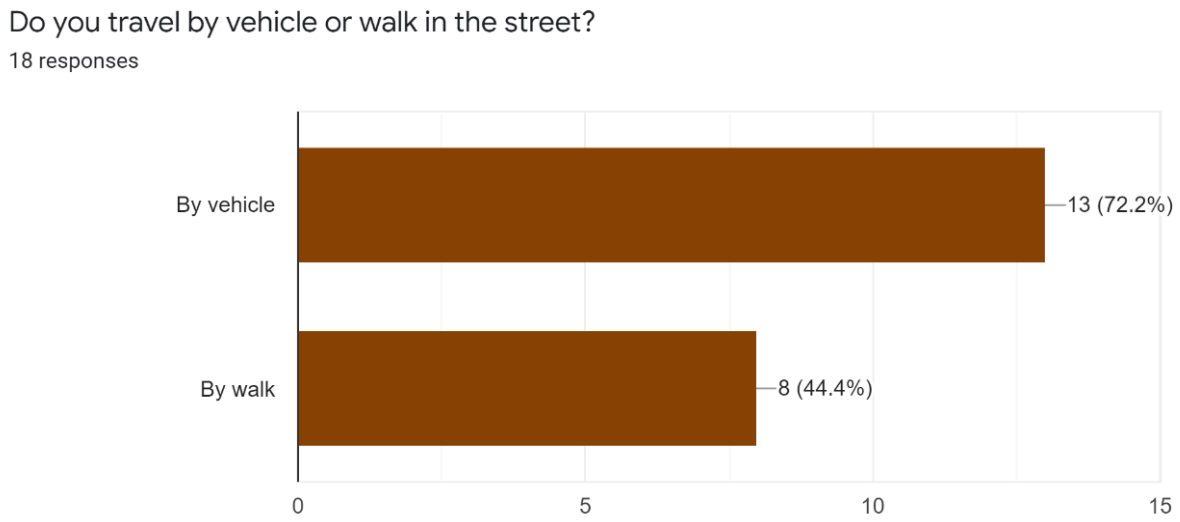


Fig. 4. 7 Survey responses - Street 1

Source: Author, 2022

13 respondents visited the street using their vehicles and 8 travelled by walking.

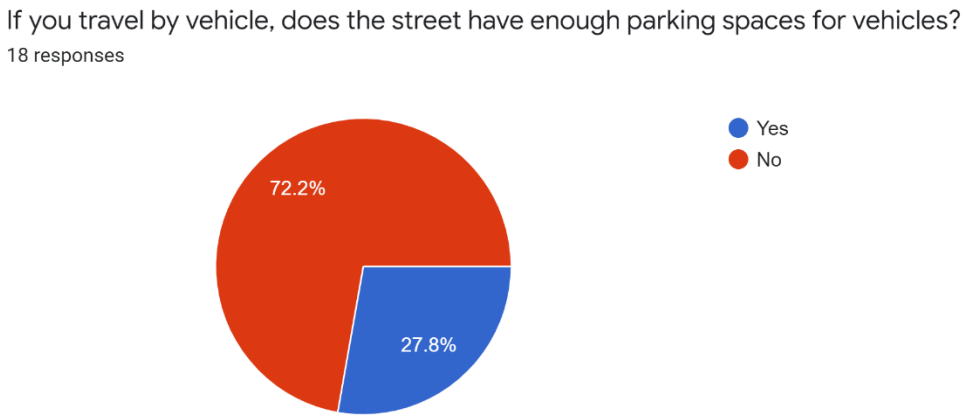


Fig. 4. 8 Survey responses - Street 1

Source: Author, 2022

72.2% of the users found enough parking spaces. 27.8% of the users find that there are not enough parking spaces.

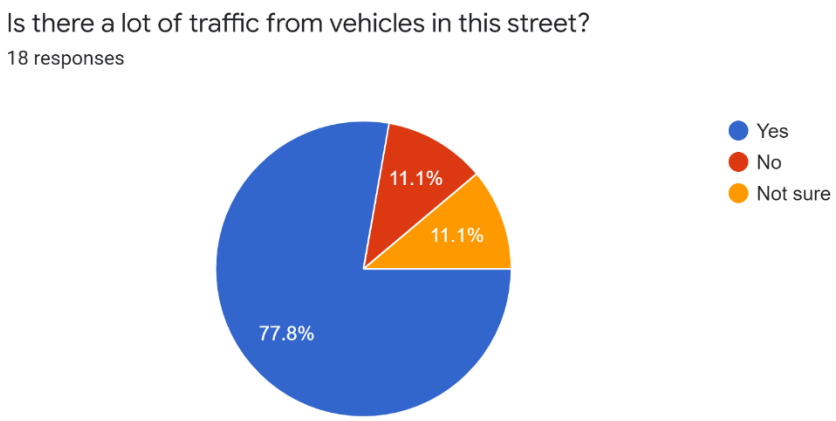


Fig. 4. 9 Survey responses - Street 1

Source: Author, 2022

77.8% of the users responded that there is a lot of traffic in the street.

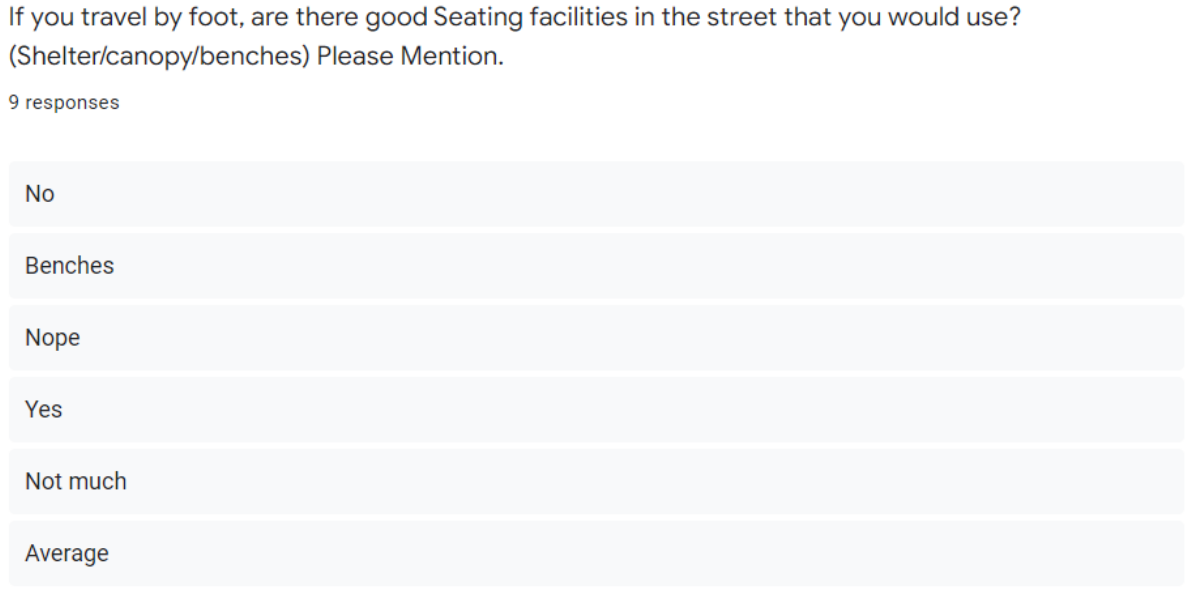


Fig. 4. 10 Survey responses - Street 1

Source: Author, 2022

When enquired if there were any additional facilities in the street such as shelter/canopy/benches, respondents gave a mixed response. 3 of them

commented that there were none, while two mentioned there were, of which one commented that there were benches.

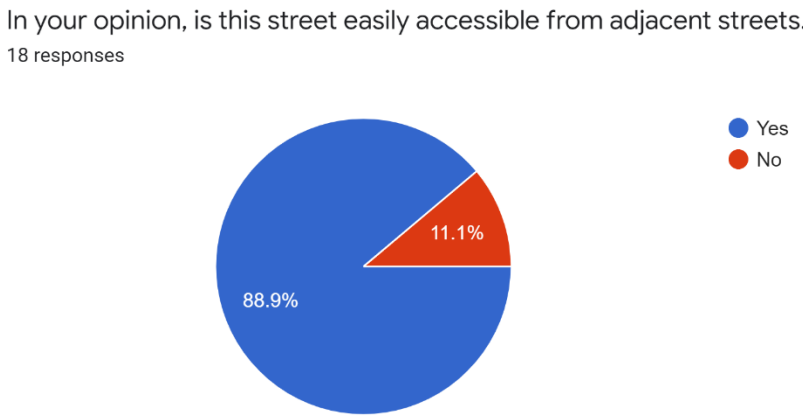


Fig. 4. 11 Survey responses - Street 1

Source: Author, 2022

88.9% of the respondents found that the street is accessible from adjacent streets.

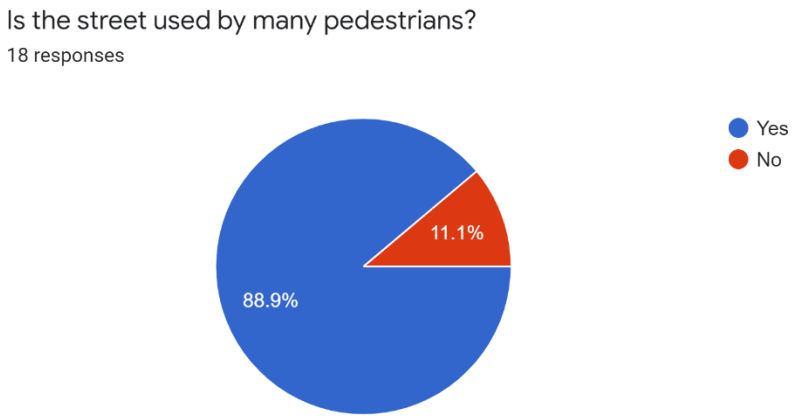


Fig. 4. 12 Survey responses - Street 1

Source: Author, 2022

88.9% of the respondents said that the street is used by many pedestrians.

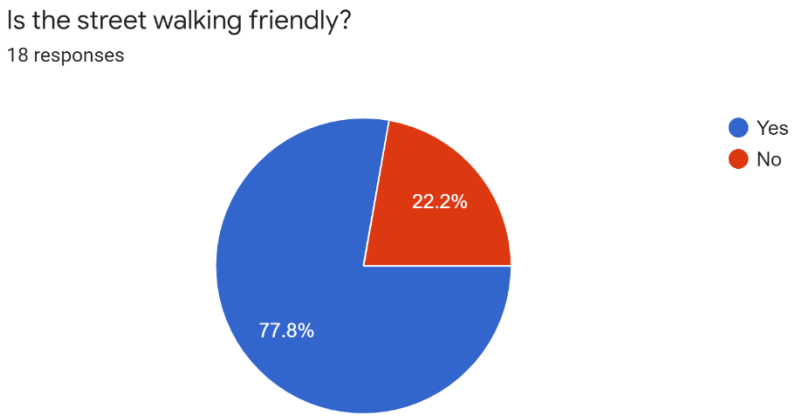


Fig. 4. 13 Survey responses - Street 1

Source: Author, 2022

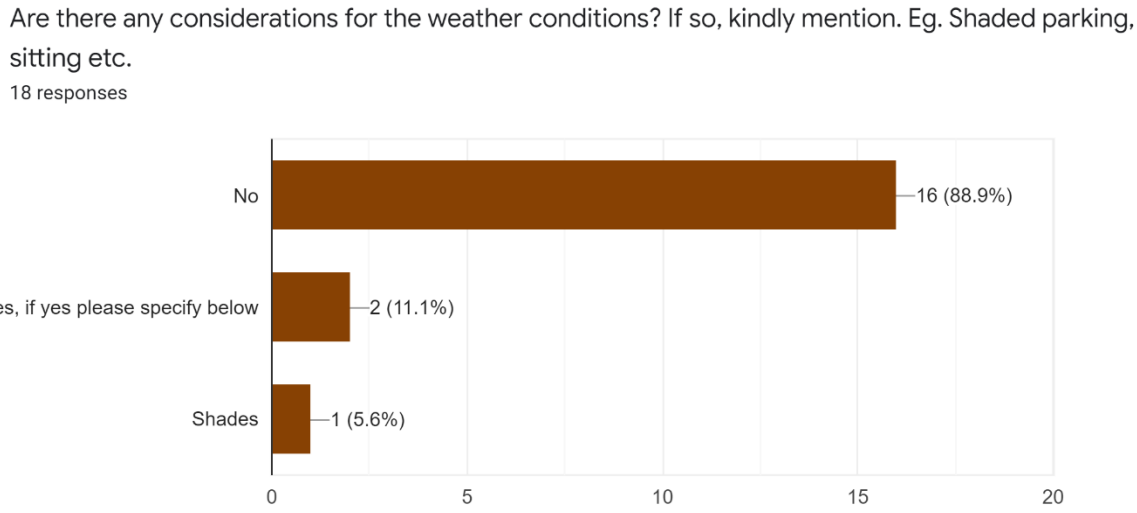


Fig. 4. 14 Survey responses - Street 1

Source: Author, 2022

16 respondents reported that the street had not considered weather conditions. Only 1 responded that there are shades.

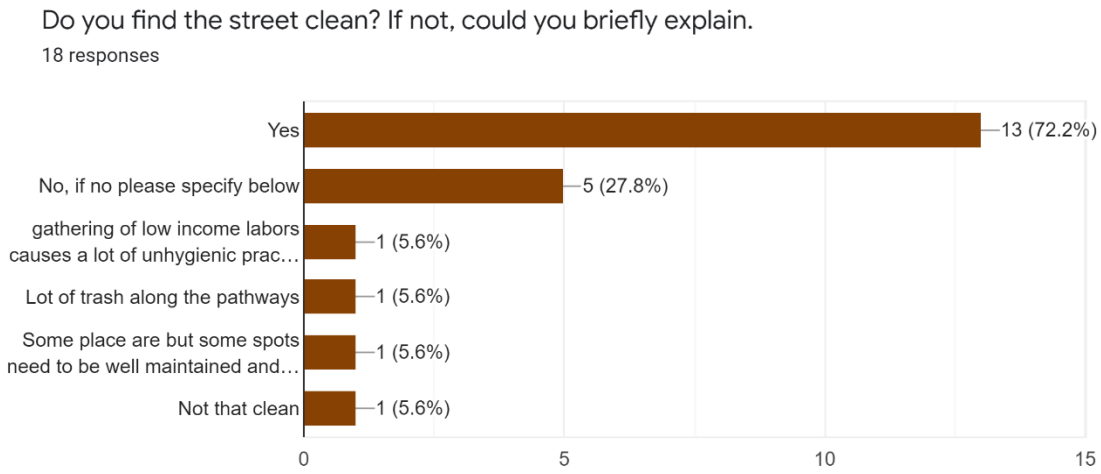


Fig. 4. 15 Survey responses - Street 1

Source: Author, 2022

Most of the respondents (72.2%) said that the street is clean. However, some pointed out the following practices which lead to uncleanliness: trash thrown away, unhygienic practices and lack of maintenance in some places.

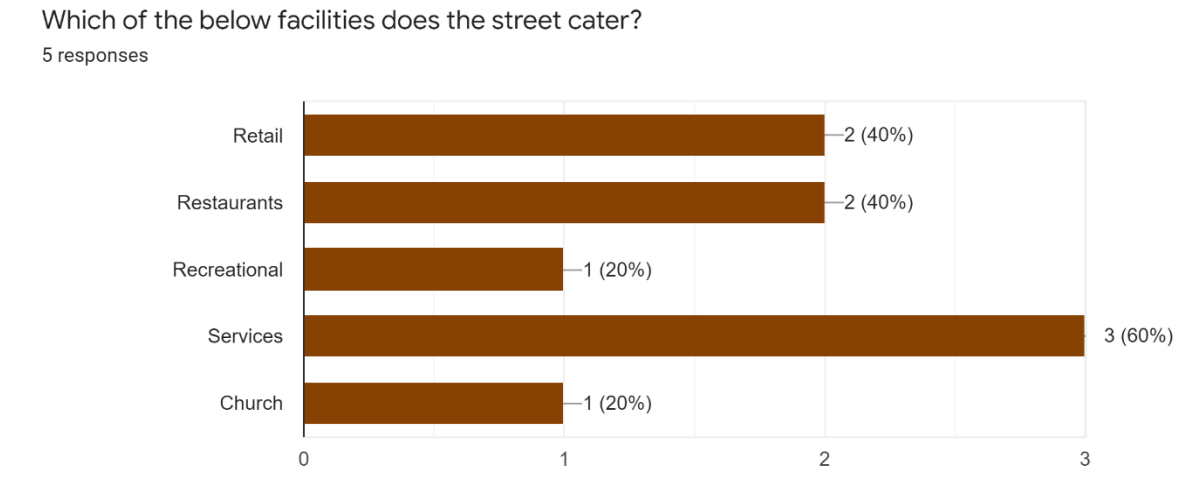


Fig. 4. 16 Survey responses - Street 1

Source: Author, 2022

According to the respondents, the street caters to retail (40%), restaurants (40%) recreational (20%) and services (60%).

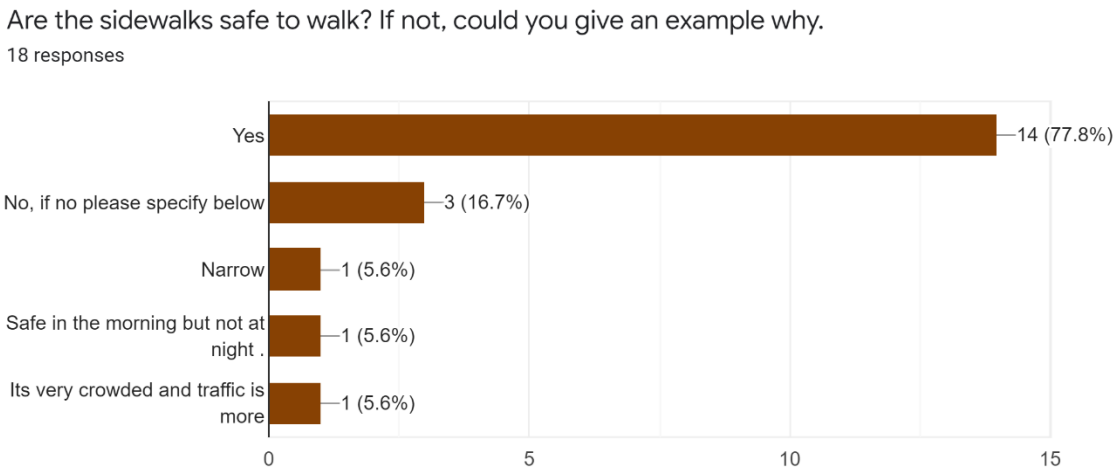


Fig. 4. 17 Survey responses - Street 1

Source: Author, 2022

Most respondents (77.8%) said that the sidewalks are safe to walk.

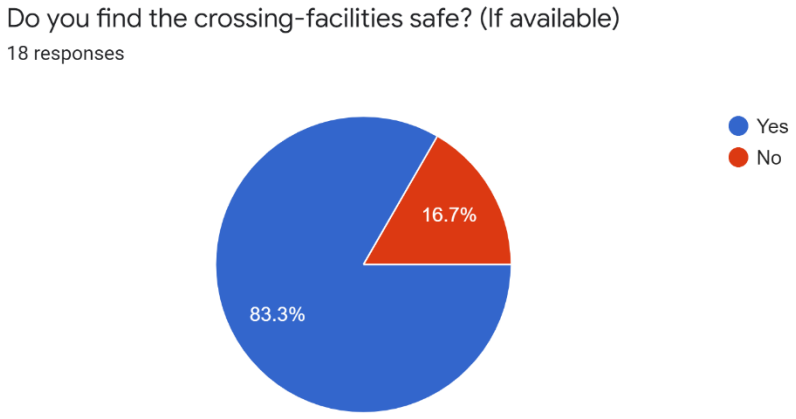


Fig. 4. 18 Survey responses - Street 1

Source: Author, 2022

83.3% of the respondents said that the crossing facilities are safe. However, 16.7% of them didn't find it safe.



Fig. 4. 19 Survey responses - Street 1

Source: Author, 2022

Most respondents didn't find any problems. Only one mentioned that the street is not that clean.



Fig. 4. 20 Survey responses - Street 1

Source: Author, 2022

Interestingly, all the respondents (100%) opted that the signboards, road signs and names of shops are clear.

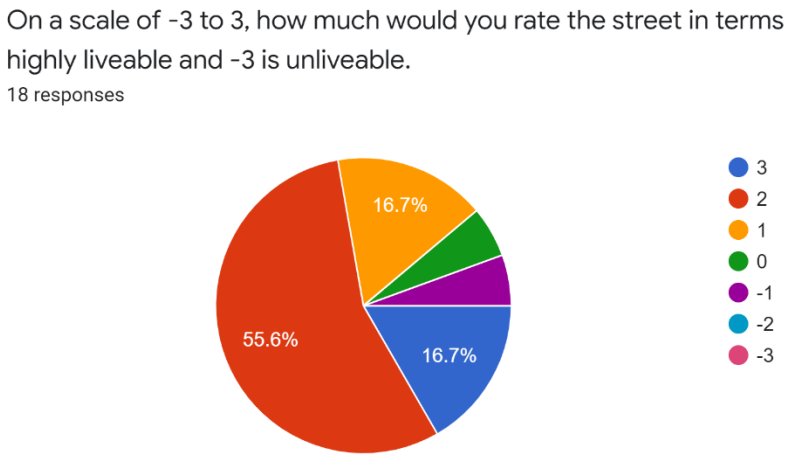


Fig. 4. 21 Survey responses - Street 1

Source: Author, 2022

55.6% of the participants rated the liveability of the street at +2, 18.7% rated it at +1, and 16.7% rated it at +3.

4.3.1.2 Conclusions on Liveability of Street 1 | Manama Commercial Street 1 based on Surveys

In this method, the liveability of the streets is evaluated using various indicators. These indicators target the different characteristics as discussed in the first method. They include physical, social, functional, economic, environmental and functionality. Finally, respondents were asked to rate liveability based on the questions answered (5 characteristics of liveability) using a semantic scale evaluation of +3 (Highly Liveable) to -3 (Highly Unliveable).

In the first case, in Commercial Street 1-Zubara Avenue, more than users who commute in an everyday manner, most of the respondents were those who visit

multiple times a week to those who visit it rarely. This is reflected in their answers as well, where most of the participants opted that they commute by vehicle over walking (As mentioned above).

When it comes to analysing the liveability of the street, physical characteristics were first evaluated. From which it can be understood that the street lacks enough parking spaces for vehicles. This is a concern as it is found that there is a lot of traffic from vehicles on this street.

Nevertheless, the street is found to be accessible from adjacent streets, is used by pedestrians and is walking friendly. Through this, the functional characterization of the street is found to be satisfactory. Moreover, street cleanliness is a serious issue, and several points are highlighted (As mentioned above)

The social characteristics of a street are a key characteristic that defines the liveability of any street. Interestingly, this street is found to have several activities taking place in it, such as meeting at the nearby garden, a church, hotels, coffee shops and clubs.

Environmental characteristics of the street need to be taken into consideration and are a significant characteristic of street liveability.

Safety is yet another point of concern. This is a concern in the sidewalks and affects user walkability. This is due to width, overcrowding and traffic. Moreover, the safety concern is found to exist at the night.

The legibility of street signs is found to be excellent on this street. However, it cannot be concluded that the street is safe as in this case, the sidewalks are found to be unsafe.

Overall, the liveability of the street is evaluated at +2 by the respondents.

4.3.2 Manama Commercial Street 2 – Isa Al Kabeer Avenue

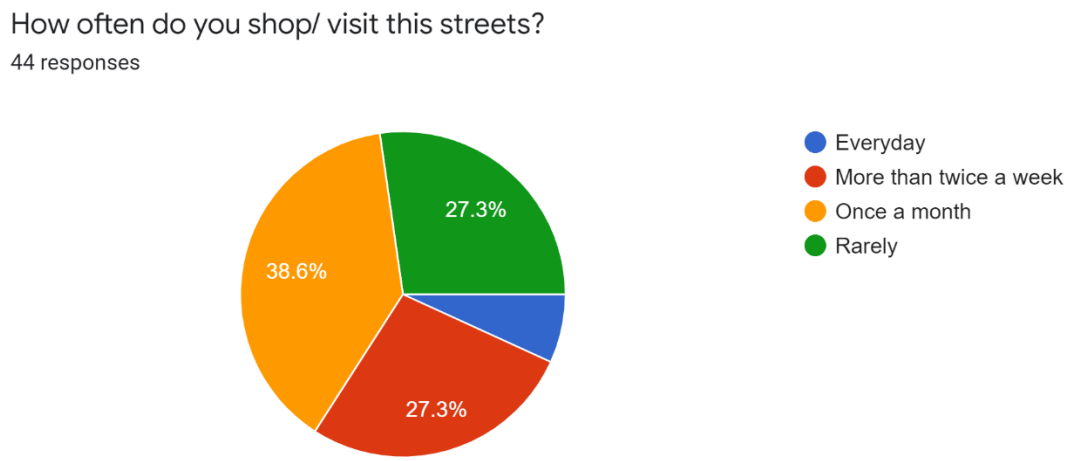


Fig. 4. 22 Survey responses - Street 2

Source: Author, 2022

33.6% of the respondents only visit the street once a month, 27.3% visit the street rarely and 27.3% visit the street more than twice a week.

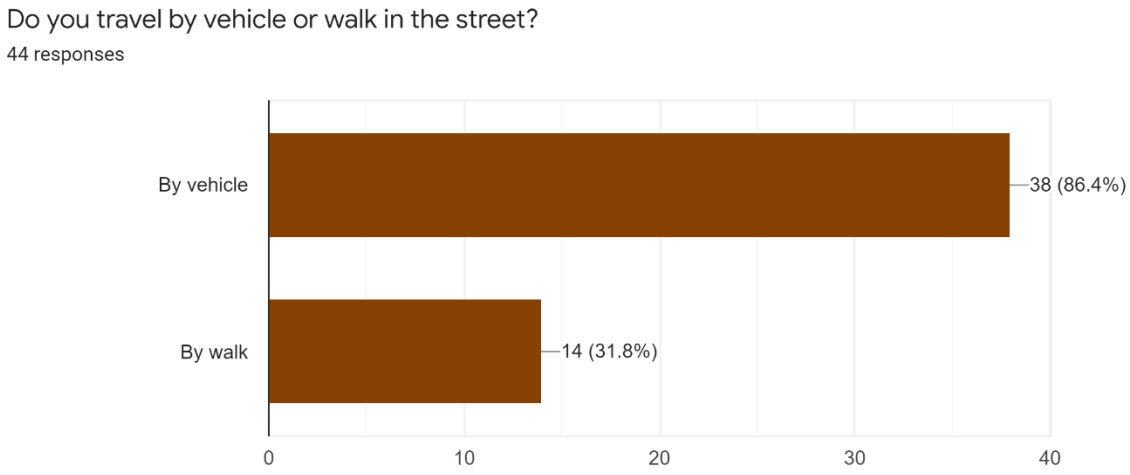


Fig. 4. 23 Survey responses - Street 2

Source: Author, 2022

38 respondents travel the street by vehicle, while 14 respondents walk.

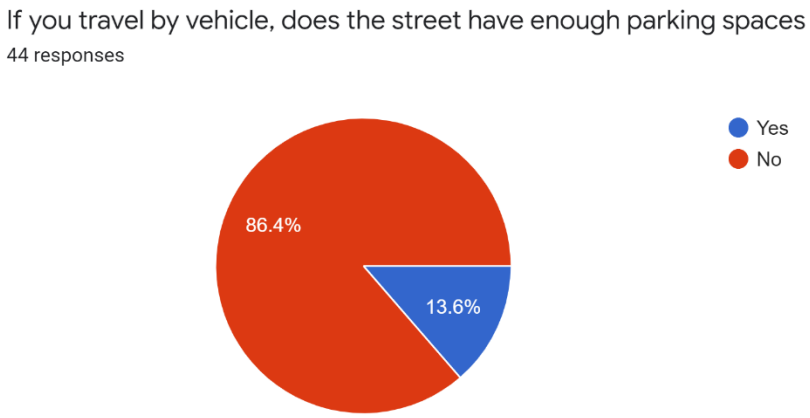


Fig. 4. 24 Survey responses - Street 2

Source: Author, 2022

86.4% of the respondents reported that parking facilities are inadequate.

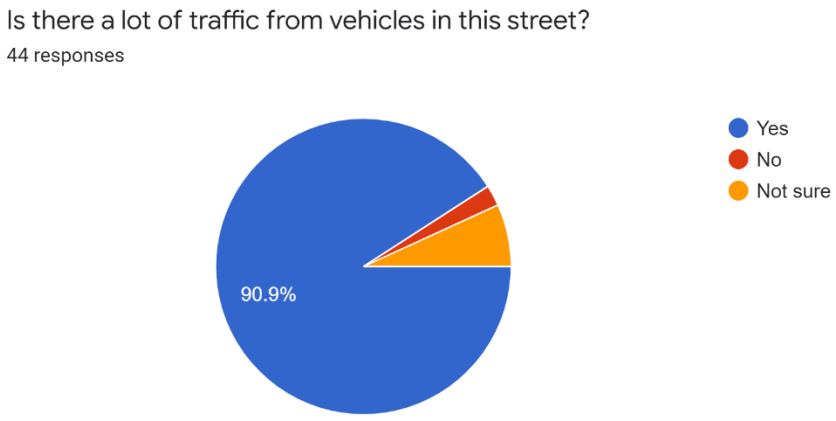


Fig. 4. 25 Survey responses - Street 2

Source: Author, 2022

90.9% of the respondents reported heavy traffic.

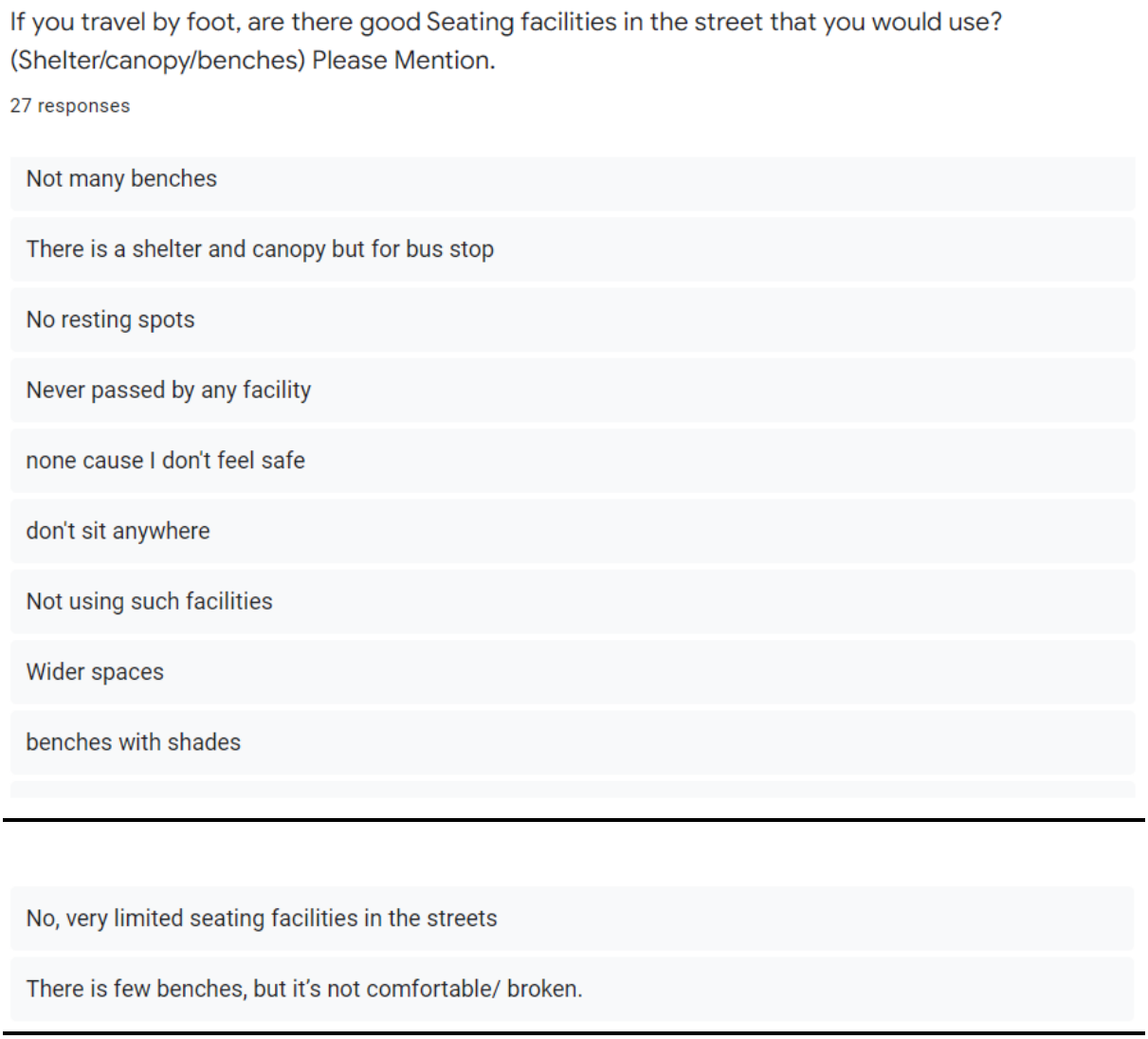


Fig. 4. 26 Survey responses - Street 2

Source: Author, 2022

Seating/ shaded facilities in the street include benches, shelter and canopy for bus stop and benches with shades. However, the benches available were uncomfortable. One respondent said that there are plenty of facilities to use. Others did not find any such facilities.

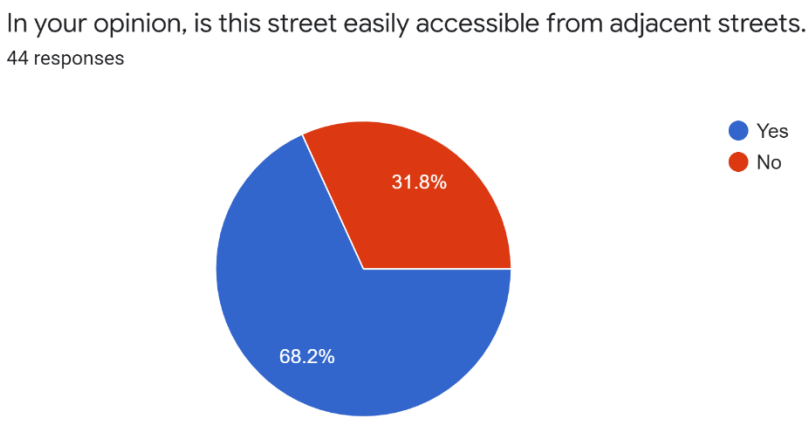


Fig. 4. 27 Survey responses - Street 2

Source: Author, 2022

68.2% of the participants found the street to be accessible from adjacent streets.

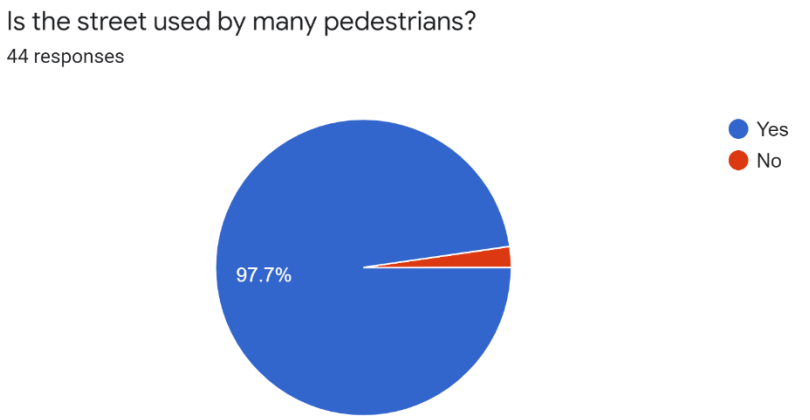


Fig. 4. 28 Survey responses - Street 2

Source: Author, 2022

Almost all (97.7%) of the respondents agreed that it is used by many pedestrians.

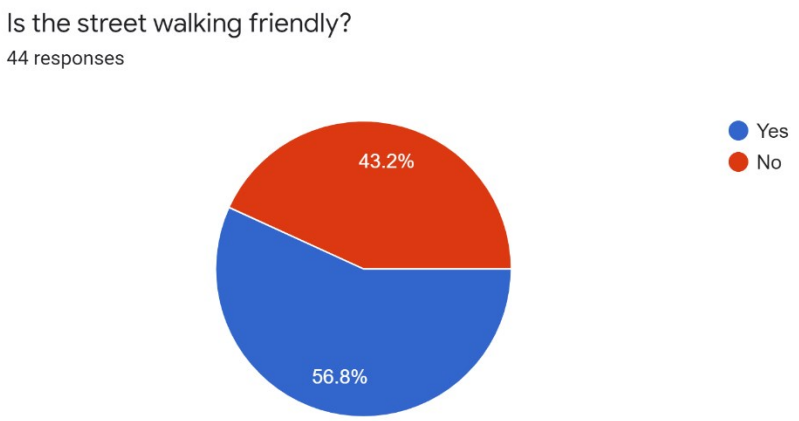
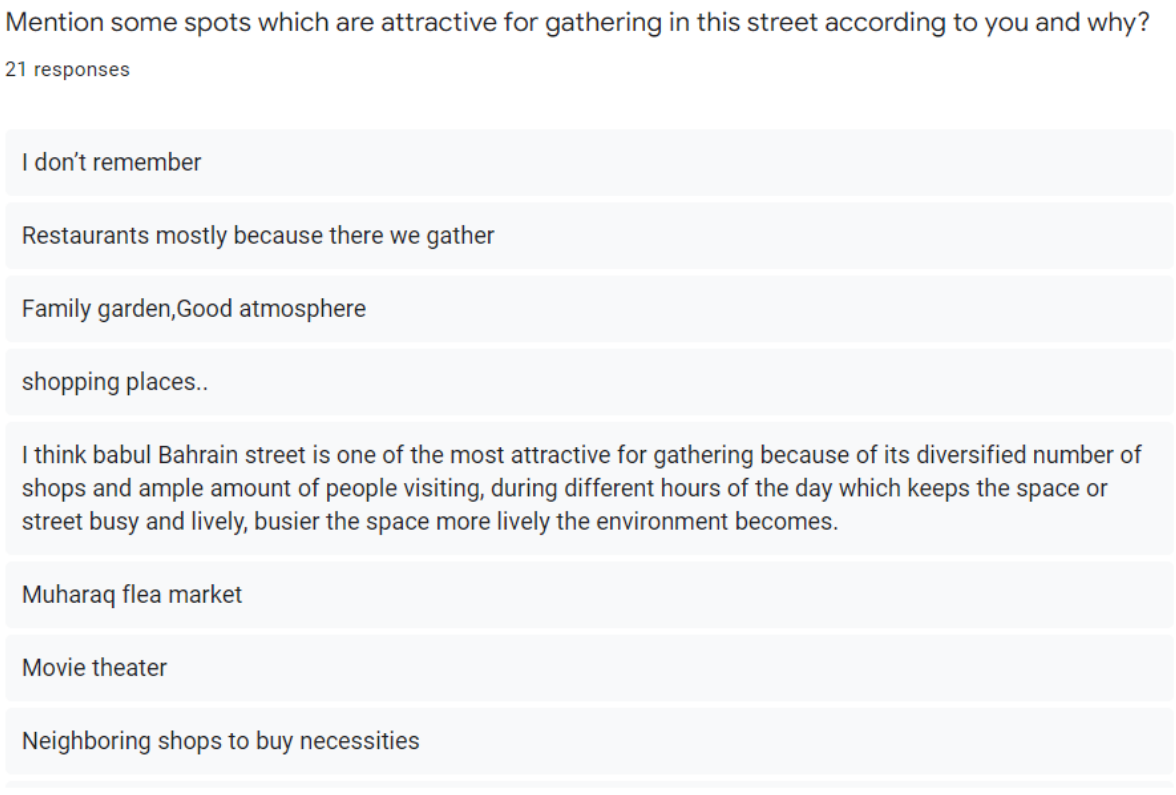


Fig. 4. 29 Survey responses - Street 2

Source: Author, 2022

Concerning street friendliness, a mixed result was obtained. 56.8% of respondents said that the street is walking-friendly, while others disagreed.



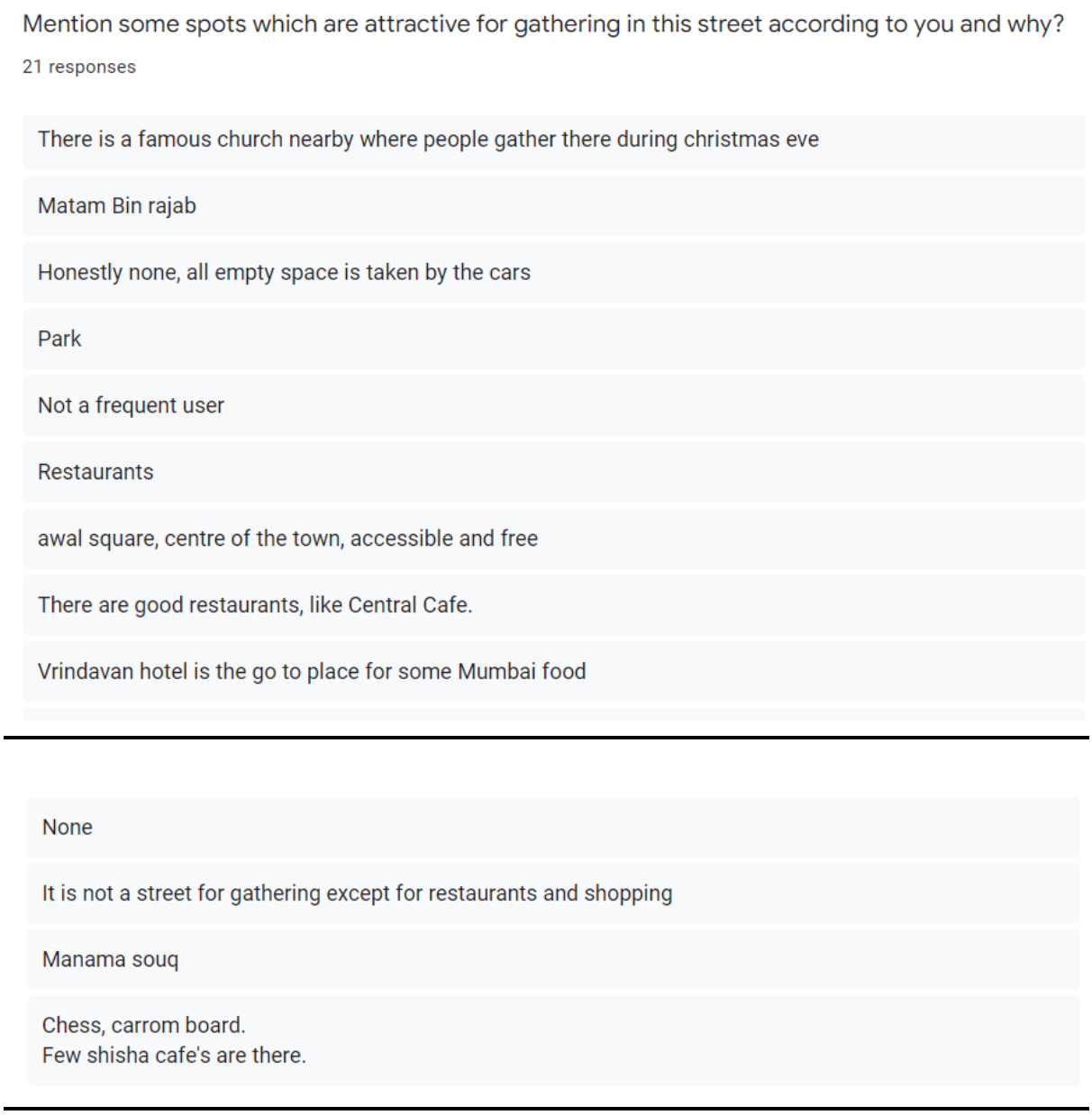


Fig. 4. 30 Survey responses - Street 2

Source: Author, 2022

Interestingly, various spots that are attractive for gathering in the street are mentioned by the respondents. (As shown in Figure above)

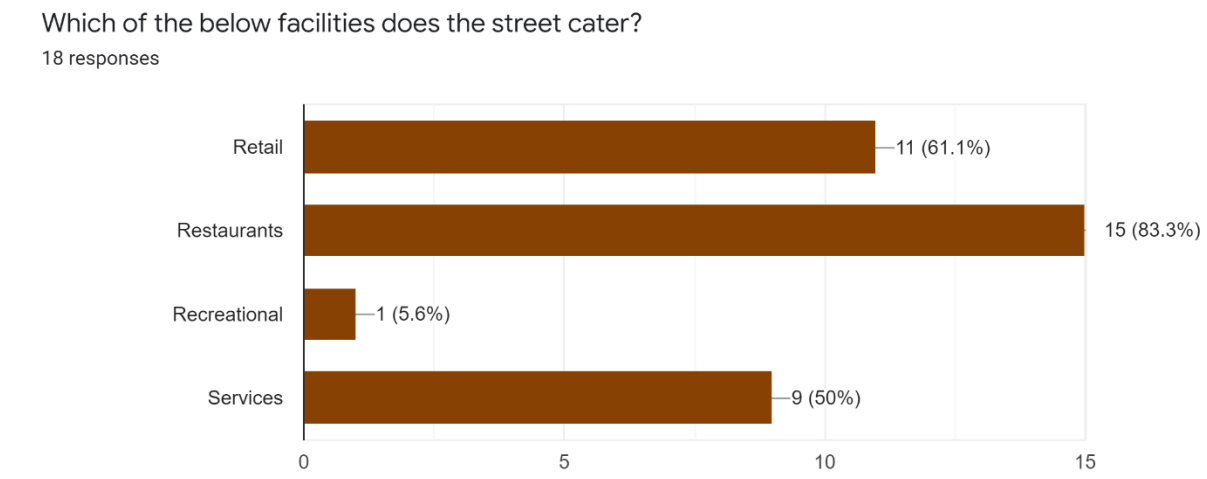


Fig. 4. 31 Survey responses - Street 2

Source: Author, 2022

Participants opted for retail, restaurants and services as the main facilities that the street provides. Only 1 person found the street to have a recreational facility.

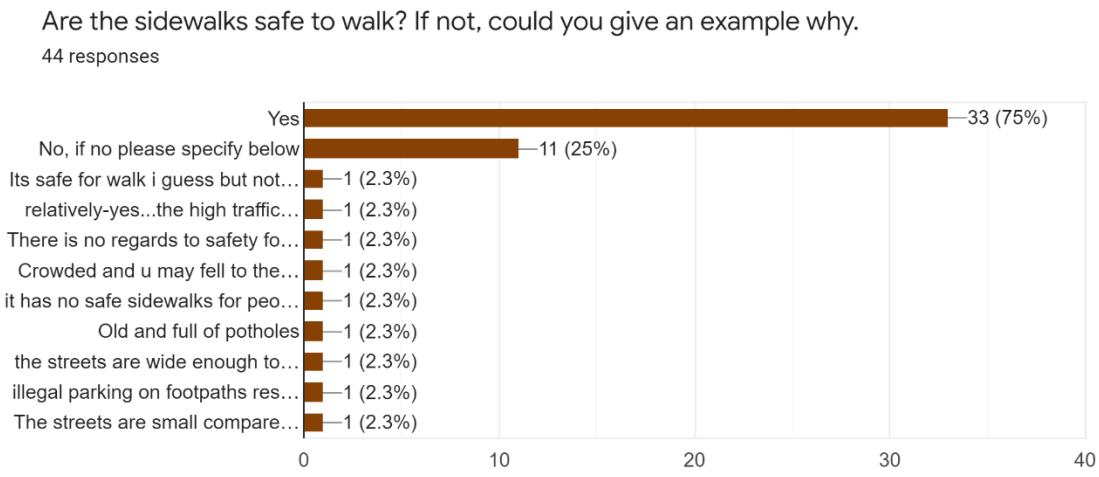


Fig. 4. 32 Survey responses - Street 2

Source: Author, 2022

Though most of the participants (75%) said that the sidewalks are safe to walk, several safety concerns were raised by the rest. These include high traffic, the crowd in the street, not being wide enough, and appearing small. Illegal parking and the existence of potholes were also mentioned.

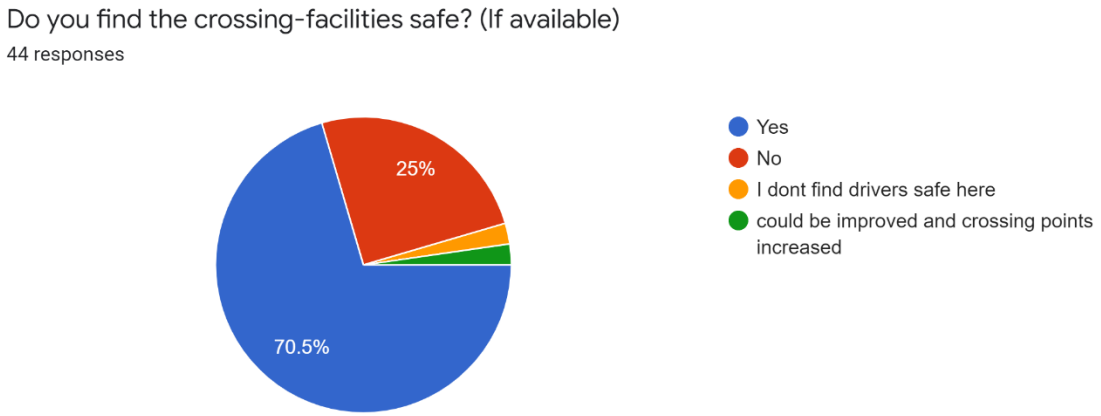


Fig. 4. 33 Survey responses - Street 2

Source: Author, 2022

70.5% of the respondents found it safe. However, one found that they don't find the drivers safe here and another found that the street could be improved and crossing points should be increased.

Are there any problems in the street in terms of its usage?

24 responses

No

No

Not really

No i gues not

Not clean

traffic could be a problem in this area.

No, but mostly old models

NO

Poor Road design , needs facilities and safe spots for pedestrains

---

Are there any problems in the street in terms of its usage?

24 responses

I hate cars taking up walking space, I support a walkable city. Cars are a dystopian nightmare forcing us to stay indoors and taking away our freedom to walk anywhere safely.

some times cars are parked in walking area

Not specifically

Prone to accidents

Not that i am aware of

i guess not

No not really, streets are well maintained and no street fights take place.

It's too narrow

Crowded



Fig. 4. 34 Survey responses - Street 2

Source: Author, 2022

One participant found that there is poor road design and needs facilities and safe spots for pedestrians. Another found that there is a traffic problem. Another respondent found that the cars take up walking space. It is understood that users are forced to stay indoors due to the lack of walkability in the city streets. Cars being parked in the walking area are highlighted by another respondent as well. A significant issue highlighted is that the street is prone to accidents. A respondent found the street too narrow. Another also highlighted that the street is crowded. The rest of the participants didn't find any problem in terms of usage.



Fig. 4. 35 Survey responses - Street 2

Source: Author, 2022

90.9% of the respondents found the signboards, road signs and names of shops to be clear. One person highlighted that some of the signs are hard to read.

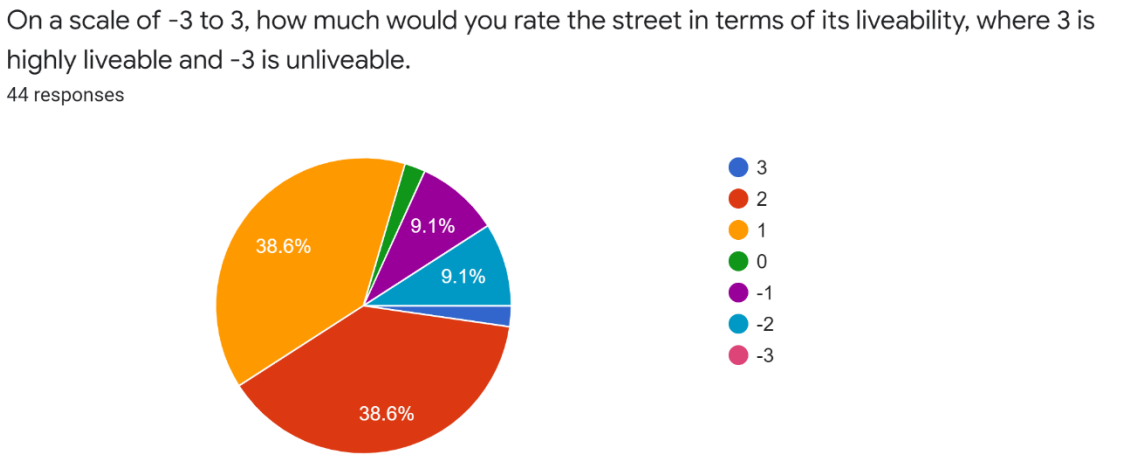


Fig. 4. 36 Survey responses - Street 2

Source: Author, 2022

When asked to rate the liveability, 38.6% of the respondents rated the street liveability as +1. Similarly, the number of respondents (38.6%) rated the liveability as +2. A small group of respondents also rated -1 and -2 (9.1% each).

4.3.2.1 Conclusion on Liveability of Street 2 | Manama Commercial Street 2 based on Surveys

In the second commercial street, Isa Al Kabeer Avenue, respondents are those who visit the street once a month and those who visit it rarely. Similar to the first street, the respondents commute this street through their vehicles.

In terms of physical characteristics, there are some benches and shading that are available in the street. It is also an accessible street, used by many pedestrians, that is reported to be walking friendly. Respondents named various spots in the street attractive for gathering. Hence, it can be concluded that it is a street with several social activities and engagements. Environmental characteristics, just as in the case of the previous street are not satisfied.

Regarding economic characteristics, the respondents are satisfied with the facilities the street provides.

Regarding sidewalk safety, several points of concern were raised. These issues need to be taken care of. Significant issues include high traffic, overcrowding, narrow sidewalks, illegal parking, availability of potholes and smaller streets. Apart from safety concerns, respondents have raised concerns about the functional characteristics. This includes the usability of the street. All other characteristics are satisfactory.

When asked to evaluate the liveability of the street, 38.6% reported +1 and 38.6% reported +2. However, based on the responses from the surveys, it can be concluded that the street satisfied the physical, economic and social characteristics of liveability, but fails to satisfy the functional (safety, usability, walkability) characteristics effectively.

4.3.3 Manama Residential Street 1

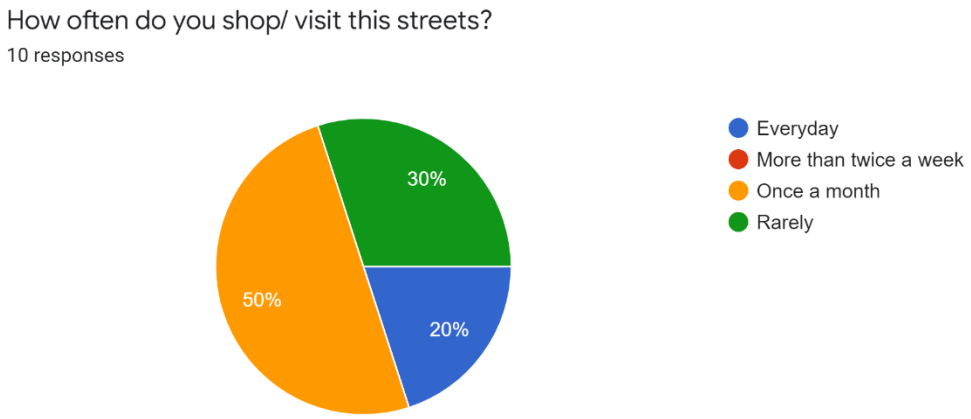


Fig. 4. 37 Survey responses - Street 3

Source: Author, 2022

Regarding the frequency of visits to the street, 50% of the respondents visit the street only once a month, while only 20% visit the street every day.



Fig. 4. 38 Survey responses - Street 3

Source: Author, 2022

6 respondents travel by vehicle while 6 others walk.

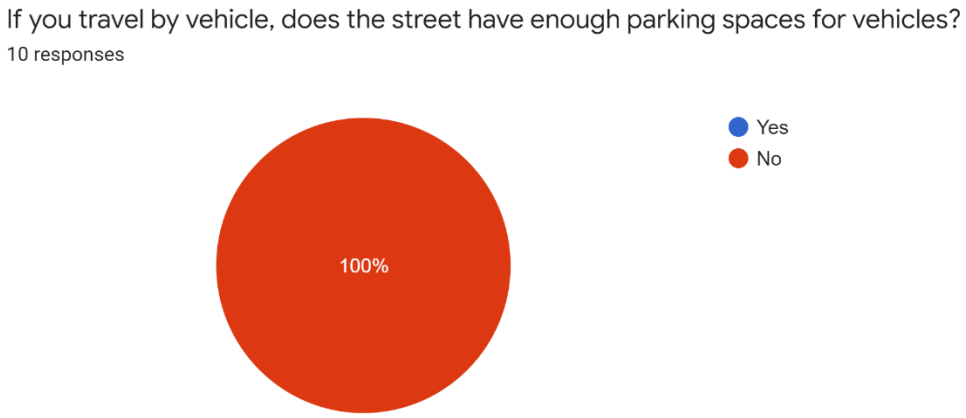


Fig. 4. 39 Survey responses - Street 3

Source: Author, 2022

All the participants (100%) agreed that the street does not have enough parking spaces for vehicles.

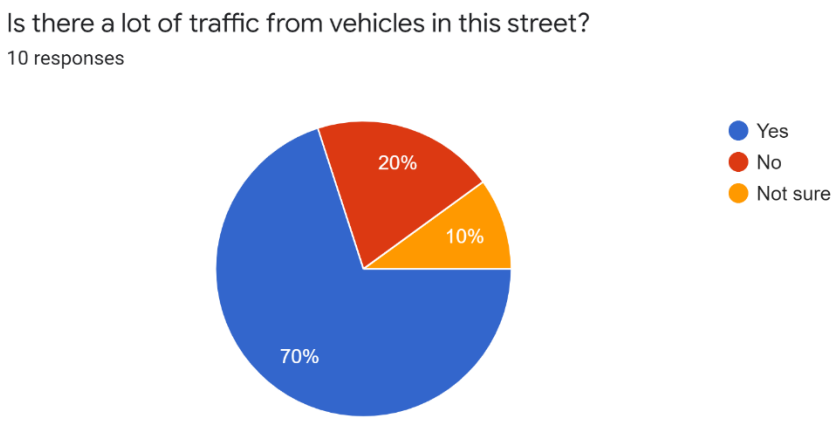


Fig. 4. 40 Survey responses - Street 3

Source: Author, 2022

70% of the respondents said that there is a lot of traffic, while 20% didn't say so.

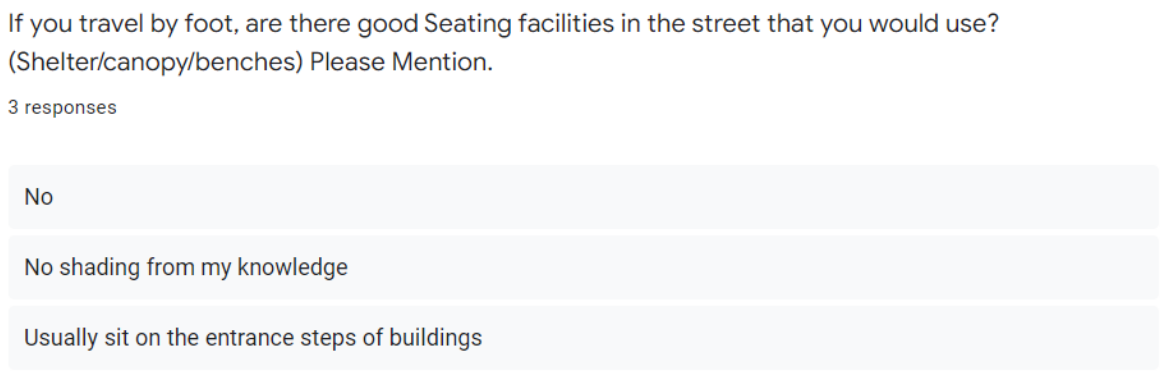


Fig. 4. 41 Survey responses - Street 3

Source: Author, 2022

On enquiring about the seating facilities in the street, one participant reported that they usually sit on the entrance steps of buildings, while others didn't find any.

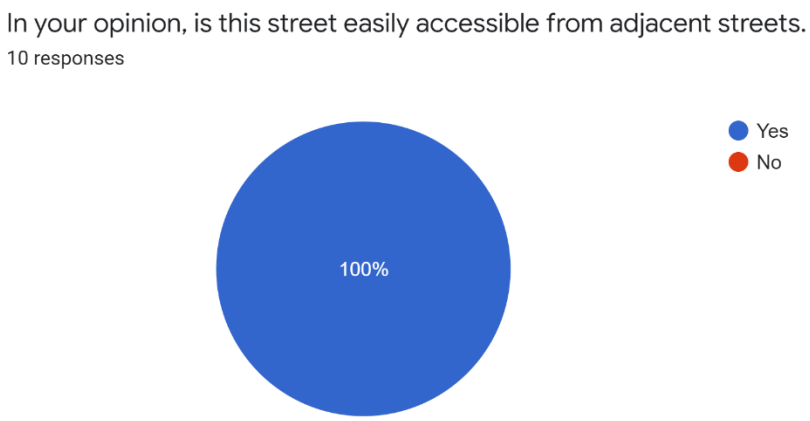


Fig. 4. 42 Survey responses - Street 3

Source: Author, 2022

All the participants (100%) found the street to be easily accessible from other streets.

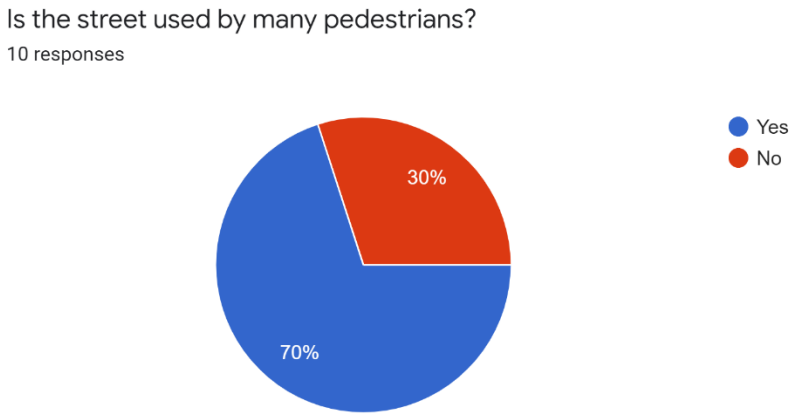


Fig. 4. 43 Survey responses - Street 3

Source: Author, 2022

70% of the respondents found that the street is used by many pedestrians. 30% didn't find the street to have many pedestrians.

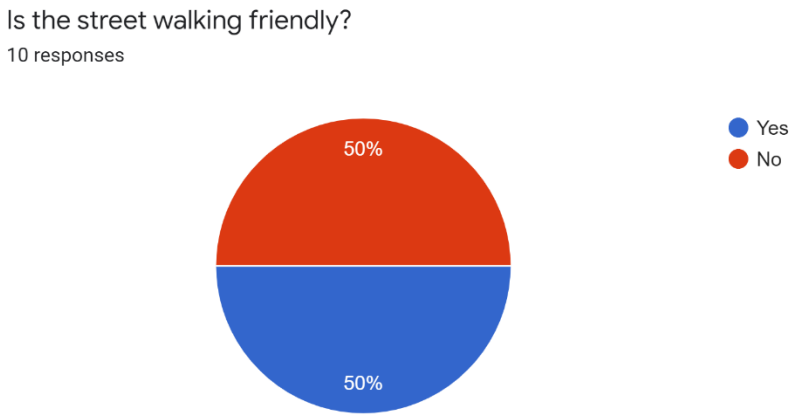


Fig. 4. 44 Survey responses - Street 3

Source: Author, 2022

There was a mixed response to the issue of walking friendliness. Half of the respondents found it walking-friendly (50%) and others didn't find it the same.

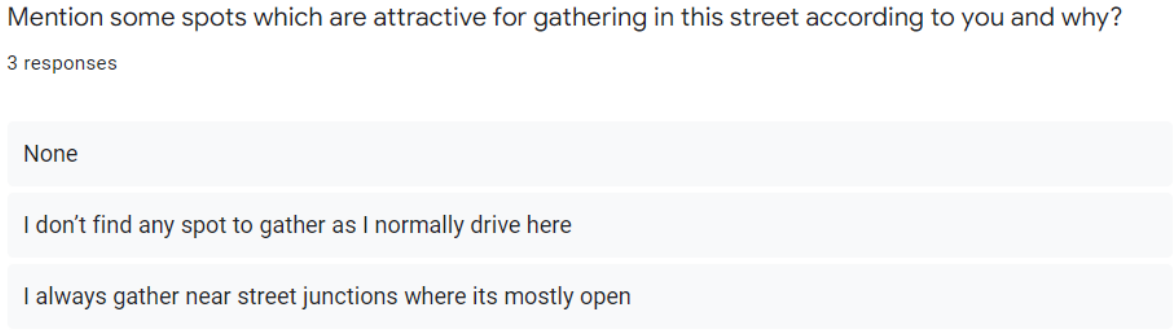


Fig. 4. 45 Survey responses - Street 3

Source: Author, 2022

When asked to name some attractive spots for gathering, one participant said that they gather near the street junctions.

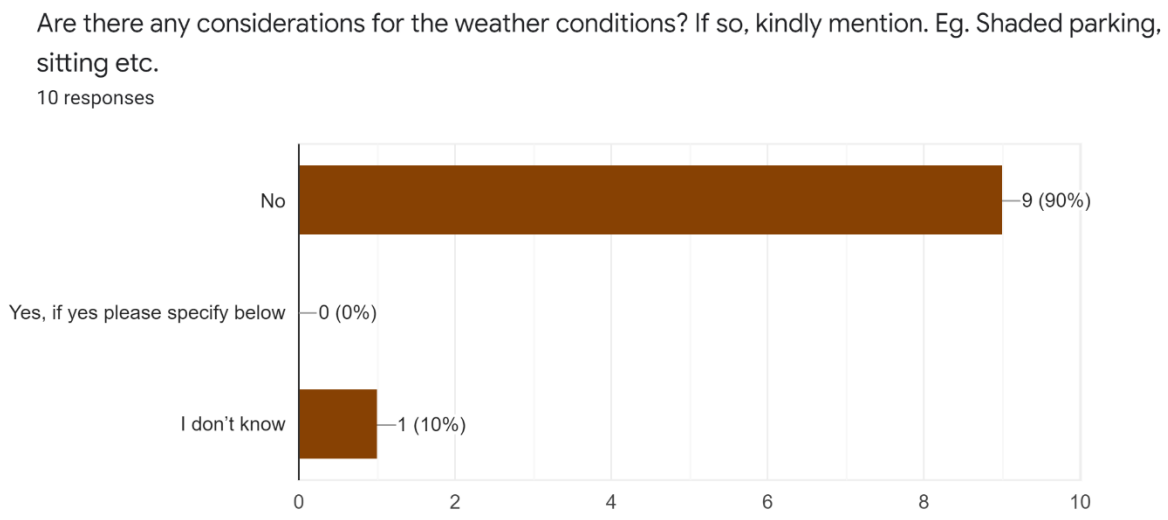


Fig. 4. 46 Survey responses - Street 3

Source: Author, 2022

Almost all the participants (90%) said that the street did not have considerations for the weather.

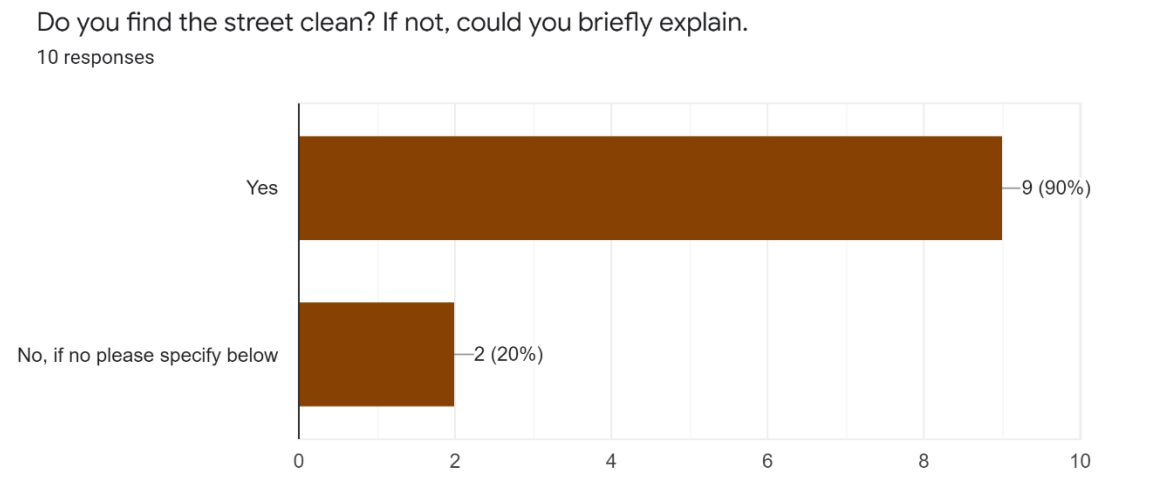


Fig. 4. 47 Survey responses - Street 3

Source: Author, 2022

Concerning cleanliness, 9 out of 10 respondents found the street to be clean.

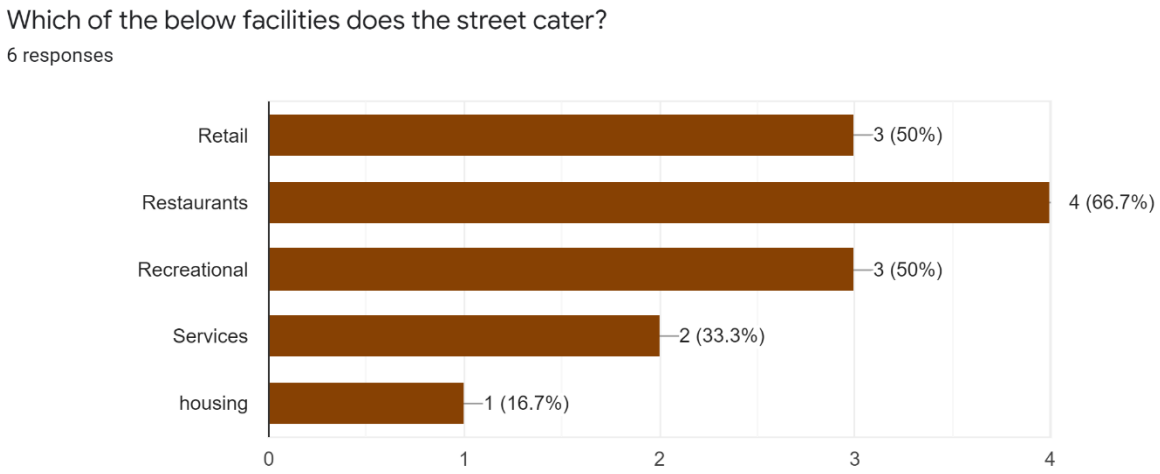


Fig. 4. 48 Survey responses - Street 3

Source: Author, 2022

When asked about the different facilities that the street caters to, 4 selected restaurants, 3 retail, other 3 recreational and 2 selected services. However, one said that the street caters to housing.

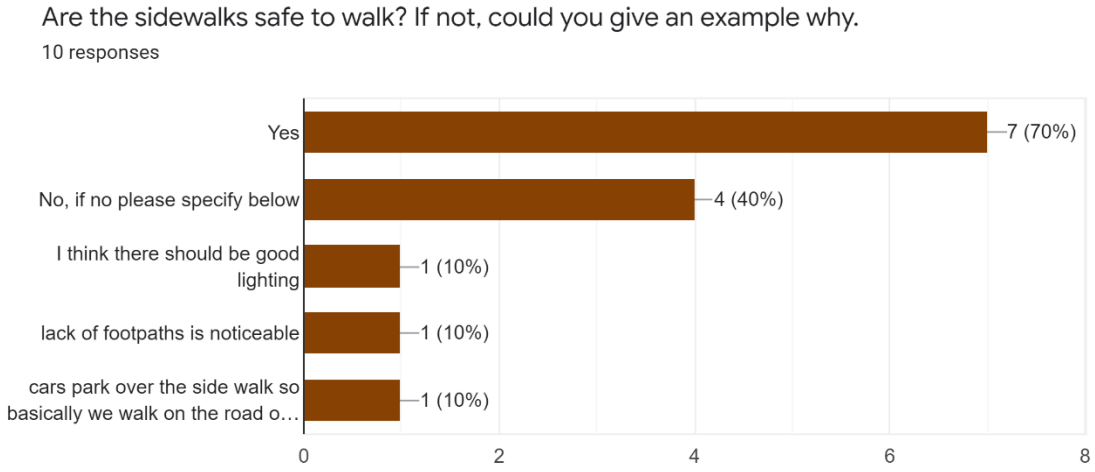


Fig. 4. 49 Survey responses - Street 3

Source: Author, 2022

70% of the respondents found the street to be safe. 40% of them found the street to be not safe. The highlighted issues include the lack of good lighting, lack of noticeable footpaths and cars being parked on the sidewalk, causing one to walk on the road.

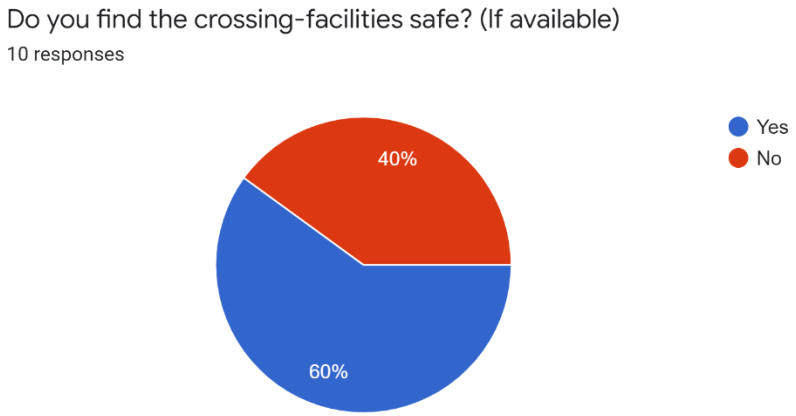


Fig. 4. 50 Survey responses - Street 3

Source: Author, 2022

60% of the respondents found it to be safe and 40% found it unsafe.

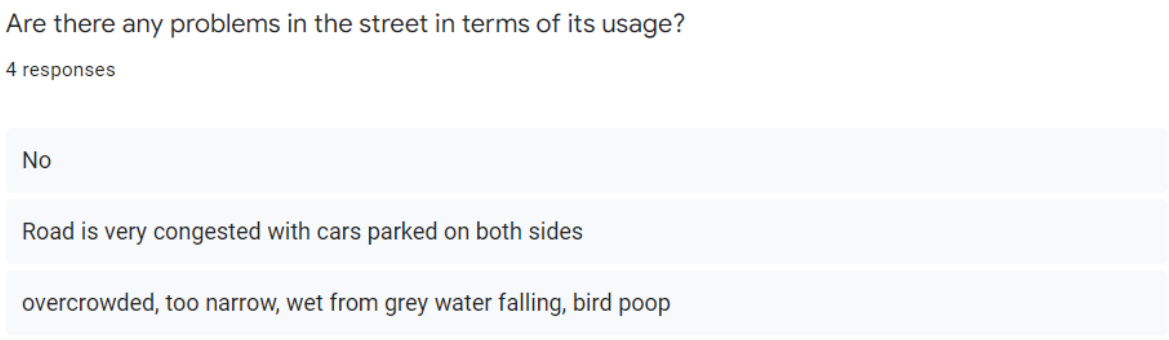


Fig. 4. 51 Survey responses - Street 3

Source: Author, 2022

When asked to mention if there was any problem in the street in terms of its usage, two remarks were that the road is congested with cars parked on both sides,

overcrowding, the road being the narrow, wet road from greywater falling and bird waste. Others didn't find any such issue.



Fig. 4. 52 Survey responses - Street 3

Source: Author, 2022

90% of the respondents found the signboards, road signs and names of shops, clear and only 10% had a different opinion.

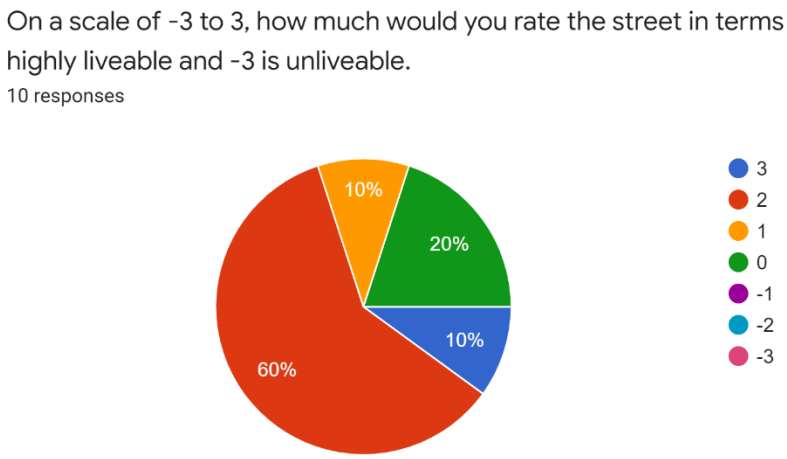


Fig. 4. 53 Survey responses - Street 3

Source: Author, 2022

Finally, when asked to rate the liveability of the street, 60% of the respondents rated the street +2, 20% rated 0 (neutral), 10% rated +1 and another 10% rated +3.

4.3.3.1 Conclusion about Liveability of Manama Residential Street 1:

In the first residential street, the residents are found to commute the street both by vehicle and by walk. The street satisfied the physical characteristics of liveability. It is used by pedestrians and is walking friendly. It is clean and the signs are legible.

In terms of socialization, the respondents did not mention any spots or activities.

Environmental characteristics have not been considered. Various economic facilities are considered: this includes retail, restaurants, recreational and services nearby.

Sidewalk safety is a critical issue here. Factors such as vehicles parked on the roadside, poor lighting, and lack of segregation between the sidewalk and the road remain serious issues affecting walkability and safety. This also affects crossing within the street. Liveability is rated +2 by 60% of the respondents.

Although the street satisfied the physical, economic and social characteristics, the environmental and functional (safety, walkability) are critical and needs consideration. This affects the liveability of the street. However, when compared to the previous two commercial streets, the impact of these issues on residents is less.

4.3.4. Manama Residential Street 2

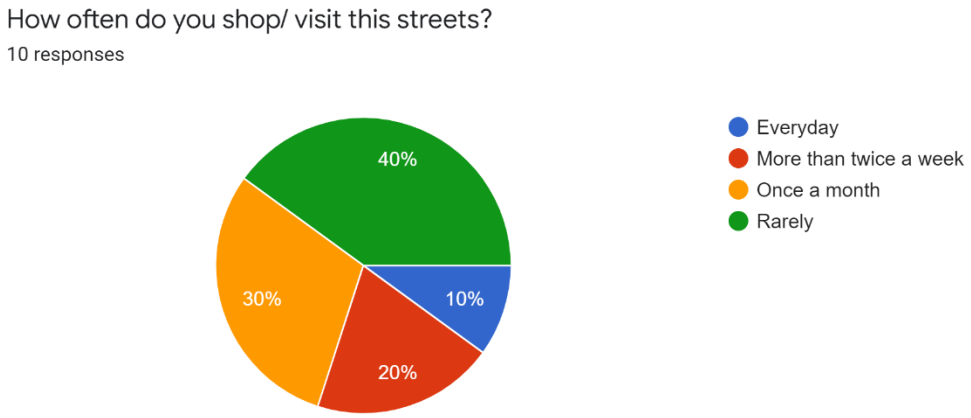


Fig. 4. 54 Survey responses - Street 4

Source: Author, 2022

In the second residential street of Manama, in terms of frequency of visits to the street, 40% of the respondents opted that they visit the street rarely. The other 30% visited the street once a month only. Only a small 10% visited the street on an everyday basis.



Fig. 4. 55 Survey responses - Street 4

Source: Author, 2022

60% of the respondents used their vehicles and 40% walked.

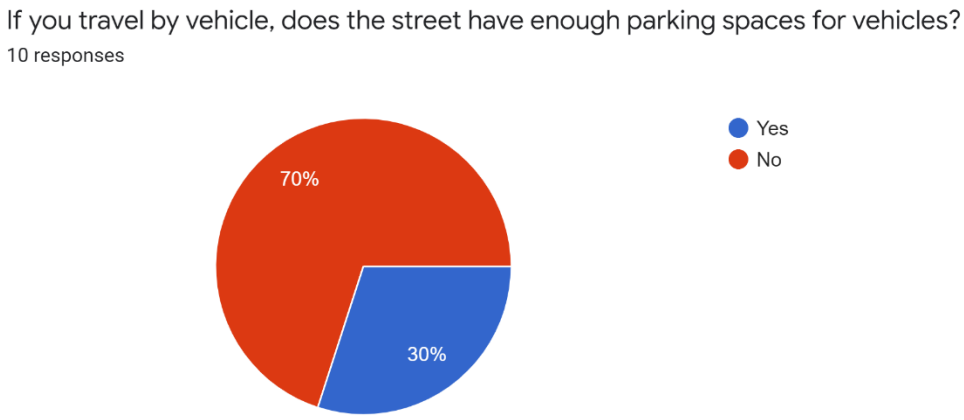


Fig. 4. 56 Survey responses - Street 4

Source: Author, 2022

70% found there are not enough parking spaces, while only 30% were satisfied.

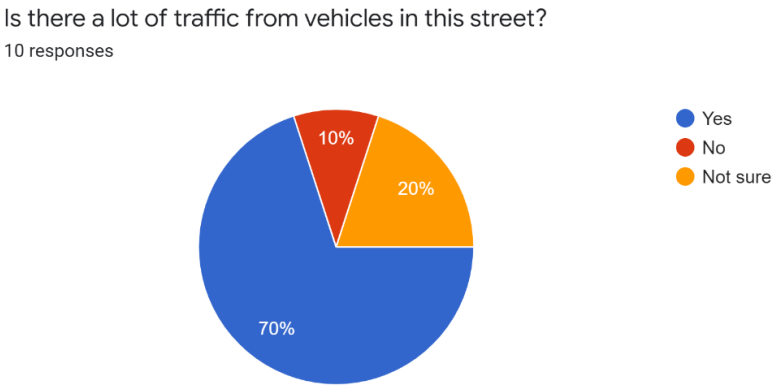


Fig. 4. 57 Survey responses - Street 4

Source: Author, 2022

70% found that the street had traffic. 10% didn't find traffic.

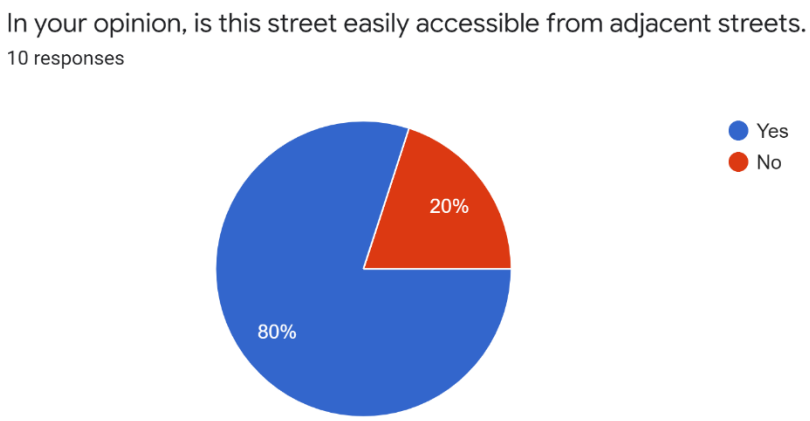


Fig. 4. 58 Survey responses - Street 4

Source: Author, 2022

80% of the respondents found that the street is accessible from adjacent streets, while 20% found it otherwise.

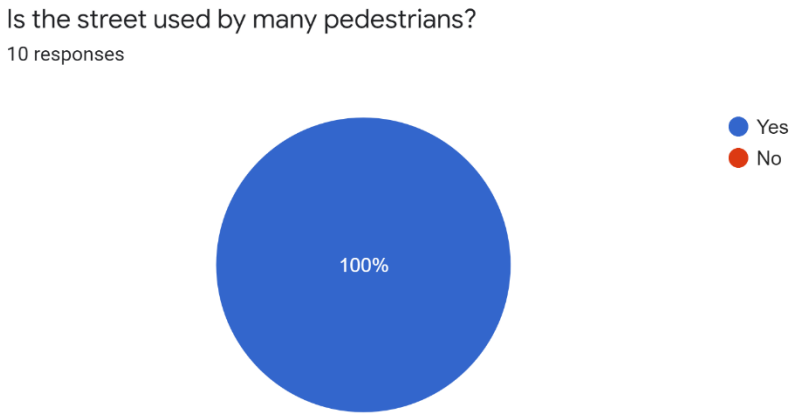


Fig. 4. 59 Survey responses - Street 4

Source: Author, 2022

All the respondents (100%) said that the street is used by many pedestrians.

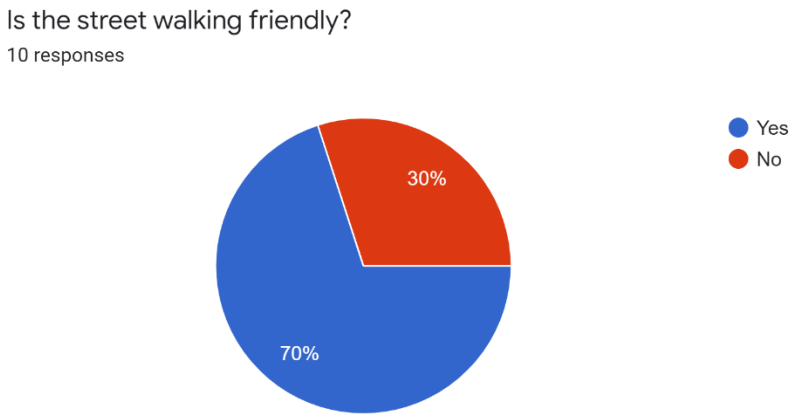


Fig. 4. 60 Survey responses - Street 4

Source: Author, 2022

70% of the respondents found it to be walking friendly and 30% didn't find it walking friendly.

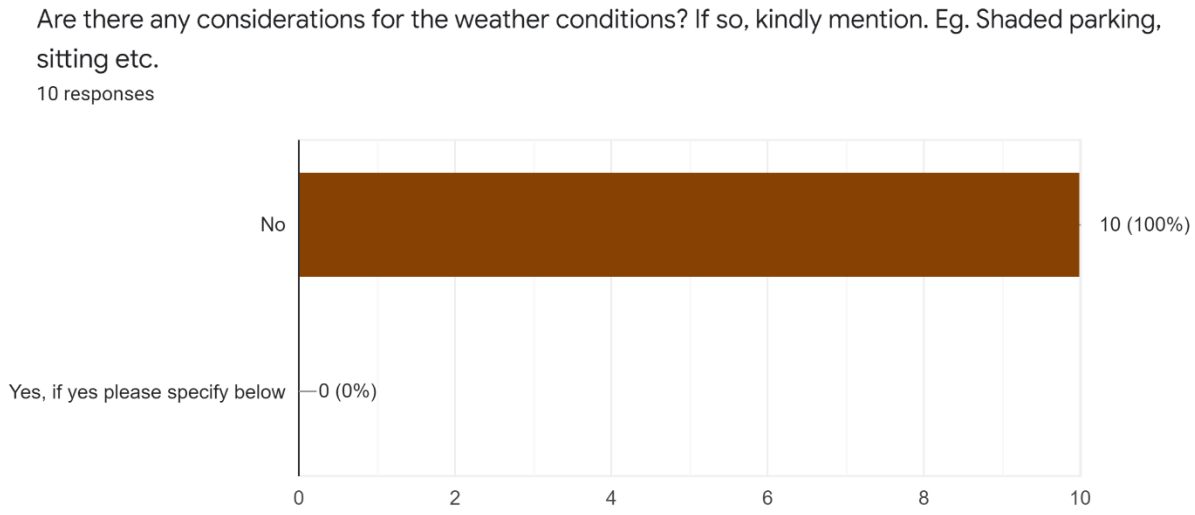


Fig. 4. 61 Survey responses - Street 4

Source: Author, 2022

All the respondents (100%) found the street to have no weather conditions.

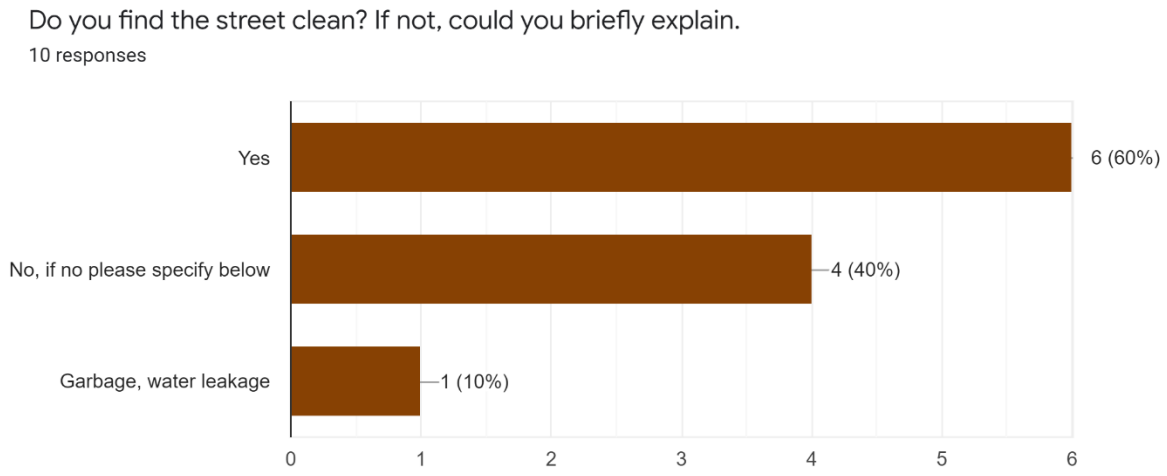


Fig. 4. 62 Survey responses - Street 4

Source: Author, 2022

In terms of street cleanliness, 60% of the respondents said that the street is clean, while 40% found it to be not clean. One said that there is an issue of garbage and water leakage in the street.

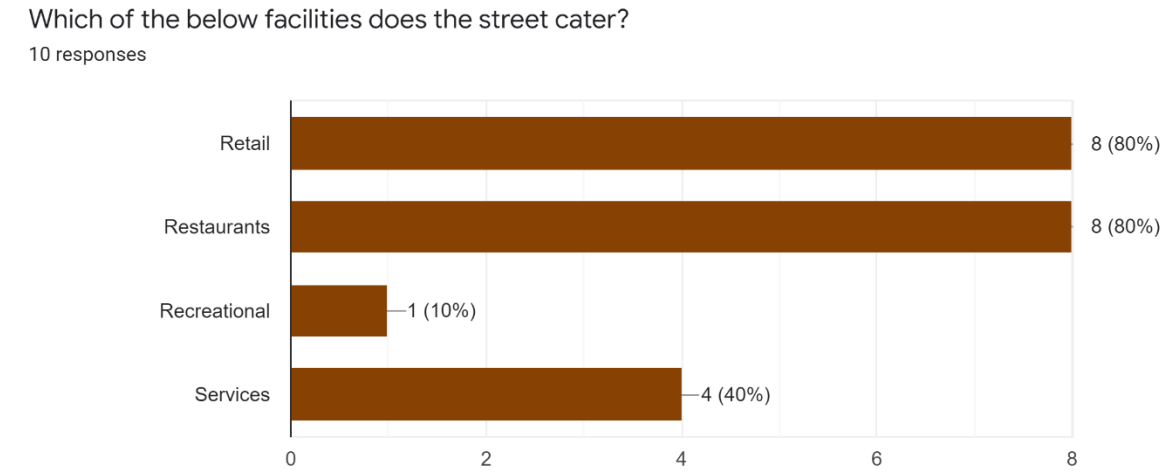


Fig. 4. 63 Survey responses - Street 4

Source: Author, 2022

Regarding the facilities that the street caters to, 8 respondents mentioned retail and restaurants, 4 mentioned services and 1 mentioned recreational.

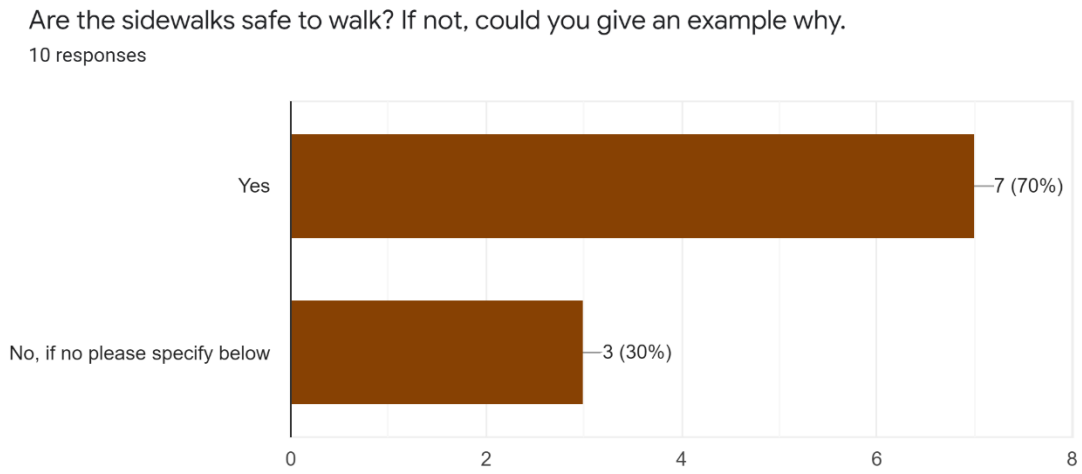


Fig. 4. 64 Survey responses - Street 4

Source: Author, 2022

70% of the respondents found that the sidewalks were safe while 30% found them unsafe.

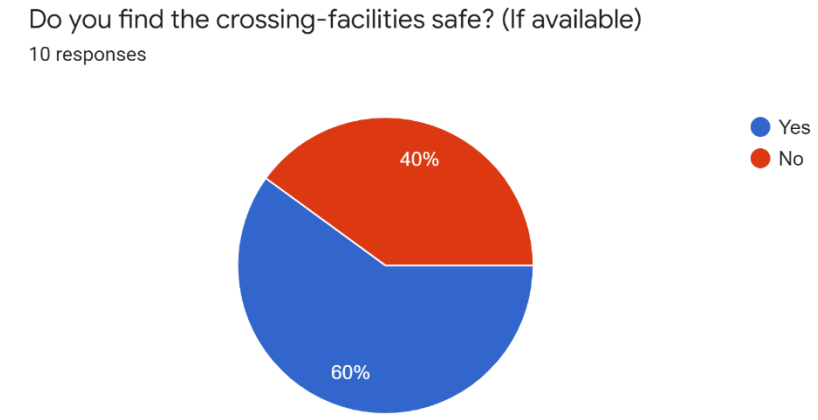


Fig. 4. 65 Survey responses - Street 4

Source: Author, 2022

60% of the respondents found the crossing facilities to be safe and 40% found them unsafe.



Fig. 4. 66 Survey responses - Street 4

Source: Author, 2022

80% of the respondents said that the signboard, road signs and names of shops are clear, but 20% didn't find it clear.

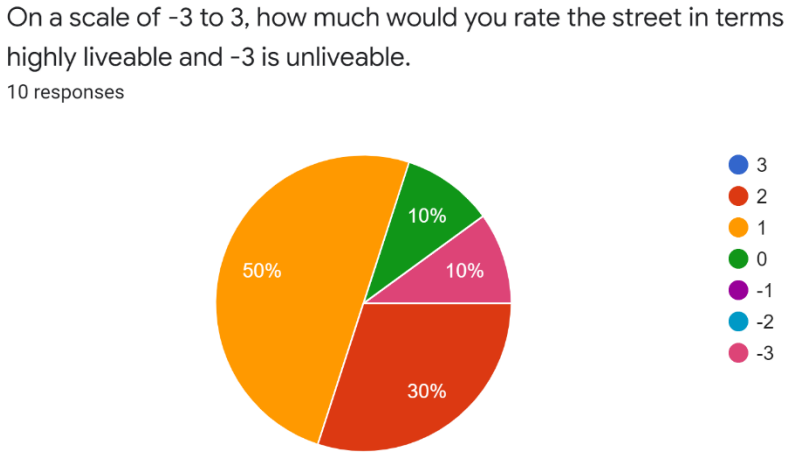


Fig. 4. 67 Survey responses - Street 4

Source: Author, 2022

The respondents were asked to rate liveability based on the questions asked. 50% of the respondents rated the street +1, while 30% rated it +2, 10% rated it 0 (neutral) and 10% rated it -3.

4.3.4.1. Conclusion about Liveability of Manama Residential Street 2 based on Surveys

In the second residential street of Manama, respondents are those who visit the street once a month or rarely. Only 10% of them are those who access the street every day. Users walked as well as travelled using their vehicles.

To evaluate liveability, the physical characteristic of the street is first analysed. According to the survey responses, the street has parking facilities, but there exists a lot of traffic from vehicles. It is accessible from the adjacent streets and is used by pedestrians. It is a street that is walking friendly. It is also legible in terms of signs. However, the street has an issue with its cleanliness as garbage is found.

To socialize, there exist some benches in the street. There exist economic facilities nearby catering to the needs of the users.

Concerning environmental considerations, the street fails to meet the criterion.

It is found that the sidewalks and crosswalks are safe, and users do not find any specific problem with functionality. Hence, the street meets the functional characteristic of liveability. When asked to rate the liveability, users rated +1.

This can be considered as an accurate rating for liveability and an example of a street that has a scope of meeting liveability if certain characteristics are taken into consideration. The street only satisfies the economic and social characteristics of liveability and fails to meet the functional, environmental and physical characteristics.

4.4 Method 3: Mapping Movements and Activities

4.4.1 Manama Commercial Street 1

- Zubara Avenue

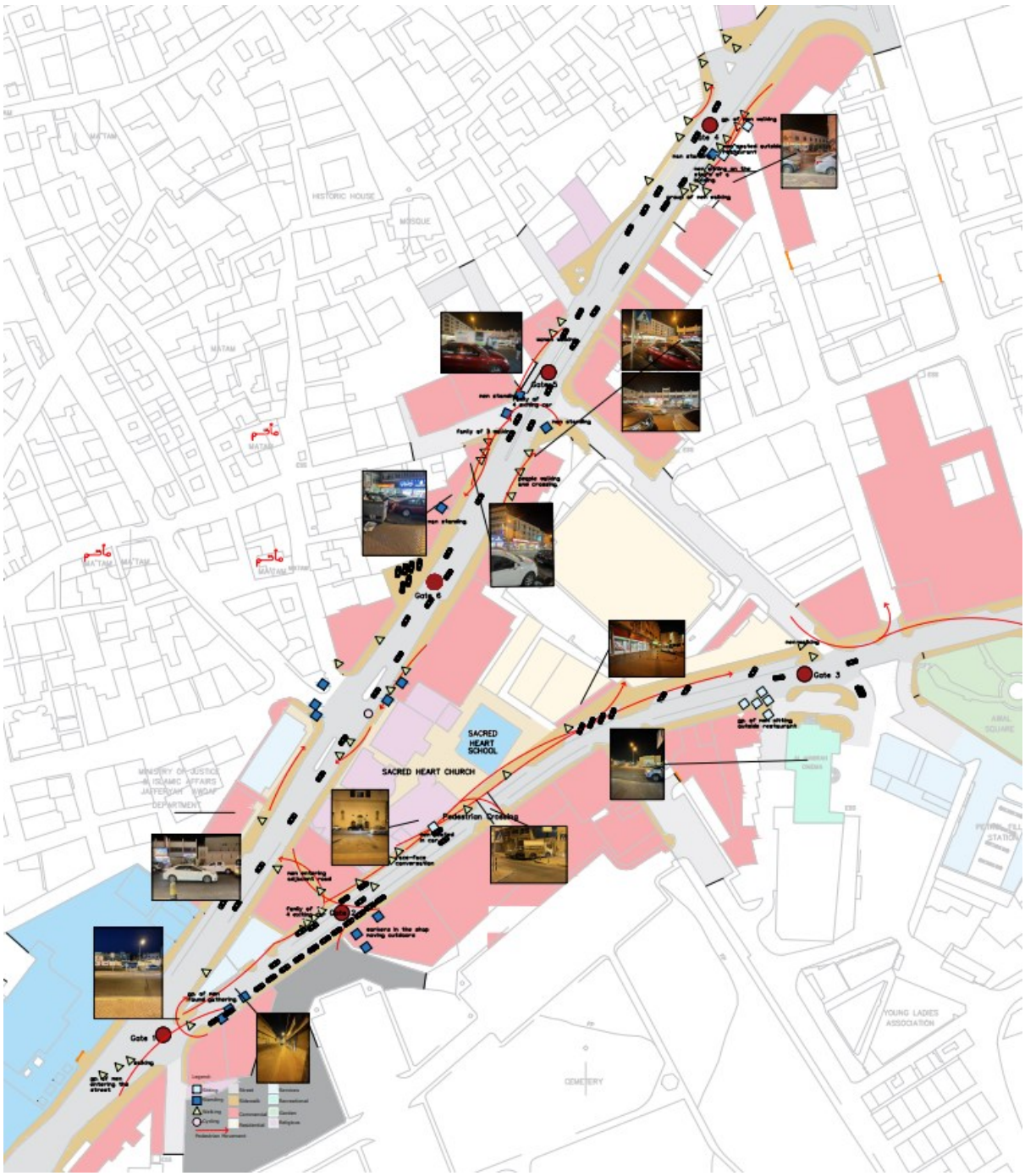


Fig. 4. 68: Manama Commercial Streets 1 & 2 are located adjacent to each other

Source: Author, 2022

Gate 1:



Fig. 4. 69: Activity Observations in Gate 1, Street 1

Source: Author, 2022

Movement: Movement patterns observed in Gate 1 include walking to the other gates, cycling, pedestrians walking to the shops, vehicles stopping to park and vehicles moving. The street also has a movement of people exiting the church.

Activities: During the evening, it was observed that a group of men were standing and talking for a period of more than 10 minutes at gate 1. Some of the men had their motorcycles with them. Men arrived from the highway as a group and walked towards the street. Moreover, families were walking toward a shop from a parked vehicle. Workers of a workshop were moving in and out of the shop as

well. During the daytime, the street has fewer activities when compared to night-time**.** People also walked towards and entered an inner road from the street.

Gate 2:

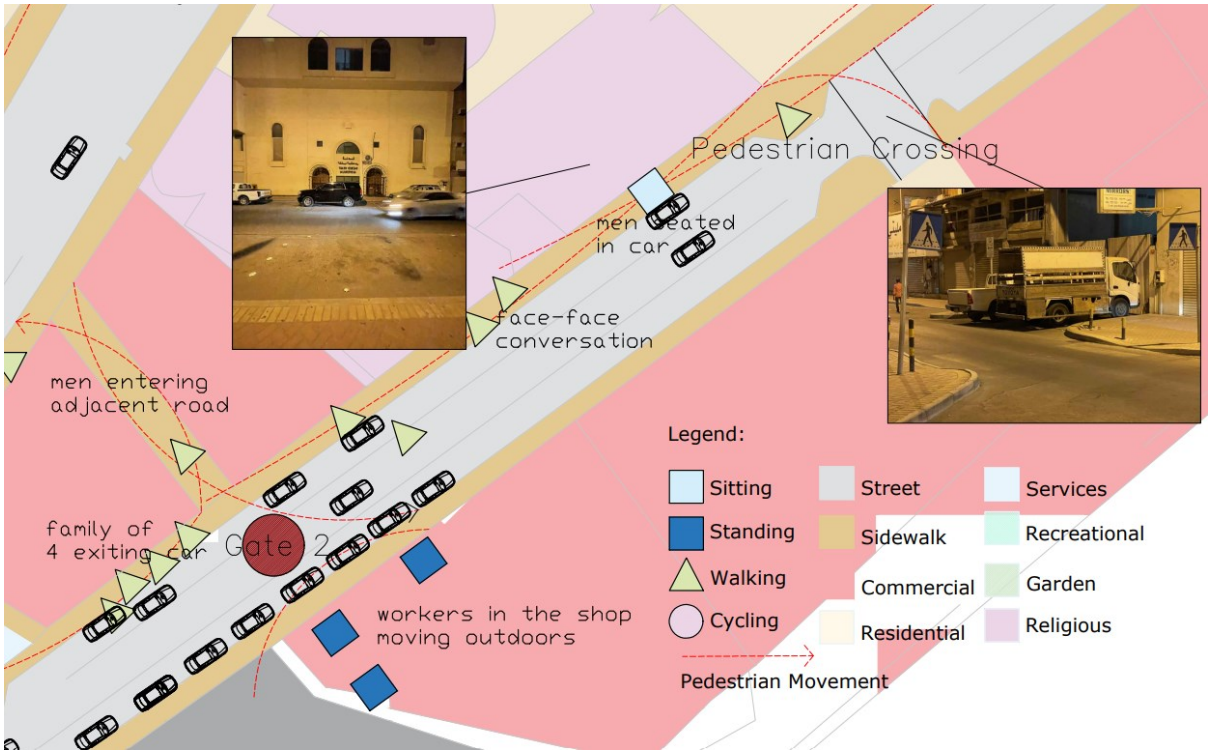


Fig. 4. 70 Activity Observations in Gate 2, Street 1

Source: Author

Movement: Observations from this zone include walking and sitting in a car.

Activities: During the daytime, a man and a woman were talking outside the church. In addition, a family was walking past the church and greeting the other man. During the evening, around 8:30 pm, the street appeared isolated and no activities took place. A man was found sitting inside his car, and another woman was seen walking with a man across the street.

Gate 3:

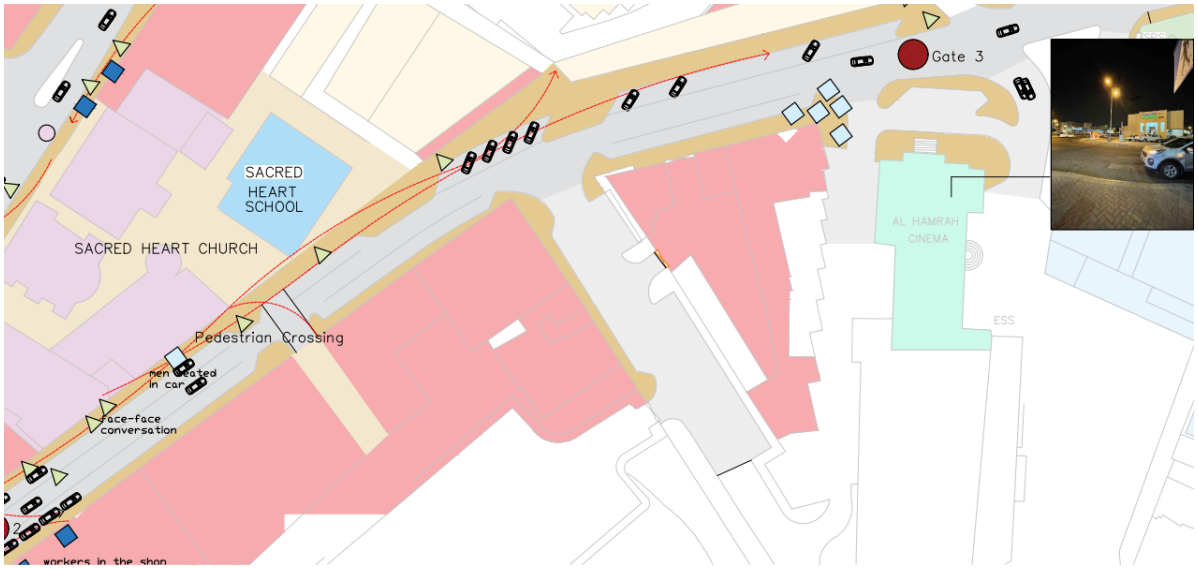


Fig. 4. 71: Activity Observations in Street 1

Source: Author, 2022



Fig. 4. 72: Activity observations in Gate 3, Street 1

Source: Author

Movement: Activities are more intense and livelier. During the daytime, families were walking towards the extended street. Men were walking through the street. Vehicles were moving, parking and entering adjacent streets.

Activities: During the daytime, activities observed include, families, talking and walking towards the adjacent street, and men walking and talking on phones. A group of people were gathering and standing. However, the scene was different during the evening, as a group of men were sitting outside a restaurant in outdoor seating. They sat there for a long period. They were talking to each other and eating. On the other side of the road, the activities were few. However, from a distance, a large group of people were walking, standing, and talking through the sidewalks in the extended part of the street.

4.4.1.1 Liveability of Manama Commercial Street 1 based on Mapping of Movement

The characteristics of liveability as explored through various literature studied and through this research are Physical, Functional, Social, Economic, Environmental, Visual and Urban Qualities.

In this street based on the movement patterns and activities, the following conclusions were drawn;

Physical- The street is accessible from the adjacent roads for pedestrians. However, there is an issue for vehicles to pass as it is a one-way road. Cleanliness is achieved and road signs are legible.

Functional- It is found that the street has users crossing the road in pedestrian crossings, walking on the sidewalks (though it is narrow), and walking both during daytime and night-time. Hence, it is found to satisfy the functional characteristic of liveability.

Social- There exists socialization in the street. However, this is limited to two gates, gates 1 and 3 during the observed intervals and days. Moreover, such socialization is found only during the night time and the street is isolated during the day times. As a result, it is concluded that the street does not satisfy the social characteristics of liveability.

Economic- There exist several shops, and customers are seen going into shops and coming out both during the daytime and the nighttime. Hence, it satisfies the economic characteristic of liveability.

Environmental- None

Visual- The main visual characteristics observed were gathering of people near gate 1 during the night-time visit, gathering of a group of people, sitting outside a restaurant and vehicles passing by. Overall, it appeared dull, isolated and deserted due to a smaller number of activities and movement when compared to adjacent streets. Therefore, it does not satisfy the visual characteristics.

Urban Qualities- People moving in and out of the inner roads can be found as a part of the streets' complexity and transparency (viewing the parallel street through pocket roads) to an extent. The human scale is not satisfactory as the sidewalks are narrow and only one person can walk properly, only at the junction of the pedestrian crossings, more people can stand/walk. The enclosure is achieved as the street is completely enclosed near gate 2 because of the façade of the church. Similarly, in the case of imageability, there are a few points of interest such as the church, the restaurant and the pocket roads that act as imageability. Therefore, urban qualities have been achieved.

Overall, the street aims at achieving only the economic characteristics of liveability. Other characteristics such as visual, physical, environmental, social and urban qualities need to be considered.

4.4.2 Manama Commercial Street 2

Gate 4:

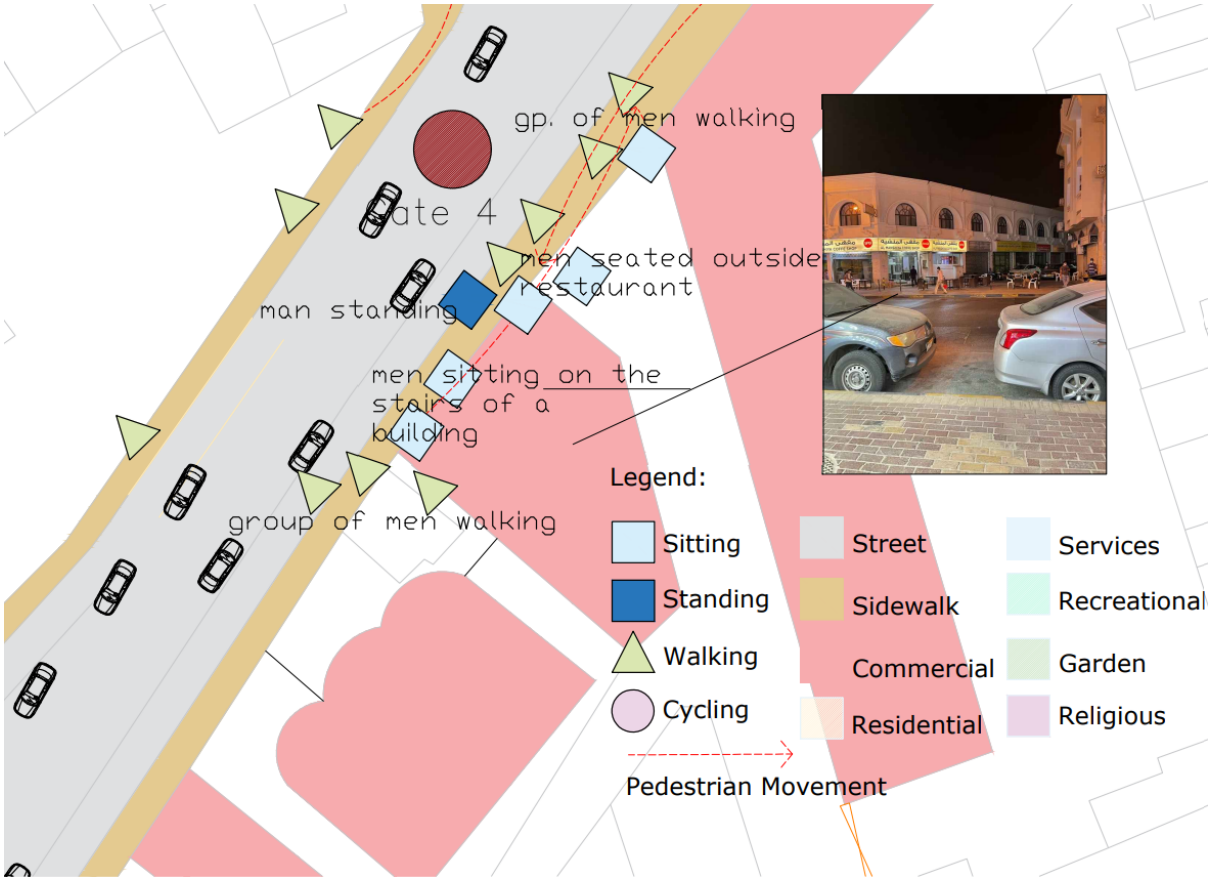


Fig. 4. 73: Activity Observations in Street 2

Source: Author, 2022

Movement: During the daytime, the observations of movement patterns were men and women walking, entering the street from the adjacent street and vehicles arriving in the street. During the evening, only two men were found entering the street during the observed time interval.

Activities: Various activities found during the day include men and women talking, a man standing outside his shop, and men and women entering shops and exiting. Whereas, in the evening, people were found sitting outside a restaurant, gathering, and others walking.

Gate 5:

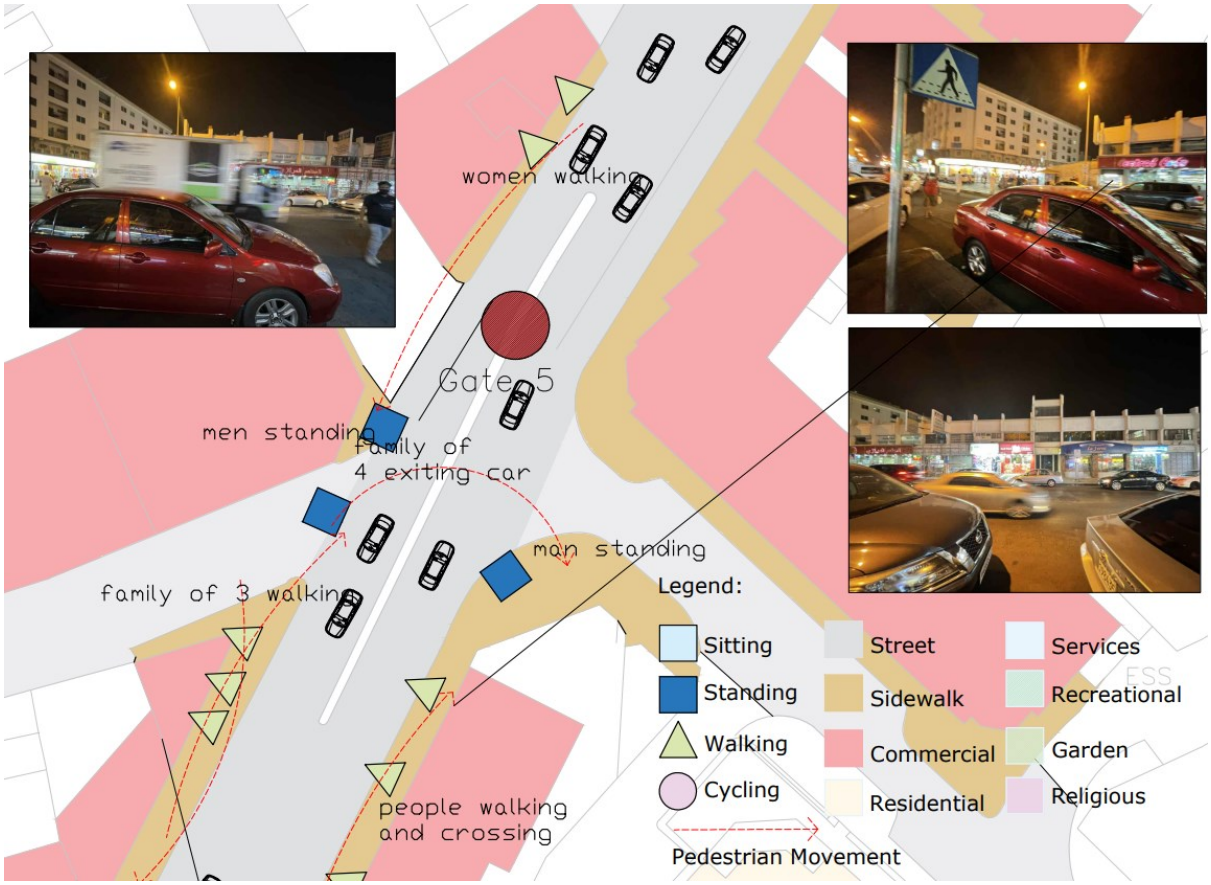


Fig. 4. 74: Activity Observations in Street 2

Source: Author, 2022

Movement:

In this zone, men and women were crossing the road during the day. During the evening, a similar pattern of people crossing the road at the signal is seen. On the sidewalks, a group of men were walking. A family of three were walking.

Activities:

People crossing the roads and walking were the only activities spotted at this gate.

Gate 3:



Fig. 4. 75: Activity Observations in Street 2

Source: Author, 2022

Movement:

The movement of pedestrians from the sidewalk of the adjacent street to Isa Al Kabeer Avenue is found. People entering the shop at this junction.

Activities:

No activities were observed here. A man was standing outside his shop near a congested car park in the daytime. During the evening, a group of men were

crossing this junction and gathering near the congested car park. Difficulty to walk to the shop and constrained movement were observed due to the limited area to walk.

4.4.2.1 Liveability of Manama Commercial Street 2 based on Mapping of Movement

The characteristics of liveability as explored through various literature studied and through this research are Physical, Functional, Social, Economic, Environmental, Visual and Urban Qualities.

In this street based on the movement patterns and activities, the following conclusions were drawn.

Physical- Pedestrians can access the street from the adjacent streets seamlessly. It is clean.

Functional- People are crossing the roads even without a pedestrian crossing. This leads to safety concerns. The street required additional pedestrian crossing and proper street design. Sidewalks are narrow, causing pedestrians to walk on roads, and causing a commotion.

Social- It is a highly sociable street with various activities taking place at the same time and groups of people gathering in different spots during different times. Local vendors are sitting informally on the sidewalks. The street meets the social characteristic of liveability completely.

Economic- The street is an excellent spot for economic factors, both during daytime and night-time.

Environmental-Shadings exist only near the restaurant. However, pedestrians use the sidewalks irrespective of whether there is a shade or not. Shaded spaces are also found near gate 2.

Visual- The street offers a variety of visual factors such as retail and good lighting. However, the sidewalks are not legible and are not proportionate. This is an issue.

Urban Qualities- The street offers good transparency as users can see through the shop's glass facades and pocket roads. It is a highly complex street with multiple activities taking place at the same time and dense. It offers great imageability and places to remember, gather and interact. Human scale is achieved to an extent by taking into consideration the height of the buildings and road width. But the sidewalks remain unproportionate. Overall, this commercial street achieves the physical characteristics of liveability and social, economic and urban qualities. It achieves visual characteristics to an extent in terms of facades and lighting. Similarly, achieves environmental characteristics to an extent. However, it fails to achieve the functional characteristics of liveability successfully and remains a drawback.

4.4.3 Manama Residential Street 1

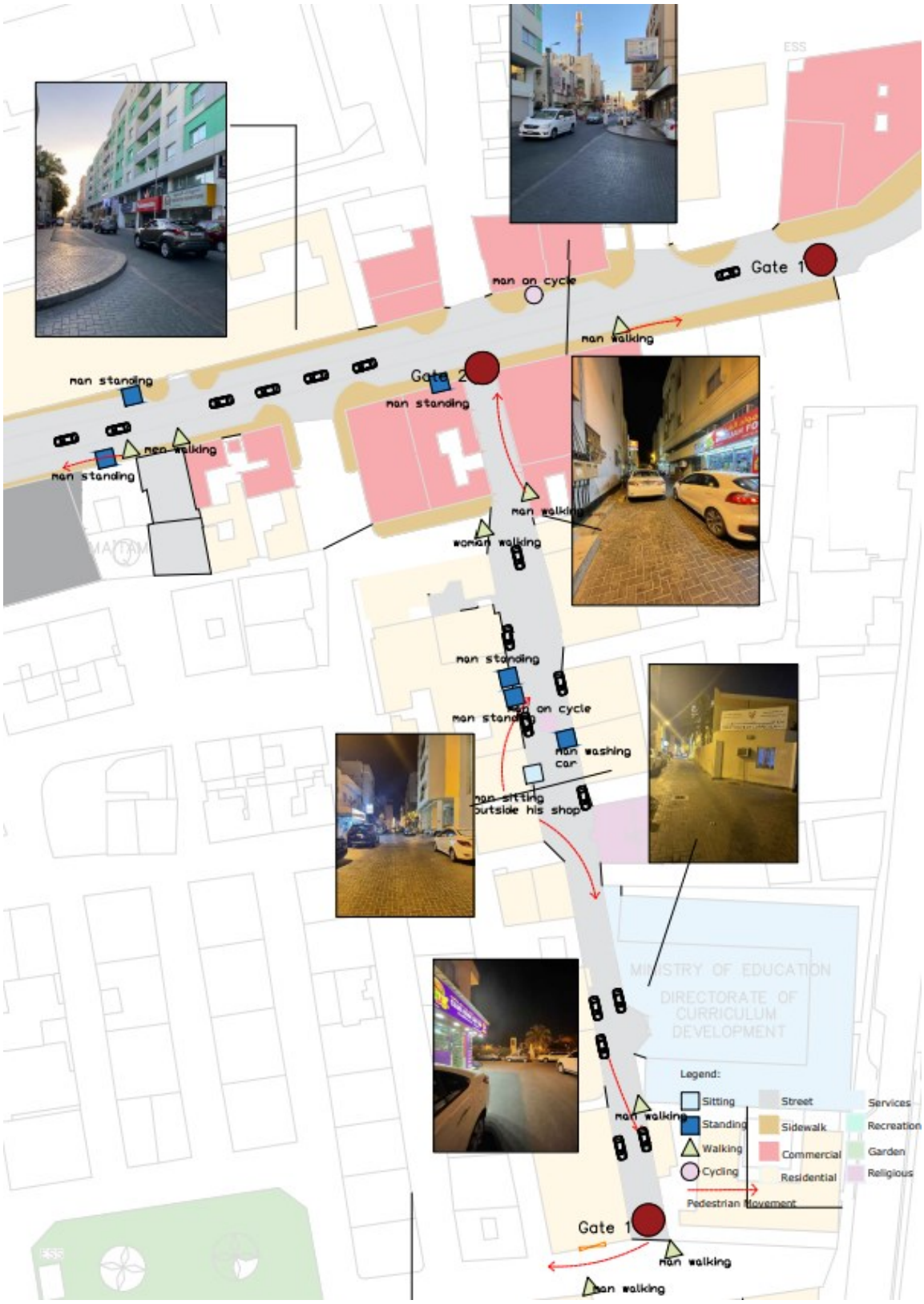


Fig. 4. 76: Manama Residential Street 1 & 2 adjacent to each other.

Source: Author, 2022



Fig. 4. 77 Activity Observations in Street 3

Source: Author, 2022

Observed on 22/9/2022 from 3:30-3:50 pm

Gate 1:

Movement: Men were walking on the sidewalks as a group, people were sitting, standing, crossing the road etc. Vehicles were entering the road.

Activities: Men were standing outside a shawarma shop ordering food during the day. Men were walking as a group exiting from the nearby shop. Women were entering a restaurant on the street. A man was on his cycle outside a cafeteria. During the evening, the street is extremely crowded and congested with vehicles and users. Pedestrians were crossing the road, walking on the sidewalks and shopping. A man and a woman were sitting in an informal outdoor sitting area of a shawarma stall. A family was entering a grocery.

Gate 2-Movement & Activities: In gate 2, vehicles exit the street and merge the Commercial Street. Pedestrians were walking on the sidewalks. A cobbler was mending shoes.

4.4.3.1 Liveability of Manama Residential Street 1 based on Mapping of Movement

The characteristics of liveability as explored through various literature studied and through this research are Physical, Functional, Social, Economic, Environmental, Visual and Urban Qualities. In this street based on the movement patterns and activities, the following conclusions were drawn.

Physical- The street is accessible from the adjacent streets for both pedestrians and vehicles.

Functional- Users can cross the roads safely but lacks proper segregation from the street to the sidewalks (requires ramp at intervals).

Social- It is a street with social activities taking place, informal outdoor seating, gathering and crowding.

Economic- There exists small grocery shops, cafes and restaurants needed to meet the needs of its residents.

Environmental- The street has some greenery near the gate 2 and is shaded due to the height of the AMH residential complex on the façade of the street

Visual- The street offers a variety of façades and lighting (observed at night). The sidewalks are legible and proportionate.

Urban Qualities- The street is not transparent, and one cannot overlook what is on the parallel road. It is dense in terms of vehicles travelling the street but is not complex compared to the commercial street discussed above. The street does not have a significant imageability, it has a mix of residential, commercial, and religious (cemetery, mosque) buildings.

Overall, the street meets the physical, social, economic, environmental and visual characteristics of street liveability. However, it fails to achieve the functionality

and urban qualities to an extent. The proportion of building heights (AMH residential complex) to the road is a major drawback.

4.4.4 Manama Residential Street 2

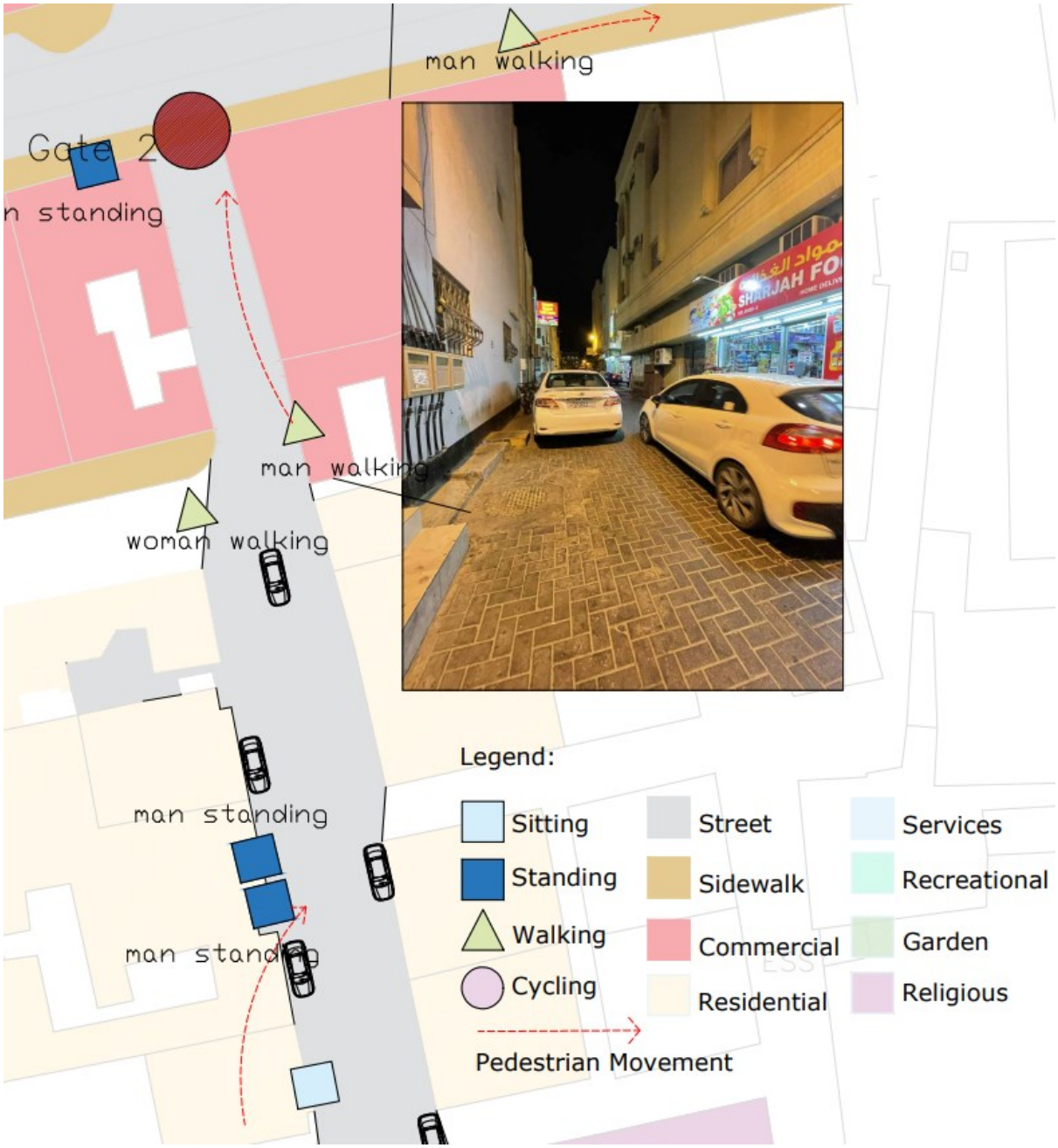


Fig. 4. 78: Activity Observations in Street 4

Source: Author, 2022

Observed on 8/8/2022 from 8:00-8:20 pm

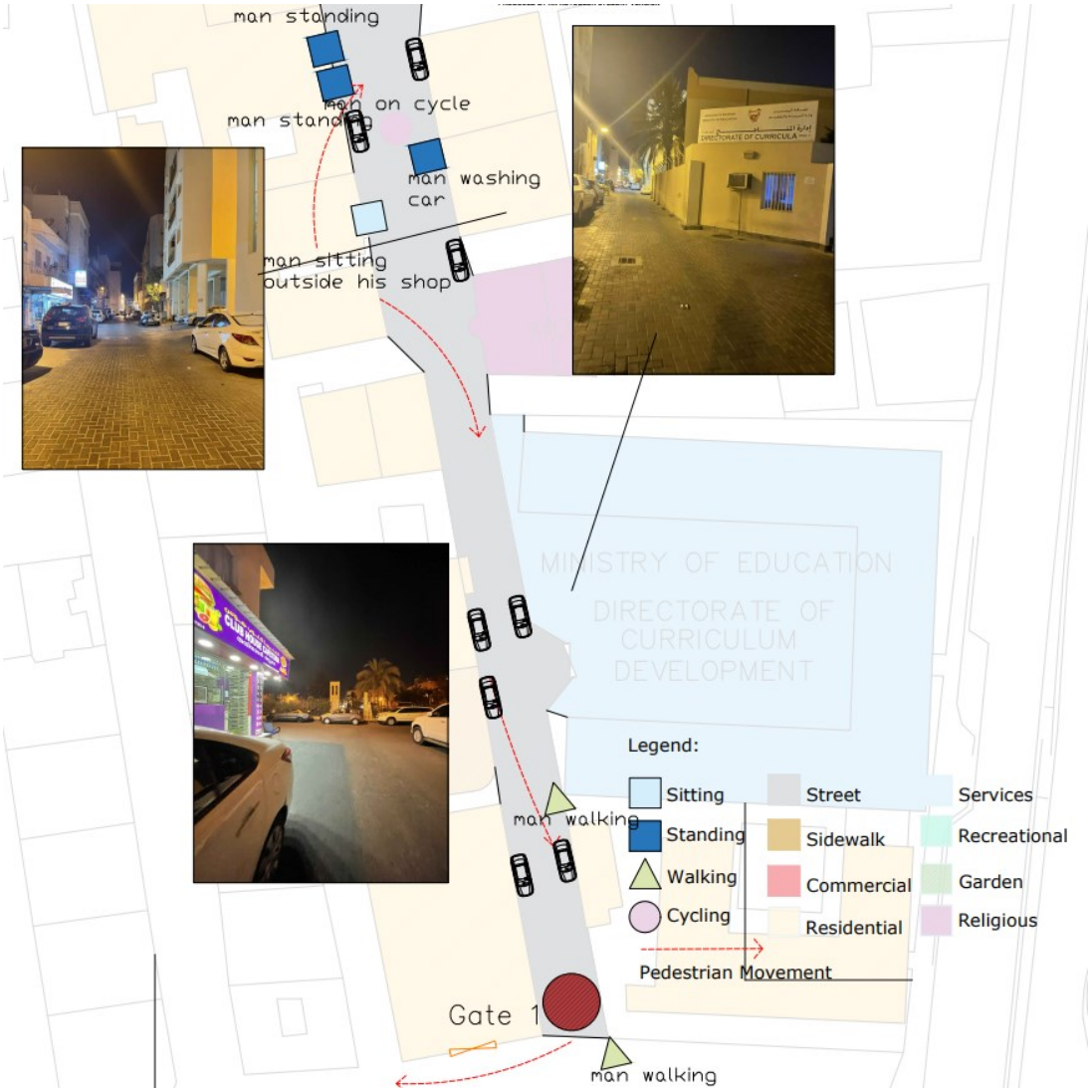


Fig. 4. 79: Activity Observations in Street 4

Source: Author, 2022

Gate: A common gate is selected in this street due to the short span of the street.

Movement: The street is congested with vehicles entering and exiting causing congestion. Men were walking, standing, sitting, and shopping. Women are walking in the street as well.

Activities: Various activities were observed in the street. First, a woman was exiting a building, standing outside the building for a period, talking on the phone and then walking from the building to the nearby street. Second, a man was

exiting the mosque and walking to the nearby building. Moreover, a group of men were exiting the mosque and going to the nearby buildings as a group. Third, a man was sitting outside his shop on a chair observing the activities outside. Fourth, two men were standing near a building under construction and talking. Five, a woman was talking to her neighbour outside her house. Lastly, a child and young woman were walking outside their house.

4.4.4.1 Liveability of Manama Residential Street 1 based on Mapping of Movement

In this street based on the movement patterns and activities, the following conclusions were drawn.

Physical- The street doesn't have segregation between sidewalks and roads. There is a lack of parking.

Functional- The width of the available space for walking is a concern. Vehicles being parked on either side is also a significant issue affecting the function of the street.

Social- Several social activities take place in this street given the size of the street.

Economic- Available nearby.

Environmental- Plants are available outside buildings.

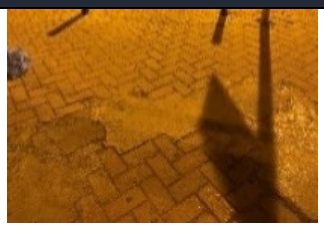
Visual- Lighting is dull and roads are not proportionate.

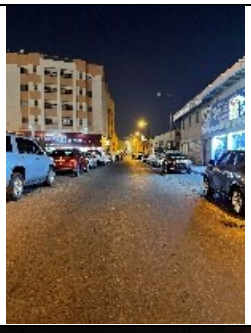
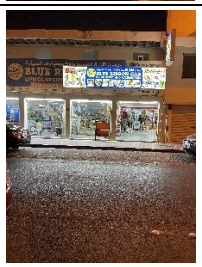
Urban Qualities-The street is very dense and complex with many houses arranged in a narrow street. It does not offer transparency and does not offer imageability.

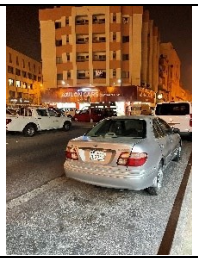
Overall, the street meets the social, economic and environmental characteristics. However, it fails to achieve functionality, and physical, visual and urban qualities of liveability.

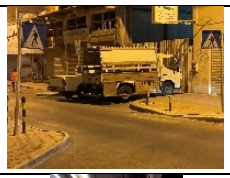
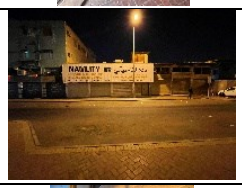
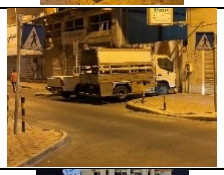
4.5 Method 4: Evaluation of Liveability Indicators

4.5.1 Street No. 1 Manama -Commercial Street 1- Zubara Avenue

Characteristics	Factors	Indicators	Images	Observations- Qualitative Evaluations	Evaluation Score
Physical	Physical attributes	Floor surfaces – paving		There are cracks and unfinished pavements.	+2
		Name boards		Visible	+3
		Signs		Proper signages are available.	+3
		Seating		There are chairs kept outside a restaurant, on the sidewalk.	-2
		Sculpture		No landmarks are available, except the church.	+1
		Canopies & Overhangs		No shading facility.	-3
		Traffic		Not very congested. Except during events.	+2

		Parking spaces		There is congestion and a lack of parking when the church is open.	-1
		Accessibility		Easily accessible, sometimes there are traffic blocks	+2
Visual		Variety of retail shops		Lack of several facilities. Only grocery and boutiques are available.	+1
		Scale and Proportion (building heights to street facades)		Narrow streets in comparison to tall buildings.	+1
		Variety of lighting		The street appears to be dull with less to no lighting. Visually it is dim and dark.	-2
		Compatibility of facades – Compositions		Few shops on the façade appear to be old along with new shops.	+1
		Proportions of space		Buildings are of various heights and sizes. (Example, a single shutter store next to a church) (Example, a Long Narrow sidewalk merges with a wide sidewalk connecting a pedestrian crossing)	+1

		Scale and Proportion (building heights to street facades)		As above	+1
		Legibility of street elements			+2
Social	Democratic public spaces for all	General public spaces		People were using the zone near paid parking lot most of the time.	+1
		Facilities for the disabled		Availability of informal slope.	-2
		Gathering nodes & Face-to-face communications.		Informal gathering spots near the church and the restaurant were found.	+2
		Socializing spaces nearby/ play spaces (for residential street)		No play spaces available nearby	-2
		Recreational facilities (for residential streets)		There are no recreational facilities available.	-3
Environmental	Weather conditions	Sunlight		The street is comfortable to walk in the evening, however, it is humid during the mornings & afternoon.	-1
		Sound		The street does not have a lot of traffic, however, there is noise reported to be there due to gatherings on weekends.	+1
		Greenery		The street does not have greenery.	-3
		Cleanliness	.	It is clean. Availability of waste bins.	+3

Economic	Complexity	Availability of various types of shops		Lack of several facilities such as services, retail, family restaurants, and fast-food chains.	-1
		Availability of various types of services.		Not available in the street.	-2
Functional	Safety & Security	Availability of pedestrian crossings		Yes	+2
		Street Furniture		Chairs from restaurants block the sidewalks.	+2
		Lighting (Safety)		The street remains unsafe as shops remain closed.	-3
		Signs		There are signs located at every interval.	+3
		Crossing Facilities (Safety)		Pedestrian crossing available.	+2
		Width of Sidewalk		Inappropriate and varying sidewalk width.	-2
		Cycling Lanes		No cycling lanes are available. Cyclists gather informally.	-3
	Connectivity to city level amenities/ Legibility	Easy access to parking		Paid parking is available but is limited.	+1
		Connectivity to Street Systems		Yes	+3
		Road Hierarchy		One way road from opp. sides causing inconvenience.	-3

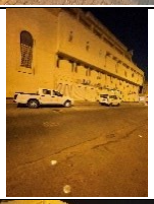
	Easy access to public level amenities/ Way Finding	Signalised intersections		No signals.	-1
		Identity		Limited identity.	-1
		Landmarks		Sacred Heart Church, Al Hamra Cinema	+1
		Directional		The street shows directions to the nearest clinic.	
		Informational		Availability of name of the avenue, closest clinic etc.	+2
Urban Qualities of Street	Imageability			Sacred Heart Church (Landmark), Azilon Cars (Entry point)	+1
	Enclosure			Since the streets are narrow compared to the building heights, it provides an enclosure.	+2
	Human Scale				-1
	Transparency			The street does not have transparency and the buildings create a visual barrier.	-3
	Complexity			During weekends or religious events, the street becomes congested which relates to complexity and density.	+1

Table: 4. 35: Evaluation of Indicators

Source: Author

4.5.1.1. Summary

Physical:

1. There are cracks and unfinished pavements
2. There are chairs kept outside a restaurant, on the sidewalk.
3. Informal entry to the church.

Visual:

1. Few shops on street, which appear to be old along with new shops.
2. Lack of several facilities. Only grocery and boutiques are available.
3. Dull, with no lighting.

Social:

1. People were using the zone near the paid parking lot most of the time
2. Informal gathering spots near the church and the restaurant.

Environmental:

1. The street is comfortable to walk in the evening. However, it is humid during the mornings & afternoon.
2. The street does not have greenery.

Economic:

1. Lack of several facilities such as services, retail, family restaurants, fast food chains

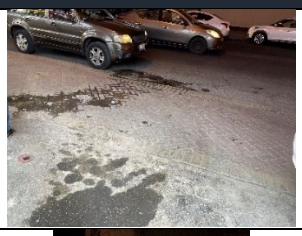
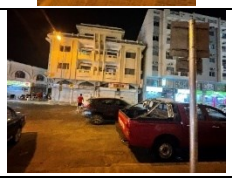
Functional:

1. Chairs from restaurants block the sidewalks.
2. The street remains unsafe as shops remain closed.
3. Availability of name of the avenue, closest clinic etc.

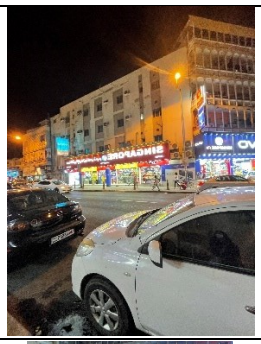
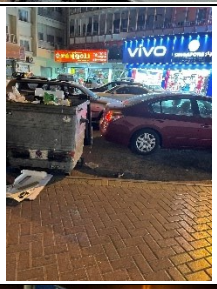
Urban Qualities of the Street:

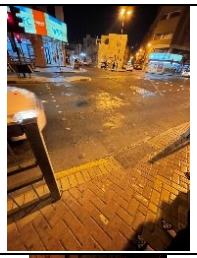
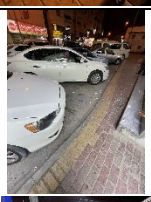
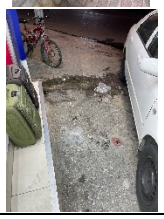
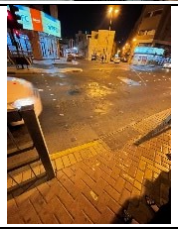
1. The street does not have transparency and the buildings create a visual barrier.
2. During weekends, at the night, the street becomes congested which relates to complexity and density. Complexity
3. Since the streets are narrow compared to the building heights, it provides an enclosure.
4. Landmarks

4.5.2 Street No. 2 Manama -Commercial Street 2- Isa Al Kabeer

Characteristics	Factors	Indicators	Images	Observations- Qualitative Evaluations	Evaluation Score
Physical	Physical attributes	Floor surfaces - paving		Surfaces appear to be unclean and uneven.	-1
		Name boards		Name boards are available. However, some of the name boards appear to be old and dusty.	+1
		Signs		Good signages.	+3
		Seating		Only for the restaurant.	-2
		Sculpture		None.	-3
		Canopies & Overhangs		None	-3
		Traffic		Heavily congested.	-2
		Parking spaces		One is unable to find parking as the paid park is mostly occupied.	+2
		Accessibility		Accessible from adjacent streets.	+3

Visual		Variety of retail shops		Streets offer a wide variety of retail shops	+3
		Scale and Proportion (building heights to street facades)		Proportionate	+3
		Variety of lighting		The street offers different lighting elements.	+2
		Compatibility of facades - Compositions		The old buildings are retained and the newer shops on the ground floor create harmony.	+3
		Proportions of space		Three storey building with a narrow sidewalk.	+2
		Scale and Proportion (building heights to street facades)		Proportionate	+3
		Legibility of street elements			+1
Social	Democratic public spaces for all	General public spaces		There are public spaces (informal)+	+1
		Facilities for the disabled			-2
		Gathering nodes & Face-to-face communications.		Several gathering nodes (informal and formal)	+3
		Socializing spaces nearby/ play spaces (for residential street)		Only outdoor dining for a restaurant.	+1
		Recreational facilities (for			-3

		residential streets)			
Environmental	Weather conditions	Sunlight		Tall buildings provide shade while walking.	+2
		Sound		Sound from vehicles.	+1
		Greenery		Lack of green spaces or plants.	-2
		Cleanliness	.	Certain gates are very untidy.	-3
Economic	Complexity	Availability of various types of shops		Varieties of shops are available.	+3
		Availability of various types of services.		The streets offer various types of services.	+3
Functional	Safety & Security	Availability of pedestrian crossings		There is a pedestrian crossing, however, men are spotted crossing informally regularly, causing a hazard.	-2
		Street Furniture		Street furniture blocking the sidewalks.	-1
		Lighting (Safety)		Safe.	+2
		Signs			+3

		Crossing Facilities (Safety)		Crossing without signals causes a safety concern.	+2
		Width of Sidewalk	 	Inappropriate and varying sidewalk width.	-2
		Cycling Lanes		No cycling lanes are available.	-3
	Connectivity to city level amenities/ Legibility	Easy access to parking		Paid parking is available but is limited.	+1
		Connectivity to Street Systems		Yes	+3
		Road Hierarchy		The transition from a 2-way lane to one way lane causes traffic congestion.	+1
	Easy access to public level amenities/ Way Finding	Signalised intersections		Available (1)	+1
		Identity		The street has its own unique identity.	+3
		Landmarks		Sacred Heart Church, and several other restaurants.	+3

		Directional		Paths are not identifiable as it breaks in between.	-2
		Informational		Signboards are available.	+2
Urban Qualities of Street	Imageability			Availability of names and signs.	+3
	Enclosure			Sacred Heart Church (Landmark), Fruit sellers, and Indian & Filipino shops.	+3
	Human Scale			Surrounded by people on all sides, it provides enclosure along with a lively street façade.	+2
	Transparency			Shop's facades offer transparency, helping one navigate and identify themselves.	+3
	Complexity				+3

Table: 4. 36: Evaluation of Indicators

Source: Author

4.5.2.1 Summary

Physical:

1. Surfaces appear to be unclean and uneven.
2. Name boards are available. However, some of the name boards are old and dusty.
3. One is unable to find parking as the paid park is mostly occupied.
4. Heavily congested

Visual:

1. Streets offer a wide variety of retail shops

Social:

1. Several gathering nodes (informal and formal)

Environmental:

1. Tall buildings provide shade
2. Lack of greenery

Economic:

1. Variety of retail, and recreational services available.

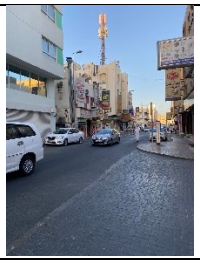
Functional:

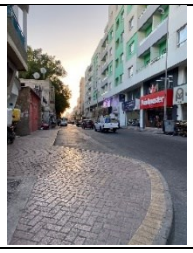
1. Crossing without signals causes a safety concern.

Urban Qualities of Street:

1. The street provides imageability as there is the availability of names and signs, transparency as shops facades offer transparency, helping one navigate and identify themselves and complexity, because of the dense buildings, activities, population and traffic.

4.5.3 Street No. 3 | Manama Residential Street

Characteristics	Factors	Indicators	Images	Observations- Qualitative Evaluations	Evaluation Score
Physical	Physical attributes	Floor surfaces – paving			-1
		Name boards			-1
		Signs		Good	+3
		Seating		Sitting spaces for restaurants.	+2
		Sculpture		None	-3
		Canopies & Overhangs		None	-3
		Traffic		Blocked during weekends by vehicles from the adjacent street.	+1
		Parking spaces		Limited as most travellers find it difficult to park especially for shopping, dining, visiting etc.	+1
		Accessibility		Congestion	-1
		Edge segments		Edges are defined.	+3
Visual		Variety of retail shops		The streets have different kinds of retail shops.	+1
		Scale and Proportion (building heights to street facades)		Midrise buildings on side of the road and low rise building on the other makes it appear disproportionate.	-1
		Variety of lighting		The street has a variety of lighting from groceries, cafeterias and restaurants in the street.	+2
		Compatibility of facades – Compositions		AMH residential building covers a large span of the street making it incompatible with the surroundings.	-2
		Legibility of street elements		Legible	+2
Social	Democratic public spaces for all	General public spaces		Outdoor dining in a restaurant acts as a public space. A nearby cemetery also exists.	-1
		Facilities for the disabled		Slopes to the sidewalks.	+1
		Gathering nodes & Face-to-face communications.		Gathering observed near restaurants.	-3

		Socializing spaces nearby/ play spaces (for residential street)		The sidewalks are spaces where people socialize while standing outside the shops.	+2
		Recreational facilities (for residential streets)		None.	-3
Environmental	Weather conditions	Sunlight		Shading from the trees and tall buildings.	+2
		Sound		No disturbances.	+3
		Greenery		A big cluster of trees.	+2
		Cleanliness	.	Clean	+3
Economic	Complexity	Availability of various types of shops		Availability of various restaurants and retail.	+2
		Availability of various types of services.		Some services are available. No banks nearby.	+1
Functional	Safety & Security	Availability of pedestrian crossings		No.	-3
		Street Furniture		Outdoor chairs of the cafeteria block the pathway.	-1
		Lighting (Safety)		Safe.	+3
		Signs		Clear.	+3
		Crossing Facilities (Safety)		Not available.	-3
		Width of Sidewalk		Proportionate.	+2
		Cycling Lanes		Not available.	-3
	Connectivity to city level amenities/ Legibility	Easy access to parking		No.	+1
		Connectivity to Street Systems		Yes. But it becomes difficult due to traffic from adjacent streets.	+1
		Road Hierarchy		Connects the street to the commercial extension of the avenue.	+3
	Easy access to public level amenities/ Way Finding	Signalised intersections		No.	-1
		Identity		Delhi House Restaurant, Cafeterias, AMH Complex.	+3
		Landmarks		Same as the above.	+3
		Directional		Signboards are available.	+3
		Informational		Availability of names and signs.	+3

Urban Qualities of Street	Imageability			AMH Complex, Mosque, Colourful boards of restaurants.	+3
	Enclosure			AMH Complex, with its height, offers a sense of enclosure to one walking through the street.	+2
	Human Scale			Proportionate.	+3
	Transparency			No.	-2
	Complexity			The various types of facilities fusing with the residential buildings, vehicles and pedestrians create complexity.	+3

Table: 4. 37: Evaluation of Indicators

Source: Author

4.5.3.1 Summary

Physical:

1. The surfaces are unclean and uneven.
2. Name boards are available. However, some of the name boards are old and dusty.
3. One is unable to find parking as the paid park is mostly occupied.
4. Heavily congested

Visual:

1. Streets offer a wide variety of retail shops

Social:

1. Several gathering nodes (informal and formal)

Environmental:

1. Tall buildings provide shade
2. There is a lack of greenery

Economic:

1. A variety of retail, and recreational services are available.

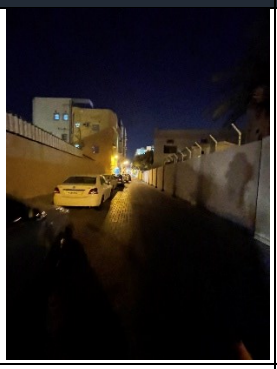
Functional:

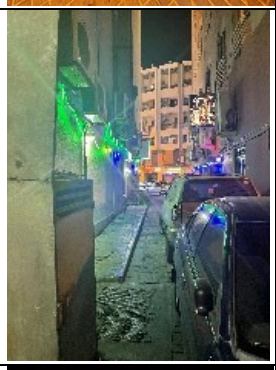
1. Crossing without signals causes a safety concern. This is an issue. The street does not satisfy the functionality.

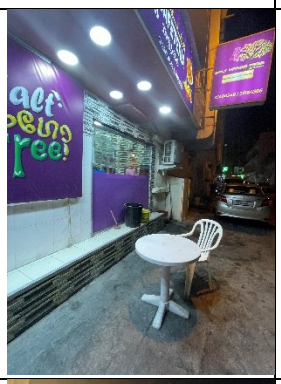
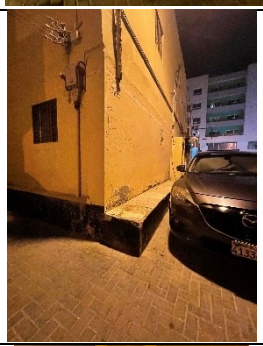
Urban Qualities of Street:

1. The Street provides imageability, transparency and complexity. The various types of facilities fusing with the residential buildings, vehicles and pedestrians create complexity.

4.5.4 Street No. 4 | Manama Residential Street

Characteristics	Factors	Indicators	Images	Observations-Qualitative Evaluations	Evaluation Score
Physical	Physical attributes	Floor surfaces - paving			+1
		Name boards			+2
		Signs		Good. Road signs and numbers.	+2
		Seating		Informal family gathering of men during weekends	-1
		Sculpture		Curve-shaped wall of the Mosque	+2
		Canopies & Overhangs		None	-3

		Traffic		Congested.	-1
		Parking spaces		Difficult to find parking for a visitor as residents themselves face issues.	+1
		Accessibility		Difficult to access adjacent tertiary streets.	-1
		Edge segments		Edges not defined.	-2
		Variety of retail shops		Availability of cold store, tailoring and a furniture workshop.	+2

Visual		Scale and Proportion (building heights to street facades)			+2
		Variety of lighting		The street is well lit with street lights.	+3
		Compatibility of facades - Compositions		Neutral colour schemed facades.	+2
		Proportions of space		Proportionate.	+2
		Legibility of street elements		Legible to an extent.	+1

Social	Democratic public spaces for all	General public spaces		The spaces are used informally by the residents.	+3
		Facilities for the disabled		None.	-3
		Gathering nodes & Face-to-face communications.		Gathering observed near furniture workshop and mosque.	+2
		Socializing spaces nearby/ play spaces (for residential street)		Park adjacent to the street.	+3
		Recreational facilities (for residential streets)		Park nearby and restaurants.	+1
		Greenery		The street has greenery in Infront of the houses grown by the residents.	+2

		Cleanliness	 .	The street is cleaned regularly.	+3
Economic	Complexity	Availability of various types of shops		Availability of cold store, tailoring and a furniture workshop.	+2
		Availability of various types of services.		Some services are there.	+1
Functional	Safety & Security	Availability of pedestrian crossings		No.	-3
		Street Furniture		Street furniture blocking the sidewalks.	-2
		Lighting (Safety)		As one walks to the adjacent road it becomes unsafe.	+1
		Signs		Clear.	+1

		Crossing Facilities (Safety)		Not available.	-3
		Width of Sidewalk		.No sidewalks specified. People walk on the road.	-3
		Cycling Lanes		Not available.	-3
	Connectivity to city level amenities/ Legibility	Easy access to parking		No.	-3
		Connectivity to Street Systems		Yes. But it becomes difficult via vehicle as it is a one-way road, which hinders travelling to the adjacent street directly.	+1
		Road Hierarchy		The transition from 1 way road makes it difficult.	-3
	Easy access to public level amenities/ Way Finding	Signalised intersections		No.	-1
		Identity		No significant identity.	+1
		Landmarks		Mosque and directorate.	+2

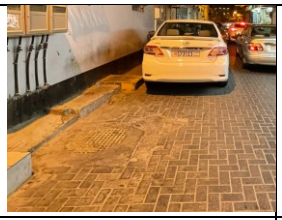
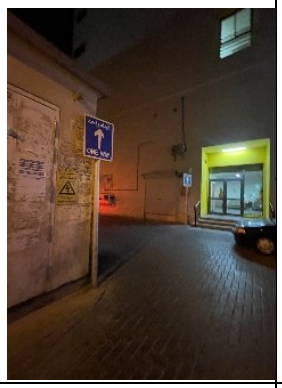
		Directional		Paths are uneven.	-2
		Informational		Signboards are available.	+3
Urban Qualities of Street	Imageability			Mosque, Mattam nearby, Restaurants nearby.	+1
	Enclosure			Surrounded by people and vehicles.	+2
	Human Scale			Proportionate.	+3
	Transparency			Shop's facades offer transparency.	+1
	Complexity			The linkage to adjacent tertiary streets makes it complex.	+1

Table: 4. 38: Evaluation of Indicators

Source: Author

4.5.4.1 Summary

Physical:

1. Informal family gathering of men during weekends.

Visual:

1. The street is well-lit with streetlights.

Social:

1. Gathering observed near furniture workshop and mosque.

Environmental:

1. Greenery outside residential buildings.

Economic:

1. There is a cold store, tailoring and a furniture workshop.

Functional:

1. Paths are uneven.
2. As one walks to the adjacent road, it becomes unsafe.
3. Yes. However, it becomes difficult via vehicle, as it is a one-way road, which hinders travelling to the adjacent street directly.

Urban Qualities of Street:

1. The linkage to adjacent tertiary streets makes it complex.
2. Mosque, Mattam nearby, Restaurants nearby.

4.6 Comparative Tables of Liveability based on 4 Methods:

4.6.1 Evaluation of Street 1- Summary

Characteristics	Method 1	Method 2	Method 3	Method 4
Physical	Accessibility and Cleanliness are the two indicators that were used. It is found that the street is accessible and is found to be clean. An issue that needs careful consideration is water leakage	The street lacks enough parking spaces for vehicles.	The street is accessible from adjacent roads for pedestrians. However, there is an issue for vehicles to pass as it is a one-way road. Cleanliness is achieved and road signs are legible.	There are cracks and unfinished pavements There are chairs kept outside a restaurant, on the sidewalk. Informal entry to the church.
Visual	xxx	xxx	The main visual characteristics observed were gathering of people near gate 1 during the night-time visit, gathering of a group of people, sitting outside a restaurant and vehicles passing by. Overall, it appeared dull, isolated and deserted due to a smaller number of activities and movements when compared to the adjacent streets. Therefore, it does not satisfy the visual characteristics.	Few shops on street, which appear to be old along with new shops. Lack of several facilities. Only grocery and boutiques are available. Dull, with no lighting.
Social	It is a social street with several social taking places	This street has several activities taking places such as meeting at the nearby garden, church, hotels, coffee shops and clubs.	There exists socialization in the street. However, this is limited to two gates: gates 1 and 3 during the observed intervals and days. Moreover, such socialization is found only during the night time and the street is isolated during the day times. As a result, the street does not satisfy the social characteristics of liveability.	People were using the zone near the paid parking lot most of the time Informal gathering spots near the church and the restaurant.
Environmental	There are no environmental considerations in the street observed by the participants.	Environmental characteristics of the street need to be taken into consideration and are a significant characteristic of street liveability.	None	The street is comfortable to walk in the evening. However, it is humid during the mornings & afternoon. The street does not have greenery.

Economic	The street caters to the needs of its users. However, there is a scope for improvement for the benefit of all types of people		There exists several shops, and customers are seen going into shops and coming out both during daytime and nighttime. Hence, it satisfies the economic characteristic of liveability.	Lack of several facilities such as services, retail, family restaurants, fast food chains
Functional	Parking is a serious issue here. Another critical issue that needs further inspection is the regular theft that occurs on this street. Walkability is also affected due to the intervention of bicycles. Therefore, the functionality of the street is poor.	Safety is yet another point of concern. This is a concern in the sidewalks and affects user walkability. This is due to width, overcrowding and traffic. Moreover, safety concerns exist at night.	In terms of function, based on the observations, the street has users crossing the road in pedestrian crossings, walking on the sidewalks (though it is narrow), and walking both during daytime and night-time. Hence, it satisfies the functional characteristics of liveability.	Chairs from the restaurants block the sidewalks. The street remains unsafe as shops remain closed. Availability of name of the avenue, closest clinic etc.
Urban Qualities of Street	**xxx**	**xxx**	People moving in and out of pocket roads can be found as a part of the streets' complexity and transparency (viewing the parallel street through pocket roads) to an extent. The human scale is not satisfactory as the sidewalks are narrow and only one person can walk properly, only at the junction of pedestrian crossings more people can stand/walk. The enclosure is achieved as the street is completely enclosed near gate 2 because of the church façade. Similarly, in the case of imageability, there are a few points of interest such as the church, the restaurant and the pocket roads that provide imageability. Therefore, urban qualities can be considered as achieved to a certain extent.	The street does not have transparency and the buildings create a visual barrier. During the weekends, at the night, the street becomes congested which relates to complexity and density. Complexity Since the streets are narrow compared to the building heights, it provides an enclosure. Landmarks

Table: 4. 39: Comparative Analysis of 4 Methods

Source: Author

4.6.2 Evaluation of Street 2- Summary

Characteristics	Method 1	Method 2	Method 3	Method 4
Physical	The street is accessible and clean. It is found to be a highly sociable street where users work, shop and commute.	There are some benches and shading that are available in the street. It is also an accessible street, which is used by many pedestrians, reported to be walking friendly	Pedestrians can access the street from adjacent streets seamlessly. It is clean.	Name boards are available. However, some of the name boards are old and dusty. One is unable to find parking as the paid park is mostly occupied. Heavily congested
Visual	xxx	xxx	The street offers a variety of visual factors such as retail and good lighting. However, the sidewalks are not legible and are not proportionate. This is an issue.	Streets offer a wide variety of retail shops
Social	Most of the socialization occurs here with buying and selling. Hence, it is filled with people always.	Respondents named various spots in the street that are attractive for gathering. Hence, it is a street with several social activities and engagement.	It is a highly sociable street with various activities taking place at the same time and groups of people gathering in different spots during different times. Local vendors are sitting informally on the sidewalks. The street meets the social characteristic of liveability completely.	Several gathering nodes (informal and formal)
Environmental	There were no environmental considerations of any kind in this street.	Environmental characteristics, just as in the case of the previous street is poor	Shadings exist only near the restaurant. However, pedestrians use the sidewalks irrespective of whether there is a shade or not. Shaded spaces are near gate 2.	Tall buildings provide shade There is a lack of greenery
Economic	The street is also a perfect economic destination for the users and caters to the essential needs of its users.	the respondents are satisfied with the facilities the street provides	The street is an excellent spot for economic factors, both during daytime and night-time.	Variety of retail, and recreational services available.
Functional	One such issue is traffic and congestion affecting usability and walkability. This includes difficulty crossing roads and difficulty driving. Yet another problem with the functionality of the street is safety. Privacy	These issues need to be taken care of. Significant issues include high traffic, overcrowding, narrow sidewalks, illegal parking, availability of potholes and smaller streets	People are crossing the roads even without a pedestrian crossing. This leads to safety concerns. The street required additional pedestrian crossing and proper street design. Sidewalks are narrow, causing pedestrians to walk on roads, and causing a commotion.	Crossing without signals causes a safety concern.

	concerns from people staring from cars are raised. The overcrowding of users and vehicles in the street can be a reason for these issues.			
Urban Qualities of Street	**xxx**	**xxx**	The street offers good transparency, as users can see through the shops' glass facades and pocket roads. It is a highly complex street with multiple activities taking place at the same time and dense. It offers great imageability and places to remember, gather and interact. Human scale is achieved to an extent by taking into consideration the height of the buildings and road width. But the sidewalks remain unproportionate.	The street provides imageability as there is the availability of names and signs, transparency as shops facades offer transparency, helping one navigate and identify themselves and complexity, because of the dense buildings, activities, population and traffic

Table: 4. 40: Comparative Analysis of 4 Methods

Source: Author

4.6.3 Evaluation of Street 3- Summary

Characteristics	**Method 1**	**Method 2**	**Method 3**	**Method 4**
Physical	There exists several limitations to this street and cannot be considered liveable due to certain issues, one of which is parking	The street satisfied the physical characteristics of liveability, the street is used by pedestrians and is walking friendly. It is clean and the signs are legible.	The street is accessible from adjacent streets for both pedestrians and vehicles.	The surfaces are unclean and uneven. Name boards are available. However, some of the name boards are old and dusty. One is unable to find parking as the paid park is mostly occupied. Heavily congested
Visual	**xxx**	**xxx**	The street offers a variety of façades and lighting (observed	Streets offer a wide variety of retail shops

			at night). The sidewalks are legible and proportionate.	
Social	It was also found that more people are found in the street during weekends. The street proves to have social factors within it, especially during the weekends	the respondents have not mentioned any spots or activities.	It is a street with social activities taking place, informal outdoor seating, gathering and crowding.	Several gathering nodes (informal and formal)
Environmental	The lack of green spaces and shadings proves that there is no consideration for environmental characteristics.	Environmental characteristics have not been considered	The street has some greenery near gate 2 and is shaded due to the height of the AMH residential complex on the façade of the street	Tall buildings provide shade There is a lack of greenery Economic: A variety of retail, and recreational services are available.
Economic	However, there are restaurants and few retail facilities, lack of proper parking and control over traffic affects the economic characteristics of this street.	Various economic facilities include retail, restaurants, recreational and services nearby.	There exists small grocery shops, cafes and restaurants needed to meet the needs of its residents.	A variety of retail, and recreational services are available.
Functional	In terms of walkability, the participants do not face any issues with the street. Moreover, it was good for walking for the residents of the street. However, there exists safety concerns in the street. This is found to be during the night when there are no streetlights. Moreover, traffic issues exist where traffic from the junction is found to cause congestion. The serious issue found in the street is the parking. This is also the case with customers who arrive on the street to dine in at the restaurant. This further causes congestion and affects the liveability in terms of physical factors and economic factors as businesses face issues due to the unavailability of parking.	Sidewalk safety is a critical issue here. Factors such as vehicles parking on the roadside, poor lighting, and no segregation between sidewalk and road remains serious issue affecting walkability and safety.	Users can cross the roads safely, but lacks proper segregation from the street to the sidewalks (requires ramp at intervals).	Crossing without signals causes a safety concern. This is an issue. The street does not satisfy the functionality.

Urban Qualities of Street	**xxx**	**xxx**	The street is not transparent and one cannot overlook what is on the parallel road. It is dense in terms of vehicles travelling the street but is not complex compared to the commercial street discussed above. The street doesn't have a significant imageability, it has a mix of residential, commercial, and religious (cemetery, mosque) buildings.	The Street provides imageability, transparency, and complexity. The various types of facilities fusing with the residential buildings, vehicles and pedestrians create complexity.

Table: 4. 41: Comparative Analysis of 4 Methods

Source: Author

4.6.4 Evaluation of Street 4- Summary

Characteristics	Method 1	Method 2	Method 3	Method 4
Physical	Physical characteristics: the street is accessible.	The physical characteristic of the street is first analysed. According to the survey responses, the street has parking facilities, but there exists a lot of traffic from vehicles. It is accessible from adjacent streets and is used by pedestrians. It is also found to be a street that is walking friendly. It is also legible in terms of signs. But the street has an issue with its cleanliness as garbage is found.	The street doesn't have segregation between sidewalks and roads. Lack of parking exists.	Informal family gathering of men during weekends.
Visual	**xxx**	**xxx**	The lighting is dull and the roads are not proportionate.	The street is well-lit with streetlights.

Social	Yes	To socialize, there exist some benches in the street.	Several social activities are found taking place in this street given the size of the street.	Gathering observed near furniture workshop and mosque.
Environmental	Greenery	Concerning environmental considerations, the street fails to meet such a criterion.		Greenery outside residential buildings.
Economic	It is analysed that due to the proximity of the street to an adjacent street with several businesses, the residents are satisfied with the economic factor. The street also has a cold store that is suitable.	There exist economic facilities nearby catering to the needs of the users.	Available nearby	There is a cold store, tailoring and a furniture workshop.
Functional	However, there exists a critical issue of users accessing the road from the wrong direction (in a one-way road). This affects the physical characteristics of a street as well as its functionality. In terms of cleanliness, it is good according to the interviews.	The sidewalks and crosswalks are safe, and users do not find any specific problem with the functionality. Hence it is found that the street meets the functional characteristic of liveability	The width of available space for walking is concerning. Vehicles being parked on either side is also a significant issue affecting the functioning of the street.	Paths are uneven. As one walks to the adjacent road, it becomes unsafe. Yes. However, it becomes difficult via vehicle, as it is a one-way road, which hinders travelling to the adjacent street directly.
Urban Qualities of Street	**xxx**	**xxx**	The street is very dense and complex with many houses arranged on a narrow street. It does not offer transparency and does not offer imageability.	The linkage to adjacent tertiary streets makes it complex. Mosque, Mattam nearby, Restaurants nearby makes it imageable.

Table: 4. 42: Comparative Analysis of 4 Methods

Source: Author

Chapter 5 | Data Analysis | Case Study 2 | Muharraq, Bahrain

5.1 Introduction

The second case study is Muharraq. The following table presents the 4 streets selected from Muharraq: 2 Commercial and 2 Residential Streets.

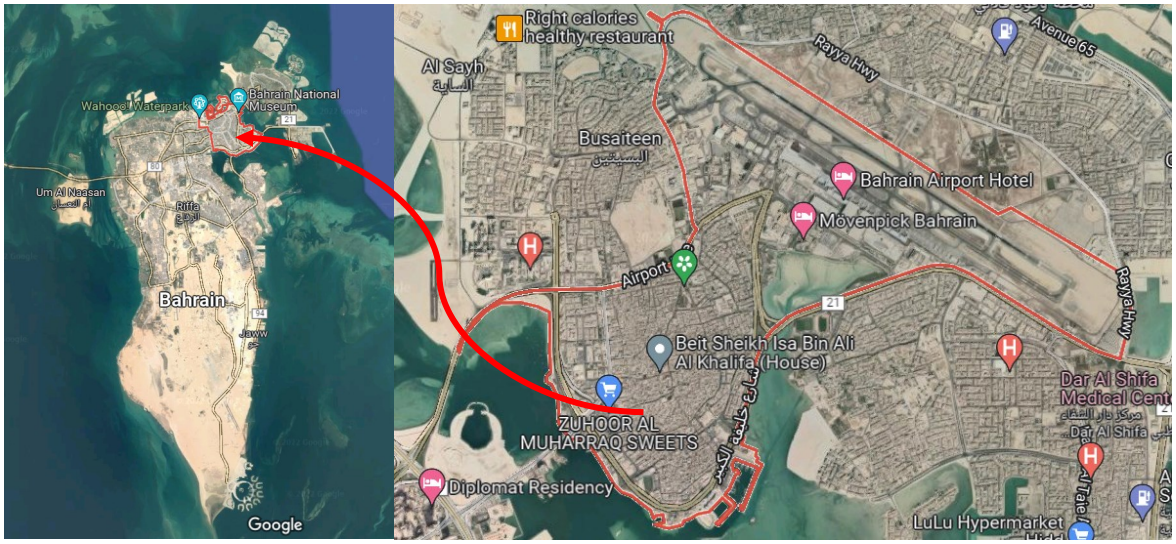


Fig. 5. 1: Muharraq, Bahrain

Source: Google Maps, 2022

Type	Street No.	Street Name	Length	Reason
Commercial Street	**Street 1**	AbdulRahman Al Fadhel Avenue	0.3km	A commercial road of Muharraq with well-designed streets and proper sidewalks
	Street 2	Road 1021	0.9km	Adjacent street with different retail amenities
Residential Street	**Street 3**	Road 611	0.28km	A tertiary street in old muharraq.
	Street 4	Road 615	0.26km	A congested, poorly maintained street.

Table 5. 1: Selected Streets

Source: Author

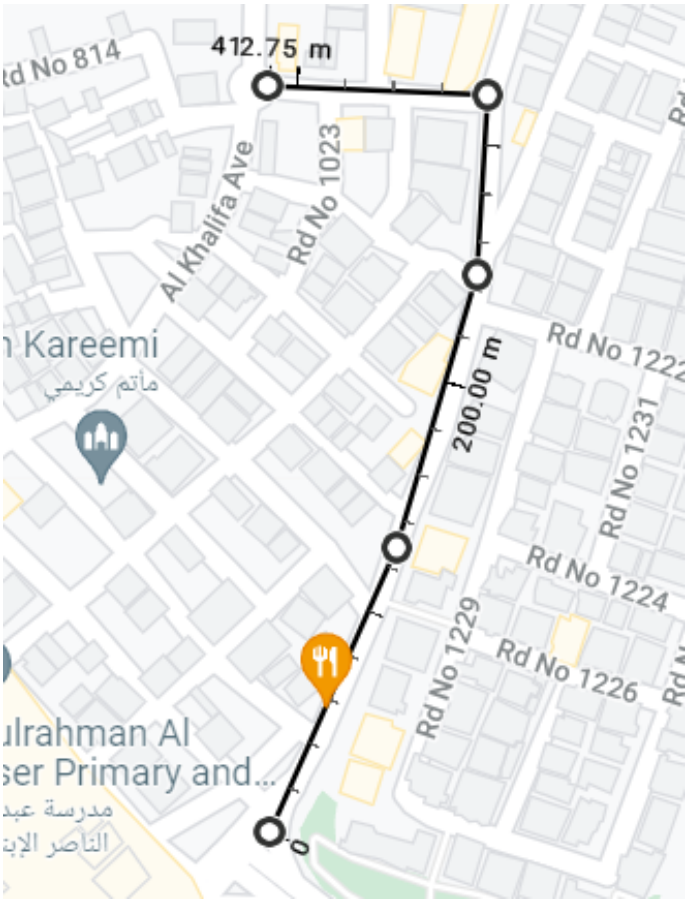


Fig. 5. 2 Google map screenshot of Muharraq Street 1&2 (Commercial)

Source: Google Maps, 2022



Fig. 5. 3 Muharraq Street 1 (left) and Street 2 (right).

Source: Author, 2022

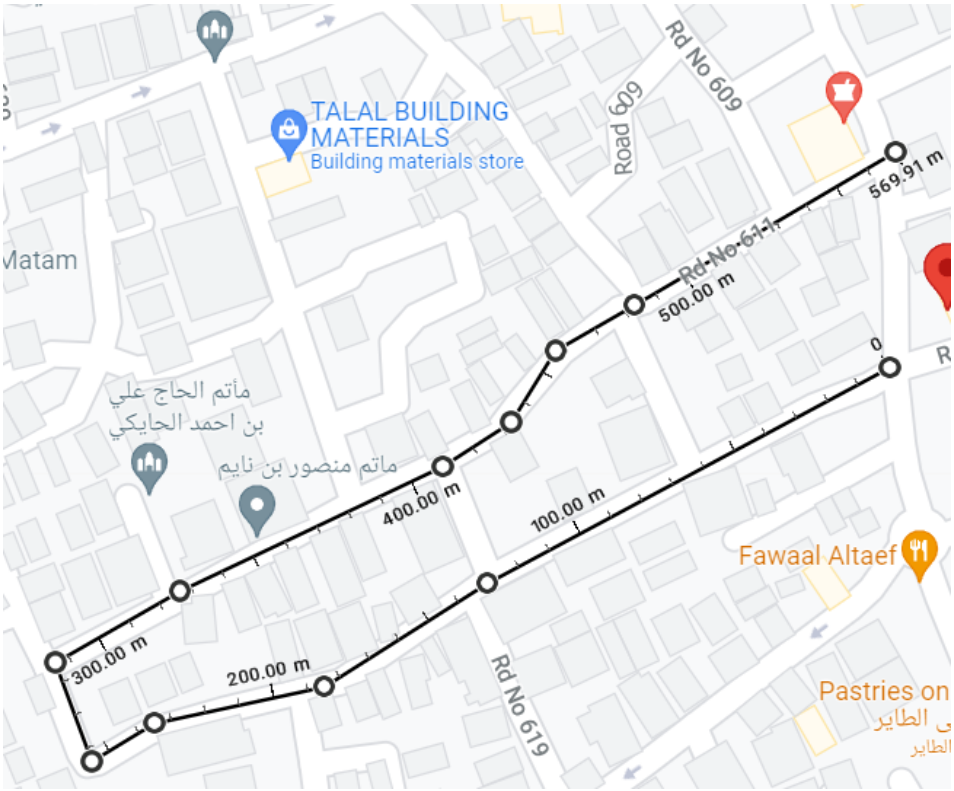


Fig. 5. 4 The Muharraq Street 3 & 4 (Residential) Marked by Author

Source: Google Maps, 2022



Fig. 5. 5: The Muharraq Street 3 (left) and Street 4 (right).

Source: Author, 2022

5.2 Method 1: Interviews

5.2.1 Muharraq Commercial Street 1

5 random users of the street were interviewed using a structured questionnaire. The different aspects of liveability assessed are physical, economic, environmental, functional, social and urban qualities. They were conducted on 22nd September 2021, from 10:30-11:30 am.

Data Analysis:

6. Physical

a. Accessibility

The general question: "Do you find the street is accessible from adjacent streets, i.e., is it easy to access?

Following are the responses:

Respondents	Reponses
1	"Yes."
2	"Yes"
3	"It is very easy"
4	"Yes"
5	"Yes. It is very easy to reach this road from highway."

Table 5. 2: Interview Responses

Source: Author

Conclusion: The street is accessible from the adjacent streets.

b. Cleanliness

The general question: "Do you find the street clean?"

Following are the responses:

Respondents	Reponses
1	"Yes."
2	"Yes."
3	"Yes, it is clean"
4	"Yes, no problem"
5	"Yes."

Table 5. 3 Interview Responses

Source: Author

Conclusion: The street is clean.

7. Social

The general question: "Are there good seating facilities/ gathering spots in the street that you use? (shelters/canopies/benches)

Following are the responses:

Respondents	Reponses
1	"No."
2	"Outside the flats, we gather in the building, but not in the road"
3	"Not much"
4	"Just the shading from shops while walking"
5	"We usually gather in the vacant parking area."

Table 5. 4 Interview Responses

Source: Author

Conclusion: There aren't significant social gatherings taking place in the street. There is an informal gathering on the vacant ground. The trees/shops provide shading for standing or walking.

8. Economic

The general question: "Does the street cater to your different needs such retail/restaurants/recreation/services etc?
Following are the responses:

Respondents	Reponses
1	"Yes"
2	"Yes, everything is here"
3	"It is there"
4	"I work here from long time, and I walk to other shops also"
5	"There are good shops like boutique, and I walk to BR to get ice cream."

Table 5. 5 Interview Responses

Source: Author

Conclusion: The users are satisfied with the facilities in the street.

9. Environmental

The general question: Are there any considerations for the weather conditions? i.e., Shadings/Trees/Shelters to protect from the weather.
Following are the responses:

Respondents	Reponses
1	"Some trees. But no shade where I will stand."
2	"No, I think"
3	"I don't know about it" "Just some flowerpots are there outside"
4	"No"
5	"I don't think"

Table 5. 6 Interview Responses

Source: Author

Conclusion: Though there are some trees, it is found that there is no shading provided for them. In general, the users don't find any environmental considerations.

10.Functionality-

d. Usability

The general question: Do you travel by your car or walk in the street? Are there any problems you face in general in terms of usability of this street?

Following are the responses:

Respondents	Reponses
1	"I use it every day for work." "No"
2	"I walk here." "No"
3	"Every day I walk."
4	"Yes, by walking and car" "There are limited parking."
5	"Sometimes in the weekend, it's difficult to find parking."

Table 5. 7 Interview Responses

Source: Author

Conclusion: The street is accessed both by cars as well as on foot. It is noticed that parking is limited, and users face difficulty to find parking at the weekend.

e. Walkability & Safety

The general question: Is the street walking-friendly? Are the street and sidewalks safe to walk?

Following are the responses:

Respondents	Reponses
1	"I walk and come. There is some issue while walking as I feel unsafe when I'm alone at night. In the junction near my shop, there are men following me."
2	"I walk here. Not safe"
3	"Walk. Yes, compared to areas like gudaibiya where I know women have safety issue, it is very safe here."
4	"Yes"
5	"Yes"

Table 5. 8 Interview Responses

Source: Author

Conclusion: A mixed response is received. Safety issues exist in the street. Users walking alone feels unsafe at night due to incidents of men following near their workplace. It is found to affect some users.

5.2.1.1 Interim Conclusion on Street 1 | Muharraq Commercial based on Interviews Collected:

1. **Physical- Accessibility-** The street is accessible from the adjacent streets.

   Physical- Cleanliness- The street is clean.
2. **Social:** There is an informal gathering on the vacant ground. Shading is available for standing or walking.
3. **Economic**: The users are satisfied with the facilities in the street.
4. **Environmental:** The users don't find any environmental considerations.
5. **Functionality: Usability:** The street is accessed both by cars as well as on foot. Parking is an issue, especially at the weekend,
6. **Functionality: Walkability & Safety**: Safety issues exist in the street. Users walking alone feels unsafe at night as men are reported to follow them.

5.1.1.2 Conclusion on Liveability of Street 1

The street satisfied the physical characteristics of liveability. Though there are informal gatherings in the street, it does not many social activities going on. The street satisfied the economic characteristic of liveability. However, it does not satisfy the environmental and functional characteristics. There exist issues with parking and safety while walking.

5.2.2 Muharraq Commercial Street 2

5 random users of the street were interviewed using a semi-structured questionnaire. The interviews were conducted on. 22nd September 2021, from 11:30 am-1:00 pm. Various aspects of liveability that were assessed are Physical, Economic, Environmental, Functional, Social and Urban Qualities.

Data Analysis:

1. **Physical**
    a. **Accessibility**

The general question: "Do you find the street is accessible from adjacent streets, i.e., is it easy to access?

Following are the responses:

Respondents	Reponses
1	"Yes."
2	"Yes, we can access. The parking can be improved as this is a difficulty."
3	"Yes. But it's difficult to take a U-turn while driving to exit the street as it's always filled with cars."
4	"It is ok. There are no signs about such a street. When I searched for a parking, I saw this street."
5	"It is okay."

Table 5. 9 Interview Responses

Source: Author

Conclusion: Accessibility is limited, as there is no specific sign to locate the street and there is a difficulty to exit the street due to traffic. Parking is also a difficulty.

b. Cleanliness

The general question: "Do you find the street clean?"

Following are the responses:

Respondents	Reponses
1	"It is okay."
2	"Yes"
3	"I don't find it clean. It's bit untidy."
4	"Not much."
5	"No problem"

Table 5. 10 Interview Responses

Source: Author

Conclusion: A mixed response. The street is generally clean. However, two out of five responses indicate that there exists some untidiness.

2. Social

The general question: "Are there good Seating facilities/ gathering spots in the street that you would use? (Shelter/canopy/benches)

Following are the responses:

Respondents	Reponses
1	"Yes. We sit outside during work."
2	"Sometimes there is gathering"
3	"The restaurant has good outdoor spot, but I never used it."
4	"No."
5	"Chairs are there"

Table 5. 11 Interview Responses

Source: Author

Conclusion: The street has facilities to foster social activities; some sit outside the shops to socialize. The restaurant offers outdoor seating spaces.

3. Economic

The general question: "Does the street cater to your different needs such retail/restaurants/recreation/services etc?

Following are the responses:

Respondents	Reponses
1	"Yes, all facilities are near for us."
2	"It is there in this street, and some shops in the next street, we have everything here"
3	"I think the facilities are available in this region, but no gardens nearby."
4	"Yes."
5	"No, I don't think there are different shops or services here, there is no banks"

Table 5. 12 Interview Responses

Source: Author

Conclusion: Most users find that the street caters to all their needs.

4. Environmental

The general question: Are there any considerations for the weather conditions? i.e., Shadings/Trees/Shelters to protect from the weather.

Following are the responses:

Respondents	Reponses
1	"I don't think"
2	"Yes. Shading from building."
3	"No, there is no tree/ shading."
4	"No."
5	"No. but it is not very hot here compared to the main street."

Table 5. 13 Interview Responses

Source: Author

5. Functionality-

a. Usability

The general question: Do you travel by your car or walk in the street? Are there any problems you face in general in terms of usability of this street?

Following are the responses:

Respondents	Reponses
1	"My shop is here so I visit here every day."
2	"This is a problem, there is not enough parking here."
3	"I faced difficulty to find parking once when there was a event here."
4	"There are good parking in the morning. It is difficult to walk in the footpath, as it's occupied with other things, so we walk in road."
5	"I walk and use car, no problem"

Table 5. 14 Interview Responses

Source: Author

Conclusion: The street does not have proper parking facilities. It is difficult to walk on the sidewalk because of other things occupying the space.

b. Walkability & Safety

The general question: Is the street walking-friendly? Are the street and sidewalks safe to walk?
Following are the responses:

Respondents	Reponses
1	"Yes. No problem." "Yes. No safety problem."
2	"It is good. Before 5 years, there were more customers. Now its less."
3	"I think yes." "Yes."
4	"Yes. But less space as cars are parked." "But space is less, so we walked in the road."
5	"Not much for walking" "It is safe"

Table 5. 15 Interview Responses

Source: Author

Conclusion: There is less space to walk on the sidewalks. In general, there is no safety problem but there is a lack of space to walk, forcing one to walk on the road.

5.2.2.1 Interim Conclusion on Street 1 | Muharraq Commercial based on Interviews Collected

Physical- Accessibility- The accessibility is limited, as there is no specific sign to locate the street and there is difficult to exit the street due to traffic. Parking is also a difficulty.

Physical- Cleanliness- A mixed response is received. Two responses out of five indicate that there exists some untidiness.

Social: The street has facilities to foster social activities, some sit outside the shop to socialize. The restaurant offers outdoor seating spaces.

Economic: Most users find that the street caters to all their needs

Environmental: Shading from a building is highlighted by one. Moreover, the intensity of heat is found to be less compared to other streets.

Functionality: Usability: The street does not have proper parking facilities. It is difficult to walk on the sidewalk because of other things occupying the space.

Functionality: Walkability & Safety: There is less space to walk on the sidewalks. In general, there is no safety problem but there is a lack of space to walk, forcing one to walk on the road.

5.2.2.2 Conclusion on Liveability of Street 1

The street caters to the social and economic characteristics of liveability successfully. It satisfied the environmental characteristics to an extent.

There is a critical issue with accessibility and cleanliness, which affect the physical characteristics. In addition, usability and walkability are problematic. Though there is no safety concern highlighted, the street does not fulfil the functional characteristics.

5.2.3 Muharraq Residential Street 1

5 random users of the street were interviewed using a semi-structured questionnaire. The interviews were conducted on 22nd September from 2:00 pm-3:00 pm. Various aspects of liveability that were assessed are Physical, Economic, Environmental, Functional, Social and Urban Qualities.

Data Analysis:

1. **Physical**

   a. **Accessibility**

The general question: "Do you find the street is accessible from adjacent streets, i.e., is it easy to access?

Following are the responses:

Respondents	Reponses
1	"Yes, but traveling with car is a bit difficult as sometimes people park in the middle of the road or you should drive through narrow alleys"
2	"Yes, it is"
3	"Yes"
4	"Yes, multi entrance points exist"
5	"yes"

Table 5. 16 Interview Responses

Source: Author

Conclusion: The street is accessible for all the participants. But there is difficult to access their vehicles due to cars being parked in the middle of the road and due to the width of the road.

   a. **Cleanliness**

The general question: "Do you find the street clean?"

Following are the responses:

Respondents	Reponses
1	"Yes, daily early morning its maintained and cleaned"
2	"Yes, given the importance of the area its cleaned by both machine and people almost every day"

3	"No, due to huge number of shops even though cleaned, in the morning they tend to get dirty by night."
4	"In terms of cleanliness yes, it is, but not well maintained as many old, depilated buildings exist."
5	"yes"

Table 5. 17 Interview Responses

Source: Author

Conclusion: Overall, the street is observed to have regular cleaning in the morning. But it is dirty and required additional cleaning. There is also a problem with the not being well-maintained.

2. Social

The general question: "Are there good Seating facilities/ gathering spots in the street that you would use? (Shelter/canopy/benches)

Following are the responses:

Respondents	Reponses
1	"Yes, mostly shop benches"
2	"Not really, except for a few benches."
3	"No"
4	"There are limited seating which is always occupied by bachelors making it hard to use."
5	"No"

Table 5. 18 Interview Responses

Source: Author

Conclusion: There is the availability of benches in the street, but it is not used by the participants.

3. Economic

The general question: "Does the street cater to your different needs such retail/restaurants/recreation/services etc?

Following are the responses:

Respondents	Reponses
1	"Yes, it has almost everything"

2	"Yes, it mostly does but it lacks when coming to providing recreational activities."
3	"Yes, easy access to most facilities."
4	"No, only limited things are available."
5	"Yes"

Table 5. 19 Interview Responses

Source: Author

Conclusion: There are only limited facilities. There is a lack of recreational activities.

4. Environmental

The general question: Are there any considerations for the weather conditions? i.e., Shadings/Trees/Shelters to protect from the weather.

Following are the responses:

Respondents	Reponses
1	"No"
2	"No, no shading apart from shops can be spotted."
3	"No"
4	"Not really"
5	"No"

Table 5. 20 Interview Responses

Source: Author

Conclusion: There are no environmental considerations.

5. Functionality-

a. Usability

The general question: Do you travel by your car or walk in the street? Are there any problems you face in general in terms of usability of this street? Are there enough parking spaces?
Following are the responses:

Respondents	Reponses
1	"No, I have a hard time finding parking spots, most of the spots are held by people using pipes under the permission of the municipality." "Mostly parking. Parking spots and slight car accidents where people tried driving nearby my car and scratched it due to the narrow space for the car to pass by."

2	"Currently no, but there are plans by the govt to build new parking complexes so that should sort the issue" "Parking issues and wrong parking mainly which hinders the movement of cars leading to traffic during peak times"
3	"That varies with time, mostly yes except for evening peak times. Traffic congestion due to the number of shops in the area"
4	"No there is a shortage for parking especially in the inner roads. Lack of family-friendliness and limited parking opportunities."
5	"No" "no"

Table 5. 21 Interview Responses

Source: Author

Conclusion: It is difficult to find parking facilities. There is a lack of sufficient space for a car to pass by leading to accidents such as scratches on cars as well as people parking wrongly restricting the movement of cars. Lack of family-friendliness is another issue reported.

b. Walkability

The general question: Is the street walking-friendly?

Following are the responses:

Respondents	Reponses
1	"Yes"
2	"Not exactly, sufficient walkways exist but they tend to be blocked by cars parking on them due to lack of space"
3	"Yes"
4	"No, they are unsafe after dark, inner streets are especially not well lit and these areas are a haven for anti-social elements."
5	"Yes"

Table 5. 22: Interview Responses

Source: Author

Conclusion: Though sufficient walkways exist; it is blocked by parked cars. Safety concern exists as it is reported to be unsafe at night due to poor lighting, which leads to anti-social activities.

c. Safety

The general question: Are the street and sidewalks safe to walk?

Following are the responses:

Respondents	Reponses
1	"Yes"
2	"Yes, except for cars blocking the walkways that could lead to hazards, especially for kids"
3	"Yes, they are safe, but the number of pedestrian crossings could be increased"
4	"No, as mentioned earlier the unlit streets with men gathering make it uncomfortable and even incidents of verbal attacks or stares are common."
5	"Yes"

Table 5. 23: Interview Responses

Source: Author

Conclusion: Safety hazards from cars block the road and affect children. There is a need for additional pedestrian crossings. Those walking are affected by verbal attacks.

6. Suggestions to improve Liveability

The general question: Are the street and sidewalks safe to walk?

Following are the responses:

Respondents	Reponses
1	"I guess the street area needs space for cars to drive around safely and also the street needs traffic inspection, many people just leave their cars in the middle of the road which causes narrowing of roads to pass by."
2	"Better planning must be put into modernising the area, allowing new buildings to only be constructed if they provide their own parking within the building. Updating and modernisation of the public parks."
3	"Increasing pedestrian crossing, restricting car speeds"
4	"Creating new parks for recreational activities, more parking spots, demolishing depilated and unused buildings, improving lighting on inner streets."
5	"More space"

Table 5. 24: Interview Responses

Source: Author

Conclusion: The suggestions to improve the liveability of the street includes, widening the street, increasing traffic inspection, better planning for newer

buildings and the need to accommodate parking facilities within the building. There is also a need to improve the lighting of the street. Moreover, the need for recreational spaces such as a garden/park is highlighted.

5.2.3.1 Interim Conclusion on Street 3| Muharraq Residential Street 1 based on the Interviews

1. **Physical: Accessibility-** Vehicular access is difficult due to cars being parked in the middle of the road and due to the narrow width of the road.
   Physical: Cleanliness- It is dirty and requires additional cleaning. The street is not well-maintained.
2. **Social:** The benches are not used by the participants.
3. **Economic**: There are only limited facilities. There is a lack of recreational activities.
4. **Environmental:** There are no environmental considerations.
5. **Functionality: Usability-** Difficult to find parking facilities. There is insufficient space for a car to pass which leads to accidents. Vehicular scratches occur as a result of the user's parking wrongly restricting the vehicular movements. Lack of family-friendliness is another issue reported.
   Functionality: Walkability & Safety- Though sufficient walkways exist, they are blocked by parked cars. Safety concerns exist. It is reported that the street is unsafe at night due to poor lighting. This leads to anti-social activities. There are safety hazards from the cars. The roadblocks affect the children. There is a need for additional pedestrian crossings.

5.2.3.2 Conclusions on Liveability of Street 1

The street has both accessibilities as well as cleanliness issues. Thus, it does not fulfil the physical characteristics of the street's liveability. There are no social activities reported. Limited facilities are available only in terms of economic characteristics. Moreover, it does not satisfy the environmental characteristics. Several critical issues regarding usability, walkability and safety are reported. This needs serious consideration and needs to be resolved for the proper functioning of the street.

5.2.4 The Muharraq Residential Street 2

5 random users of the street were interviewed. The interviews were conducted on 22nd September from 3:00 pm to 4:00 pm. Interviews were semi-structured. Various aspects of liveability assessed are physical, economic, environmental, functional, social and urban qualities.

Data Analysis:

1. **Physical**
    a. **Accessibility**

The general question: "Do you find the street is accessible from adjacent streets, i.e., is it easy to access?

Following are the responses:

Respondents	Reponses
1	"Yes"
2	"Yes, but could be difficult using a car"
3	"Yes"
4	"Yes"
5	"Yes"

Table 5. 25: Interview Responses

Source: Author

Conclusion: The street is accessible from the adjacent streets. However, there is a difficulty for those accessing through vehicles.

b. Cleanliness

The general question: "Do you find the street clean?"

Following are the responses:

Respondents	Reponses
1	"Yes"
2	"Yes"
3	"Yes"
4	"Yes"
5	"It is."

Table 5. 26: Interview Responses

Source: Author

Conclusion: All participants agreed that the street is clean.

6. Social

The general question: "Are there good Seating facilities/ gathering spots in the street that you would use? (Shelter/canopy/benches)

Following are the responses:

Respondents	Reponses
1	"No"
2	"No"
3	"No"
4	"No seats"
5	"There are informal sitting."

Table 5. 27: Interview Responses

Source: Author

Conclusion: Although there are informal seatings. there are not many social activities taking place.

7. Economic

The general question: "Does the street cater to your different needs such retail/restaurants/recreation/services etc?

Following are the responses:

Respondents	Reponses
1	"Yes"
2	"Sufficient"
3	"Yes"
4	"There are malls, banks nearby. Customers from Qatar, Kuwait, Oman comes here."
5	"Yes"

Table 5. 28: Interview Responses

Source: Author

Conclusion: The street caters to all the needs of the users.

8. Environmental

The general question: Are there any considerations for the weather conditions? i.e., Shadings/Trees/Shelters to protect from the weather.

Following are the responses:

Respondents	Reponses
1	"No"
2	"No"
3	"No"
4	"No"
5	"Some shading are there."

Table 5. 29: Interview Responses

Source: Author

Conclusion: No environmental considerations exist except for some shading.

9. Functionality-

a. Usability

The general question: Do you travel by your car or walk in the street? Are there any problems you face in general in terms of usability of this street?

Following are the responses:

Respondents	Reponses
1	"Often crowded and no parking space"
2	"Illegal parking during peak times that causes traffic jams"
3	"No"
4	"No"
5	"Can't drive inside the street properly."

Table 5. 30: Interview Responses

Source: Author

Conclusion: Usability is restricted due to crowding in the street, lack of parking facilities, illegal parking and not being able to drive in the street properly. Traffic congestion also exists due to illegal parking.

b. Walkability

The general question: Is the street walking-friendly?
Following are the responses:

Respondents	Reponses
1	"Yes"
2	"Yes"
3	"Yes, I walk 2 times."
4	"No issues to walk"
5	"I find difficulty as I walk to the inner road."

Table 5. 31: Interview Responses

Source: Author

Conclusion: In general, the street is walking-friendly, but there is difficulty while walking to the inner road.

c. Safety

The general question: Are the street and sidewalks safe to walk?
Following are the responses:

Respondents	Reponses
1	"Yes"
2	"Yes"
3	"It is safe, crossing is difficult"
4	Yes, no problem
5	Not very safe, there are cats.

Table 5. 32: Interview Responses

Source: Author

Conclusion: The street is safe. The crossing is difficult. There are street cats.

10.Suggestions to improve liveability

The general question: Are the street and sidewalks safe to walk?
Following are the responses:

Respondents	Reponses
1	"Should have more parking space and wider roads"
2	"Better monitoring of these wrong parking and awareness for shops in this regard"
3	"Only to cross."
4	"Good lighting so its more welcoming"
5	"Need safe walkway."

Table 5. 33: Interview Responses

Source: Author

Conclusion: Several crucial suggestions for improvement are put forward by the respondents. These are needed for wider roads, more parking spaces, strict rules to park correctly, better crossing facilities, better lighting and safety on the sidewalks.

5.2.4.1 Interim Conclusions on Street 1 | Muharraq Commercial based on Interviews:

a. **Physical: Accessibility-** The street is accessible from the adjacent streets. However, there are difficulties for those accessing through vehicles.
b. **Physical: Cleanliness-** All participants agreed that the street is clean.
c. **Social:** Although there is informal seating, there are many social activities taking place.
d. **Economic**: The street caters to all the needs of the users.
e. **Environmental:** No environmental considerations exist except for some shading.
f. **Functionality: Usability-** Usability is restricted due to crowding of the street, lack of parking facilities, illegal parking and not being able to drive in the street properly. Traffic congestion also exists due to illegal parking.

   Functionality: Walkability & Safety:

   In general, the street is walking-friendly, but there is difficulty while walking to the inner road. The street is safe, except for the difficulties in crossing the street. There are also street cats.

5.2.4.2 Conclusion on Liveability of Street 1

The street is accessible to pedestrians. However, vehicular access is difficult. Thus, it is not accessible. The street is clean. The economic characteristics are satisfied.

The environmental characteristic is not considered. However, some shading is available. There exist many issues reported in terms of usability, walkability and safety in this street.

The street satisfied only the economic characteristic of liveability. Therefore, the street needs to achieve all the other characteristics to achieve liveability.

5.3 Method 2: Online Questionnaire

The second method is an online questionnaire. Various aspects of liveability assessed are physical, economic, environmental, functional, social and urban qualities. Different indicators are used under each characteristic.

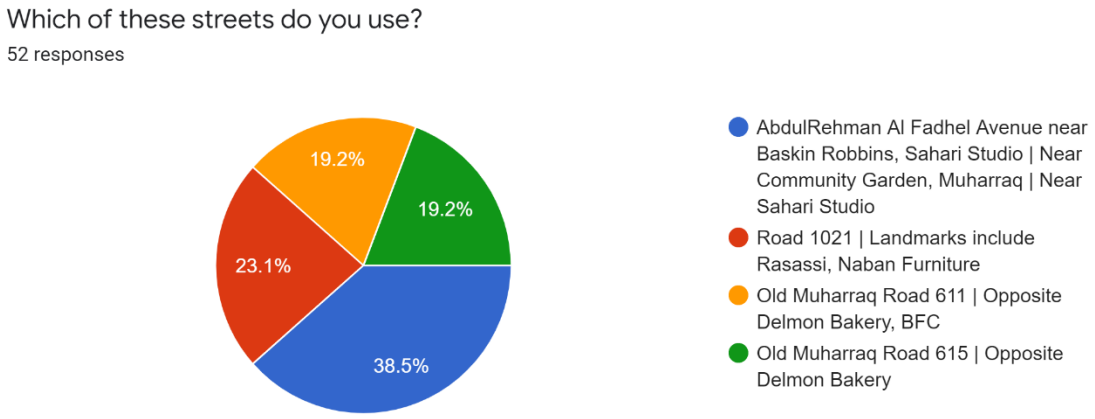


Fig. 5. 6 Screenshots from Survey

Source: Author, 2022

Response	Percentage
Abdul Rehman Al Fadhel Avenue near Baskin Robbins, Sahari Studio | NearCommunity Garden, Muharraq | NearSahari Studio	38.5%
Road 1021 | Landmarks includeRasassi, Naban Furniture	23.1%
Old Muharraq Road 611 | OppositeDelmon Bakery, BFC	19.2%
Old Muharraq Road 615 | OppositeDelmon Bakery	19.2%

Table 5. 34: Frequency of visiting the streets

Source: Author

5.3.1 Muharraq Commercial Street 1 – Abdul Rehman Al Fadhel Avenue

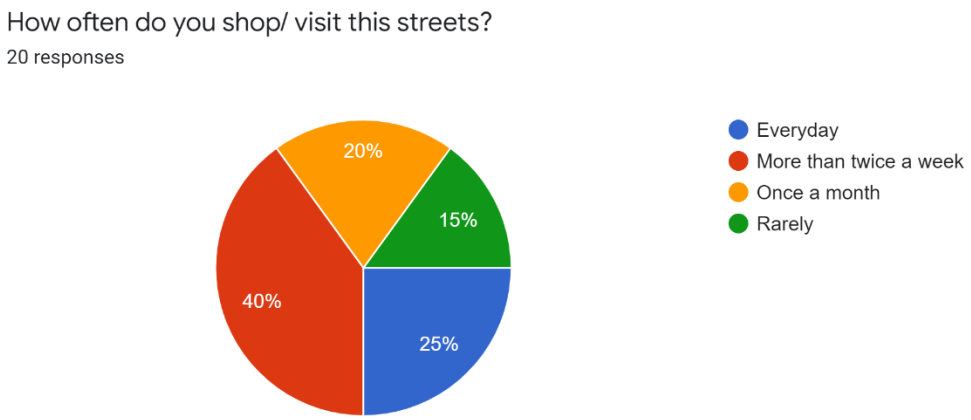


Fig. 5. 7 Survey responses – street 1

Source: Author, 2022

It is found that 40% of the participants used the street more than twice a week, only 25% of them used the street on an everyday basis and 15% of them used the street rarely and 20% used the street once a month.

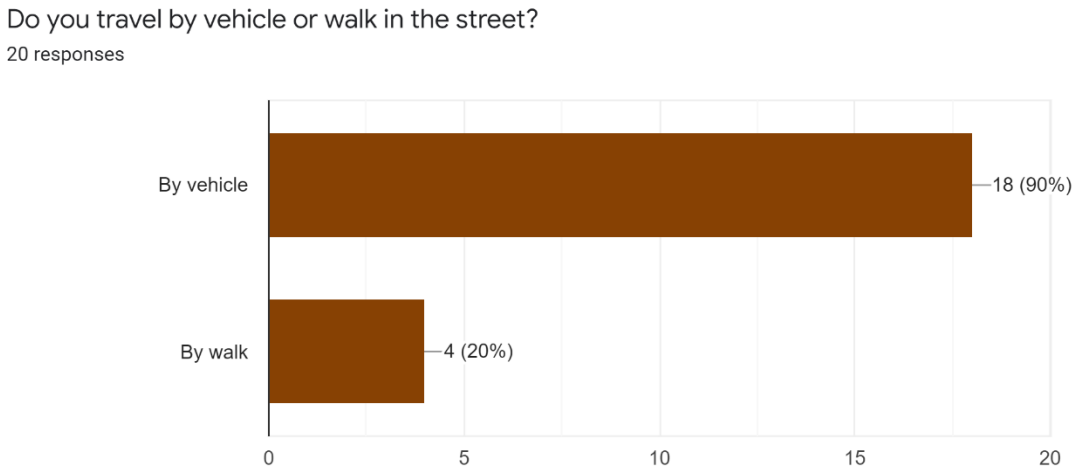


Fig. 5. 8 Survey responses – street 1

Source: Author, 2022

90% of the participants commute by vehicle.

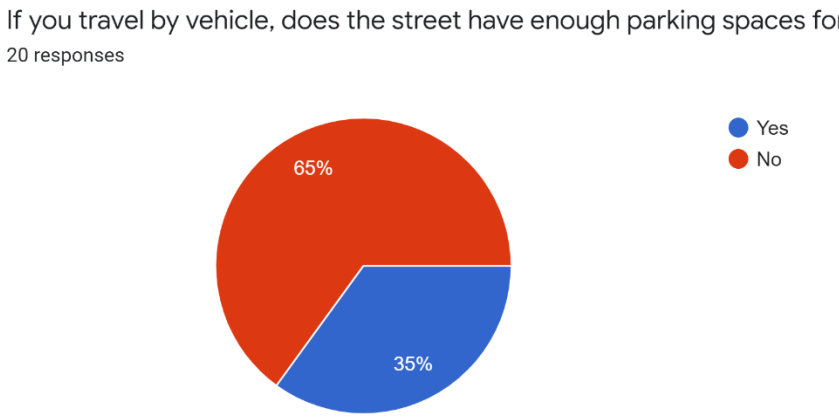


Fig. 5. 9 Survey responses – street 1

Source: Author, 2022

65% of the participants found that the street has enough parking spaces.

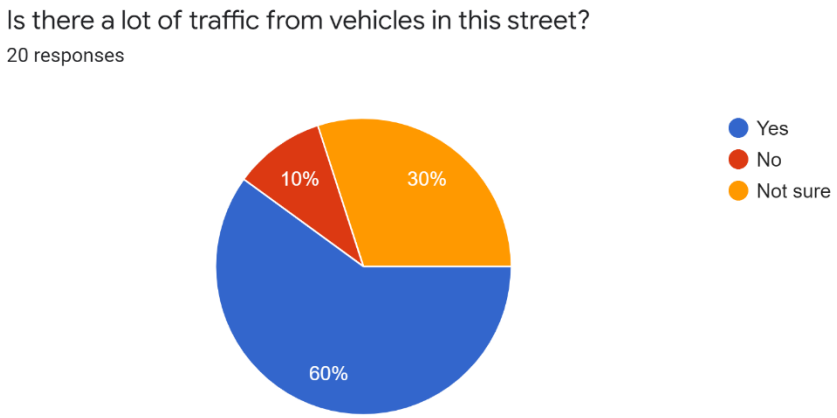


Fig. 5. 10 Survey responses – street 1

Source: Author, 2022

60% of the users said that there is a lot of traffic.

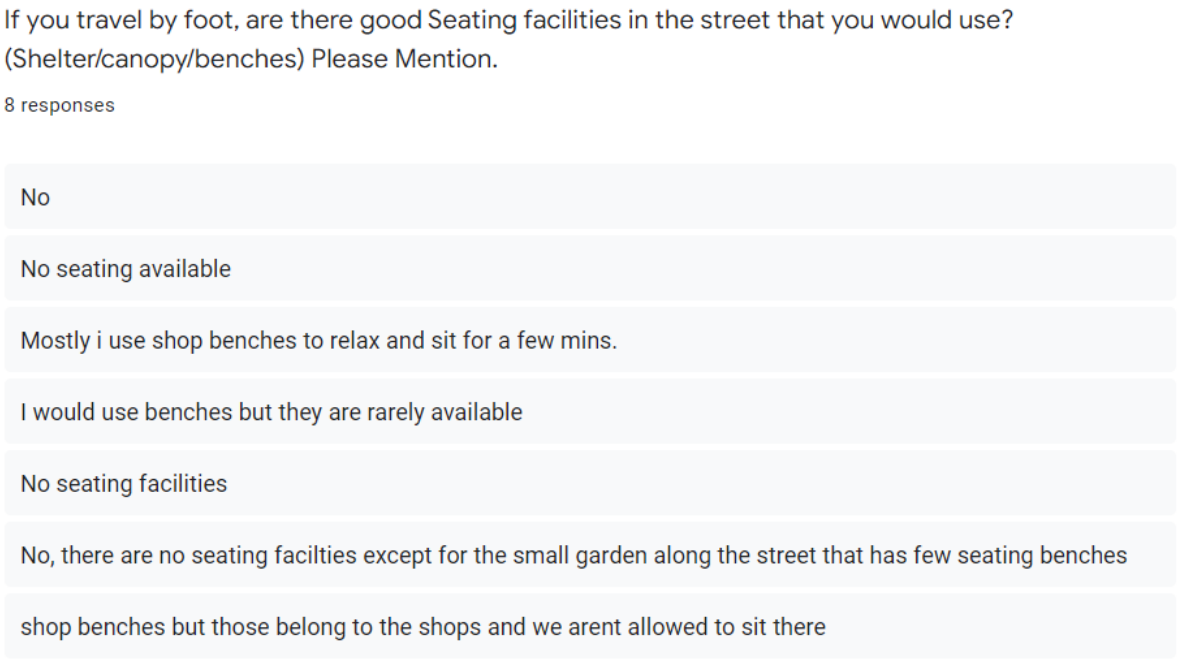


Fig. 5. 11 Survey responses – street 1

Source: Author, 2022

When asked about the seating facilities, one participant said that they use the shop benches to relax and sit for a few mins.

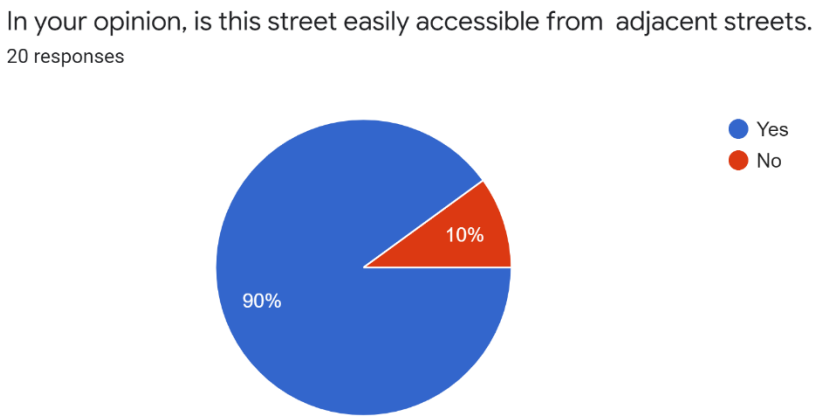


Fig. 5. 12 Survey responses – street 1

Source: Author, 2022

90% of the respondents agreed that the street is accessible from the adjacent streets.

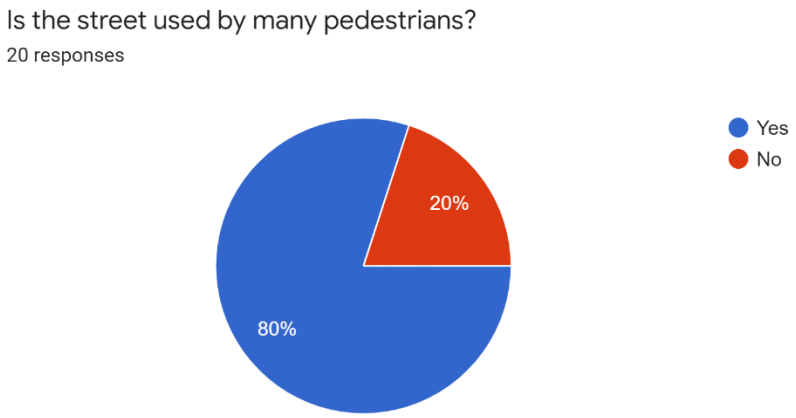


Fig. 5. 13 Survey responses – street 1

Source: Author, 2022

80% of the respondents said that the street is used by many pedestrians.

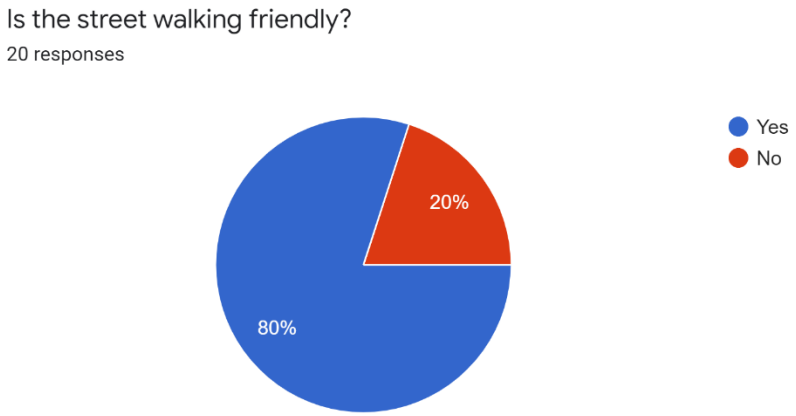


Fig. 5. 14 Survey responses – street 1

Source: Author, 2022

80% of the respondents agreed that the street is walking friendly.



Fig. 5. 15 Survey responses – street 1

Source: Author, 2022

When asked about some spots that the respondents found attractive for gathering, one participant answered the garden is a good spot, and another said that around the corners there is not much disturbance. Another said that there is a park where they spend their time and also a spot near Baskin Robbins where they enjoy their ice-creams from there itself.

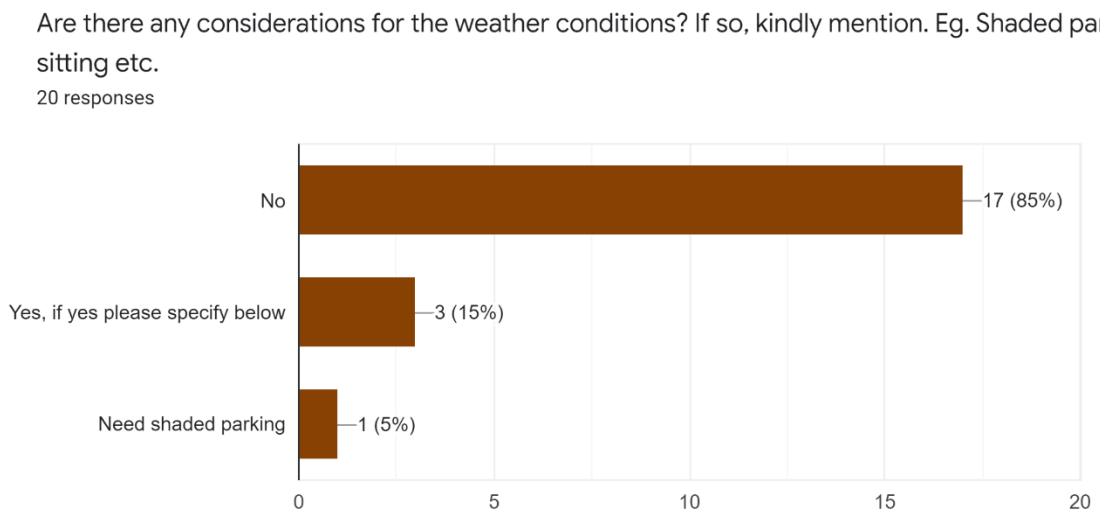


Fig. 5. 16 Survey responses – street 1

Source: Author, 2022

85% of the respondents reported that there are no considerations for the weather.

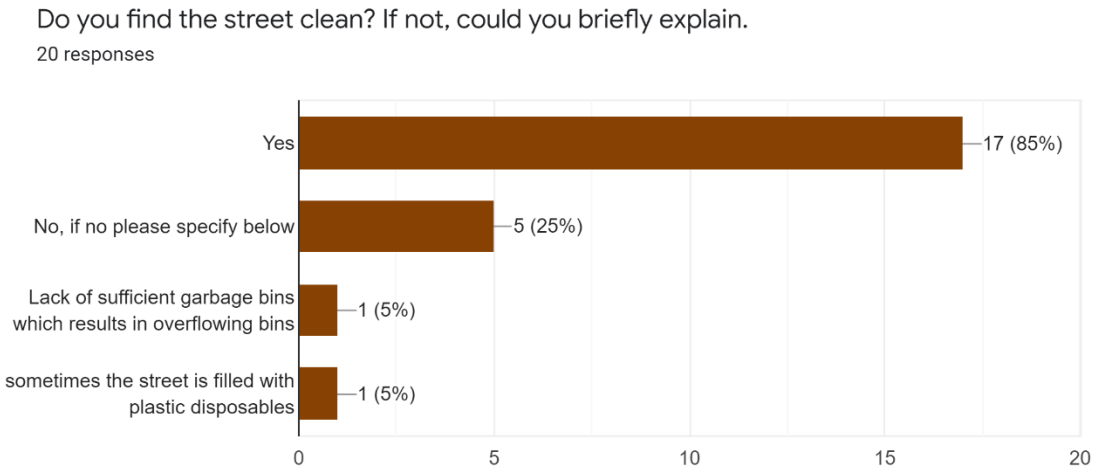


Fig. 5. 17 Survey responses – street 1

Source: Author, 2022

87.5% of the respondents found that the street is clean.

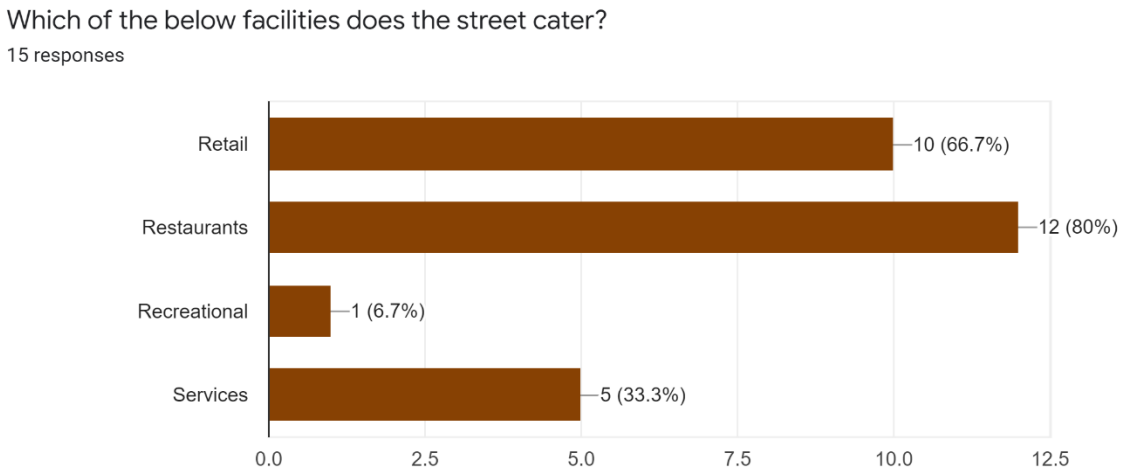


Fig. 5. 18 Survey responses – street 1

Source: Author, 2022

66.7% respondents selected retail, 80% selected restaurants, 6.7% selected recreational and 33.3% selected services.

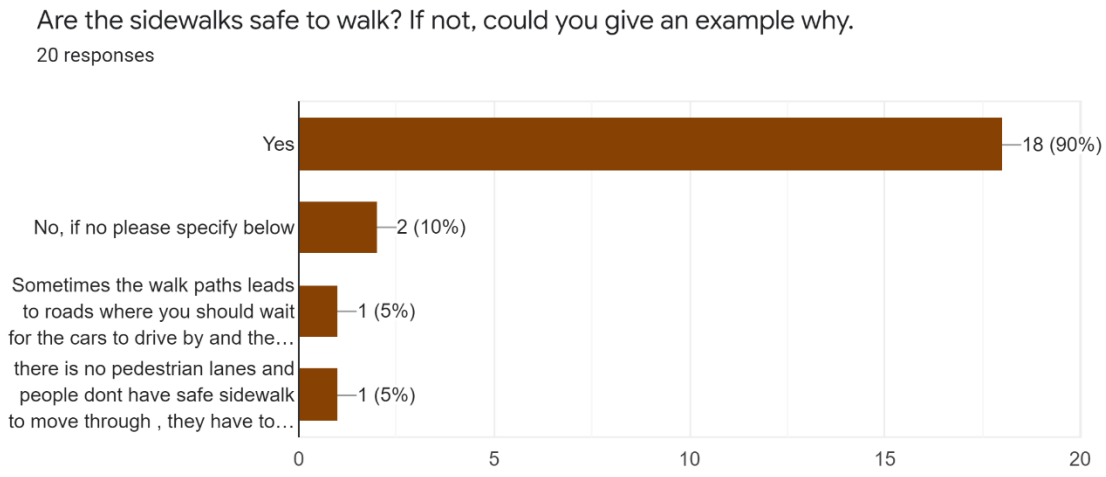


Fig. 5. 19 Survey responses – street 1

Source: Author, 2022

90% of the respondents reported that the sidewalks are safe.

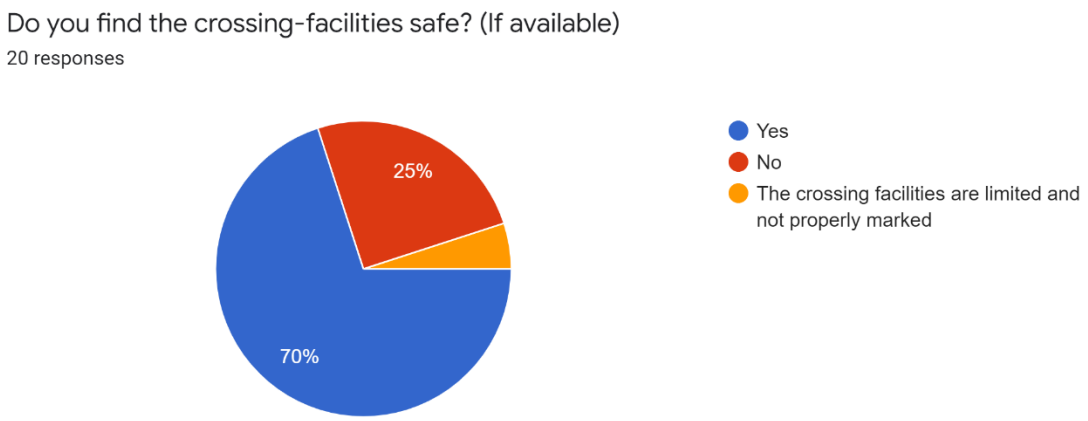


Fig. 5. 20 Survey responses – street 1

Source: Author, 2022

70% reported that the crossing facilities are safe.

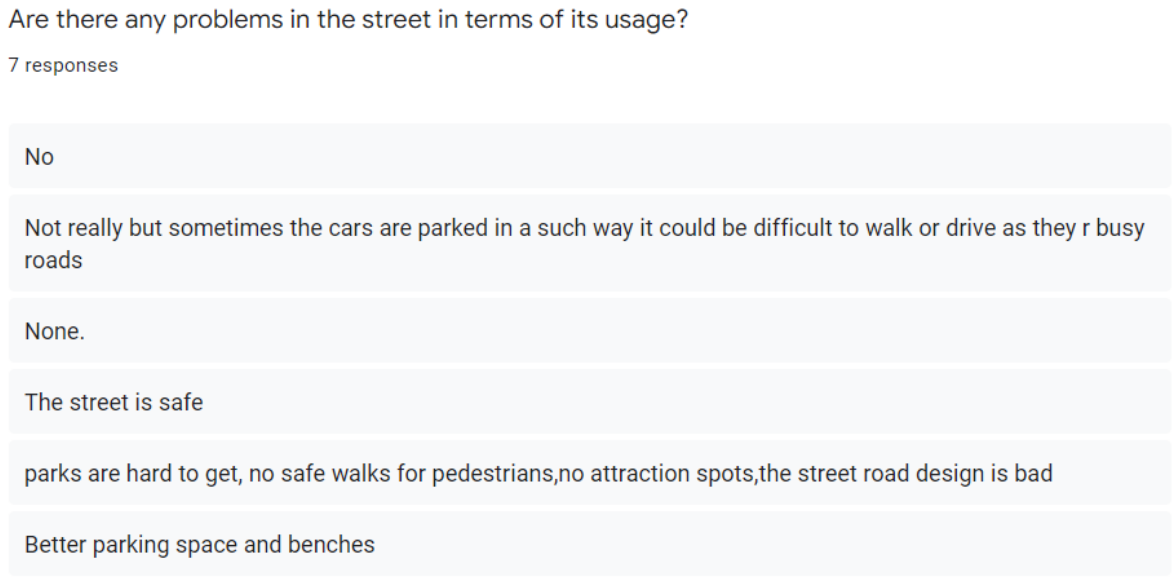


Fig. 5. 21 Survey responses – street 1

Source: Author, 2022

When asked about the problems in the street in terms of its usage, the participants didn't find any problems. However, one participant said that sometimes when cars are parked in a certain way, it is difficult to walk or drive as they are busy

roads. It is also reported that there are no safe walkways for pedestrians. There is also a lack of attractive spots and poor road design.



Fig. 5. 22 Survey responses – street 1

Source: Author, 2022

85% of the respondents reported that the signboards, road signs, names of shops etc are clear.

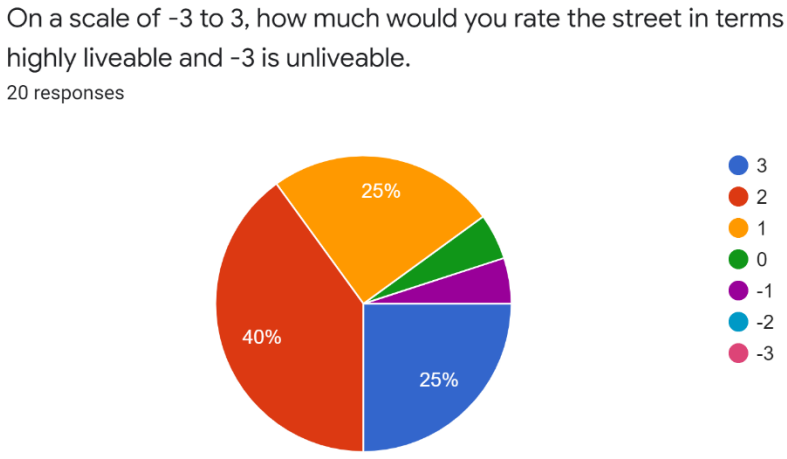


Fig. 5. 23 Survey responses – street 1

Source: Author, 2022

40% of the participants rated the street liveability at +2, 25% rated +3, and 25% rated +1.

5.3.1.1 Conclusions on Liveability of Street 1 | Muharraq Commercial Street 1 based on Surveys

Physical:

- It is accessible and clean.

Functional:

- The lack of proper parking is highlighted.
- The street is used by many pedestrians and is walkable.
- It is walking friendly.
- Streets, sidewalks and crossings are considered safe.

Social:

- There are few benches used to socialize, but no other social activities are reported.

Environmental:

- No environmental considerations.

Economic:

- It caters to economic needs but does not have recreational facilities.
- Most participants rated the liveability at +2

5.3.2 Muharraq Commercial Street 2

Road 1021-Rasassi, Naban Furniture

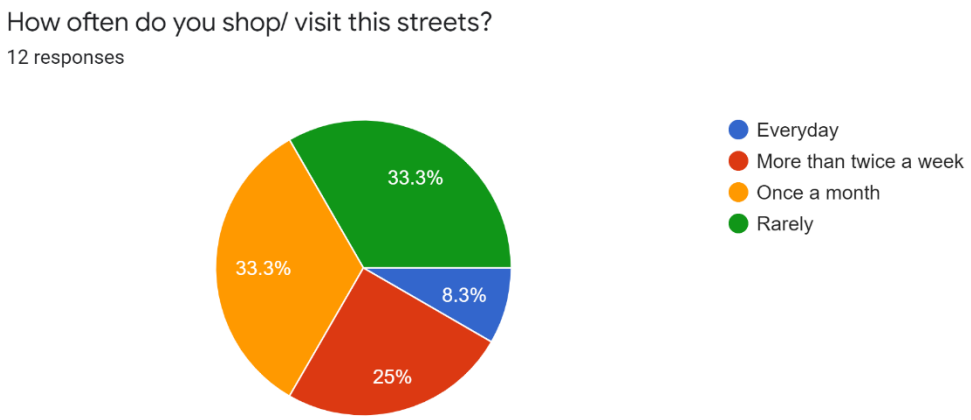


Fig. 5. 24 Survey responses – street 2

Source: Author, 2022

33.3% reported that they use the street rarely, 33.3% use the street once a month, 25% more than twice a week and 8.3% visit every day.

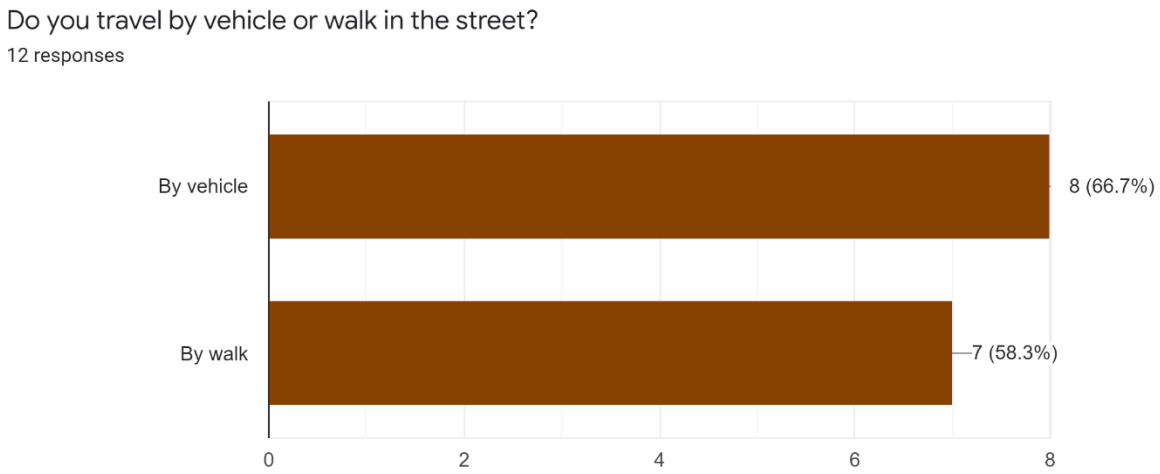


Fig. 5. 25 Survey responses – street 2

Source: Author, 2022

66.7% visit the street by vehicle.

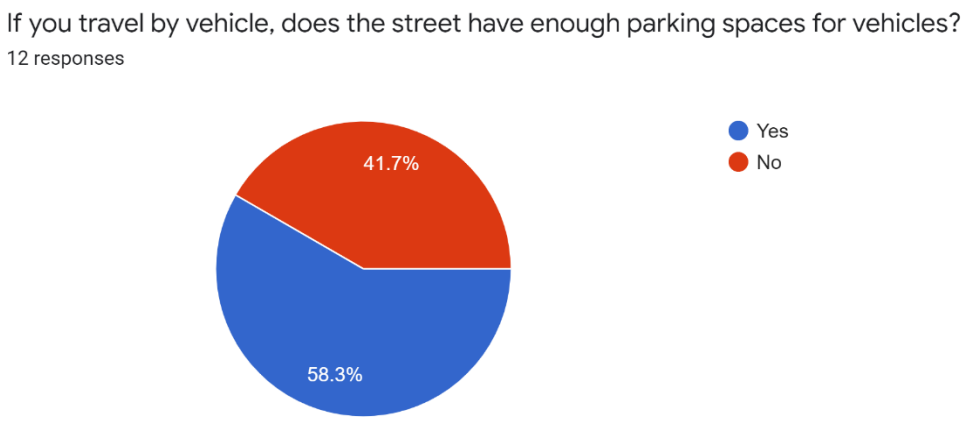


Fig. 5. 26 Survey responses – street 2

Source: Author, 2022

58.3% reported that the street has enough parking spaces for vehicles.

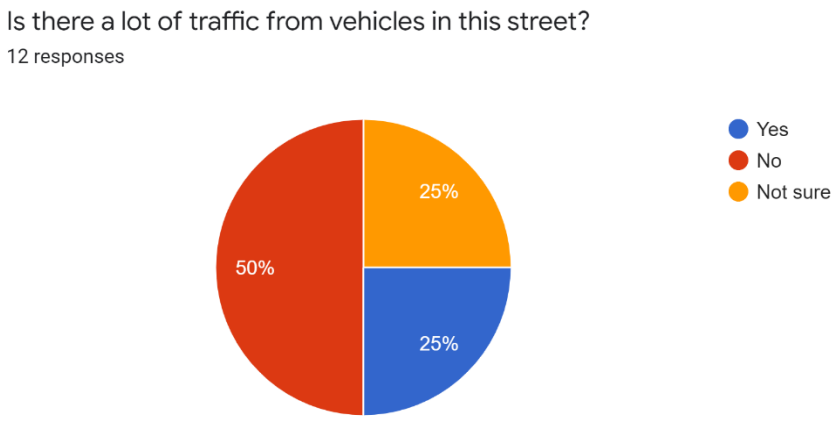


Fig. 5. 27 Survey responses – street 2

Source: Author, 2022

50% reported that there is no traffic on this street, while 35% reported there is a lot of traffic.

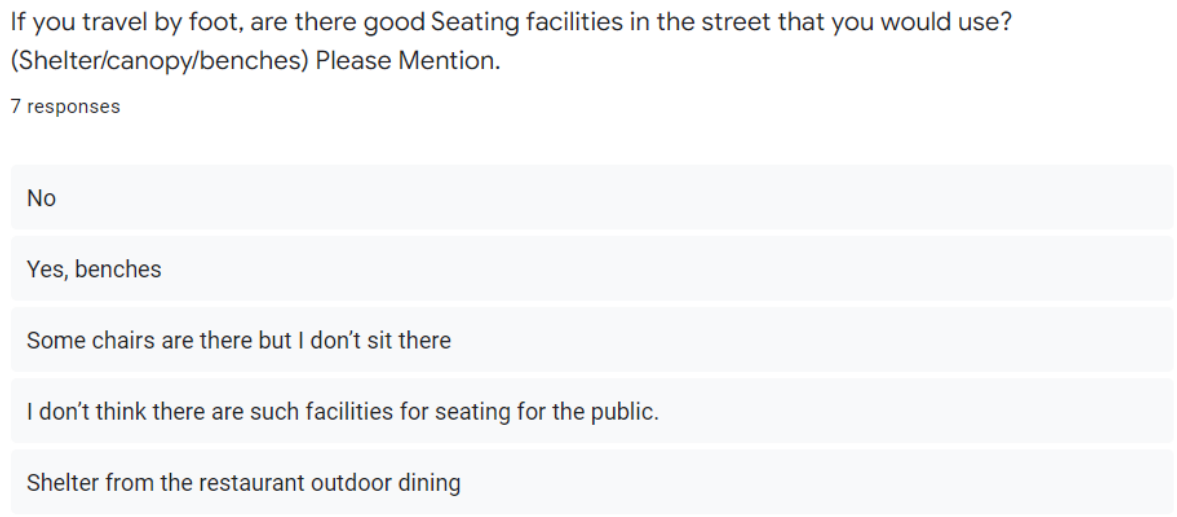


Fig. 5. 28 Survey responses – street 2

Source: Author, 2022

Some good seating facilities include benches, chairs, and outdoor dining.

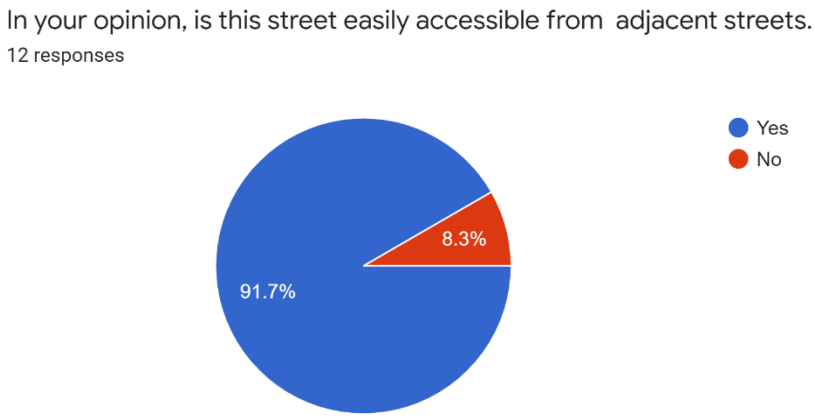


Fig. 5. 29: Survey responses – street 2

Source: Author, 2022

91.7% of the respondents reported that the street is easily accessible from the adjacent streets.

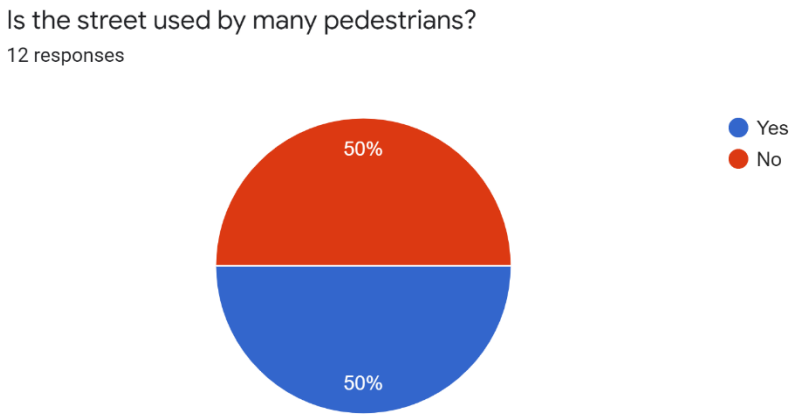


Fig. 5. 30: Survey responses – street 2

Source: Author, 2022

50% of the respondents reported that the street is used by the pedestrians and the other 50% reported that the street is not used by the pedestrians.

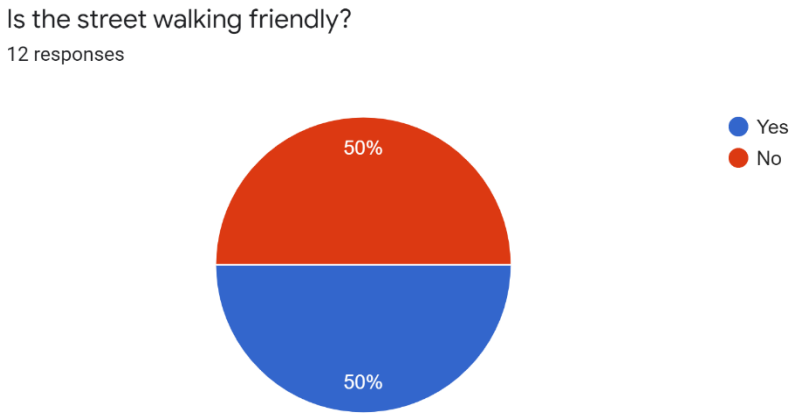


Fig. 5. 31: Survey responses – street 2

Source: Author, 2022

50% of the respondents reported that the street is walking-friendly and the other 50% reported that the street is not walking-friendly.



Fig. 5. 32: Survey responses – street 2

Source: Author, 2022

Some attractive spots for gathering are restaurants and the park.

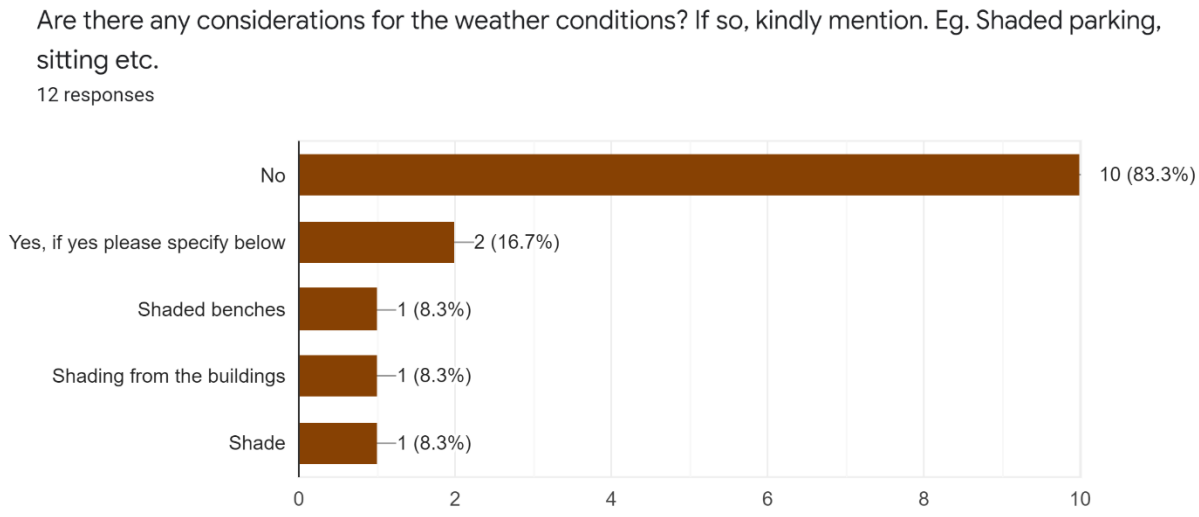


Fig. 5. 33: Survey responses – street 2

Source: Author, 2022

83.3% of the users reported that the street doesn't have any weather conditions.

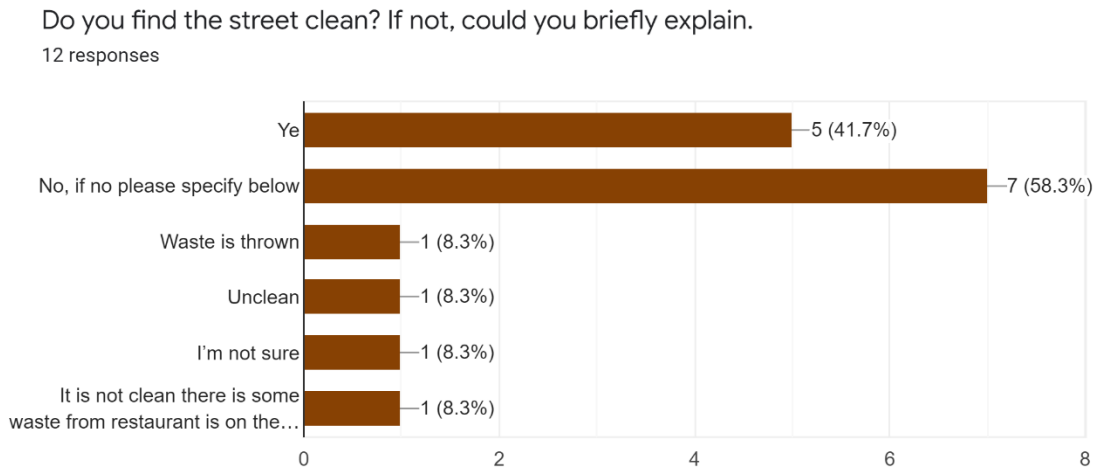


Fig. 5. 34: Survey responses – street 2

Source: Author, 2022

58.3% didn't find the street clean. Only 41.7% reported that the street is clean. Some issues reported are waste being thrown, unclean and waste outside the restaurant.

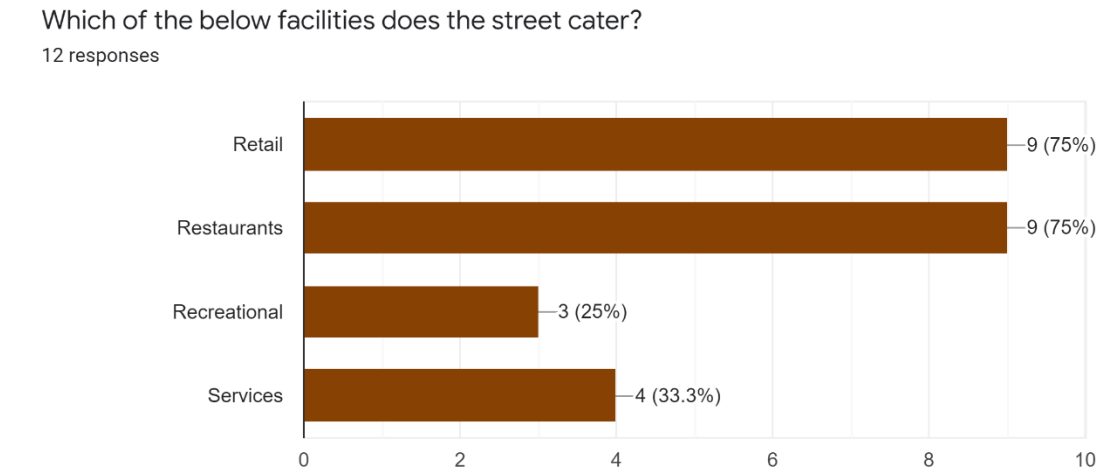


Fig. 5. 35: Survey responses – street 2

Source: Author, 2022

The facilities catered by the street are retail according to 75%, other 75% reported restaurants, 25% reported recreational and 33.3% opted for services.

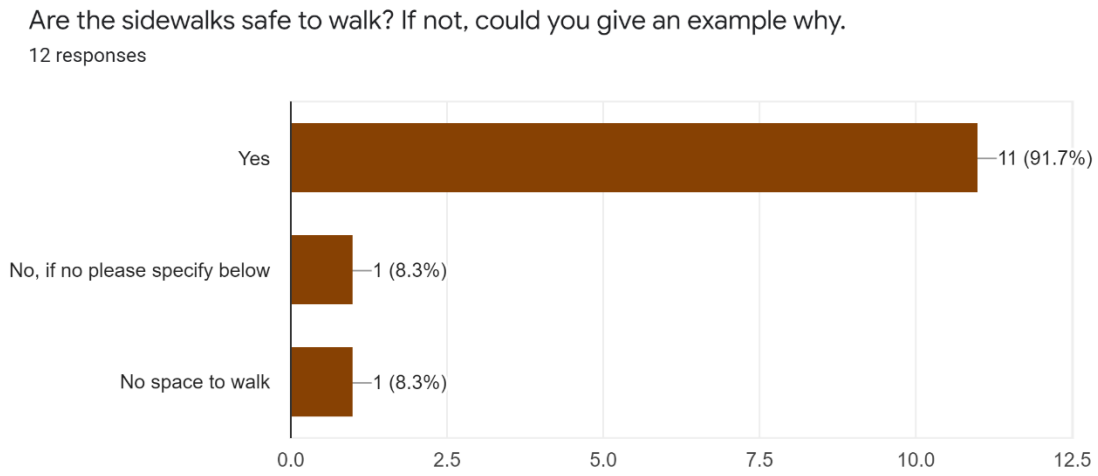


Fig. 5. 36: Survey responses – street 2

Source: Author, 2022

91.7% reported that sidewalks are safe to walk.

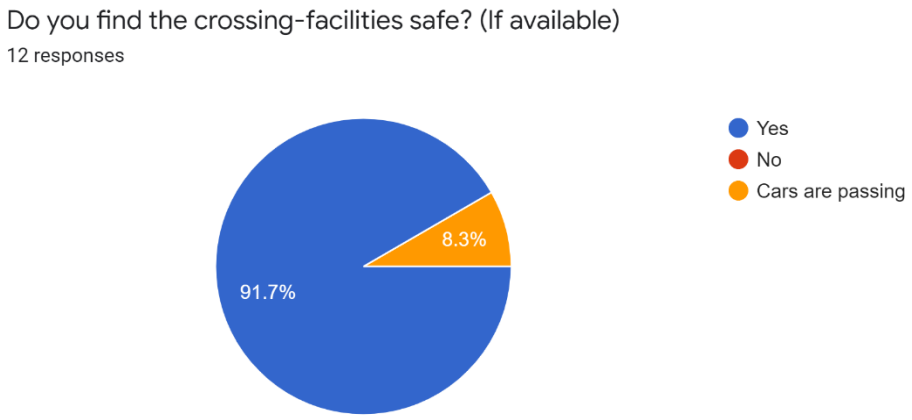


Fig. 5. 37: Survey responses – street 2

Source: Author, 2022

91.7% of the respondents reported that the crossing facilities are safe.



Fig. 5. 38: Survey responses – street 2

Source: Author, 2022

The signboards, road signs, names of shops etc are clear to all. (100%)

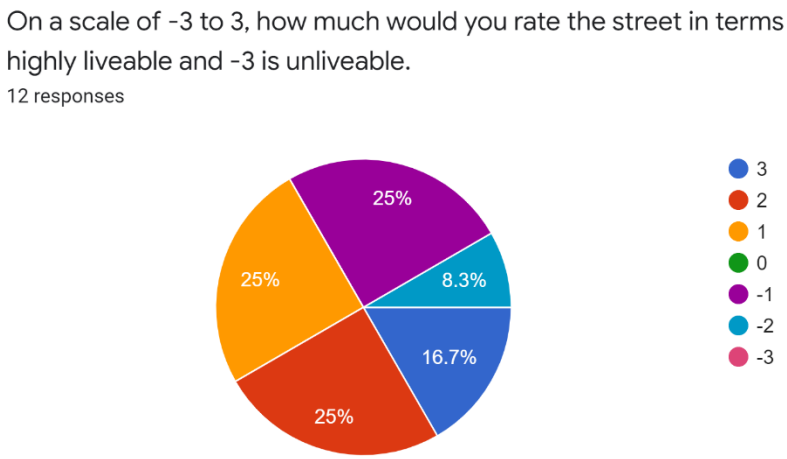


Fig. 5. 39: Survey responses – street 2

Source: Author, 2022

25% of the respondents rated the street liveability +1, 25% rated +2 and only 16.7% rated +3. 25% rated -1 and 8.3% rated -2.

5.3.2.1 Conclusions on Liveability of Street 2 | Muharraq Commercial Street 2 based on Surveys

Physical:

- It is accessible
- Most respondents find it unclean
- Hence, physical characteristics are not satisfied.

Functional:

- Not walking-friendly
- Sidewalks are safe.
- Crossing facilities are safe.
- It is not functional, as there are issues with usability highlighted, such as tight space.

Social:

- Some facilities are provided to foster social activities, but social activities are not reported.
- Hence, social characteristics are not satisfied.

Environmental:

- No considerations for the environment.

Economic:

- It caters to the economic needs
- Economic characteristics are fulfilled.

25% of the respondents rated the street liveability +1, 25% rated +2 and only 16.7% rated +3. 25% rated -1 and 8.3% rated -2. The street satisfies each characteristic to an extent, but there are drawbacks to each characteristic.

5.3.3 Muharraq Residential Street 1

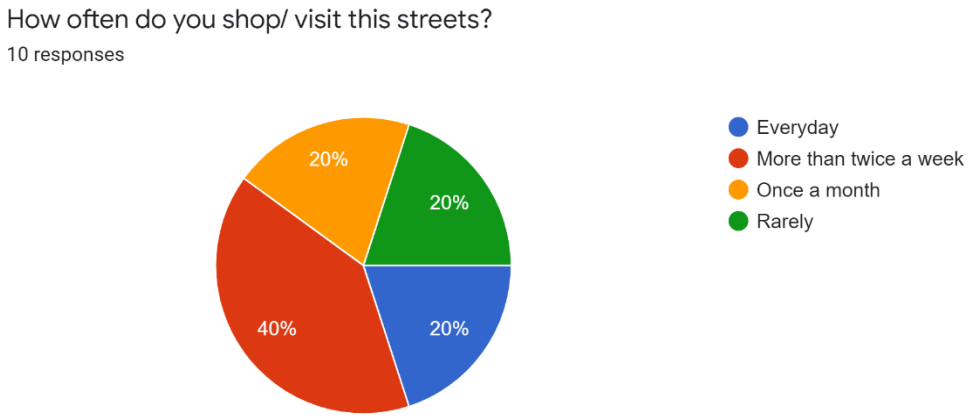


Fig. 5. 40 : Survey responses – street 3

Source: Author, 2022

20% of the respondents use the street every day, 40% more than twice a week, 20% once a month and 20% rarely.



Fig. 5. 41 : Survey responses – street 3

Source: Author, 2022

70% of the respondents use the street by vehicle and 60% walk.

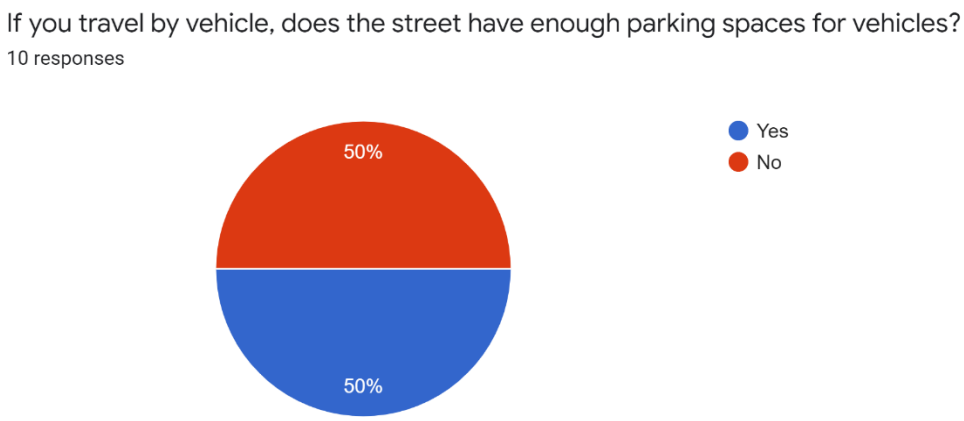


Fig. 5. 42 : Survey responses – street 3

Source: Author, 2022

50% find the street has enough parking space for vehicles and the other 50% didn't find enough parking spaces.

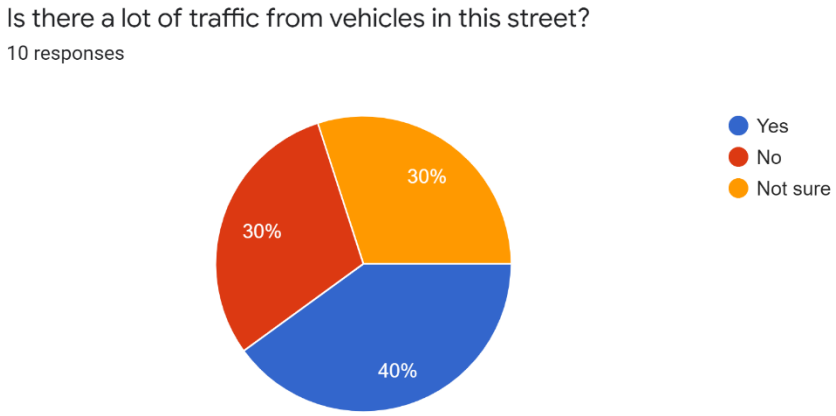


Fig. 5. 43 : Survey responses – street 3

Source: Author, 2022

40% of the respondents reported that there is a lot of traffic from vehicles, others didn't report that there is traffic.

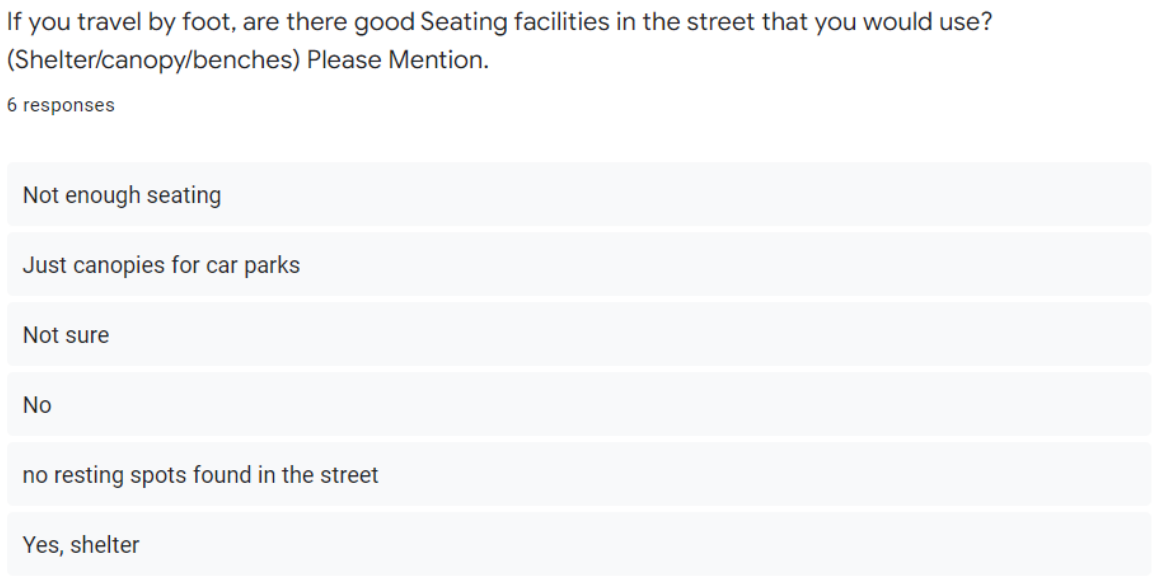


Fig. 5. 44 : Survey responses – street 3

Source: Author, 2022

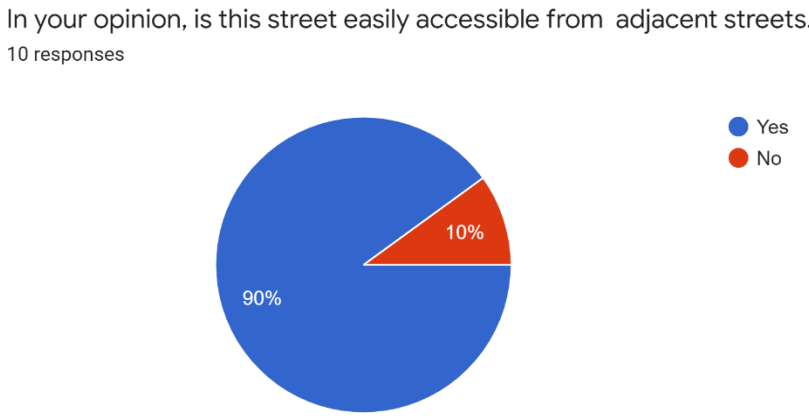


Fig. 5. 45 : Survey responses – street 3

Source: Author, 2022

90% of the respondents find that the street is easily accessible from the adjacent streets.

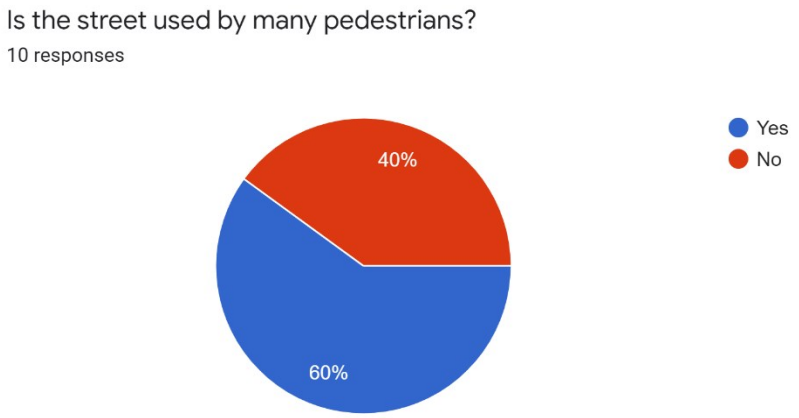


Fig. 5. 46 : Survey responses – street 3

Source: Author, 2022

60% of the respondents reported that the street is used by many pedestrians.

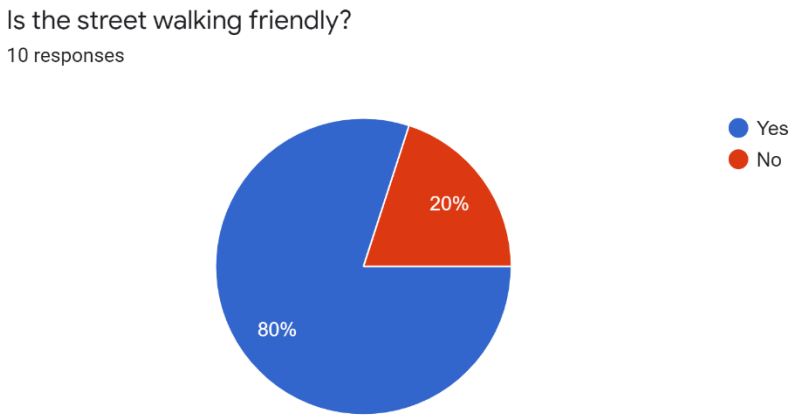


Fig. 5. 47 : Survey responses – street 3

Source: Author, 2022

80% of the respondents find the street is walking friendly.



Fig. 5. 48 : Survey responses – street 3

Source: Author, 2022

Spots attractive for gathering in this street are the park and the retail spaces.

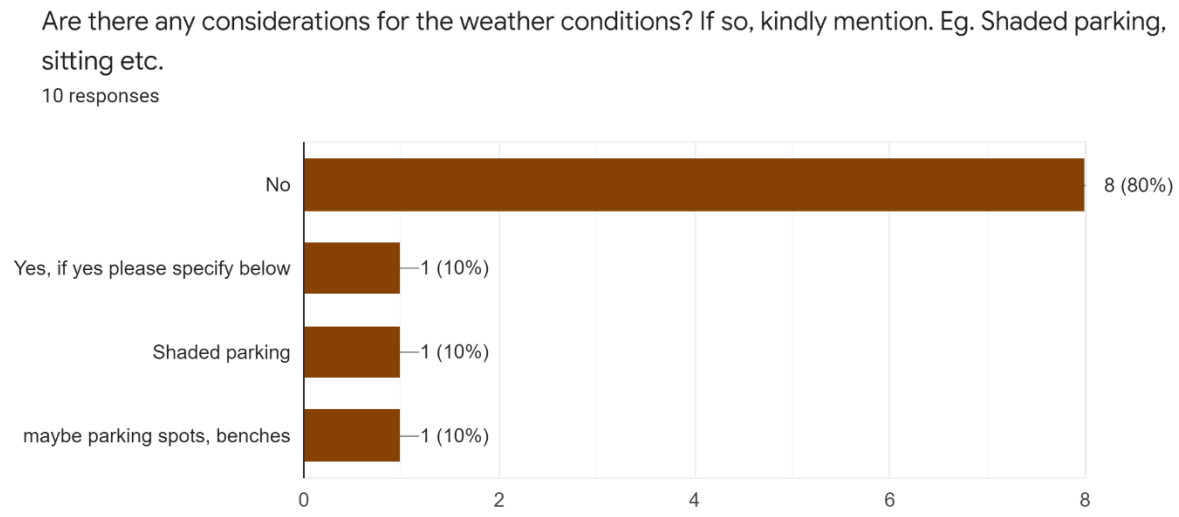


Fig. 5. 49 : Survey responses – street 3

Source: Author, 2022

80% of the respondents reported that the street does not have any consideration for the weather conditions.

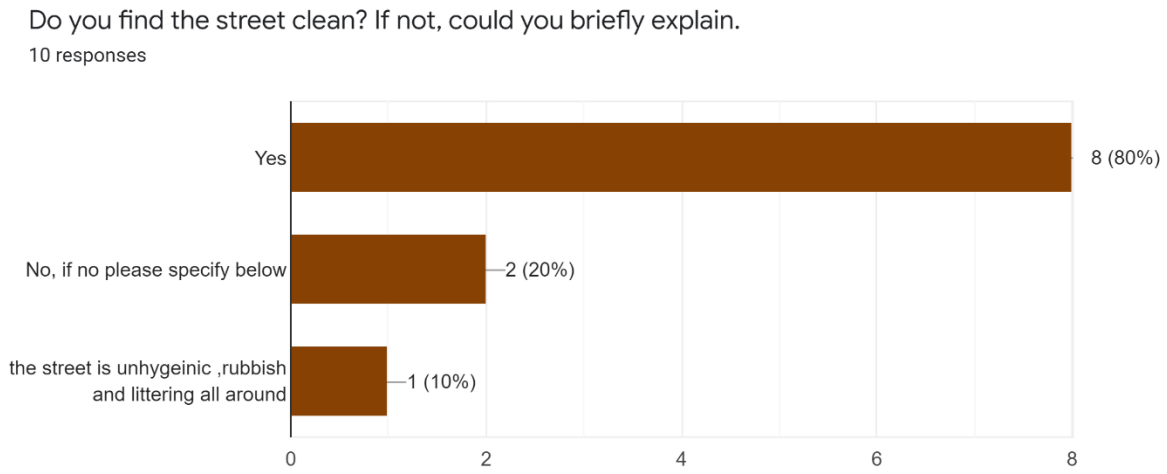


Fig. 5. 50 : Survey responses – street 3

Source: Author, 2022

80% of the respondents reported that the street is clean.

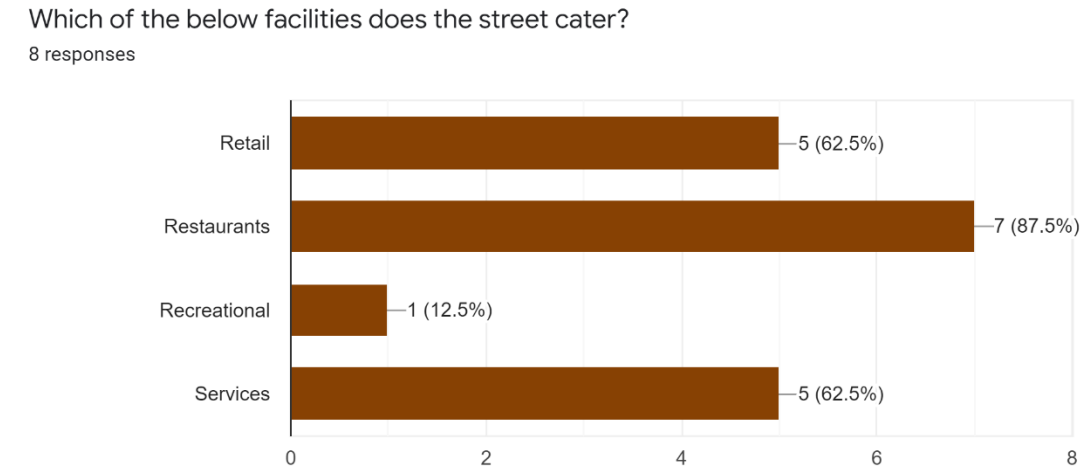


Fig. 5. 51 : Survey responses – street 3

Source: Author, 2022

87.5% of the respondents said that the street caters for retail, 87.5% chose restaurants, and 62.5% chose services.

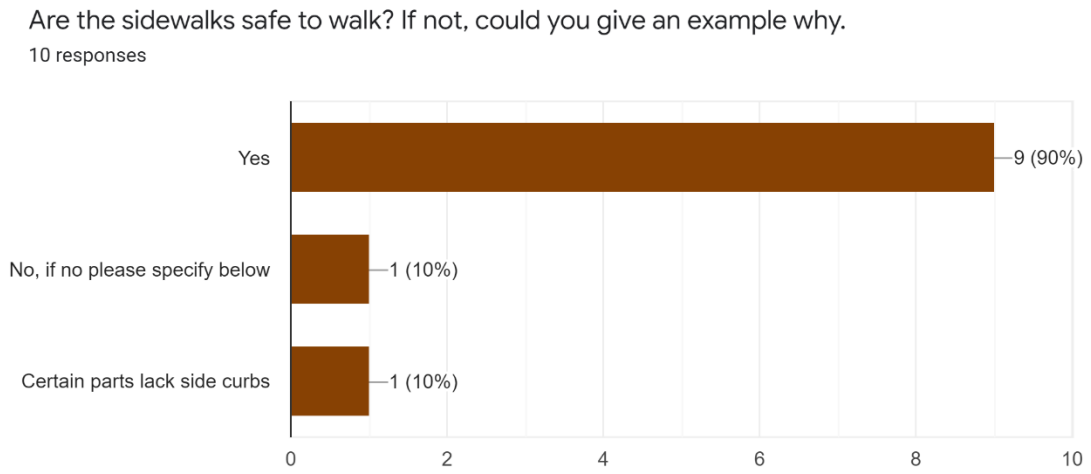


Fig. 5. 52 : Survey responses – street 3

Source: Author, 2022

90% of the respondents find the sidewalks to be safe.

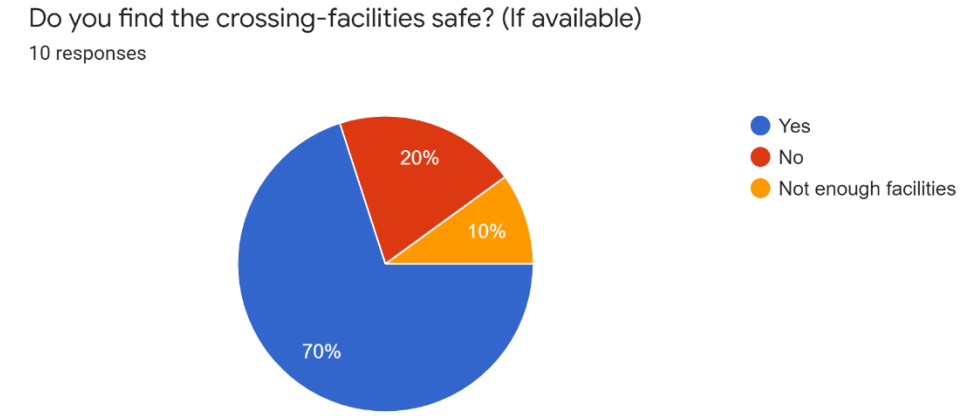


Fig. 5. 53 : Survey responses – street 3

Source: Author, 2022

70% of the respondents reported that the crossing facilities are safe.

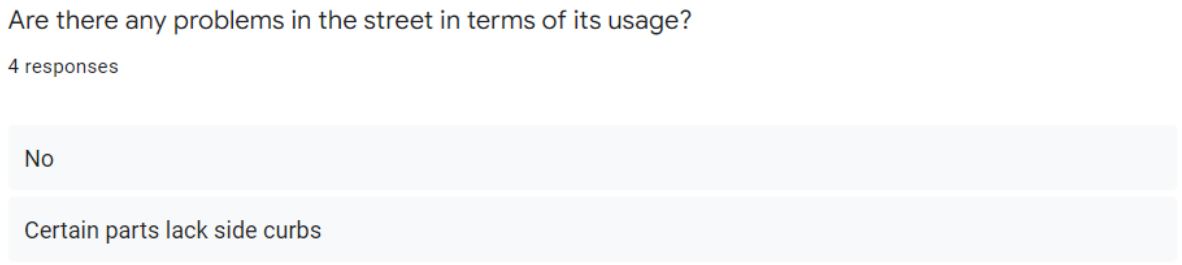


Fig. 5. 54 : Survey responses – street 3

Source: Author, 2022



Fig. 5. 55 : Survey responses – street 3

Source: Author, 2022

All the respondents agreed that the signboards, road signs and names of the shops are clear.

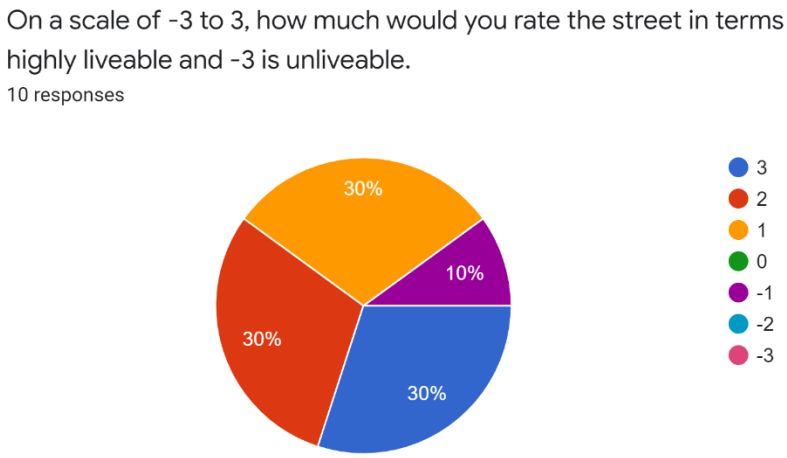


Fig. 5. 56 : Survey responses – street 3

Source: Author, 2022

30% of the respondents rated the liveability +3, 30% rated +1, 30% rated -2 and 10% rated -1.

5.3.3.1 Conclusions on Liveability of the Street | Muharraq Residential Street 3 based on Surveys

Physical:

- It is accessible and clean
- There are not enough parking spaces, and there is traffic congestion.
- It does not satisfy physical characteristics.

Functional:

- Crossing facilities are safe.
- Sidewalks are safe.
- It is walking-friendly and is used by pedestrians.
- Fulfils the functional characteristics.

Social:

- The nearby park is the only socialization space reported. However, there are no activities in the street.
- The street does not satisfy the social activities within it.

Environmental:

- Some canopies and shelters are found in the street.
- Satisfies the environmental character.

Economic:

- Caters to all the facilities.
- Satisfies the economic aspects.

Overall, as per the survey responses. There are no significant issues reported in the street except for parking and traffic issues. The street can foster some social activities and resolve the parking issues to be considered liveable. +3, +2 and +1 are the common rating given for the liveability of the street.

5.3.4 Muharraq Residential Street 2

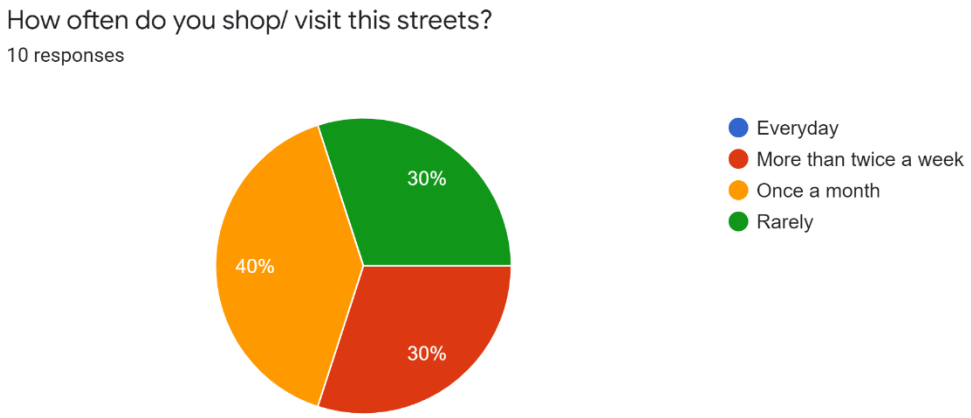


Fig. 5. 57 : Survey responses – street 4

Source: Author, 2022

40% reported that the street is used once a month, 30% use the street more than twice a week and 30% use the street rarely.



Fig. 5. 58: Survey responses – street 4

Source: Author, 2022

70% of the respondents reported that they used the street by vehicle, and 50% walked.

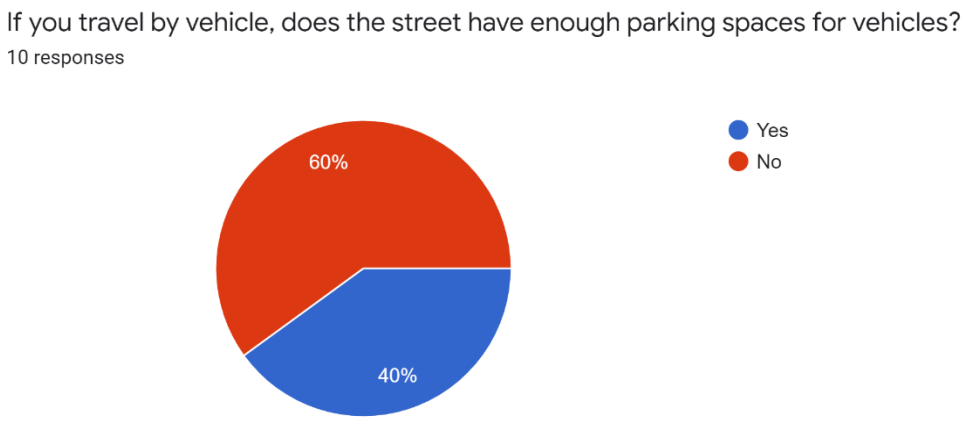


Fig. 5. 59: Survey responses – street 4

Source: Author, 2022

60% of the respondents reported that the street does not have enough parking and 40% reported that it has enough parking.

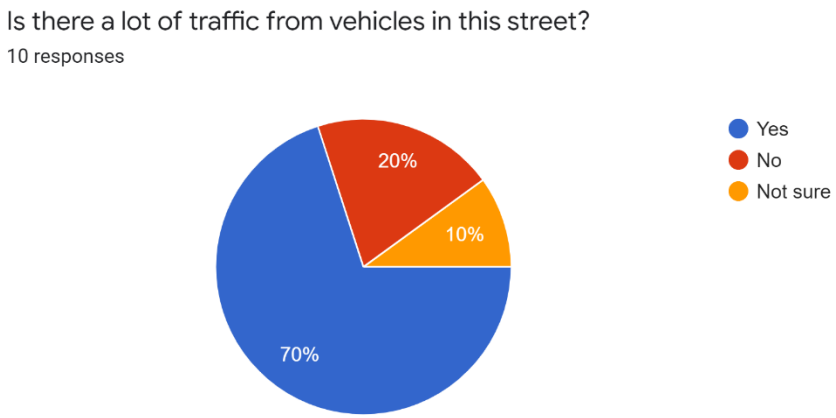


Fig. 5. 60: Survey responses – street 4

Source: Author, 2022

70% of the respondents reported that there is a lot of traffic from vehicles on this street.

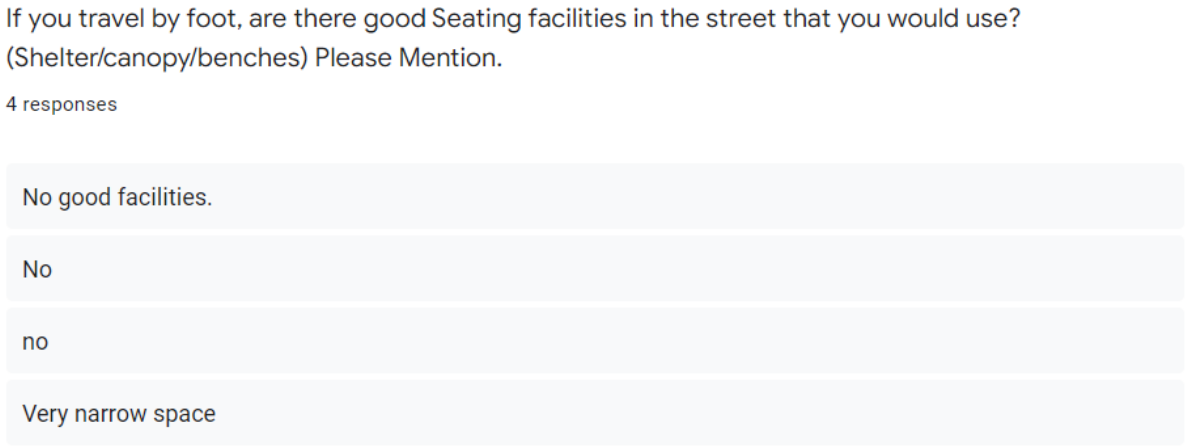


Fig. 5. 61: Survey responses – street 4

Source: Author, 2022

The respondents said that there are no good facilities in the street for socialization and that there is a very narrow space.

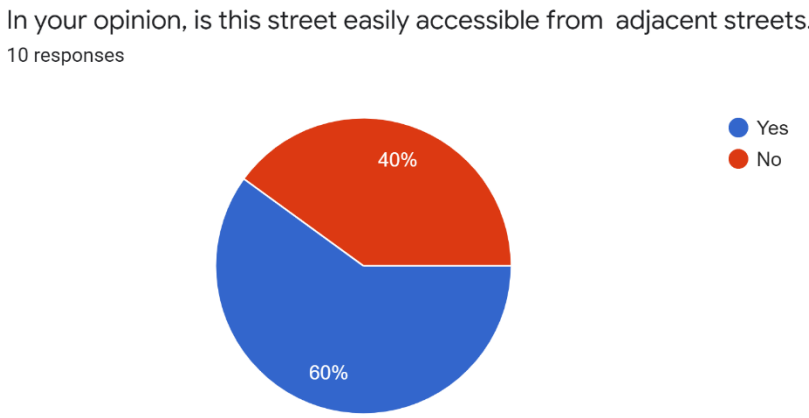


Fig. 5. 62: Survey responses – street 4

Source: Author, 2022

60% of the respondents find that the street is easily accessible from the adjacent streets.

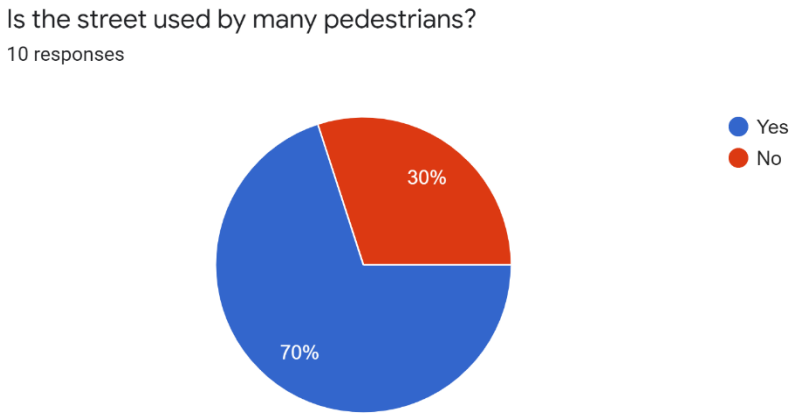


Fig. 5. 63: Survey responses – street 4

Source: Author, 2022

70% of the respondents report that the street is used by many pedestrians.

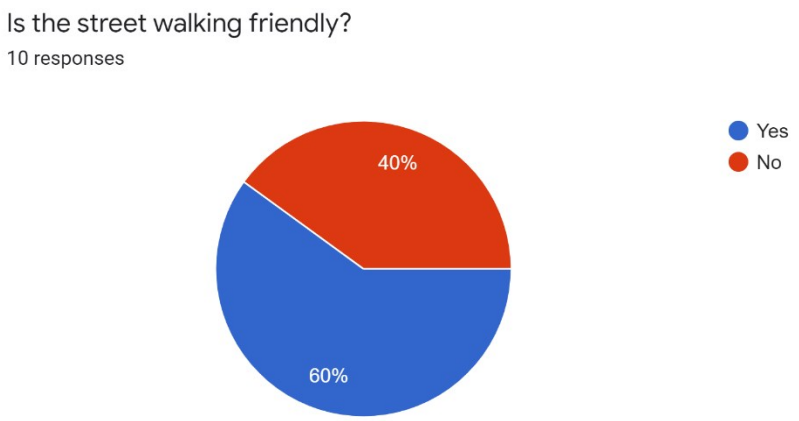


Fig. 5. 64: Survey responses – street 4

Source: Author, 2022

60% of the respondents find the street walking-friendly, while others do not find it walking friendly.

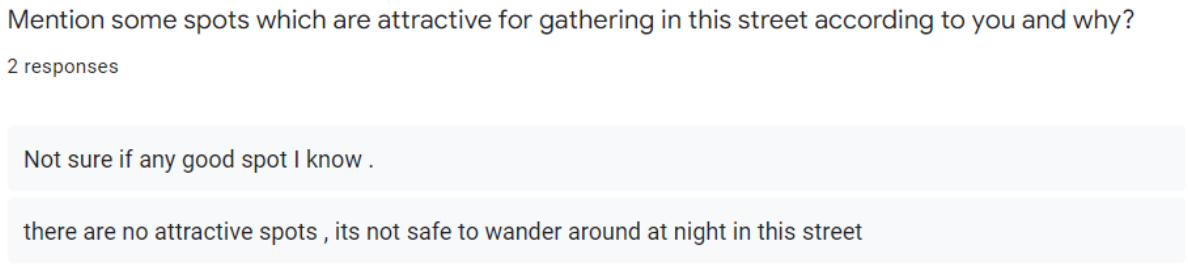


Fig. 5. 65: Survey responses – street 4

Source: Author, 2022

One respondent highlighted that it is unsafe to walk at night on this street.

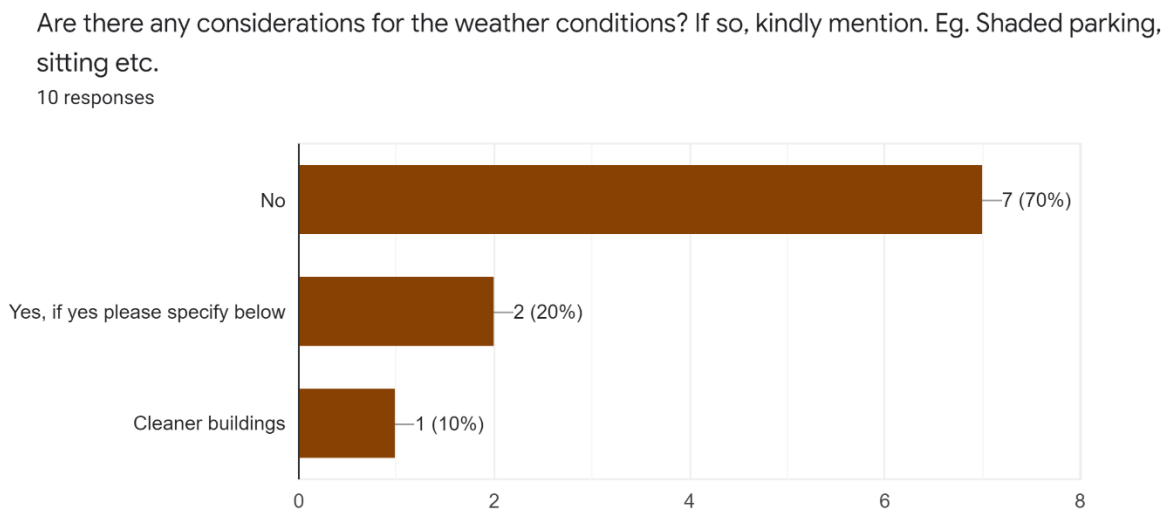
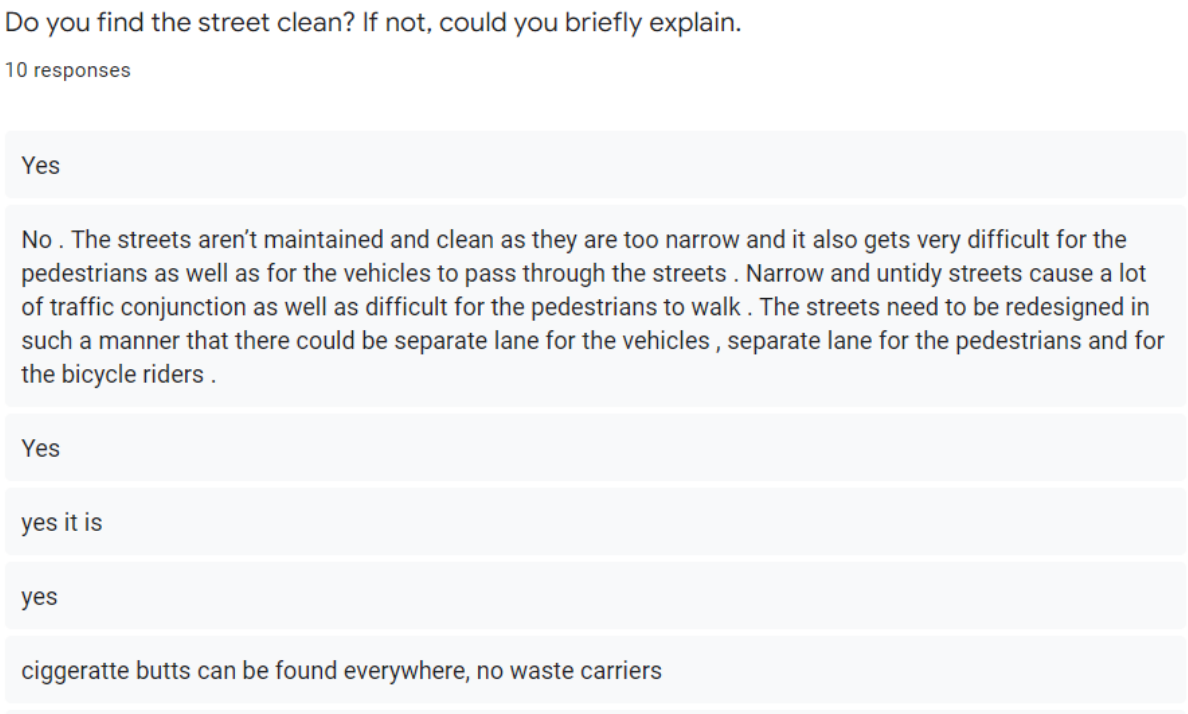


Fig. 5. 66: Survey responses – street 4

Source: Author, 2022

70% of the respondents reported that there is no consideration for the weather.



The buildings need to be visually pleasing

Yes , i find it clean always

Clean and safe.

Fig. 5. 67: Survey responses – street 4

Source: Author, 2022

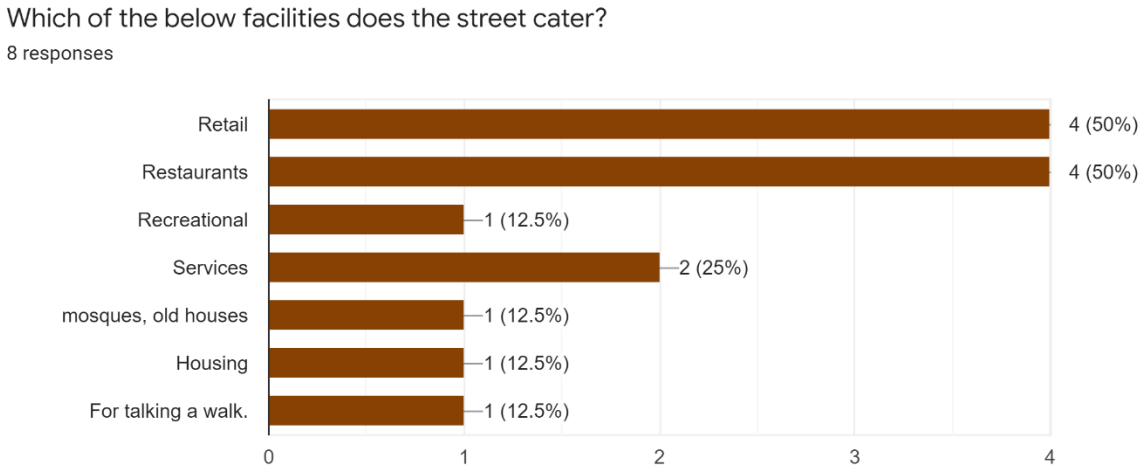


Fig. 5. 68: Survey responses – street 4

Source: Author, 2022

50% of the respondents reported that the street provides the retail facility, 50% reported restaurants, and 2% reported that the street caters to services.

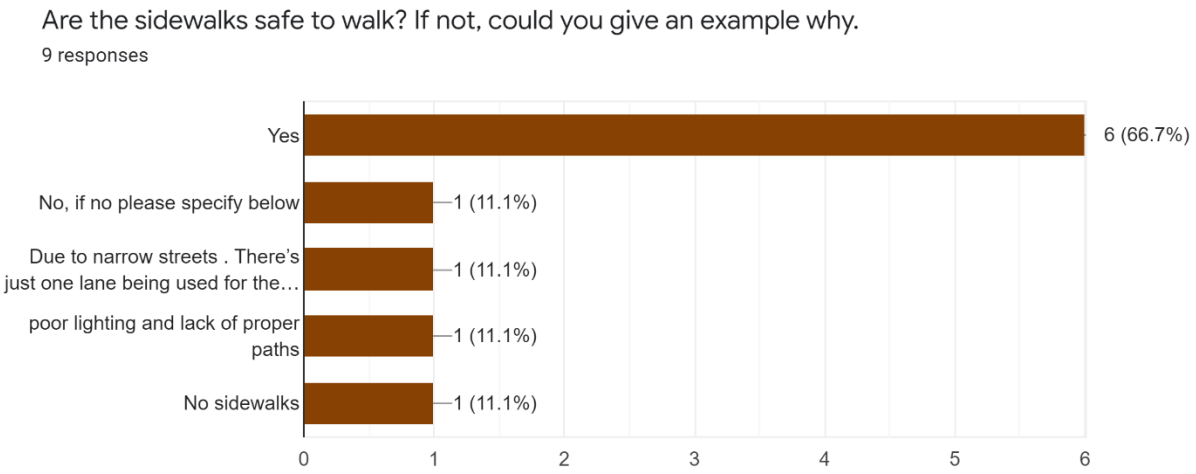


Fig. 5. 69: Survey responses – street 4

Source: Author, 2022

66.7% reported that the sidewalks are safe. However, others highlighted certain issues. Some of the highlighted issues are narrow streets, poor lighting, lack of proper paths to walk, and absence of a sidewalk.

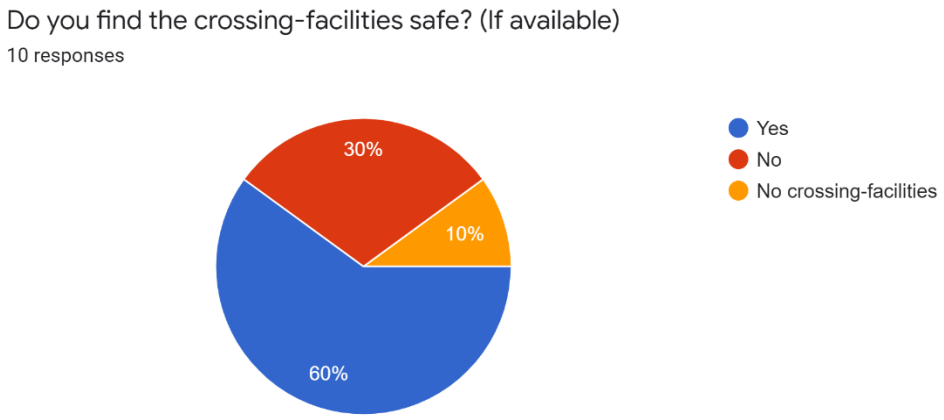


Fig. 5. 70: Survey responses – street 4

Source: Author, 2022

60% of the respondents reported that the crossing- facilities are safe. But 10% highlighted that there are no crossing facilities.



Fig. 5. 71: Survey responses – street 4

Source: Author, 2022

90% of the users reported that the signboards, road signs, names of shops etc are clear.

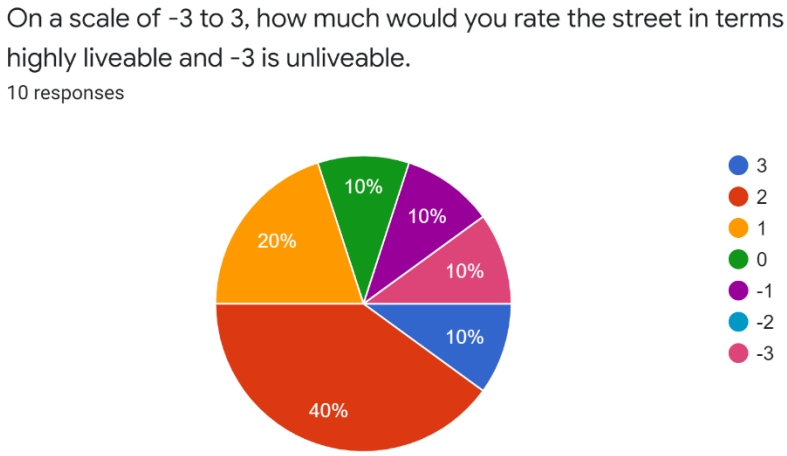


Fig. 5. 72: Survey responses – street 4

Source: Author, 2022

40% of the respondents rated the liveability of this street as +2, 20% rated +1 and only 10% rated +3. Additionally, 10% rated -1, another 10% -2 and another 10% -3.

5.3.4.1 Conclusions on the Liveability of Street | Muharraq Residential Street 3 based on Surveys

Physical:

- The signs are clear.
- It is not clean.
- It satisfies the physical characteristics.

Functional:

- Crossing facilities are safe.
- Sidewalks are safe.
- It is walking-friendly and is used by many pedestrians.
- It does not have enough parking spaces.
- Does not satisfy the functional characteristic due to the lack of parking spaces, traffic and the narrow street.

Social:

- The street does not satisfy social activities within it.

Environmental:

- It does not satisfy the environmental character.

Economic:

- Satisfies economic characteristic

These observations are similar to the observations of the previously discussed residential street. There exists an issue with traffic, parking space, the width of street & sidewalk and environmental considerations.

This street is evaluated at +2 in terms of liveability (40%). However, the street needs to fulfil environmental, social and functional characteristics to be considered close to liveable, hence this rating cannot be considered adequate. Through the other methods, a rating and conclusions can be produced

5.4 Method 3 | Mapping of Movement

5.4.1 Muharraq Commercial Street 1



Fig. 5. 73: Activity Observations- Street 1

Source: Author, 2022

Gate 1:

Movement: In gate 1, the activities and movement observed were vehicles entering the street from the adjacent road, men and women walking to shops, families walking and children walking to shops.

Activity Observations: The different activities observed includes, children, walking to the cold store, a man standing outside his shop, a man loading and unloading goods to his cold store, a woman walking, and a man talking on the phone and walking.

Gate 2:

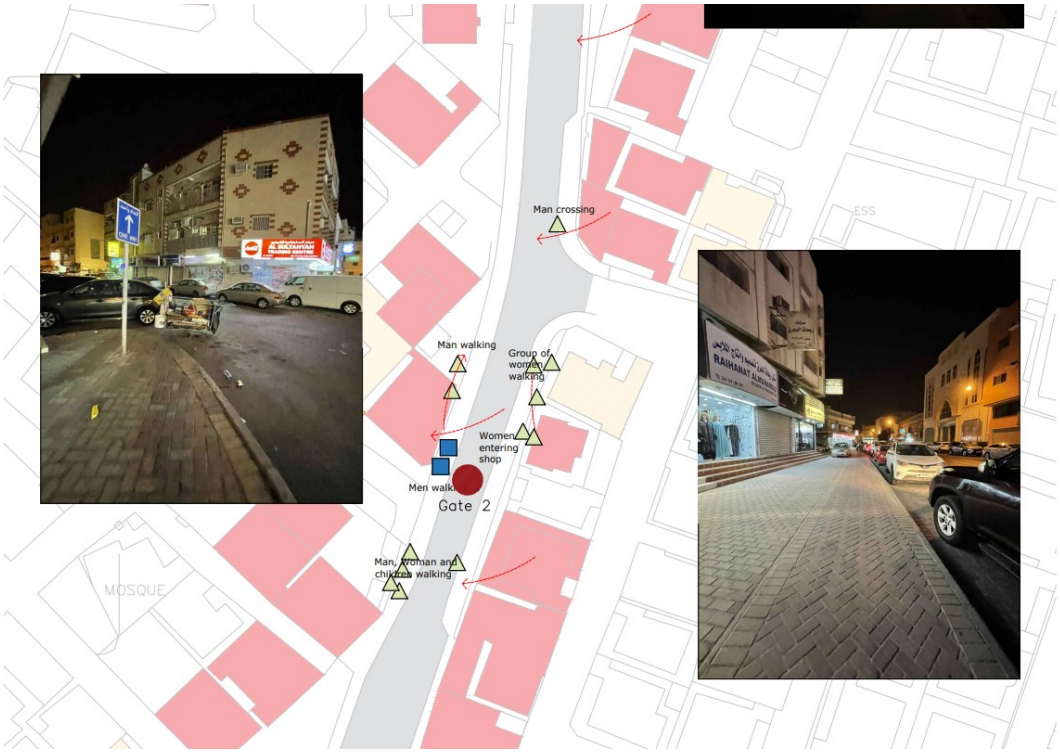


Fig. 5. 74: Activity Observations- Street 1

Source: Author, 2022

Movement: Near the second gate, the movements observed were women walking, men cycling and family walking.

Activity Observations: The various activities exhibited by the users were, a group of women talking to each other and walking towards a boutique, and women exiting a boutique with plastic covers in hand. The other observation was that men were found standing and talking outside a car parts shop, most of the men were found smoking and entering and exiting the same shop and staying in the area for a long period.

Gate 3:

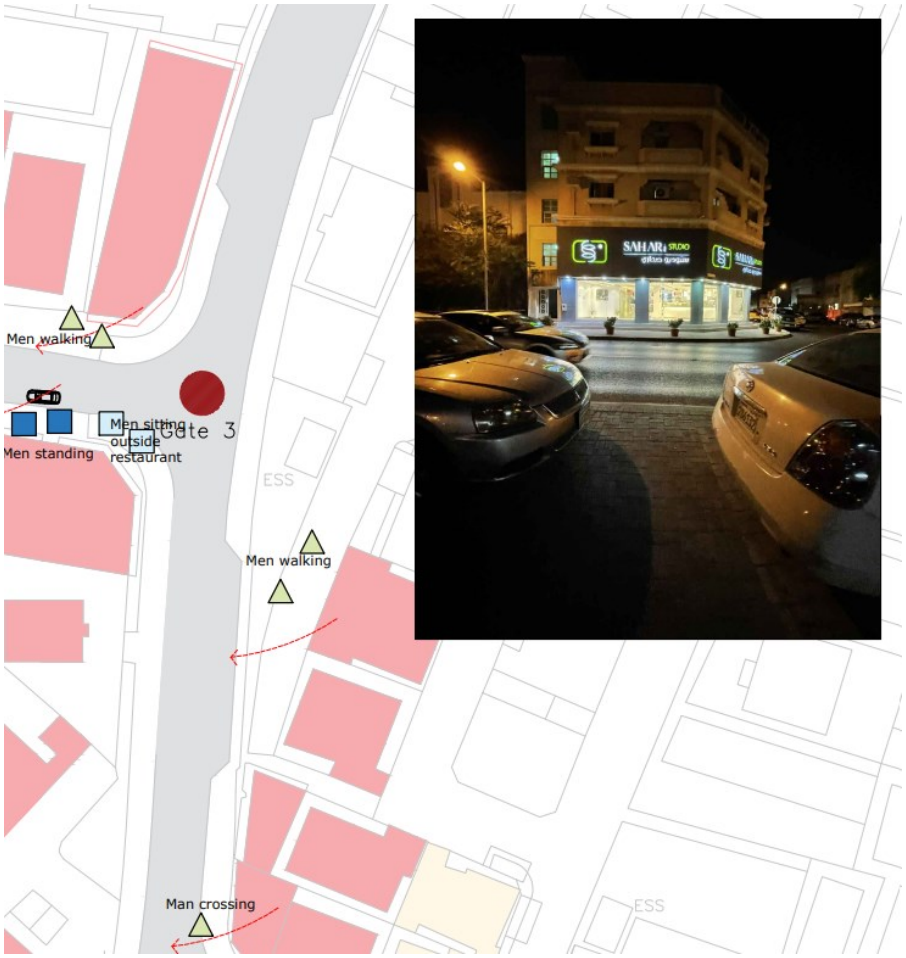


Fig. 5. 75: Activity Observations- Street 1

Source: Author, 2022

Movement- Activity Observations:

In the third gate, it was observed that a family was walking towards a studio, a family walking from a parked car to a building on the adjacent side, and vehicles entering and exiting the street and turning to the commercial street 2. The street was found to be more active during the evening and on the weekend compared to the daytime in terms of vehicular movements. However, the street had pedestrians and customers shopping even during the daytime.

5.4.1.1 Liveability of Muharraq Commercial Street 1 based on Mapping of Movement

The characteristics of liveability as explored through various literature studied and through this research are physical, functional, social, economic, environmental, visual and urban qualities.

In this street, based on the movement patterns and activities, the following conclusions were drawn.

Physical- It is accessible from the highway through a secondary road. It is clean.

Functional- Users can commute easily without hazards. It is walkable and safe in general.

Social- Several social activities are found taking place in the street. Lively during the night time.

Economic- Satisfies the needs of users.

Environmental-There are few trees but no specific solutions to control heat/weather.

Visual- Several shops are available making it visually pleasing. The streets and sidewalks are proportionate.

Urban Qualities- The street offers transparency through glass facades where one can see through the shops and the streets at a distance. It satisfies the human scale. It has imageability and certain spots that are a landmark. E.g., Sahari Studio. The street is not complex compared to the streets of Manama or the residential streets of Muharraq but has buildings adjacent to each other.

Overall, it can be considered as nearing liveability fully but not fully liveable. Some areas that require consideration are environmental and complexity. Other points are all fulfilled. As a result, there is a scope for improvement in this street and can be liveable in the future with the necessary improvements

5.4.2 The Muharraq Commercial Street 2

Gate: A common gate is selected due to the short span of the street.



Fig. 5. 76: Activity Observations- Street 2

Source: Author, 2022

Movement: Though this street is shorter than the adjacent commercial street, it offers various vibrant activities within it. Men are found crossing the road, walking in the street, entering, and exiting shops, while vehicles enter the tertiary roads etc.

Activity Observations: Men are standing outside the restaurant, sitting in chairs and talking to each other. Some men are also walking on the roads as there is no sidewalk and there are chairs kept outside the restaurant. One man is seen sitting outside his shop on a plastic chair talking to another man. People are entering and exiting the shop loading goods from a vehicle. Men are also entering a perfume shop on the edge of the street during the daytime. During the evening, a similar pattern of activities occurs except that, a more number of vehicles are moving through the street.

5.4.2.1 Liveability of Muharraq Commercial Street 2 based on Mapping of Movement

The characteristics of liveability as explored through various literature studied and through this research are physical, functional, social, economic, environmental, visual and urban qualities. In this street based on the movement patterns and activities, the following conclusions were drawn.

Physical- The street is accessible to pedestrians.

Functional- There is a lack of proper sidewalks.

Social- Several social activities take place on this street. People walk, gather, shop and around.

Economic- The street caters to various retail and recreational facilities.

Environmental- There is no environmental consideration.

Visual- A variety of shops and facades exist.

Urban Qualities- Not transparent, complex.

5.4.3 Muharraq Residential Street 1

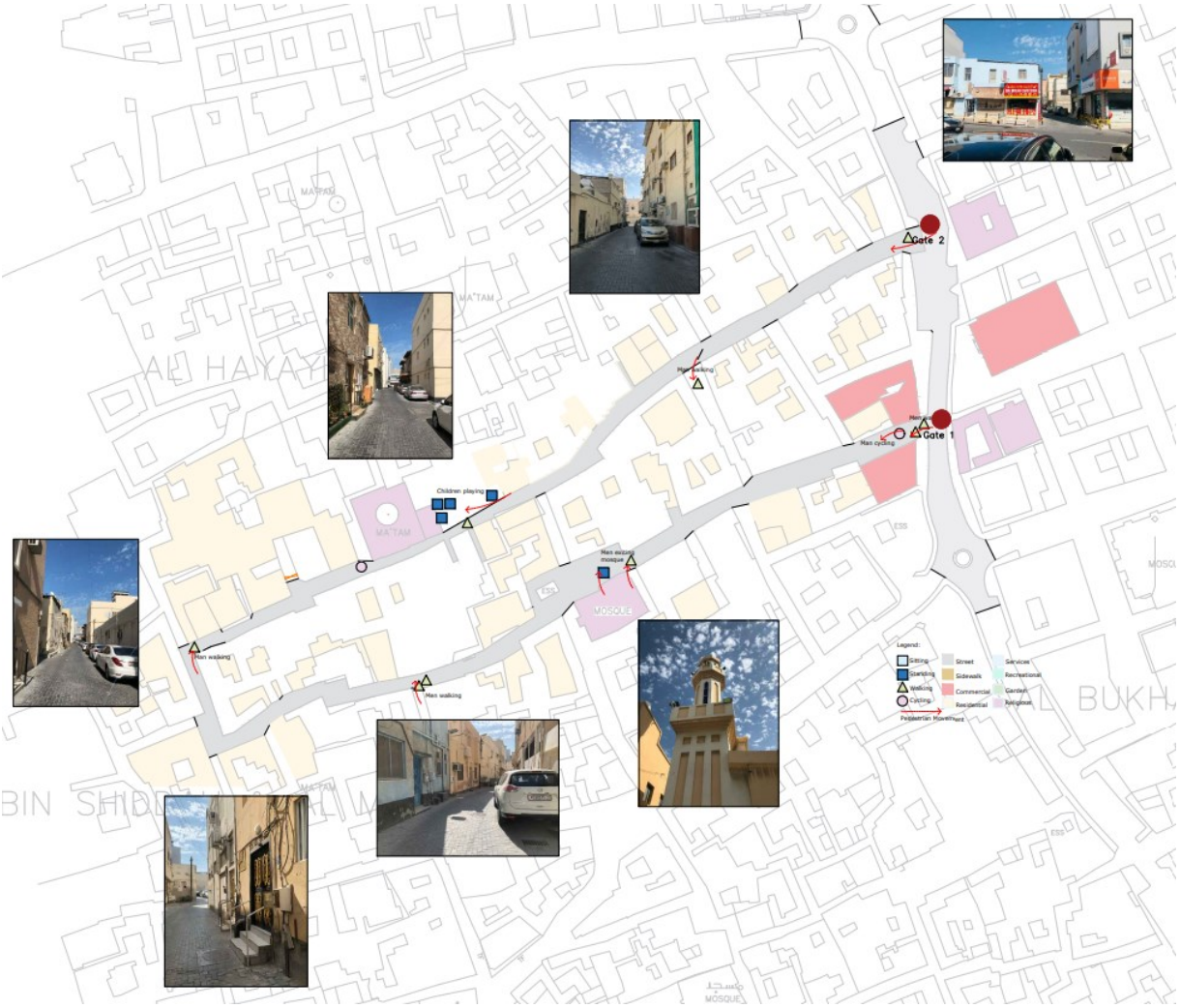


Fig. 5. 77: Activity Observations- Street 3

Source: Author, 2022

Observed on 22/9/2022 from 11:18-11:30 am

Gate 1:

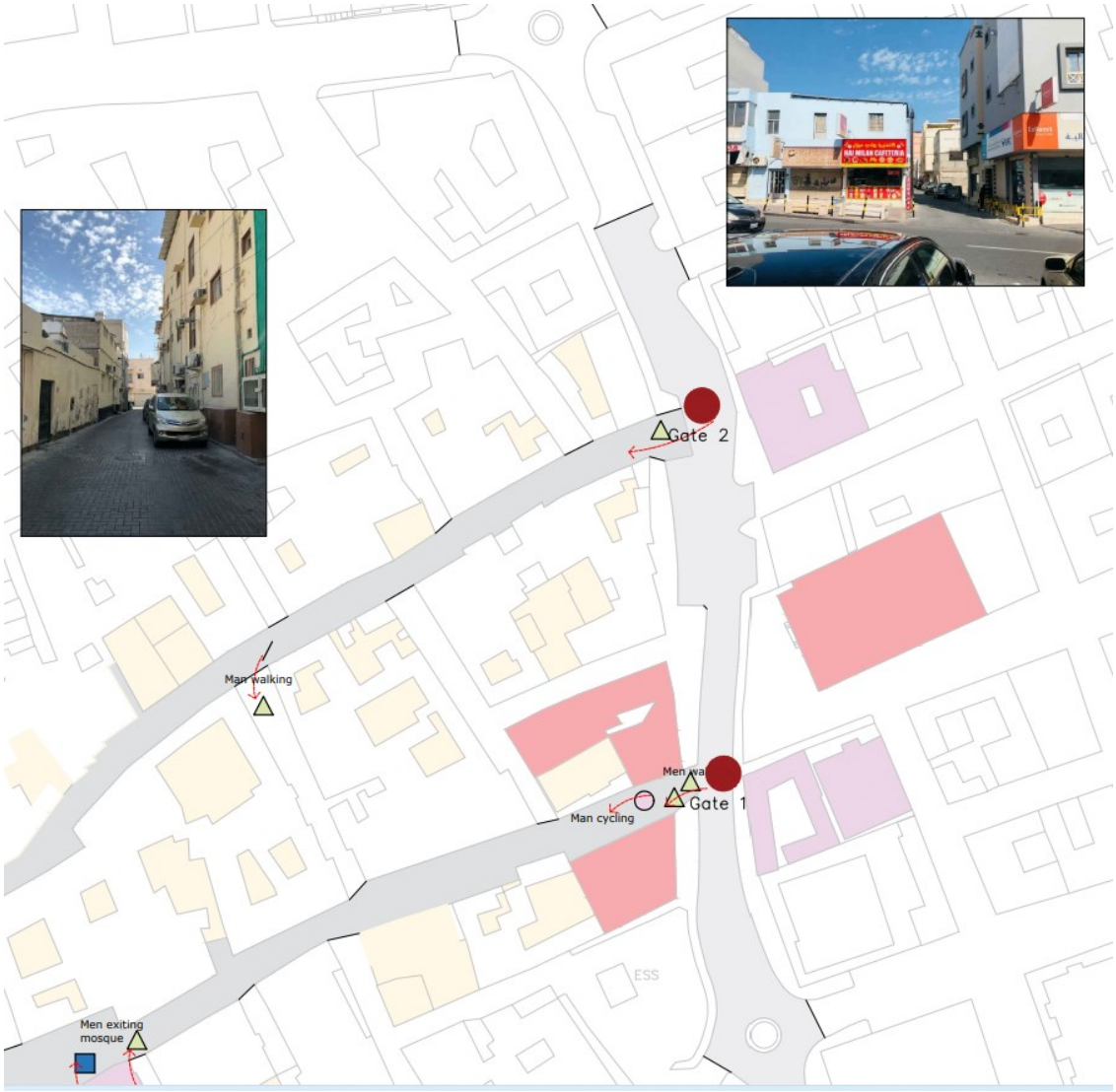


Fig. 5. 78: Activity Observations- Street 4

Source: Author, 2022

Movement & Activity Observations: Few cars are seen exiting the street and merging with the adjacent street. Men are walking, standing, and sitting. Men are seen gathering, sitting and talking. A man is found entering a bakery and exiting with his purchase. A man is seen entering a cold store. A cyclist is found entering the residential street. A man is seen exiting the mosque in the street after the prayer in the morning. During the evening, a group of men were found exiting the mosque after the prayer. A man is seen walking to his house.

5.4.3.1 Liveability of Muharraq Residential Street 1 based on Mapping of Movement

The characteristics of liveability as explored through various literature studied and through this research are Physical, Functional, Social, Economic, Environmental, Visual and Urban Qualities.

In this street, based on the movement patterns and activities, the following conclusions were drawn. (Most points are common for the second residential street and this street).

Physical- The street is accessible. However, the vehicle movement is restricted as a vehicle is parked on one side of the road. It is clean.

Functional- People are seen entering, exiting and cycling. It is walkable. It is also safe for a person to walk.

Social- During the evenings, social gatherings take place.

Economic- All facilities are available at a walkable distance.

Environmental- No shading, except for buildings.

Visual- Visually appealing.

Urban Qualities- It is highly complex, due to the people, vehicles, narrow walkways and elements close to each other. It satisfies the human scale and has imageability. The unique doorsteps, door styles, facades and colours add to the imageability.

Though it satisfies the visual. Economic and social characteristics, the street needs to address several critical issues in terms of usability, environment and functionality for vehicles.

5.4.4 Muharraq Residential Street 2

Gate 2:

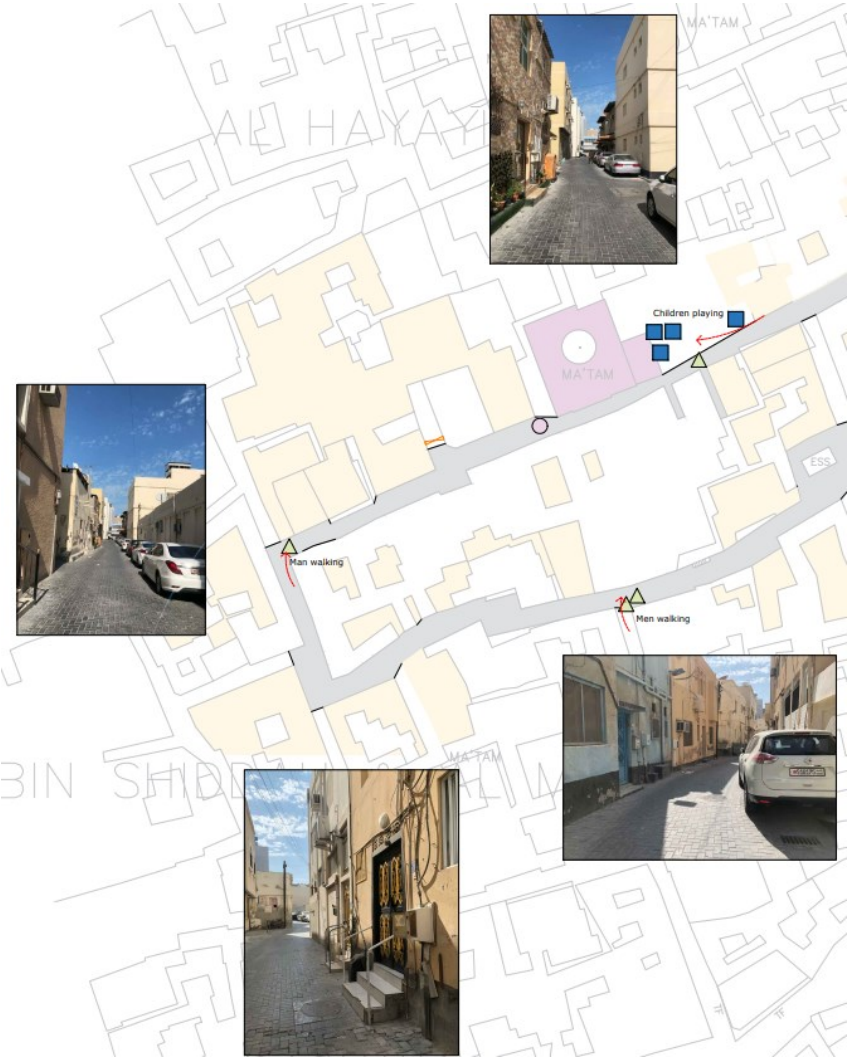


Fig. 5. 79: Activity Observations- Street 4

Source: Author, 2022

Observed on 22/9/2022 from 11:30-11:45 am

Movement: In the second residential street, a man was walking towards the inner street. A vehicle was entering the street. The street appears to be isolated though it is densely populated with houses on either side. Children returning home from the nearby madrasa.

5.4.4.1 Liveability of the Muharraq Residential Street 2 based on Mapping of Movement

The characteristics of liveability as explored through various literature studied and through this research are physical, functional, social, economic, environmental, visual and urban qualities.

In this street, based on the movement patterns and activities, the following conclusions were drawn.

Physical- The street is accessible to vehicles. However, it is not easy to enter and exit due to the street width. The street is clean.

Functional- There exist issues with usability. These include a lack of proper walkways. As a result, children play in the vacant land in the parallel street, but not on this street. This is mainly because of the lack of proper space planning and space segregation for sidewalks and parking. Safety concerns also exist here, as it appears isolated.

Social- Children socialize within the street.

Economic- Several retail and recreational facilities are available on the outskirts of the entire region. It is within a walkable distance.

Environmental- The buildings provide shades through their structure. However, the issue of heat prevails. People do not walk or stand to socialize in the outskirts during the daytime.

Visual- The street fully satisfied the visual characteristic of Liveability. This is because of its variety of residential facades, that are arranged organically and in a visually pleasing manner.

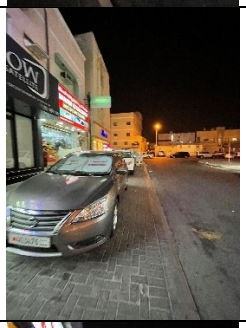
Urban Qualities-. It has a high level of complexity as it is a highly dense street filled with a lot of residential buildings adjacent to each other. Vehicles parked,

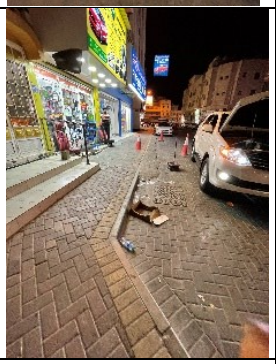
the road, and the stairs add to the complexity. It satisfies the human scale. Examples include a road that is sufficient for a person to walk and enter the street. Doorsteps leading to houses and sizes of doors are suitable for entrances considering the people. However, the issue lies in the fact that this street has vehicles accessing the same road. If vehicles are denied access or if it has separate parking, they can be considered highly liveable. The street does satisfy the imageability.

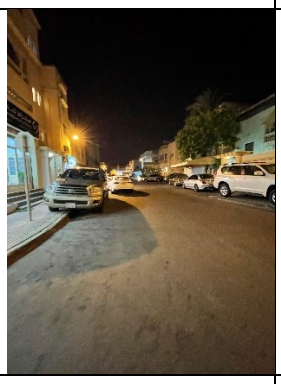
It needs to fulfil the other important characteristics; physical, functional and all aspects of urban qualities

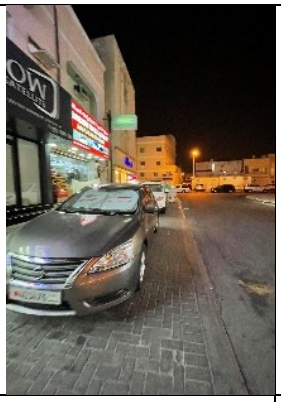
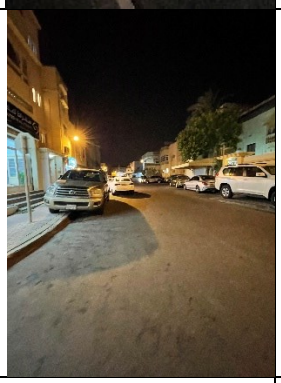
5.5 Method 4: Evaluation of Liveability Indicators

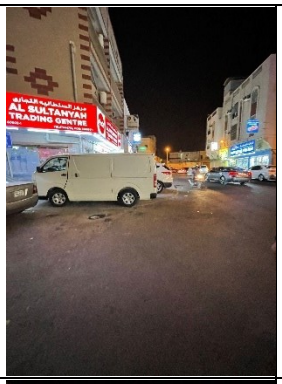
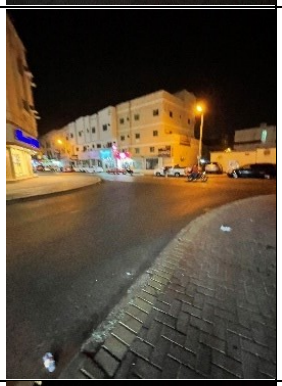
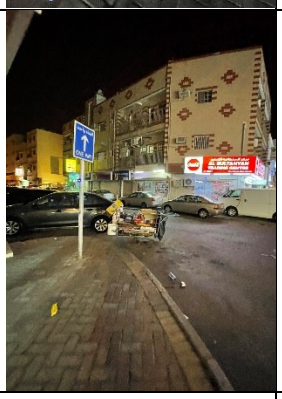
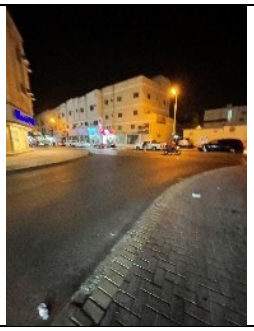
5.5.1 Street No. 1 | Muharraq Commercial Street

Characteristics	Factors	Indicators	Images	Observations - Qualitative Evaluations	Evaluation Score
Physical	Physical attributes	Floor surfaces - paving		Paved well.	+2
		Name boards		Available, but not legible	+1
		Signs		Clear.	+3
		Seating		Chairs are kept informally outside shops.	+2
		Sculpture		None	-3
		Canopies & Overhangs		None.	-1
		Traffic		Not very congested.	+1
		Parking spaces		Parking is available on either side of the street.	+2

		Accessibility		Accessible.	+3
		Edge segments		Not well defined.	-1
Visual		Variety of retail shops		Available to an extent.	+2
		Scale and Proportion (building heights to street facades)		Proportionate	+3
		Variety of lighting		Well lighted street	+3
		Compatibility of facades - Compositions		Distinct facades.	+1
		Legibility of street elements		Difficulty walking due to street elements.	-1
Social	Democratic public spaces for all	General public spaces		Informal spaces are available and outdoor sitting.	+2
		Facilities for the disabled		Informal slopes to the sidewalk.	+1
		Gathering nodes & Face-to-face communications .		People found gathering in several locations including cafes, workshops etc.	+3
		Socializing spaces nearby/ play spaces (for residential street)		The public bus stop is located on the adjacent street.	+1
		Recreational facilities (for		Not in the street or nearby	-2

		residential streets)			
		Greenery		Few trees are available	+2
		Cleanliness	. 	Not clean. Waste is found in the street.	-3
Economic	Complexity	Availability of various types of shops		Available	+2
		Availability of various types of services.		Available	+1
Functional	Safety & Security	Availability of pedestrian crossings		None.	-3
		Street Furniture		Chairs from the restaurant and workshops are found in the street. Other elements such as trolleys and cycles. affect walkability	-2

		Lighting (Safety)		Safe	+3
		Signs		Clear	+3
		Crossing Facilities (Safety)		Not available	-3
		Width of the Sidewalk		Appropriate. But several blockages affect walkability.	-2
		Cycling Lanes		Not available	-3
	Connectivity to city level amenities/ Legibility	Easy access to parking		Yes, as it is not crowded.	+1
		Connectivity to Street Systems		Connected	+3
		Road Hierarchy		Good	+2
		Signalised intersections		Not available	-2

	Easy access to public level amenities/ Way Finding	Identity		A small street is adjacent to a commercial street.	+3
		Landmarks		Near Rassasi.	+2
		Directional		Yes	+2
		Informational		Yes	+2
Urban Qualities of Street	Imageability			Not very imageable.	-1
	Enclosure			Yes, the street is very small and provides enclosure.	+2
	Human Scale			Yes, but not very well on the sidewalks.	+1
	Transparency			Inner roads provide access and a view of other streets.	+3

	Complexity			The availability of small inner roads connected to the street produces complexity.	-1

Table 5. 35: Evaluation of Liveability Indicators

Source: Author

5.5.1.1 Summary

Physical:

1. Chairs are kept informally outside shops.
2. Parking is available on either side of the street.
3. Not very congested. traffic

Visual:

1. The street is well-lit

Social:

1. People found gathering in several locations including cafes, workshops etc.
2. The public bus stop is located in the adjacent street.

Environmental:

1. Not clean. Waste is found in the streets.

Economic:

1. Various types of shops are available

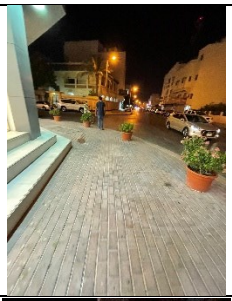
Functional:

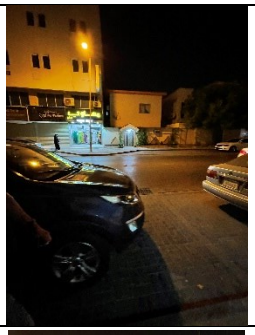
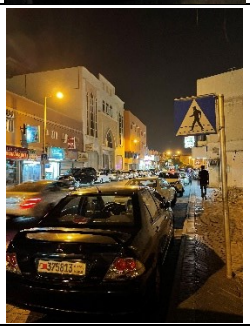
1. Chairs from restaurants and workshops are found in the street. Other elements such as trolleys and cycles affect walkability.
2. Appropriate. But several blockages affect walkability.

Urban Qualities of Street:

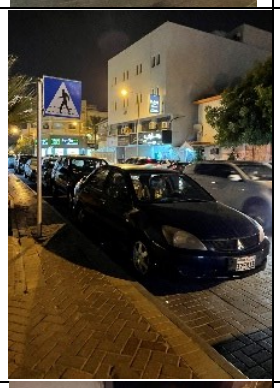
1. Small inner roads are connected to the street, producing complexity.
2. Near Rassasi.- Landmark

5.5.2 Street No. 2 | Muharraq Commercial Street

Characteristics	Factors	Indicators	Images	Observations-Qualitative Evaluations	Evaluation Score
Physical	Physical attributes	Floor surfaces - paving		Not maintained well on one side of the road.	+1
		Name boards		Clear	+3
		Signs		Legible	+3
		Seating		None available.	-3
		Sculpture		Some street elements exist that act as street sculptures.	-2
		Canopies & Overhangs		Trees provide shade to an extent.	+1
		Traffic		Not much traffic.	+2
		Accessibility		Accessible.	+3

Visual		Variety of retail shops		Yes	**+2**
		Scale and Proportion (building heights to street facades)		Proportionate.	+2
		Variety of lighting		Available due to the attractive retail shops.	**+3**
		Compatibility of facades - Compositions		Different types of shops, colours, and boards.	+2
		Legibility of street elements		A long street with residential buildings and commercial facilities on the ground floor.	**+2**
Social	Democratic public spaces for all	General public spaces		No specified location.	+1
		Facilities for the disabled		No specified ramps.	-1
		Gathering nodes & face-to-face communications.		No specific gathering nodes were found in the street.	-1

		Socializing spaces nearby/ play spaces (for residential street)		A paved area in front of the cold store.	+2
		Recreational facilities (for residential streets)			-2
		Greenery		Availability of trees in the street.	+2
		Cleanliness	.	Clean	+3
Economic	Complexity	Availability of various types of shops		Available	+2
		Availability of various types of services.		Available	+2
Functional	Safety & Security	Availability of pedestrian crossings		Available	+2

		Street Furniture		Street furniture aims to produce a positive impact and avoid crashing cars in the shops.	+2
		Lighting (Safety)		Streetlights are available but there is a concern related to safety for women.	-1
		Signs		Legible	+3
		Crossing Facilities (Safety)		They are very safe.	+3
		Width of Sidewalk		Sidewalks are narrow to one side of the street and wide on the other side.	+1
		Cycling Lanes		Not available.	-3
	Connectivity to city level	Easy access to parking		Yes.	+3

	amenities/ Legibility	Connectivity to Street Systems		Connects to a nearby avenue and highway through a secondary road.	+2
		Road Hierarchy			+2
	Easy access to public level amenities/ Way Finding	Signalised intersections		Available only at the entrance to the street.	+1
		Identity		Sahari Studio.	+1
		Landmarks		Sahari studio acts as a prominent landmark, due to its size, location and lighting compared to nearby shops.	+1
		Directional		Yes.	+3
		Informational		Yes.	+2
Urban Qualities of Street	Imageability			Limited features are contributing to its imageability.	+1
	Enclosure			There is an enclosure due to the height of the buildings.	+2
	Human Scale			Limited.	+1
	Transparency			Not there.	-1
	Complexity			Not very complex.	+1

Table 5. 36: Evaluation of Liveability Indicators

Source: Author

5.5.2.1 Summary

Physical:

1. One side of the road is not well-maintained.
2. Trees provide shade to an extent.

Visual:

1. A long street with residential buildings and commercial facilities on the ground floor.

Social:

1.No specific gathering nodes found in the street.
2. There is a paved area in front of the cold store.

Environmental:

1. Trees exist in the street

Economic:

2. Various types of shops exist.

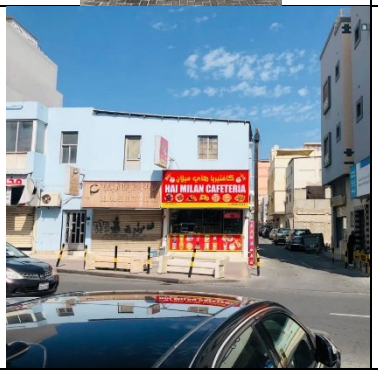
Functional:

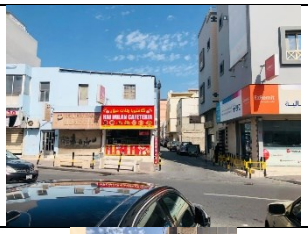
1. Street furniture produces a positive impact.
2. Streetlights are available but there is a concern related to the safety of women.
3. Sidewalks are narrow on one side of the street and wide on the other side.
4. Connects to the nearby avenue and highway through a secondary road.
5. Sahari Studio acts as a prominent landmark, due to its size, location and lighting compared to nearby shops

Urban Qualities of Street:

1. Limited features are contributing to its imageability.

5.5.3 Street No. 3 | Muharraq Residential Street

Characteristics	Factors	Indicators	Images	Observations- Qualitative Evaluations	Score
Physical	Physical attributes	Floor surfaces - paving		Paved.	+1
		Name boards		Few are there.	-1
		Signs		Only the road number exists	-2
		Seating		None.	-2
		Sculpture		None.	-2
		Canopies & Overhangs		Outside some houses.	+2
		Traffic		Congestion when cars try to pass by due to the narrow width of the street.	-1
		Parking spaces		None.	-3
		Accessibility		Accessible from the commercial street adjacent. However, accessing the adjacent inner streets through cars is difficult.	-1

Visual		Variety of retail shops		Retail shops are available nearby at a walkable distance.	+2
		Scale and Proportion (building heights to street facades)		Narrow street. Inner road of 1 m directing to houses.	-1
		Variety of lighting		Limited lighting at night.	-1
		Compatibility of facades - Compositions		An old traditional residential street with colourful buildings.	+2
		Legibility of street elements		Uneven. Stairs and parts of the building extend to the road.	-2
Social	Democratic public spaces for all	General public spaces		Yes.	+2
		Facilities for the disabled		None.	-2
		Gathering nodes & Face-to-face communications.		Yes, informally on the street.	+1
		Socializing spaces nearby/ play spaces (for residential street)		Children and cyclists are found in street.	+3
		Recreational facilities (for residential streets)		Nearby.	+2
	Weather	Sunlight		Very hot	-3
		Greenery		Few plants and flowers in residents' planters.	+1

Environmental	conditions	Cleanliness		Untidy	-2
Economic	Complexity	Availability of various types of shops		Few are available.	+2
		Availability of various types of services.		Yes	+1
Functional	Safety & Security	Availability of pedestrian crossings		Not available.	-3
		Street Furniture		No.	-3
		Lighting (Safety)		Safe	+1
		Signs		Safe	+1
		Crossing Facilities (Safety)		Safe	-3
		Width of Sidewalk		None	-3
		Cycling Lanes		None	-3
	Connectivity to city level amenities/ Legibility	Easy access to parking		Difficult	-3
		Connectivity to Street Systems		Yes.	+2
		Road Hierarchy		Similar tertiary streets.	+2
	Easy access to public level amenities/ Way Finding	Signalised intersections		No.	-3
		Identity		Unique traditional organic building.	+2
		Landmarks		Historic buildings.	+3
		Directional		No. Difficulty to identify the route.	+1
		Informational		No.	-2
Urban Qualities of Street	Imageability			Yes. Unique houses provide imageability.	+2
	Enclosure			Yes. Due to the width of the street, there is a high enclosure.	+3

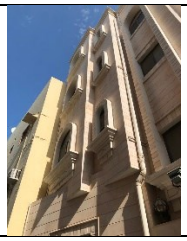
	Human Scale			Excellent	+3
	Transparency			No.	+1
	Complexity			Highly complex. The street has an inner road and narrow streets of 1m leading to houses that cannot be seen from the residential street 611. Moreover, the connectivity to the adjacent streets is congested and uneven.	+3

Table 5. 37: Evaluation of Liveability Indicators

Source: Author

5.5.3.1 Summary

Physical:

1. Only the road number exists.
2. Congestion when cars try to pass due to the narrow width of the street.
3. Accessible from the nearby commercial street. However, accessing the adjacent inner streets through cars is difficult.

Visual:

1. Retail shops are nearby at a walkable distance.
2. Narrow street.
3. An old traditional residential street with colourful buildings.
4. Uneven. Stairs and parts of the building extend to the road.

Social:

1. Children and cyclists are found in street.

Environmental:

2. Few plants and flowers are in the residents' planters.
3. Very hot
4. Untidy

Economic:

1. Some shops nearby

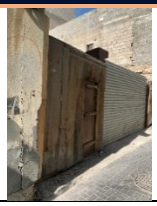
Functional:

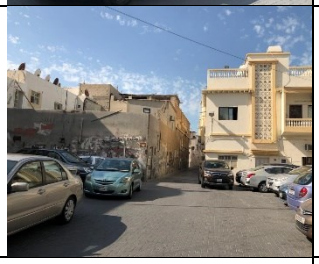
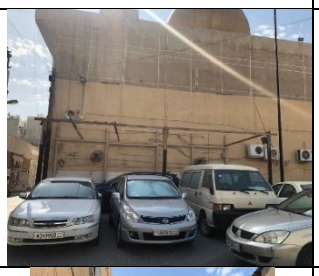
1. Unique traditional organic building.

Urban Qualities of Street:

1. Heavily complex. The street has pocket roads and narrow streets of 1m leading to houses that cannot be seen from the residential street 611. Moreover, the connectivity to the adjacent streets is congested and uneven.

5.5.4 Street No. 4 | Muharraq Residential Street

Characteristics	Factors	Indicators	Images	Observations	Score
Physical	Physical attributes	Floor surfaces - paving		Unpaved.	-1
		Name boards		House numbers and the road number	+1
		Signs		Not many are there.	-1
		Seating		None	-3
		Sculpture		None	-3
		Canopies & Overhangs		Few are there.	+1
		Traffic		There is a difficulty for vehicles to pass, but no traffic	+2
		Parking spaces		Limited, informally parked on the road	-2
		Accessibility		Difficult to access by a car, or by walking. It is accessible easily	-1
Visual		Variety of retail shops		Outside the street, there are but limited.	-2
		Scale and Proportion (building heights to street facades)		Narrow Street with Dense Buildings (1-2 storey houses)	+1
		Variety of lighting		None	-3
		Compatibility of facades - Compositions		Variety of façade elements relating to the context.	+3
		Legibility of street elements		Legible	+1
Social		General public spaces		Road	+1
		Facilities for the disabled		None	-3

	Democratic public spaces for all	Gathering nodes & Face-to-face communications.		Road and inner roads	+1
		Socializing spaces nearby/ play spaces (for residential street)		Open informal parking lot	+2
		Recreational facilities (for residential streets)		None	-3
		Greenery		Not available	-1
		Cleanliness	.	Clean	+2
Economic	Complexity	Availability of various types of shops		In walkable distance outside the street.	-2
		Availability of various types of services.		Yes, but one needs to go on the main road.	-1
Functional	Safety & Security	Availability of pedestrian crossings		No.	-3
		Street Furniture		No.	-3
		Lighting (Safety)		Unsafe at night	-3
		Signs		Clear	+1
		Crossing Facilities (Safety)		Not available	-2
		Width of Sidewalk		None	-3
		Cycling Lanes		None	-3
	Connectivity to city level ameniti es/ Legibility	Easy access to parking		Very difficult to find parking as a new person.	-3
		Connectivity to Street Systems		Connected for a person walking.	-2

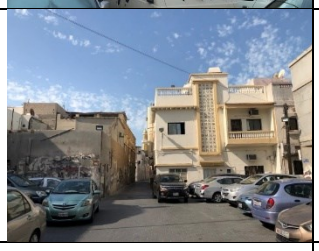
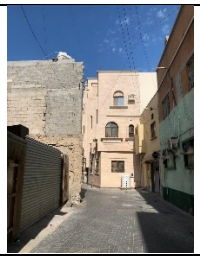
		Road Hierarchy		Tertiary roads.	+2
	Easy access to public level amenities/ Way Finding	Signalised intersections		None	-3
		Identity		Known for the Mosque and heritage houses	+3
		Landmarks		Mosque	+2
		Directional		Directs to Mosque	+2
		Informational		Not much information.	**+1**
Urban Qualities of Street	Imageability			Unique and organic traditional houses	+3
	Enclosure			Yes.	+3
	Human Scale			Yes.	+3
	Transparency			No. Houses are located adjacent to each other.	-1
	Complexity			Highly complex.	+3

Table 5. 38: Evaluation of Liveability Indicators

Source: Author

5.5.4.1 Summary

Physical:

1. Unpaved.
2. House numbers and the road number exist.
3. It the difficulty for vehicles to pass, but no traffic.
4. Limited, informally parked on the road.
5. Difficult to access by car. It is accessible to pedestrians

Visual:

1. Narrow street with dense buildings (1-2 storey houses)

Social:

1. Road and inner roads.
2. Open informal parking lot.

Environmental:

1. Shading from the extension of houses.
2. No other considerations.

Functional:

3. Known for the Mosque and heritage houses.
4. Directs to the Mosque.

Urban Qualities of Street:

1. Unique and organic traditional houses.

5.6 Comparative Tables of Liveability based on 4 Methods:

5.6.1 Evaluation of Street 1- Summary

Characteristics	Method 1	Method 2	Method 3	Method 4
Physical	The street is accessible from the adjacent streets. The street is clean.	It is accessible and clean.	It is accessible from the highway through a secondary road. It is clean.	1. Chairs are kept informally outside the shops. 2. Parking is available on either side of the street. 3. Not very congested. traffic
Visual	**xxx**	**xxx**	Several shops. Proportionate street with sidewalks.	1. Well lighted street
Social	There is an informal gathering on the vacant ground. Shading from standing beneath the shops is available while walking.	There are few benches used to socialize, but no other social activities are reported.	Several social activities are found taking place in the street. Lively during night-time.	1. Users found gathering in several locations including cafes, workshops etc. 2. The public bus stop is located on the adjacent street.
Environmental	The people don't find any environmental considerations.	No environmental considerations.	There are few trees but no specific solution to control heat/weather.	1. Not clean. Waste is found thrown into the streets.
Economic	The users are satisfied with the facilities in the street.	1. It caters to economic needs but does not have recreational facilities. 2. Most participants rated at +2	Satisfies the needs of users.	1. Various types of shops are available
Functional	The street is accessed both by cars as well as on foot. Parking is an issue, especially at the weekend, Safety issues exist in the street. Users walking alone feels unsafe at night as men are reported to follow them.	1. The lack of proper parking is highlighted. 2. The street is used by many pedestrians and is walkable. 3. It is walking friendly. 4. Streets, sidewalks and crossings are considered safe.	Users can commute easily without hazards. It is walkable and safe in general.	1. Chairs from restaurants and workshops are found on the street. Other features affect the walkability such as trolleys and cycles. 2. Appropriate. But several blockages affect walkability.
Urban Qualities of Street	**xxx**	**xxx**	The street offers transparency through glass facades where one can see through the shops and streets at	1. Small inner roads connected to the street, produce complexity. Near Rassasi.- Landmark

			a distance. It satisfies the human scale. It has imageability and certain spots that are a landmark. Eg., Sahari Studio. The street is not complex compared to the streets of Manama or the residential streets of Muharraq. However, it has dense buildings adjacent to each other.	

Table 5. 39: Comparison of data produced from 4 methods

Source: Author

5.6.2 Evaluation of Street 2- Summary

Characteristics	Method 1	Method 2	Method 3	Method 4
Physical	The accessibility is limited, as there is no specific sign to locate the street and there is difficult to exit the street due to traffic. Parking is also a difficulty. A mixed response is received. It is perceived from two responses that there exists some untidiness.	• It is accessible • Most respondents find it unclean • Hence, physical characteristics are not satisfied.	The street is accessible by walking,	1. Not maintained well on one side of the road. 2. Trees provide shade to an extent.
Visual	**xxx**	**xxx**	Variety of shops and facades, proportionate.	1. A long street with residential buildings and commercial facilities on the ground floor.
Social	The street has facilities to foster social activities; some sit outside the shop to socialize. The restaurant offers outdoor seating spaces.	1. Some facilities are provided to foster social activities, but social activities are not reported. 2. Hence, social characteristics are not satisfied.	Several social activities are taking place on this street. People walking, gathering, shopping etc are observed.	1. No specific gathering nodes were found in the street. 2. A paved area in front of the cold store.
Environmental	Shading from building is highlighted by one. Moreover, the intensity of heat is	No considerations for the environment.	No environmental consideration.	1. Trees exist in the street

	found to be less compared to the other streets.			
Economic	Most users find that the street caters to all their needs.	1. It caters to the economic needs 2. Economic characteristics are fulfilled.	The street caters to various retail and recreational facilities.	1. Various types of shops exist.
Functional	The street does not have proper parking facilities. It is difficult to walk on the sidewalk because of other things occupying the space. There is less space to walk on the sidewalks. In general, there is no safety problem but there is a lack of space to walk, forcing one to walk on the road.	1. Not walking-friendly 2. Sidewalks are safe. 3. Crossing facilities are safe. 4. It is not functional, as there are issues with usability highlighted, such as tight space.	Irrespective of the condition of lack of proper sidewalks	1. Street furniture produces a positive impact. 2. Streetlights are available but there is a concern related to safety for women 3. Sidewalks are narrow on one side of the street and wide on the other side. 4. Connects to the nearby avenue and highway through a secondary road 5. Sahari Studio acts as a prominent landmark, due to its size, location and lighting compared to nearby shops
Urban Qualities of Street	**xxx**	**xxx**	Not transparent, complex.	1. Limited features are contributing to its imageability.

Table 5. 40: Comparison of data produced from 4 methods

Source: Author

5.6.3 Evaluation of Street 3- Summary

Characteristics	Method 1	Method 2	Method 3	Method 4
Physical	It is difficult to access their vehicles due to cars being parked in the middle of the road and due to the width of the road. - It is dirty and requires additional cleaning. There is also a problem with it not being well-maintained.	1. It is accessible and clean. 2. Not enough parking spaces, and there is traffic congestion. 3. It does not satisfy physical characteristics.	The street is accessible. However, vehicles are restricted as vehicles are parked on one side of the road. It is clean.	1. Only road number 2. Congestion when cars try to pass by due to the narrow width of the street. 3. Accessible from commercial street adjacent. However, accessing the adjacent inner streets through the car is difficult.
Visual	**xxx**	**xxx**	Visually appealing, proportionate street.	1. Retail shops are adjacent at a walkable distance. 2. Narrow street. Inner road of 1 m directing to houses. 3. An old traditional residential street with colourful buildings. 4. Uneven. Stairs and parts of the building extend to the road.
Social	1. The available benches are not used by the people.	1. The park available nearby is the only socialization aspect reported. However, no activities in the street are reported. 2. The street does not satisfy social activities within it.	During the evening, social gathering is observed.	1. Children and cyclists are found in the street.
Environmental	There are no environmental considerations.	1. Some canopies and shelters are found in the street. 2. Satisfies the environmental character.	No shading, except for buildings.	1. Few plants and flowers in residents' planters. 2. Very hot 3. Untidy
Economic	1. There are only limited facilities. Lack of recreational activities.	3. Caters to all the facilities. 4. Satisfies the economic needs.	All facilities are available in walkable distance.	1. Some shops exist nearby.
Functional	Difficulty to find parking facility exists. Usability issues are lack of sufficient space for a car to pass by leading to	5. Crossing facilities are safe. 6. Sidewalks are safe.	Regarding usability, people are seen entering, exiting and	1. Unique traditional organic building.

	accidents such as scratches on cars and people parking wrongly restricting the movement of cars. Lack of family-friendliness is another issue reported. Though sufficient walkways exist; it is blocked by parked cars. Safety concern exists as it is reported to be unsafe at night due to poor lighting, which leads to anti-social activities. Cars block the road affecting the children. The need for additional pedestrian crossings exists.	7. It is walking-friendly and is used by pedestrians. 8. Fulfils the functional characteristics.	cycling. It is walkable. It is also safe for a person walking.	
Urban Qualities of Street	**xxx**	**xxx**	The street does not offer transparency, as the buildings are densely placed next to each. It is highly complex, due to the people, vehicles, narrow walkways and elements close to each other. It satisfies the human scale and has imageability. The unique doorsteps, door styles, facades and colours add to the imageability.	Heavily complex. The street has a pocket road and the narrow streets of 1m leading to houses that cannot be seen from the residential street 611. Moreover, the connectivity to adjacent streets is congested and uneven.

Table 5. 41: Comparison of data produced from 4 methods

Source: Author

5.6.4 Evaluation of Street 4- Summary

Characteristics	Method 1	Method 2	Method 3	Method 4
Physical	The street is accessible from the adjacent streets. However, there is a difficulty for those accessing through vehicles. All participants agreed that the street is clean.	1. The signs are clear. 2. It is not clean. 3. It satisfies the physical characteristics.	The street is accessible. But it is not easy to enter and exit due to the street width. It is clean.	1. Unpaved. 2. House numbers and road number 3. Difficult for vehicles to pass, but no traffic 4. Limited, informally parked on the road 5. Difficult to access by car. It is accessible to pedestrians.
Visual	**xxx**	**xxx**	The street fully satisfies the visual characteristic of liveability. This is because of its variety of residential facades, that are arranged organically and in a visually pleasing way.	1. Narrow Street with Dense Buildings (1-2 storey houses)
Social	Though there are informal seating available, there aren't any social activities reported taking place.	The street does not satisfy social activities within it.	Children socialise on the streets.	1. Road and inner roads 2. Open informal parking lot
Environmental	No environmental considerations exist except for some shading.	It does not satisfy the environmental character.	The buildings provide shade through their structure while walking. However, the issue of heat still prevails. People do not walk or stand to socialize in the outskirts during the daytime.	1. Shading from an extension of houses 2. No other considerations
Economic	The street caters to all the needs of the users.	Satisfies the economic characteristic	Several retail and recreational facilities are available on the outskirts of the entire region. It is at a walkable distance. Hence it is satisfactory.	
Functional	Usability is restricted due to crowding in the street, lack of parking facility, illegal parking and not being able to drive in the street properly. Traffic jams also exist due to illegal parking. In general, the street is walking-friendly, but there is difficulty while walking to the inner road.	9. Crossing facilities are safe. 10. Sidewalks are safe. 11. It is walking-friendly and is used by many pedestrians. 12. It does not have enough parking spaces.	There exists an issue with usability. These include a lack of a proper walkway. As a result, children are found playing on vacant land in a parallel street, but not on this street. This is mainly because of the lack of proper space planning and space segregation for sidewalks and parking. Safety concerns also exist here, as it appears	1. Known for the Mosque and heritage houses 2. Directs to Mosque

	The street is safe, except for difficulty in crossing and street cats.	13. Does not satisfy the functional characteristic due to a lack of parking space, traffic and narrow street.	isolated when the mapping was conducted.	
Urban Qualities of Street	**xxx**	**xxx**	It cannot be considered transparent. This is because the buildings are tightly placed next to each other. It has a high level of complexity as it is a highly dense street filled with lots of residential buildings adjacent to each other. Vehicles parked, road, stairs etc adds to the complexity. It satisfies the human scale. Examples include a road that is sufficient for a person to walk and enter the street. Doorsteps leading to houses and sizes of doors suitable for entrance considering the user. But, the issue lies in the fact that this street has vehicles accessing the same road. The street satisfies imageability.	Unique and organic traditional houses

Table 5. 42: Comparison of data produced from 4 methods

Source: Author

Chapter 6 | Data Analysis | Case Study 3 | Riffa, Bahrain

6.1 Introduction

The second case study is Riffa. The following table presents the 4 streets selected from Riffa: 2 Commercial and 2 Residential Streets.

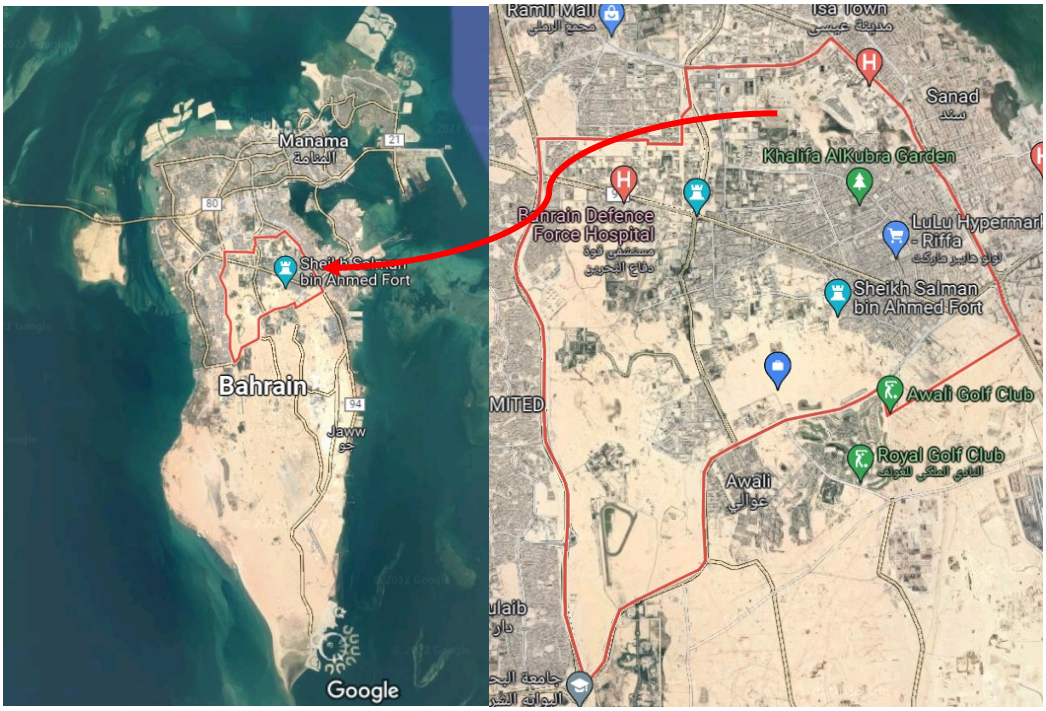


Fig. 6. 1 Satelite Image of Riffa, Bahrain

Source: Author, 2022

Type	Street No.	Street Name	Length	Reason
Commercial Street	**Street 1**	Riffa Souq	0.6km	A populated commercial market road is known for its various amenities.
	Street 2	Bokowara Street	0.82km	A well designed and functioning commercial street.
Residential Street	**Street 3**	Road 977	0.17 km	A tertiary residential street with a retail complex
	Street 4	Road 973+974	0.14 km	A congested, poorly maintained street.

Table 6. 1: List of selected streets from Riffa, Bahrain

Source: Author

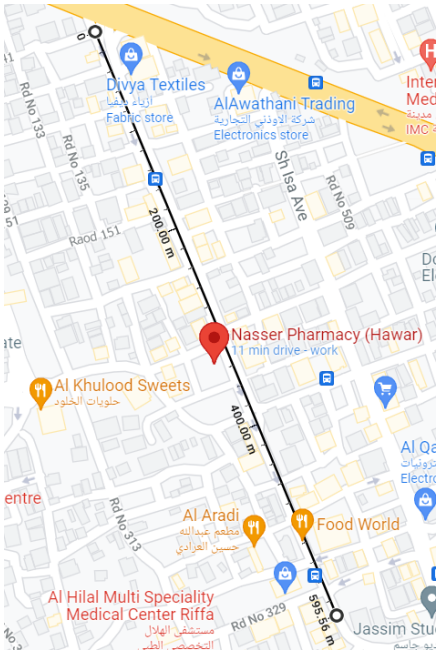


Fig. 6. 2: Google map screenshot of the Riffa Street 1 (Commercial) marked by Author

Source: Google Maps, 2022

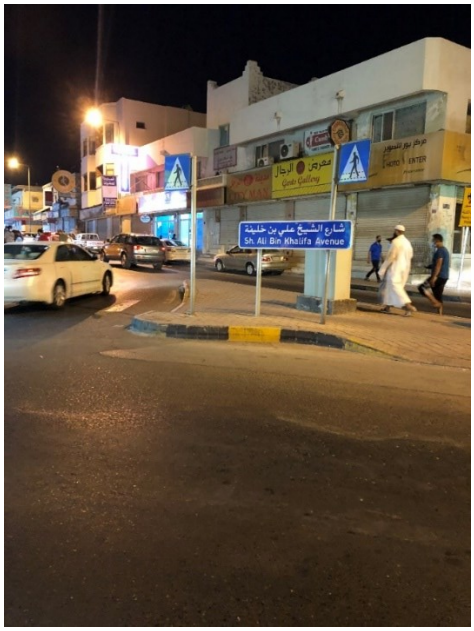


Fig. 6. 3: Photograph from the Riffa Street 1.

Source: Author, 2022

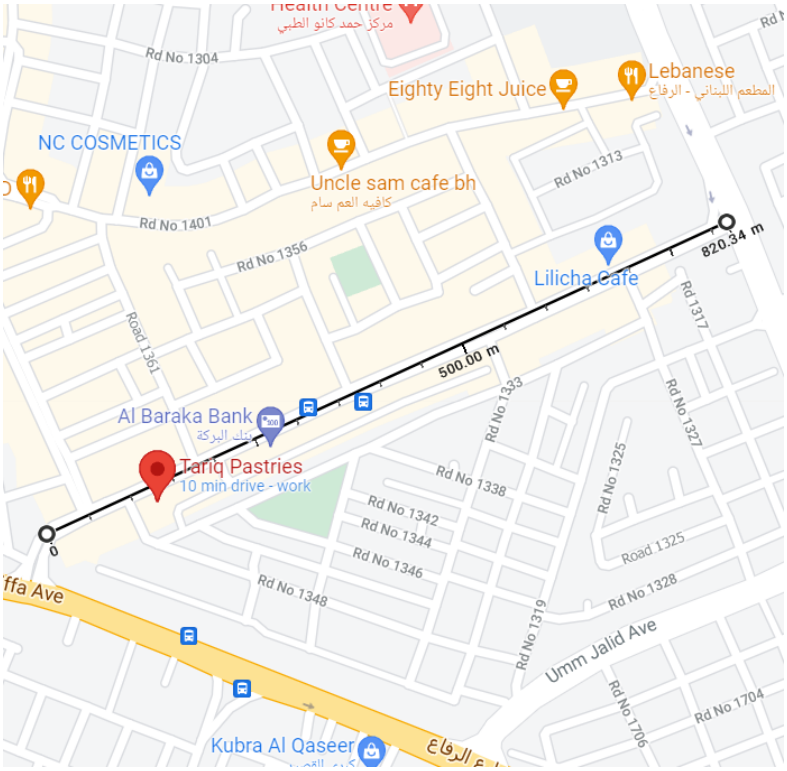


Fig. 6. 4 Google map screenshot of Riffa Street 2 (Commercial) Marked by Author

Source: Google Maps, 2022



Fig. 6. 5: The Riffa Street 2

Source: Author, 2022

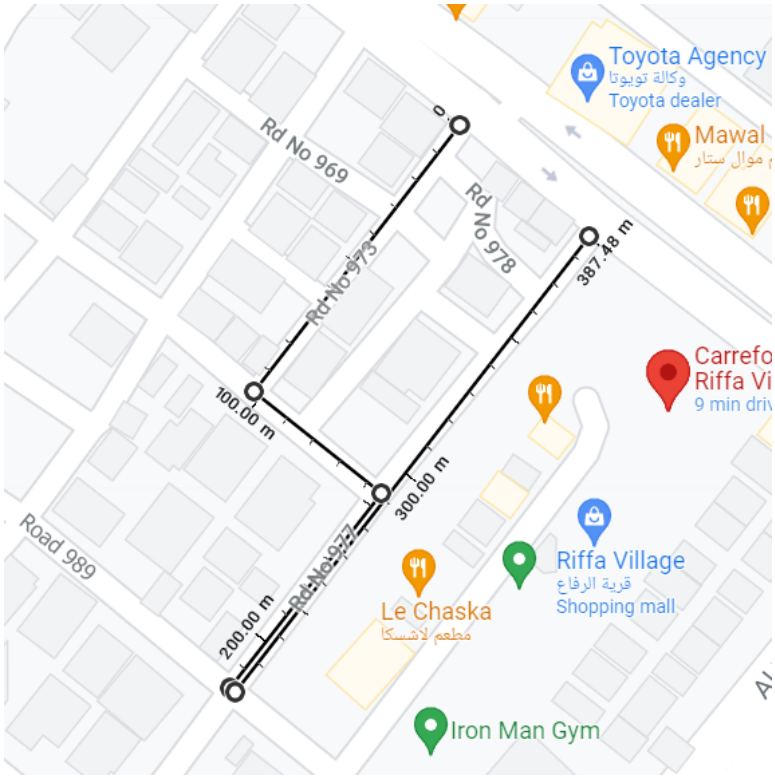


Fig. 6. 6: Google map screenshot of Riffa Street 3&4 (Residential) Marked by Author

Source: Google Maps, 2022



Fig. 6. 7 Riffa Residential Street 3 (left),
Street 4 (right)

Source: Author, 2022

6.2 Method 1: Interviews

6.2.1 Riffa Commercial Street 1- Riffa Souq

No. of participants: 5 from each street (Total Interviews:20)

5 random users of the street were interviewed using a structured questionnaire. They were conducted on 26 June 2021 from 8:00-9:00 pm. The different aspects of liveability assessed are: Physical, Economic, Environmental, Functional, Social and Urban Qualities.

Data Analysis:

1. Physical

a. Accessibility

The general question: "Do you find the street is accessible from adjacent streets, i.e., is it easy to access?

Following are the responses:

Respondents	Reponses
1	*"Yes it is accessible."*
2	*"Yes"*
3	"Yes."
4	"Yes we can access it" "
5	*"Yes"*

Table 6. 2: Interview Responses

Source: Author

Conclusion: The street is accessible.

2. Cleanliness

The general question: "Do you find the street clean?"

Following are the responses:

Respondents	Reponses
1	*"Yes."*
2	*"Yes it is clean."*
3	"Yes its very clean"
4	"It is clean"
5	*"Clean"*

Table 6. 3: Interview Responses

Source: Author

Conclusion: The street is clean.

3. Social

The general question: "Are there any social activities taking place in the street?"

Following are the responses:

Respondents	Reponses
1	"Yes theres children playing here"
2	"Its always having people and cars"
3	"Yes, always"
4	"Yes"
5	"Before there were children who used to come and fight here, as 4 people. Before there were many accidents in this street. There are also group of strangers who come in pick up at night and pick up group of people or drop them to the street. It is very suspicious whether a group is being sent to ask for money."

Table 6. 4: Interview Responses

Source: Author

Conclusion: There are good social activities here, but there is an issue with children gathering and fighting, resulting in accidents.

4. Economic

The general question: "Does the street cater to your different needs such retail/restaurants/recreation/services etc?

Following are the responses:

Respondents	Reponses
1	"Yes"
2	"Yes"
3	"No hospital in walking distance. There is only pharmacy."
4	"Everything we have here"
5	"Yes, it is here"

Table 6. 5: Interview Responses

Source: Author

Conclusion: All facilities are available in the street.

5. Environmental

The general question: Are there any considerations for the weather conditions? i.e., Shadings/Trees/Shelters to protect from the weather.

Following are the responses:

Respondents	Reponses
1	"No"
2	"Nothing"
3	"I don't think"
4	"There are chairs for the bus stop near the mosque"
5	"No, some small plants"

Table 6. 6: Interview Responses

Source: Author

Conclusion: There are no significant considerations for the environment.

6. Functionality-

c. Usability & Parking facilities

The general question: Do you travel by your car or walk in the street? Are there any problems you face in general in terms of usability of this street? Are there problems with the parking?

Following are the responses:

Respondents	Reponses
1	"There is problem with parking." "There should separate parking for customers and separate staff parking."
2	"The problem here is parking"
3	"Difficult to get parking"
4	"Not much"
5	"Parking is a serious problem here. Customers who come from far find it difficult and the business."

Table 6. 7: Interview Responses

Source: Author

Conclusion: Parking is found as a critical issue affecting the staff and customers of the street.

d. Walkability & Safety

The general question: Is the street walking-friendly? Are the street and sidewalks safe to walk?

Following are the responses:

Respondents	Reponses
1	"For walking it is good"
2	"No problem here"
3	"Yes, its good. Safe"
4	"Crossing the street should be done carefully. Yes. 2 people can walk at a time properly."
5	"No. There are many problems here. There are ladies who come and ask for money. Sometimes they enter the shops also. This is why the other customers also leave in fear without shopping. They also come in the footpath and ask people who are walking." "The ladies who come while we work or walk, are causing safety problem, they even call bad words. This affects the business."

Table 6. 8: Interview Responses

Source: Author

Conclusion: A mixed response was received. There is an issue in crossing the street. Moreover, poor ladies begging for money are disturbing the pedestrians and customers.

6.2.1.1 Interim Conclusion on Street 1 | Riffa Commercial Street 1 based on Interviews Collected

1. **Physical- Accessibility-** The street is accessible.

   Physical- Cleanliness- The street is clean.
2. **Social:** There are good social activities here, but there is an issue with children gathering and fighting, resulting in accidents. There is also a critical issue highlighted where a group of people are being dropped off and picked up from the street to collect money.
3. **Economic**: All facilities are available in the street.
4. **Environmental:** There are no significant considerations for the environment.

5. **Functionality: Usability:** Parking is found as a critical issue affecting the staff and customers.

   Functionality: Walkability & Safety: A mixed response was received. There is an issue in crossing the street. Moreover, ladies begging for money is affecting the pedestrians and customers.

6.2.1.2 Conclusion on Liveability of Street 1

The street satisfies the physical characteristics of liveability. The street has some social activities but quarrels among children are reported. The street has significant issues related to functionality; this includes parking and begging. This has affected the users' walkability and businesses, though the street caters to all the economic needs.

6.2.2 Riffa Commercial Street 2- Bokowara Street

Data Analysis:

1. Physical

7. Accessibility

The general question: "Do you find the street is accessible from adjacent streets, i.e., is it easy to access?

Following are the responses:

Respondents	Reponses
1	"It is usually busy in the weekend, 6:30-8:30 is the peak time".
2	"I use this street 2 times every day. I travel by car. The parking is ok"
3	"There is no proper waste bin, it needs to be a bigger waste bin"
4	"It is very comfortable for me to walk"
5	"Yes, it is easy"

Table 6. 9: Interview Responses

Source: Author

Conclusion: The street has easy access.

8. Cleanliness

The general question: “Do you find the street clean?”

Following are the responses:

Respondents	Reponses
1	“It’s clean”
2	“It is congested and dirty sometimes to walk”
3	“Yes, it’s clean”
4	“Yes”
5	“Some waste we can find sometimes”

Table 6. 10: Interview Responses

Source: Author

Conclusion: A mixed response was received. Issue of congestion and cleanliness exists.

9. Social

The general question: “Are there good Seating facilities/ gathering spots in the street that you would use? (Shelter/canopy/benches)

Following are the responses:

Respondents	Reponses
1	“Yes, it is always lively”
2	“I don’t see any gatherings here”
3	“No”
4	“No seats”
5	“I don’t sit here but there are other people who sit”

Table 6. 11: Interview Responses

Source: Author

Conclusion: The street is used by some people, but there is no specified seating.

10.Economic

The general question: “Does the street cater to your different needs such retail/restaurants/recreation/services etc?

Following are the responses:

Respondents	Reponses
1	“There are good retail facilities here” He added, “Before there was rush and many customers, from Qatar, but now business is down”
2	“There are all shops, but there are children who come and makes trouble”
3	“There are no hospitals here which can be reached in walkable distance”
4	“Yes”
5	“Everything is available here. I always buy tea from Karak Shop here. Every morning I buy tea and walk to my office nearby”

Table 6. 12: Interview Responses

Source: Author

Conclusion: The street has good economic facilities.

11.Environmental

The general question: Are there any considerations for the weather conditions? i.e., Shadings/Trees/Shelters to protect from the weather.

Following are the responses:

Respondents	Reponses
1	“There are no shadings”
2	“No”
3	“No consideration”
4	“No”
5	“There is a bus stand, but there is no shading here. This should be resolved”.

Table 6. 13: Interview Responses

Source: Author

Conclusion: There are no environmental considerations.

12.Functionality-

e. Usability

The general question: Do you travel by your car or walk in the street? Are there any problems you face in general in terms of usability of this street?
Following are the responses:

Respondents	Reponses
1	“No”
2	“No problem with usability”

3	"I walk and come here, I did not find any problem"
4	"Just we cannot cross the road easily now, before there was no grill in the middle. Now we have to go till the crossing to go to other side. It is a problem."
5	"No, I am happy with this area. I walk"

Table 6. 14: Interview Responses

Source: Author

Conclusion: Users are restricted to crossing the road at pedestrian crossings only and not anywhere else due to street dividers. However, most of the respondents are satisfied.

f. Walkability & Safety

The general question: Is the street walking-friendly? Are the street and sidewalks safe to walk?
Following are the responses:

Respondents	Reponses
1	"There is a barrier to walk, which is the grill. Before it was not there, and it was easy for us to walk"
2	"There is an issue, though there is CCTV, some teenagers used to come and disturb us inside the shop. They even go to other shops, you can ask in all other shops in this street. They come in their cycle"
3	"It is difficult to walk in the footpath as cars are parked, we need to walk in the road"
4	"It is good"
5	"It is safe"

Table 6. 15: Interview Responses

Source: Author

Conclusion: Difficulty to walk on sidewalks causes users to walk on the roads. Teenagers are reported to disturb the shopkeepers.

6.2.2.1 Interim Conclusion on Street 2 | Riffa Commercial Street 2 based on Interviews Collected

1. **Physical- Accessibility-** The street has easy access.

   Physical- Cleanliness- A mixed response was received. An issue of congestion and cleanliness exists.

2. **Social:** The street is used by some people, but there is no specified seating.
3. **Economic**: The street has good economic facilities.

   Environmental: There are no environmental considerations.
4. **Functionality: Usability:** Users are restricted to crossing the roads at pedestrian crossings only and not anywhere else due to street dividers. Most of the respondents are satisfied.

   Functionality: Walkability & Safety: Street divider is found to affect users. Difficulty walking on sidewalks causes users to walk on the roads. Teenagers are reported to affect the shopkeepers.

6.2.2.2 Conclusion on Liveability of Street 2

The street satisfies the physical characteristics to an extent but does not fully satisfy the cleanliness indicator. It has some social activities and satisfies the economic characteristics. The street does not satisfy the environmental characteristics. Certain issues are highlighted related to usability, walkability and safety. However, most other users do not find any issues. Overall, the street could be liveable in the future, if these issues are rectified and if there is surveillance at regular intervals.

6.2.3 Riffa Residential Street 1

Data Analysis:

1. **Physical**

a. **Accessibility**

The general question: "Do you find the street is accessible from adjacent streets, i.e., is it easy to access?

Following are the responses:

Respondents	Reponses
1	"Yes, its easy"
2	"I can access it well"

3	"Yes"
4	"Yes"
5	"Yes. It is"

Table 6. 16: Interview Responses

Source: Author

Conclusion: The street is accessible.

b. Cleanliness

The general question: "Do you find the street clean?"

Following are the responses:

Respondents	Reponses
1	*"Yes"*
2	*"Yes"*
3	*"Yes"*
4	*"Yes, it is clean"*
5	*"Yes"*

Table 6. 17: Interview Responses

Source: Author

Conclusion: The street is clean.

2. Social

The general question: "Are there any social activities taking place? Are there any seating facilities available?"

Following are the responses:

Respondents	Reponses
1	"Yes"
2	"Yes always there are people here who visit it to meet at the restaurants"
3	"Yes there is seating here outside the restaurant"
4	"Yes"
5	"It is having many activities"

Table 6. 18: Interview Responses

Source: Author

Conclusion: There are several social activities taking place in the street.

3. Economic

The general question: "Does the street cater to your different needs such retail/restaurants/recreation/services etc?

Following are the responses:

Respondents	Reponses
1	"I find all facilities nearby, but to meet my relatives and go to church, I have to travel far away.
2	"There are shops near but it is restaurants mostly, I buy groceries from other part of Riffa"
3	"There are all shops and services available here like supermarket, banks, restaurants, but the things available in the supermarket is limited, so we go to other areas."
4	"I walk in this street for all my needs"
5	"But to travel to my work it is far, so I use public bus"

Table 6. 19: Interview Responses

Source: Author

Conclusion: All facilities are available in the street.

4. Environmental

The general question: Are there any considerations for the weather conditions? i.e., Shadings/Trees/Shelters to protect from the weather.

Following are the responses:

Respondents	Reponses
1	"There are good outdoor sitting for cafes and restaurants with shading. It is a good spot to walk"
2	"Trees"
3	"There are trees here in the ground"
4	"Some greenery is here, its good"
5	"We need more trees so there is less sun when I walk"

Table 6. 20: Interview Responses

Source: Author

Conclusion: The street has trees and shadings from restaurants.

5. Functionality

a. Usability

The general question: Do you travel by your car or walk in the street? Are there any problems you face in general in terms of usability of this street?

Following are the responses:

Respondents	Reponses
1	"Walk" "No"
2	"I come in my car" "It is difficult for customers to come here as it's in the inside road"
3	"No place"
4	"I have car, no problem here"
5	"No"

Table 6. 21: Interview Responses

Source: Author

Conclusion: It is difficult to locate the shops (Retail complex). No other issues.

13.Walkability & Safety

The general question: Is the street walking-friendly? Are the street and sidewalks safe to walk?
Following are the responses:

Respondents	Reponses
1	"It is safe to walk"
2	"The cars come suddenly from the other street and this leads to safety issues"
3	"Sometimes I face difficulty to cross road and go to my house as there are many cars"
4	"Yes "
5	"I like to walk here, I didn't find any problem for safety"

Table 6. 22: Interview Responses

Source: Author

Conclusion: There is a difficulty to cross the road.

6.2.3.1 Interim Conclusions on Street 3 | Riffa Residential Street 1 based on Interviews

1. **Physical: Accessibility-** The street is accessible.

   Physical: Cleanliness- The street is clean.

2. **Social:** There are several social activities taking place in the street.
3. **Economic**: All facilities are available in the street.
4. **Environmental:** The street has trees and shading from restaurants.
5. **Functionality: Usability:** There is a difficulty for the users to locate the shops (Retail complex). No other issues.

   Functionality: Walkability & Safety: It is difficult to cross the road.

6.2.3.2 Conclusions on Liveability of Street 4

The street satisfies the physical, economic and social characteristics of liveability. Interestingly, the street also fulfils the environmental characteristics taking into consideration its area size. The only drawback is related to crossing roads and identification. If there are proper pedestrian crossings with signages, it can be a highly liveable street.

6.2.4 The Riffa Residential Street 2

Data Analysis:

1. **Physical**
   a. **Accessibility**

The general question: "Do you find the street is accessible from adjacent streets, i.e., is it easy to access?

Following are the responses:

Respondents	Reponses
1	"Yes"
2	"Yes its near to main highway"
3	"It is easy"

4	"Yes"
5	"It is"

Table 6. 23: Interview Responses

Source: Author

Conclusion: The street is accessible.

b. Cleanliness

The general question: "Do you find the street clean?"

Following are the responses:

Respondents	Reponses
1	"Yes"
2	"They come from company every day to clean"
3	"Its very neat place"
4	"Sometimes its dirty when there's sandstorm"
5	"It is sometimes not clean outside my door and I have observed that the trash from nearby areas are collected here"

Table 6. 24: Interview Responses

Source: Author

Conclusion: There are issues with cleanliness. Residents find it dirty during the sandstorms.

2. Social

The general question: "Are there good Seating facilities/ gathering spots in the street that you would use? (Shelter/canopy/benches)

Following are the responses:

Respondents	Reponses
1	"Sometimes when guests arrive, we gather in the street, usually during the weekends"
2	"This street was full of children. They always play during afternoons and evenings. But, now it is reduced, as there was news of mongoose walking in the area, children are afraid to play"
3	"It was very active and noisy before"
4	"We take our toddlers to walk and play every evening"
5	"We find noise and sounds of children playing behind this street."

Table 6. 25: Interview Responses

Source: Author

Conclusion: Plenty of social activities take place on this street.

3. Economic

The general question: "Does the street cater to your different needs such retail/restaurants/recreation/services etc?

Following are the responses:

Respondents	Reponses
1	"I find it safe to walk but I am afraid to walk my dog as there are cars coming in unexpectedly. Because there is less light"
2	"No, I have not found any shadings in this street except for the cars and some trees"
3	"Yes, sometimes we buy from here, but other shopping is mainly from lulu or other malls"
4	"Yes"
5	"Carrefour supermarket is in walking distance, we also have pharmacy and other restaurants right here"

Table 6. 26: Interview Responses

Source: Author

Conclusion: The street caters to the different needs of users.

4. Environmental

The general question: Are there any considerations for the weather conditions? i.e., Shadings/Trees/Shelters to protect from the weather.

Following are the responses:

Respondents	Reponses
1	"We have a small garden and plants in our compound"
2	"There is shaded parking for cars, we can walk under it"
3	"Shading for cars"
4	"Some trees"
5	"There are shading from trees"

Table 6. 27: Interview Responses

Source: Author

Conclusion: The street is found to have shading from trees.

5. Functionality-

a. Usability

The general question: Do you travel by your car or walk in the street? Are there any problems you face in general in terms of usability of this street?
Following are the responses:

Respondents	Reponses
1	"There are parking available for residents"
2	"It is difficult to park in my garage, as the road is very narrow and there are cars parked on the opposite side."
3	"It is okay I think, because I come by walk or transport"
4	"Both" "No problem it's a good street"
5	"No problem"

Table 6. 28: Interview Responses

Source: Author

Conclusion: It is difficult to park/drive due to cars being parked on opposite sides.

b. Walkability & Safety

The general question: Is the street walking-friendly? Are the street and sidewalks safe to walk?
Following are the responses:

Respondents	Reponses
1	"I find it safe to walk but I am afraid to walk my dog as there are cars coming in unexpectedly. Because there is less light"
2	"Yes, its walking-friendly, for walking there is space"
3	"I find it safe here"
4	"It is very safe and very good for children" "They enjoy to play here"
5	"Yes" "Yes"

Table 6. 29: Interview Responses

Source: Author

Conclusion: The street does not have sufficient lighting.

6.2.4.1 Interim Conclusions on Street 4 | Riffa Residential Street 2 based on the Interviews:

1. **Physical- Accessibility-** The street is accessible.

   Physical- Cleanliness- There exist issues with cleanliness. Residents find it dirty during sandstorms.
2. **Social:** Plenty of social activities take place on this street. Children have damaged properties.
3. **Economic**: The street caters to the different needs of users.
4. **Environmental:** The street is found to have shading from trees.
5. **Functionality: Usability:** Difficulty to park/drive exists due to cars being parked on opposite sides.

   Functionality: Walkability & Safety: The street does not have sufficient lighting.

6.2.4.2 Conclusions on Liveability of Street 4

Though the street satisfies the accessibility indicator of liveability, it does not satisfy the cleanliness all the time. Hence, it does not fully satisfy the physical characteristics. The street does satisfy the social characteristics and environmental characteristics. The economic facilities are available at walkable distances making it satisfactory. Few, but significant drawbacks are related to the functional characteristics. There is an issue with driving and parking as it is congested with vehicles. Yet another crucial issue is related to stalking and poor lighting. Functional issues related to usability and safety need to be rectified to seek a higher level of liveability.

6.3 Method 2: Online Questionnaire

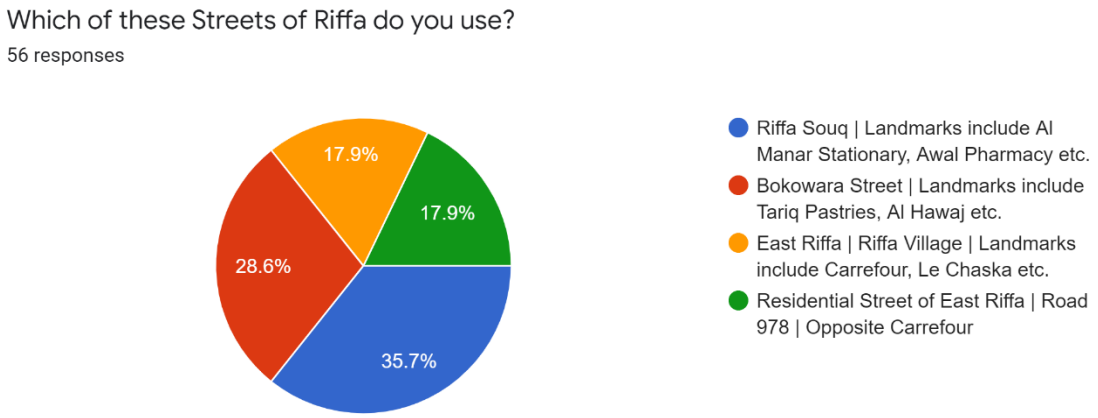


Fig. 6. 8: Survey Responses Street 1

Source: Author, 2022

6.3.1 Riffa Commercial Street 1

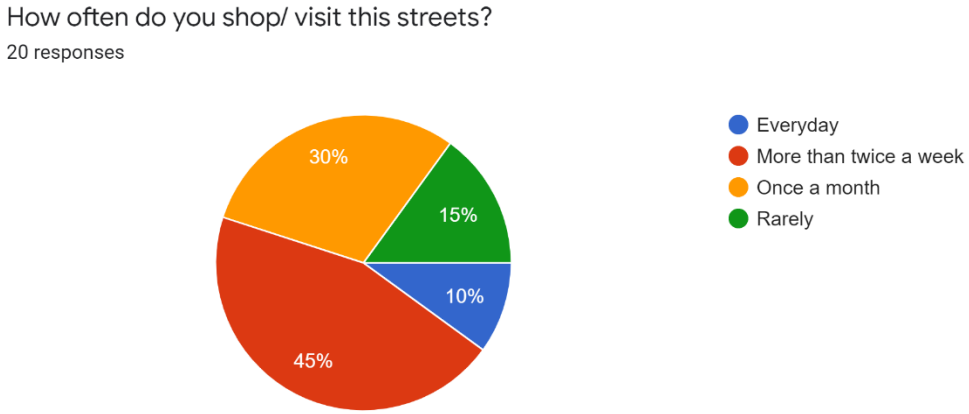


Fig. 6. 9 Survey Responses Street 1

Source: Author, 2022

58.3% of the respondents agreed that they visited the street more than twice a week. While 33.3% visited it once a month. Only 8.3% visited the street rarely. When asked about the mode of transport, 83.3% of the respondents visited the street by vehicle and only 4 participants visited by walking.

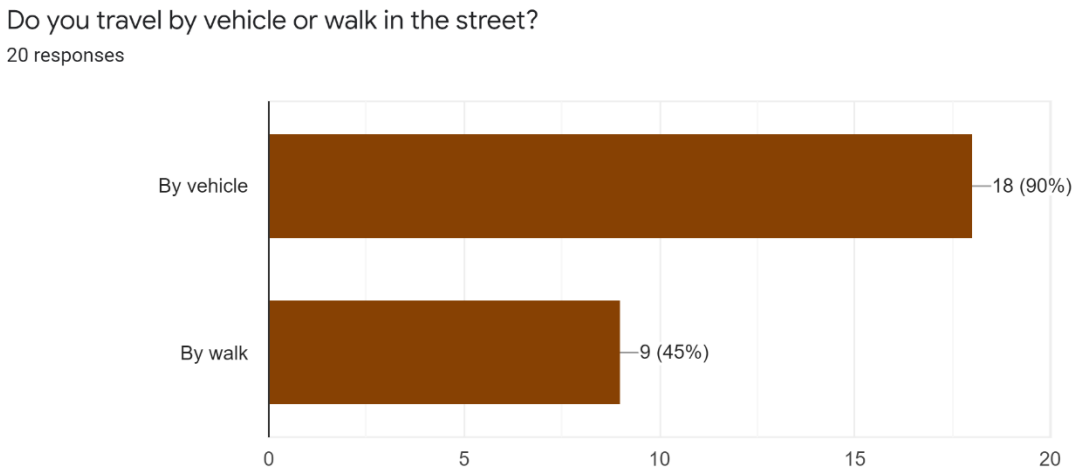


Fig. 6. 10 Survey Responses Street 1

Source: Author, 2022

90% of the respondents travel by vehicle, others walk.

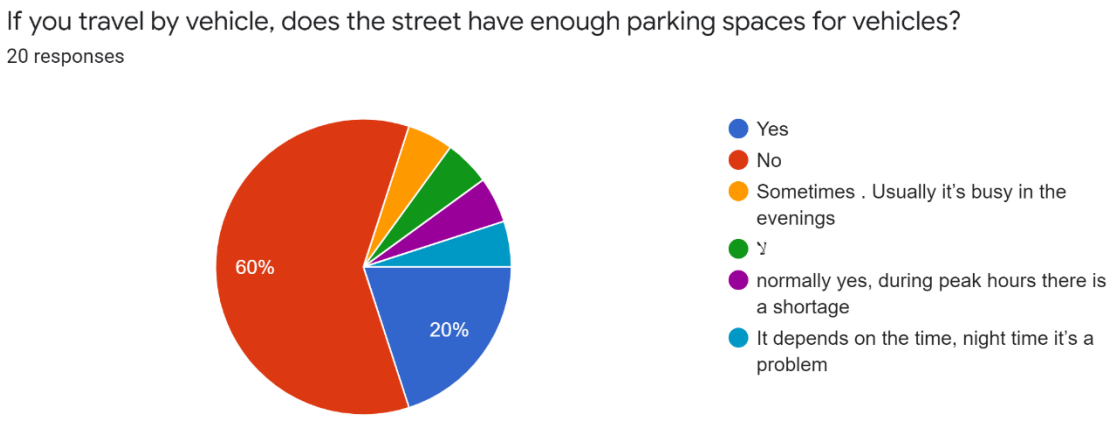


Fig. 6. 11 Survey Responses Street 1

Source: Author, 2022

Some issues highlighted related to parking facilities are that the street is usually busy in the evening and shortage of parking during peak hours.

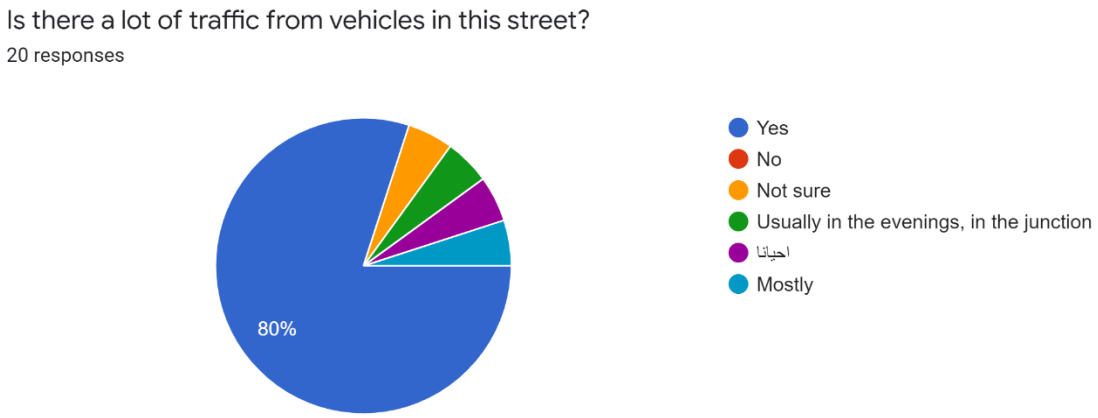


Fig. 6. 12 Survey Responses Street 1

Source: Author, 2022

80% of the respondents find a lot of traffic from vehicles on this street.

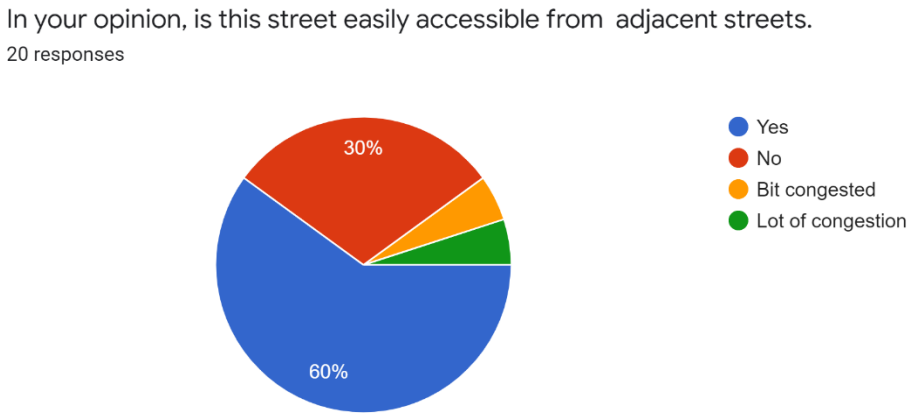


Fig. 6. 13 Survey Responses Street 1

Source: Author, 2022

60% of the respondents find the street easily accessible. One reported that the street is a bit congested and another reported there is a lot of congestion.

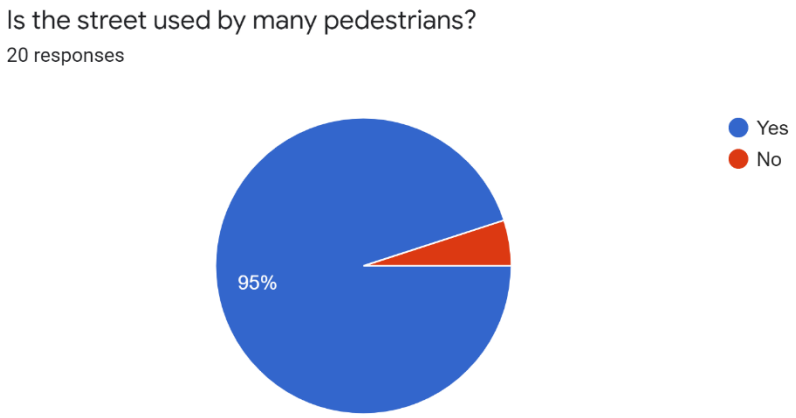


Fig. 6. 14 Survey Responses Street 1

Source: Author, 2022

95% of the respondents reported that the street is used by many pedestrians.

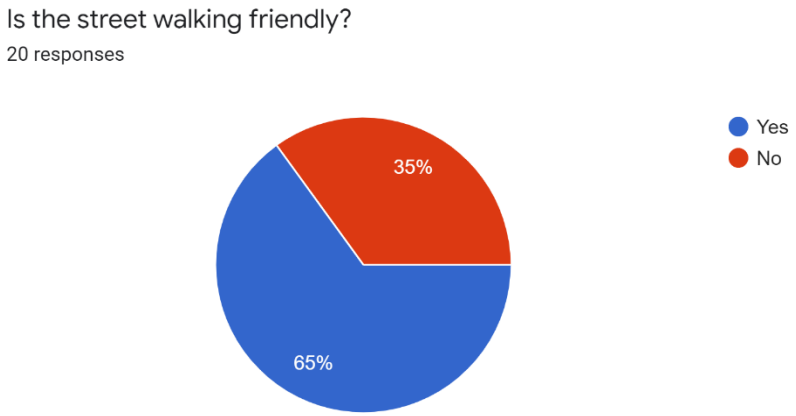


Fig. 6. 15 Survey Responses Street 1

Source: Author, 2022

65% of the respondents find the street walking friendly. Others do not find it walking friendly.

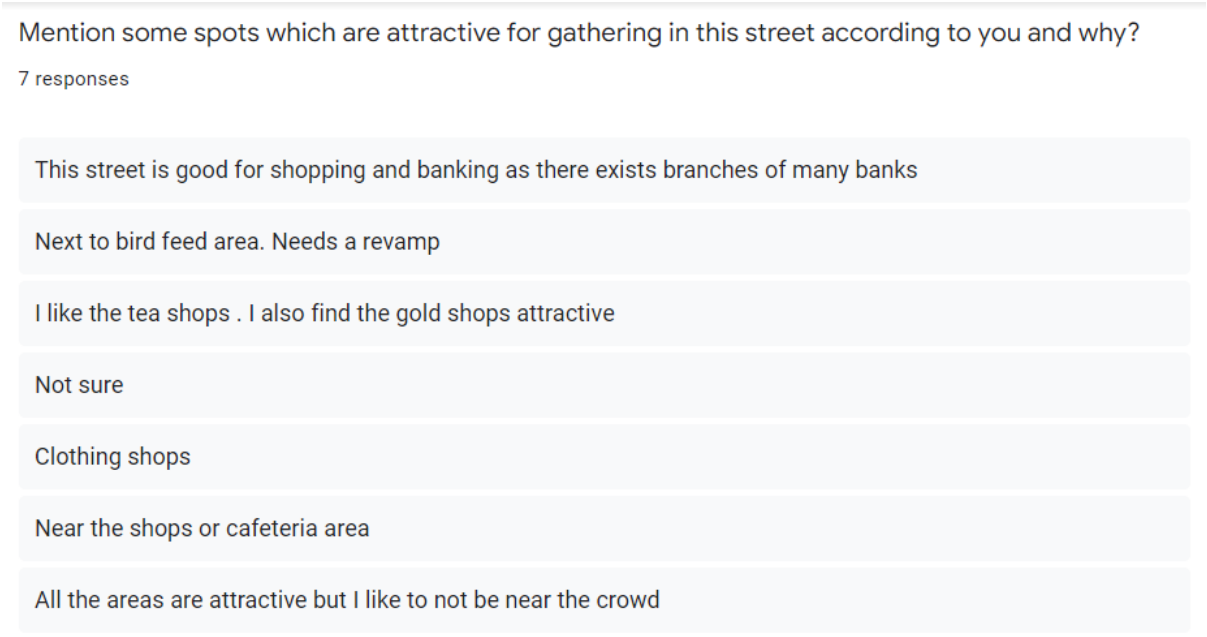


Fig. 6. 16 Survey Responses Street 1

Source: Author, 2022

Some attractive spots for gathering mentioned by the respondents are tree branches, the birds' feed area (Which is reported to need a revamp), tea shops, gold shops, clothing shops and the cafeteria area.

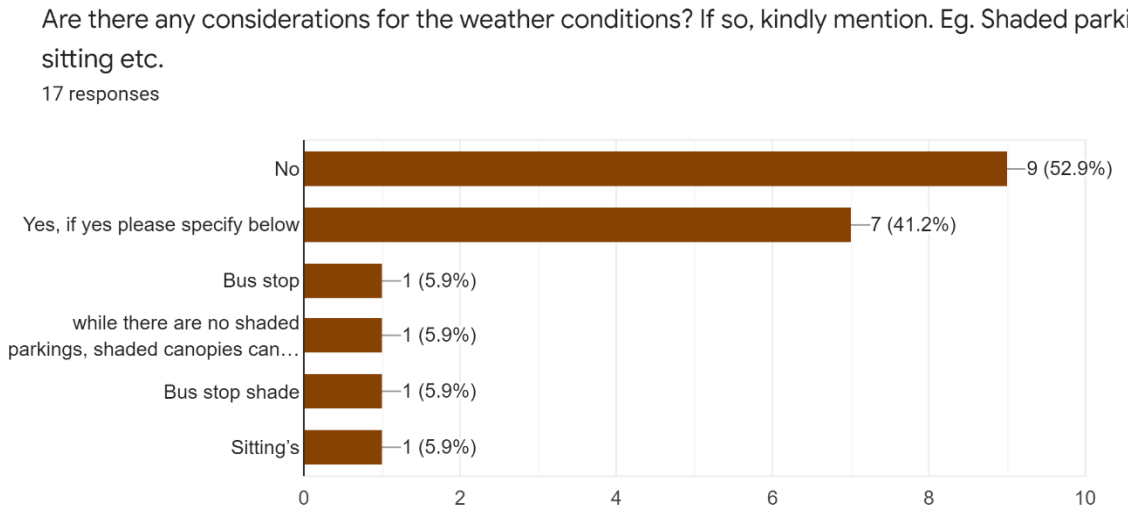


Fig. 6. 17 Survey Responses Street 1

Source: Author, 2022

52.9% of the respondents do not find any environmental considerations.

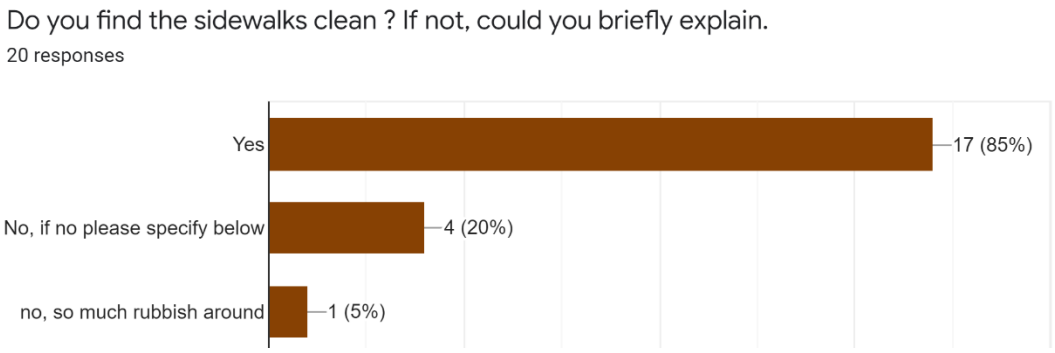


Fig. 6. 18 Survey Responses Street 1

Source: Author, 2022

85% of the respondents find the sidewalks clean. But one respondent reported that there is rubbish around.

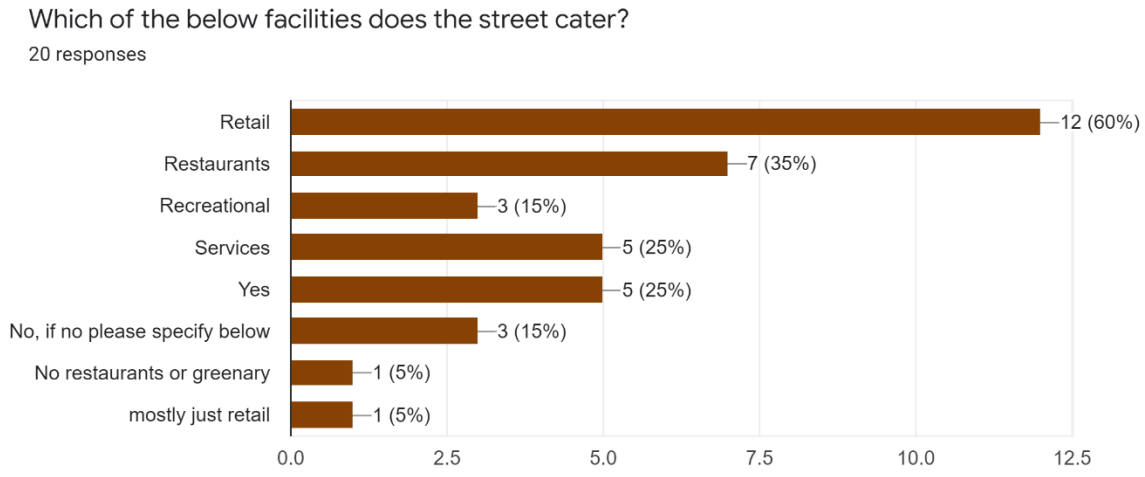


Fig. 6. 19 Survey Responses Street 1

Source: Author, 2022

The street caters to all the facilities mentioned above. But one mentioned that there are no restaurants or greenery.

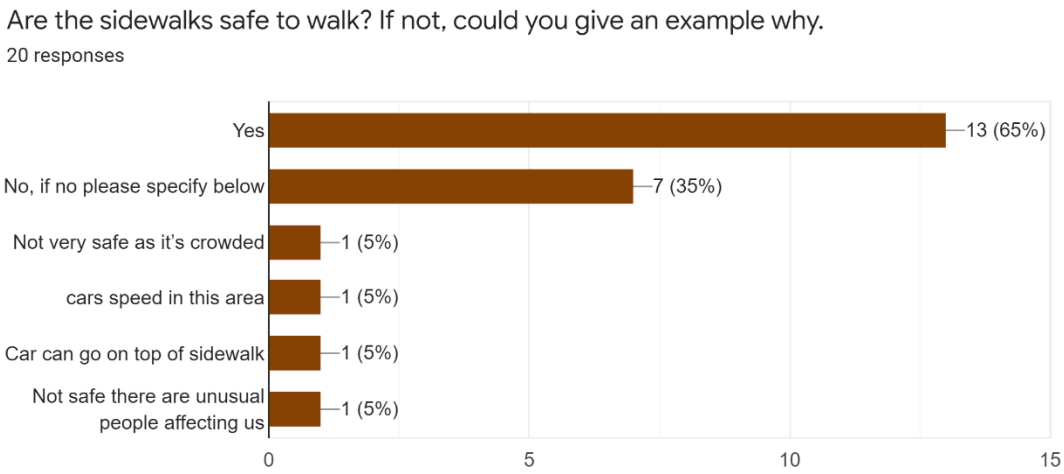


Fig. 6. 20 Survey Responses Street 1

Source: Author, 2022

85% of the respondents find the sidewalks safe to walk. But one reported that it is not safe as it is crowded. Another reported that the cars speed in this area. Another reported that cars are driving on the sidewalks. Other users are also reported to affect the pedestrians.

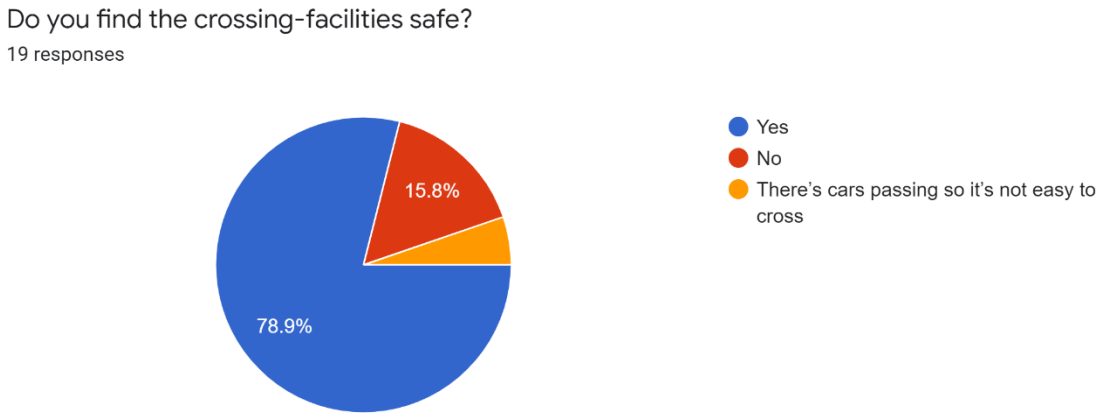


Fig. 6. 21 Survey Responses Street 1

Source: Author, 2022

78.9% of the respondents reported that the crossing facilities are safe. One respondent reported that cars are passing which hinders crossing.



Fig. 6. 22 Survey Responses Street 1

Source: Author, 2022

90% of the respondents find the signboards, road signs and names of shops clear.

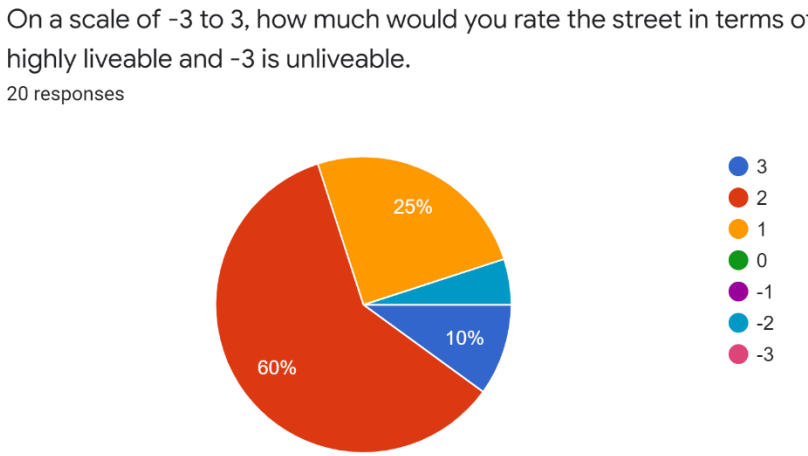


Fig. 6. 23 Survey Responses Street 1

Source: Author, 2022

60% of the respondents rated the street liveability +2, while 25% rated +1 and only 10% rated +3.

6.3.1.1 Conclusion on Liveability of Street 1 | Riffa Commercial Street 1

Physical:

- It is accessible
- It is clean

Functional:

- The street is walkable
- Crossing facilities are safe and sidewalks are safe
- Usability issues exist and affect those who walk.
- There is an issue with the parking facility
- Vehicular congestion exists.
- The street does not fully satisfy the functional characteristics as usability and safety are affected.

Social:

- The street is highly sociable and has a variety of activities taking place.

Economic:

- The street satisfies the economic characteristics.

Environmental:

- Few shading, shelter, and sitting are mentioned.

6.3.2. Riffa Commercial Street 2

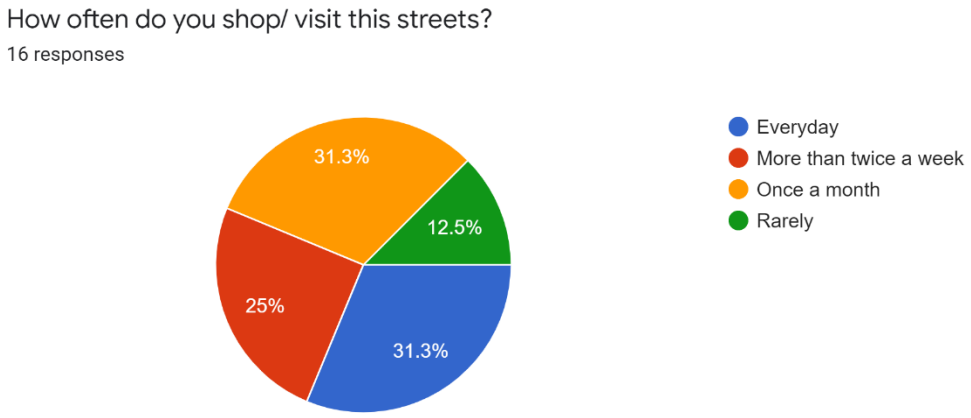


Fig. 6. 24 Survey Responses Street 2

Source: Author, 2022

31.3% of the respondents use the street once a month, 31.3% use it every day, 25% use it more than twice a week and 12.5% use it rarely.

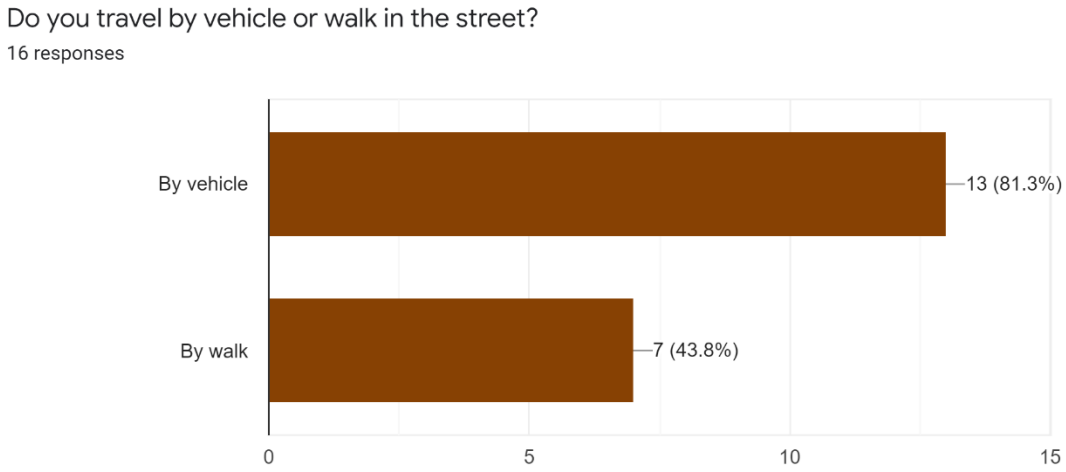


Fig. 6. 25 Survey Responses Street 2

Source: Author, 2022

81.3% of the respondents travel by vehicle and others walk.

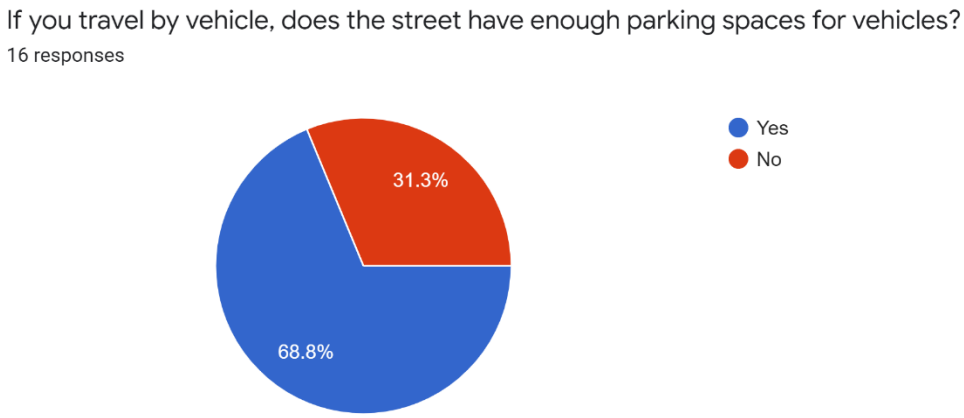


Fig. 6. 26 Survey Responses Street 2

Source: Author, 2022

68.8% of the respondents reported that the street has enough parking spaces.

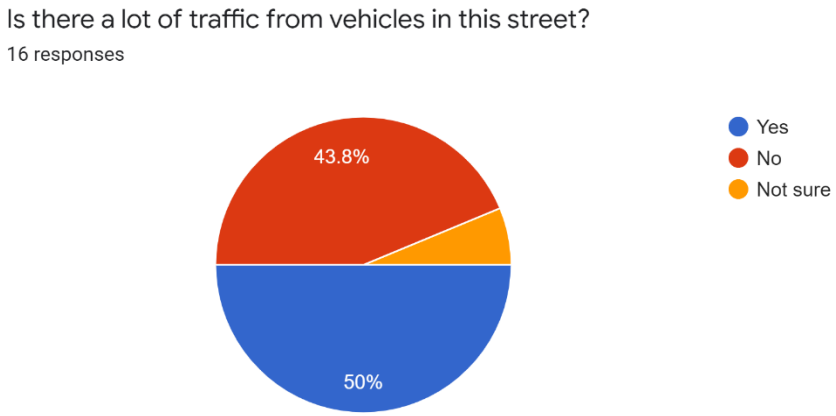


Fig. 6. 27 Survey Responses Street 2

Source: Author, 2022

50% of the respondents reported that there is a lot of traffic from vehicles on this street. But 40% didn't find traffic.

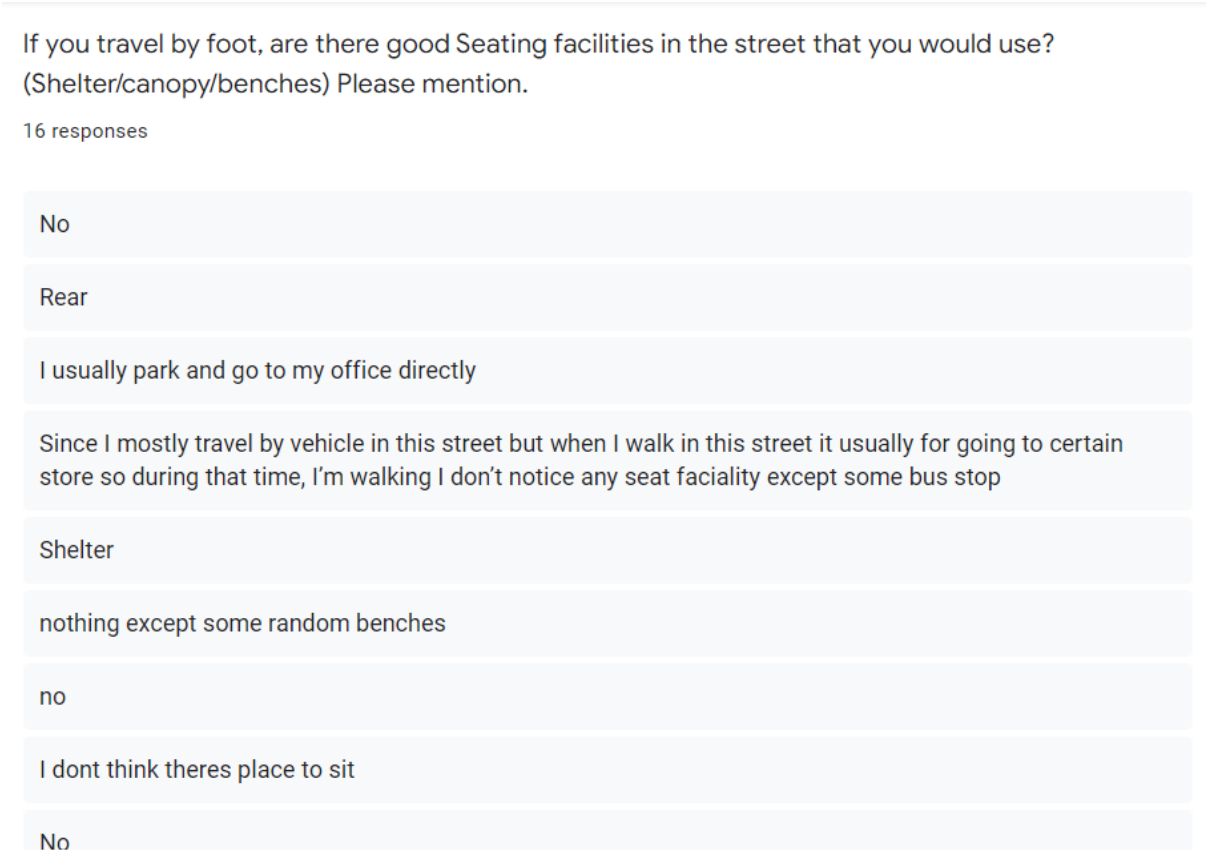


Fig. 6. 28 Survey Responses Street 2

Source: Author, 2022

Good seating facilities are reported by the respondents which include some shelters and some benches.

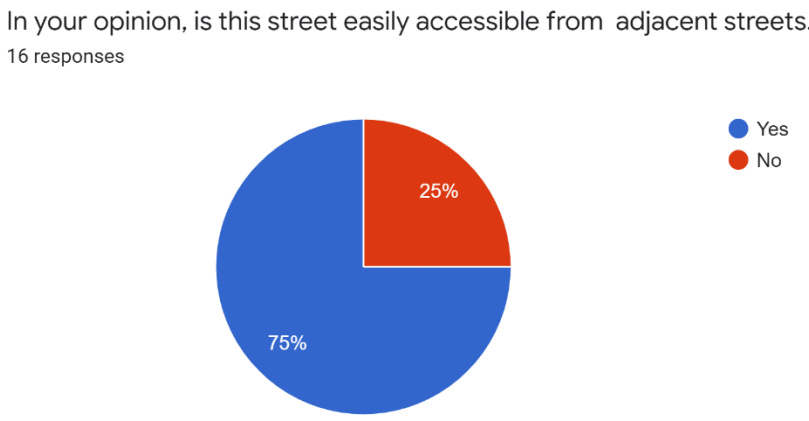


Fig. 6. 29 Survey Responses Street 2

Source: Author, 2022

75% of the respondents reported that the street is easily accessible from the adjacent streets.

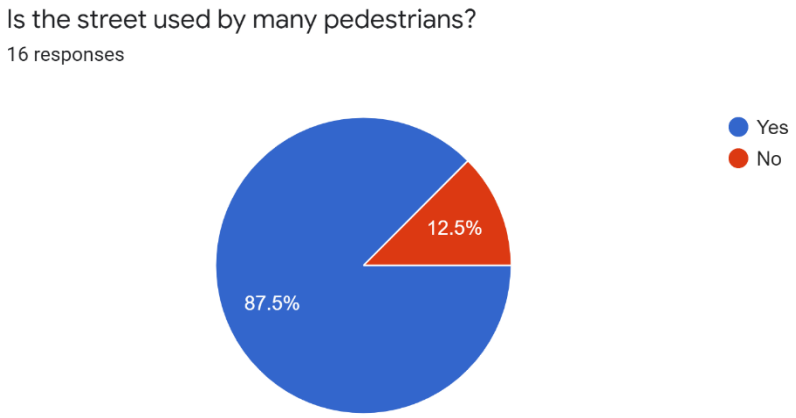


Fig. 6. 30 Survey Responses Street 2

Source: Author, 2022

87.5% of the respondents reported that the street is used by many pedestrians.

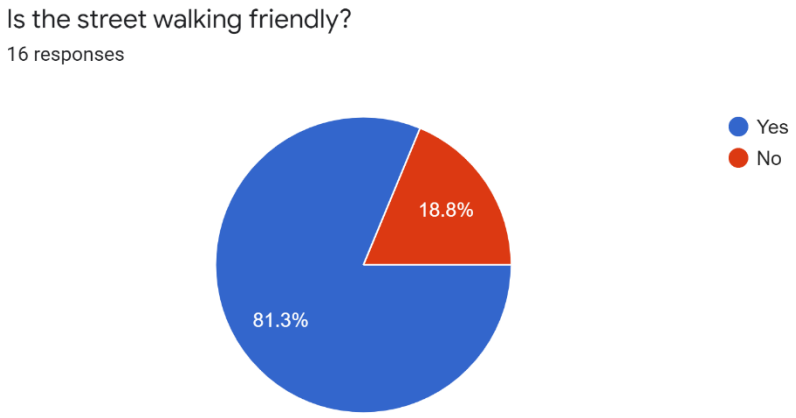


Fig. 6. 31 Survey Responses Street 2

Source: Author, 2022

81.3% of respondents reported that the street is walking friendly.

Mention some spots which are attractive for gathering in this street according to you and why?

16 responses

-

Traditional equiped

Coffee shops

Front of karak shop as we drink tea between work

This street contains many different store and restaurant which attract the people to shop in this street and some of these stores are available in malls like city center and seef mall. In addition, this provides people living in the region (riffa) easy access to popular stores, but nowadays this street lost it popularity due to malls. For me I like this street since it reminds me of childhood

Volleyball

Restaurants

1977 karak is a good place to hangout late night gathering for karak. There are grill shops as well for small

Mention some spots which are attractive for gathering in this street according to you and why?

16 responses

Restaurants

1977 karak is a good place to hangout late night gathering for karak. There are grill shops as well for small gathering

Outside cafeteria

No

The shopping spots are attractive

It's a good street, it's calm and silent so it's attractive for me

Restaurant

I come here to get a cup of tea and spend some time with family

Nil

Fig. 6. 32 Survey Responses Street 2

Source: Author, 2022

Several attractive spots are available for gathering in the street (As noted in the image above).

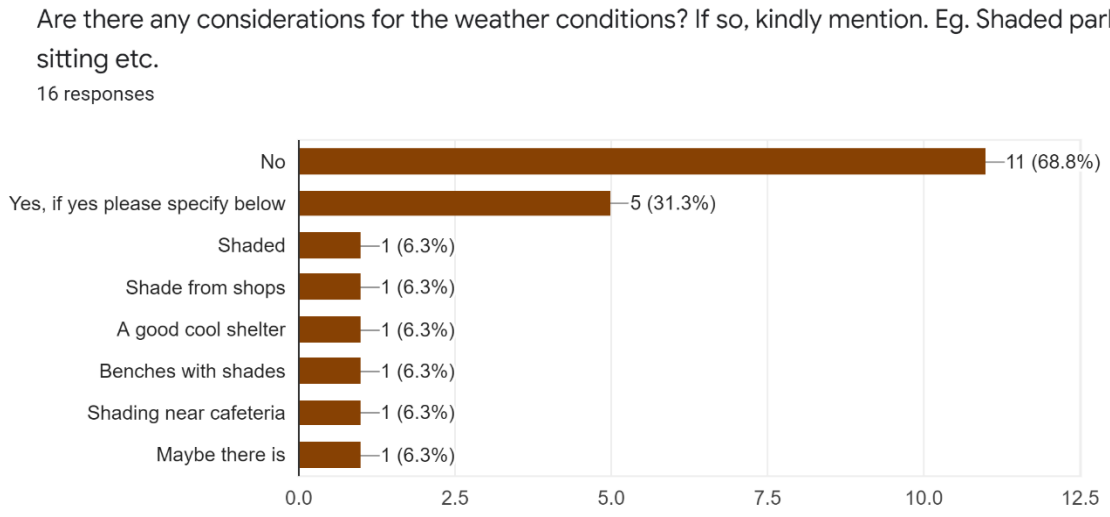


Fig. 6. 33 Survey Responses Street 2

Source: Author, 2022

68.8% reported that there are no considerations for the weather conditions. Others reported that there are shaded spaces, shades from shops, and benches with shades and shading near the cafeteria.

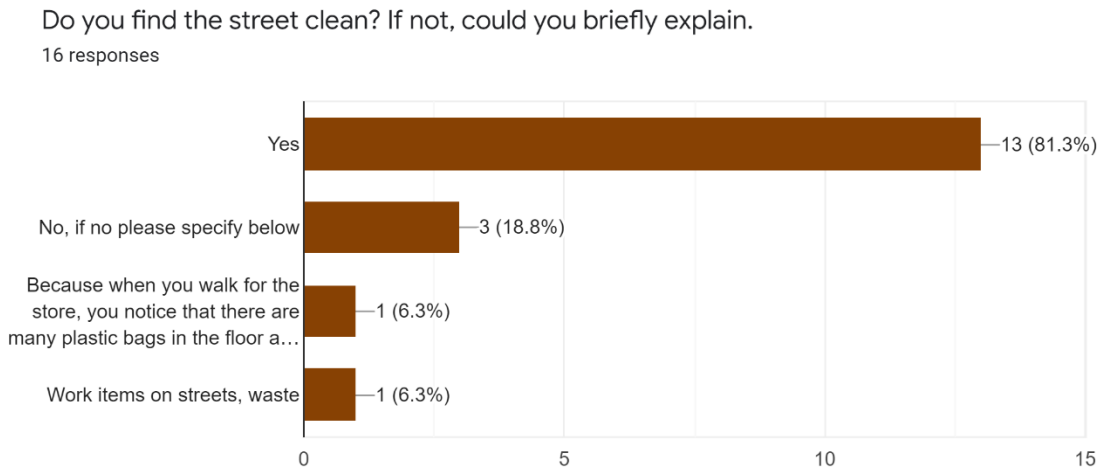


Fig. 6. 34 Survey Responses Street 2

Source: Author, 2022

81.3% of the respondents find the street clean. But one reported that plastic bags are lying on the floor and another reported that there are work items and waste in the street.

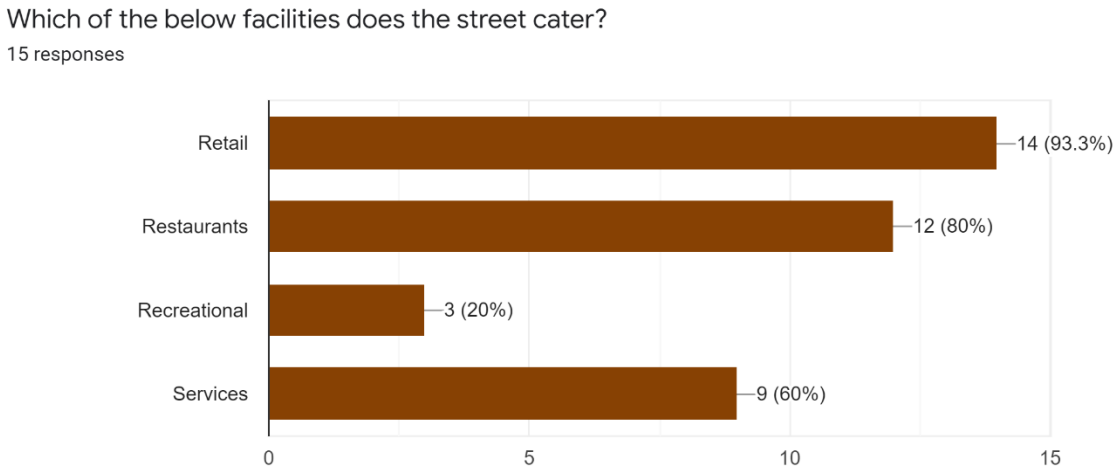


Fig. 6. 35 Survey Responses Street 2

Source: Author, 2022

The respondents reported that the street caters to all the economic facilities.

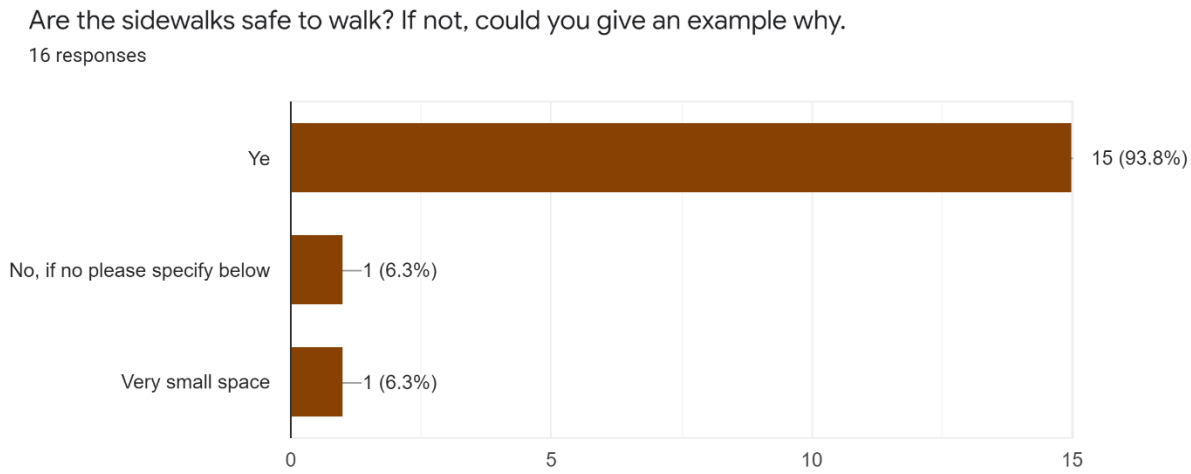


Fig. 6. 36 Survey Responses Street 2

Source: Author, 2022

93.8% of the respondents reported that the sidewalks are safe. But one respondent reported that there is less space to walk.

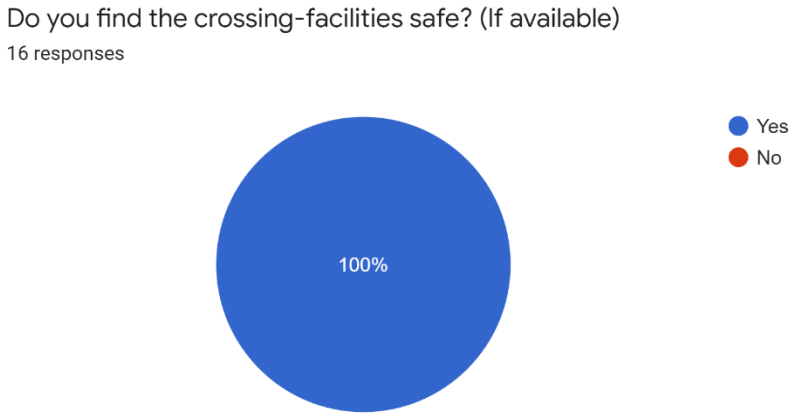


Fig. 6. 37 Survey Responses Street 2

Source: Author, 2022

All the participants (100%) reported that the crossing facilities are safe.

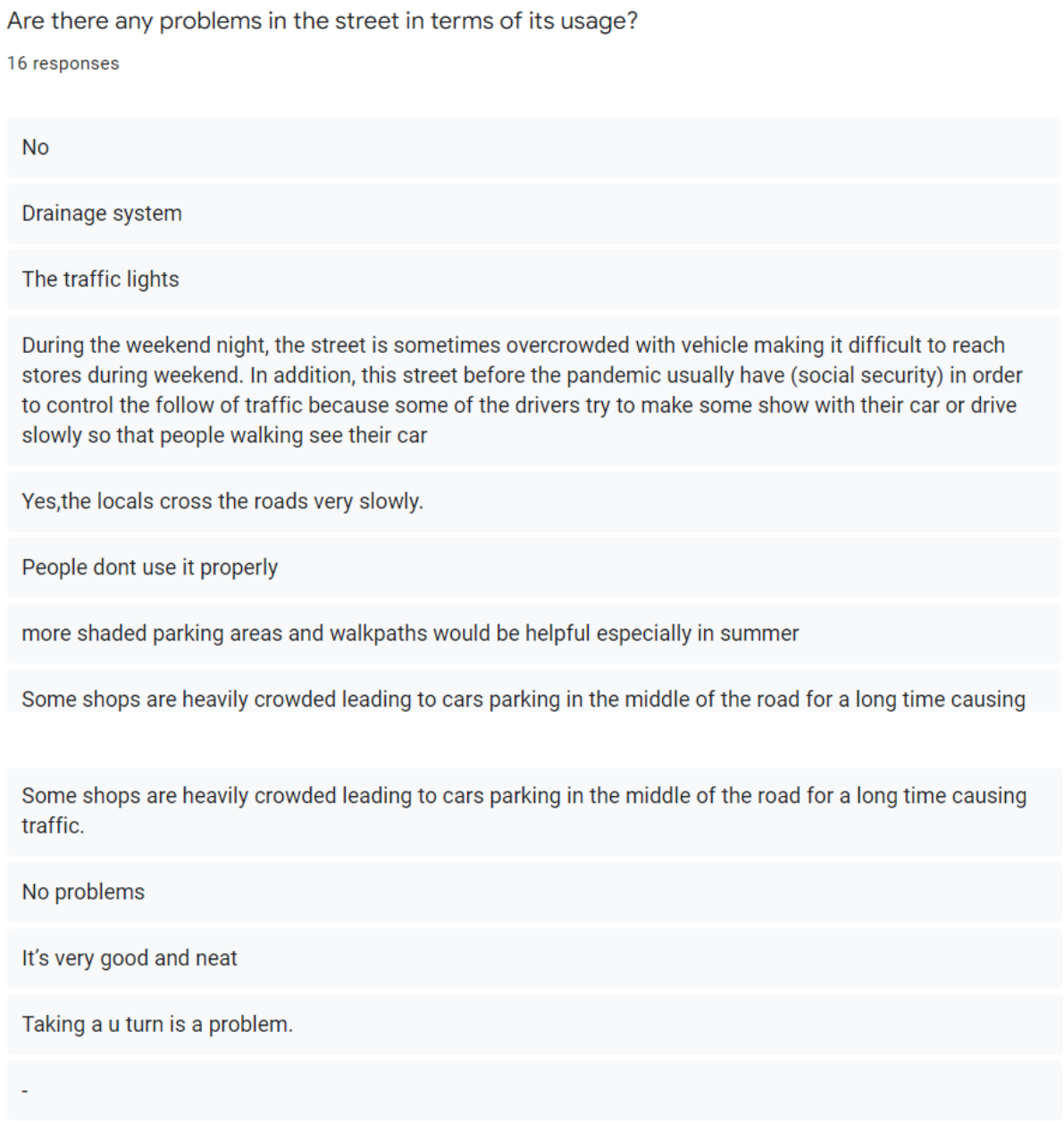


Fig. 6. 38 Survey Responses Street 2

Source: Author, 2022

Several issues regarding the usability of the street are reported. These include issues with the drainage system, traffic lights, overcrowding of vehicles during weekend nights, activities performed by the car drivers, people crossing the roads slowly, lack of shaded parking and sidewalks and difficulty taking a U-Turn.

There is also an issue mentioned related to a lot of crowding in some shops which results in cars parking in the middle of the road, which further leads to traffic.



Fig. 6. 39 Survey Responses Street 2

Source: Author, 2022

93.8% of the respondents reported that the signboards, road signs, and names of the shops are clear.

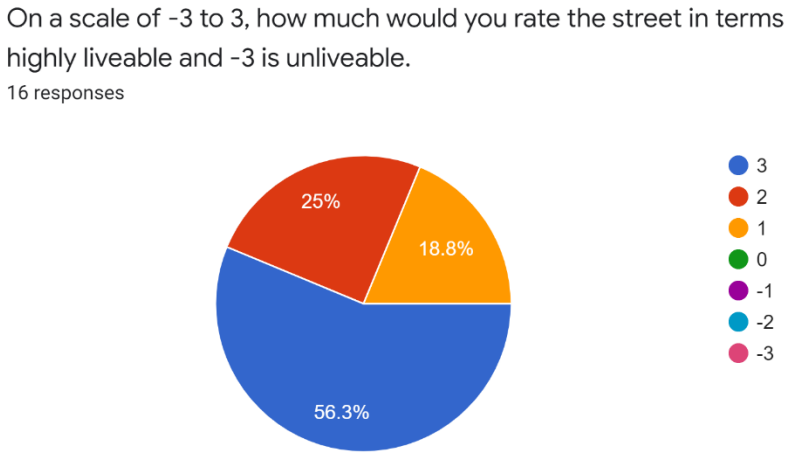


Fig. 6. 40 Survey Responses Street 2

Source: Author, 2022

56.3% of the respondents rated the liveability of the street at +3. 25% rated +2 and 18.8% rated +1

6.3.2.1 Conclusions on Liveability of Street 2 | Riffa Commercial Street 2

Physical:

- It is accessible
- It is clean. 2 issues related to plastic bags and work items are reported.
- The street satisfies the physical characteristics to an extent.

Functional:

- The street has parking facilities and does not have much traffic.
- Several issues related to usability are reported, which need serious consideration to fulfil the functional characteristics.
- Crossing facilities and sidewalks are safe.

Social:

- Several social activities take place.
- It satisfies the social characteristics.

Economic:

- The street caters to all the economic needs.

Environmental:

- Shading from the shops is available. There are benches under shades.

6.3.3 Riffa Residential Street 1

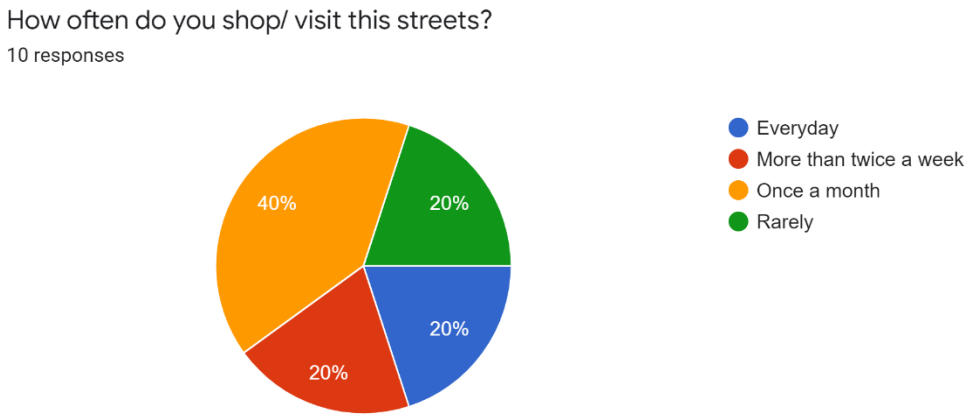


Fig. 6. 41 Survey Responses Street 3

Source: Author, 2022

40% of respondents use the street once a month and only 20% use it every day.



Fig. 6. 42 Survey Responses Street 3

Source: Author, 2022

80% of the respondents travel by vehicle and others walk.

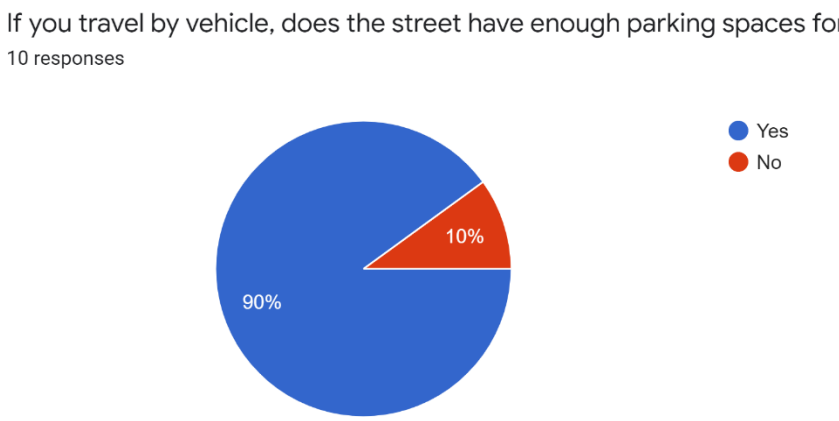


Fig. 6. 43 Survey Responses Street 3

Source: Author, 2022

90% of the respondents reported that the street has enough parking spaces.

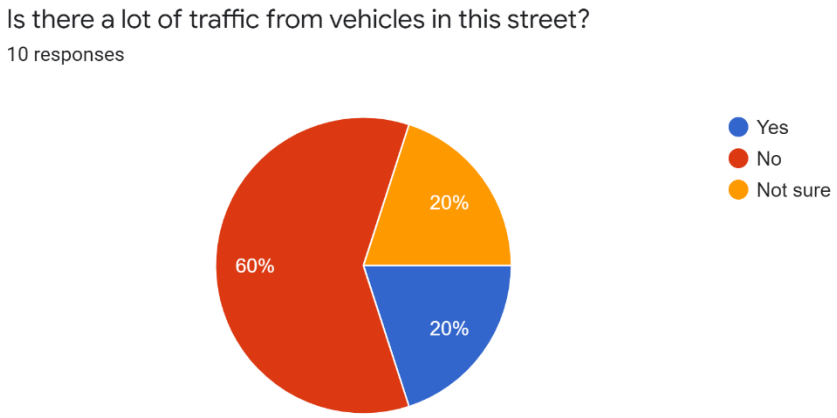


Fig. 6. 44 Survey Responses Street 3

Source: Author, 2022

60% of the respondents reported that there is a lot of traffic from vehicles in the street.

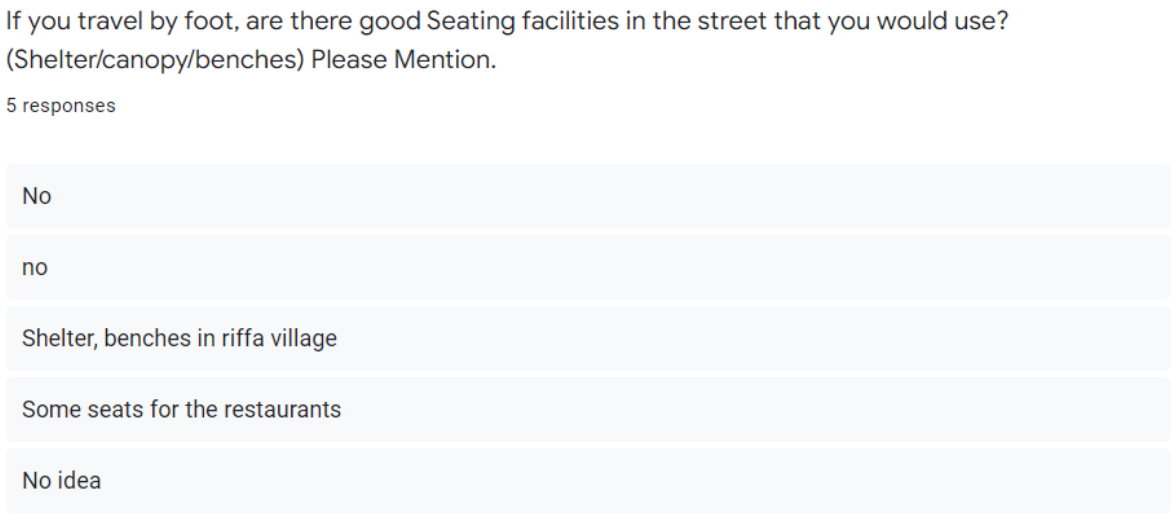


Fig. 6. 45 Survey Responses Street 3

Source: Author, 2022

Good seating facilities reported by the respondents are seats, benches and shelter in the restaurants in the Riffa village.

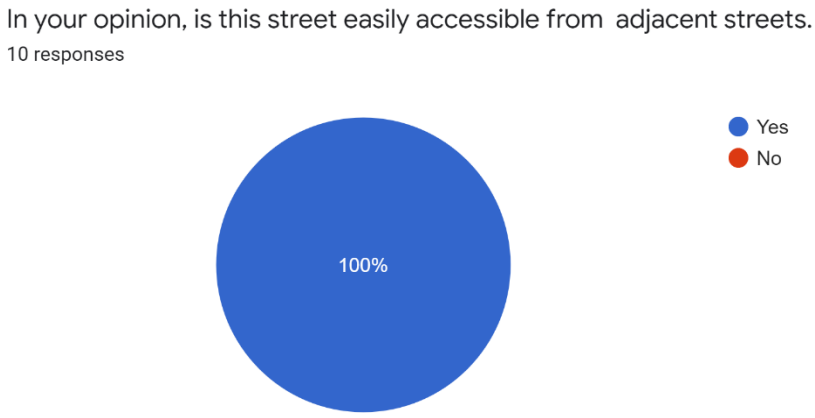


Fig. 6. 46 Survey Responses Street 3

Source: Author, 2022

All the respondents (100%) reported that the street is accessible.

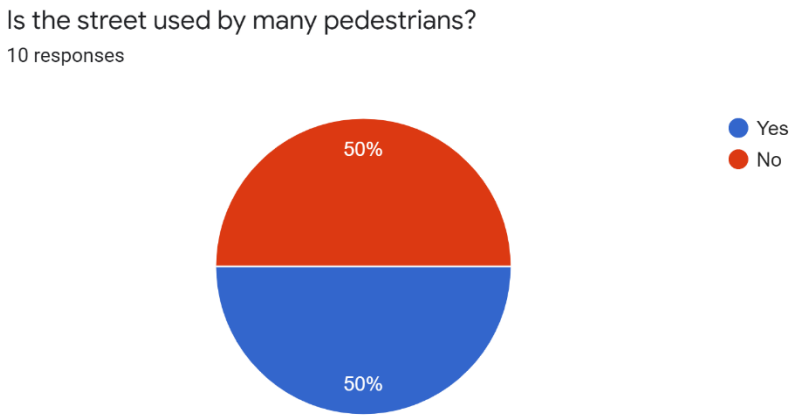


Fig. 6. 47 Survey Responses Street 3

Source: Author, 2022

A mixed response is received regarding the pedestrians using the street. 50% reported that it is used by pedestrians, and others said that it is not used by pedestrians.

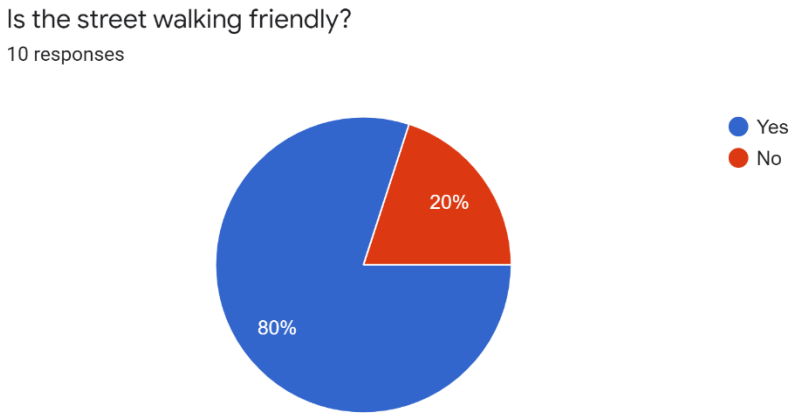


Fig. 6. 48 Survey Responses Street 3

Source: Author, 2022

80% of the respondents reported that the street is walking friendly.

Mention some spots which are attractive for gathering in this street according to you and why?

5 responses

Dont know

Riffa village mainly , Geant and shops in there

It's near Riffa views park

It's good for walking out

Outside the houses

Fig. 6. 49 Survey Responses Street 3

Source: Author, 2022

Are there any considerations for the weather conditions? If so, kindly mention. Eg. Shaded parking, sitting etc.

10 responses

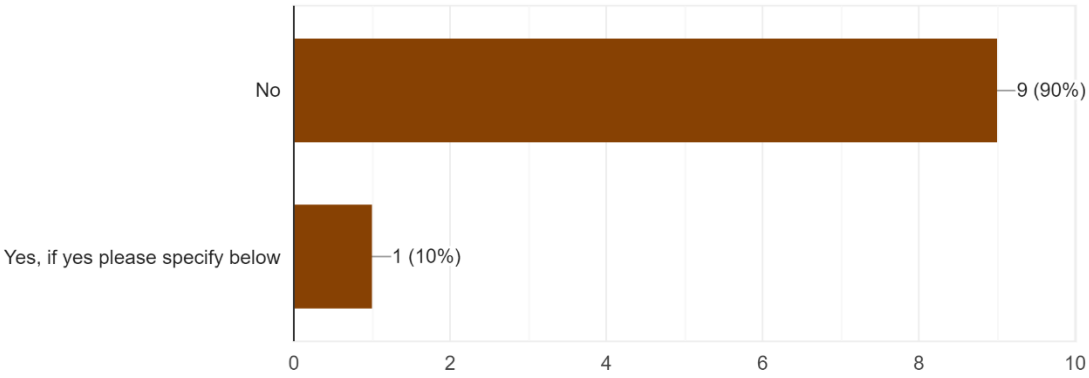


Fig. 6. 50 Survey Responses Street 3

Source: Author, 2022

90% of the respondents reported that the street has no weather conditions.

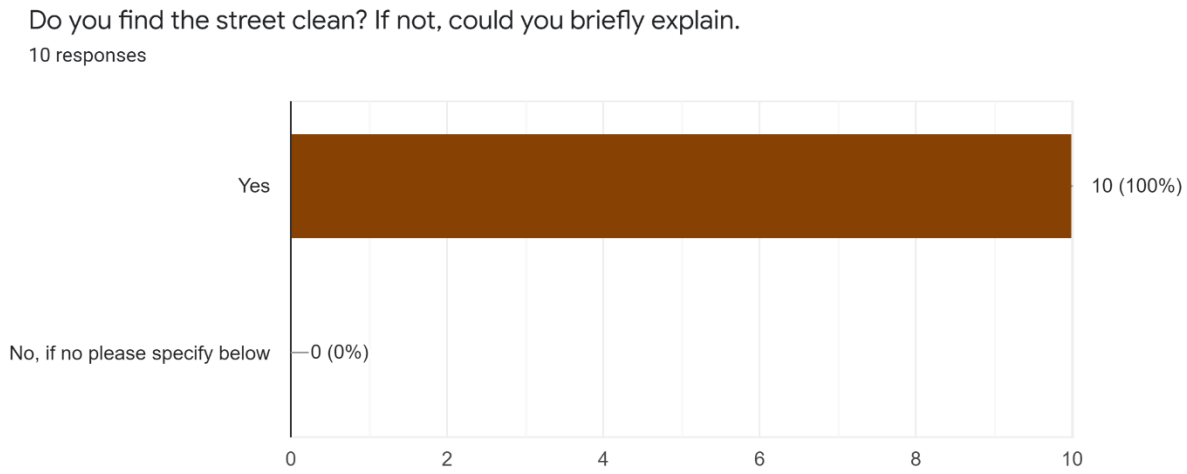


Fig. 6. 51 Survey Responses Street 3

Source: Author, 2022

All the respondents (100%) reported the street is clean.

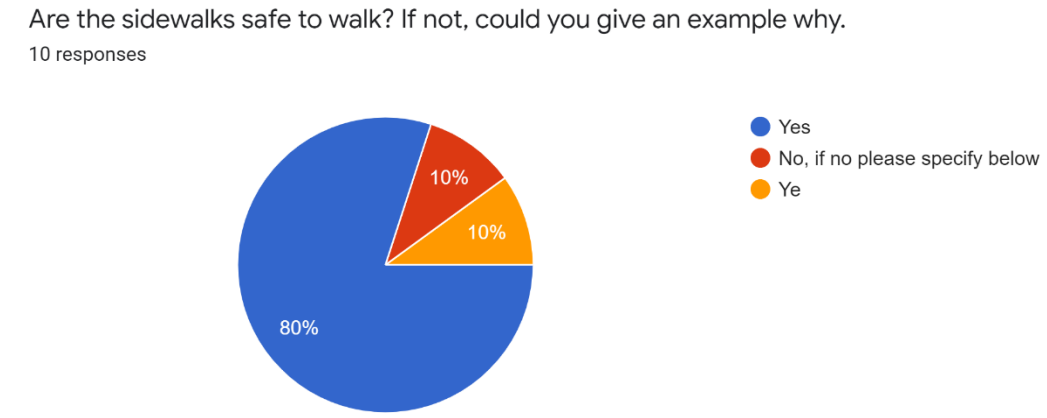


Fig. 6. 52 Survey Responses Street 3

Source: Author, 2022

80% of the respondents report the sidewalks are safe to walk.

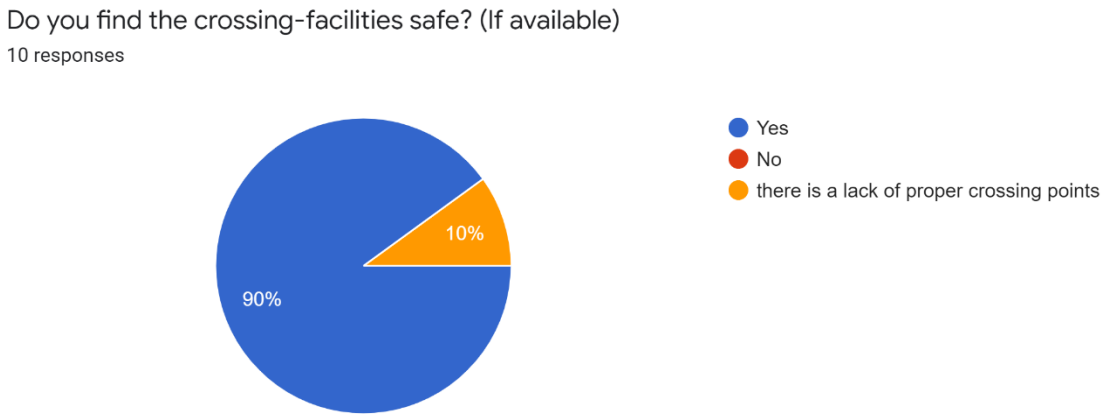


Fig. 6. 53 Survey Responses Street 3

Source: Author, 2022

90% of the respondents reported that the crossing facilities are safe.

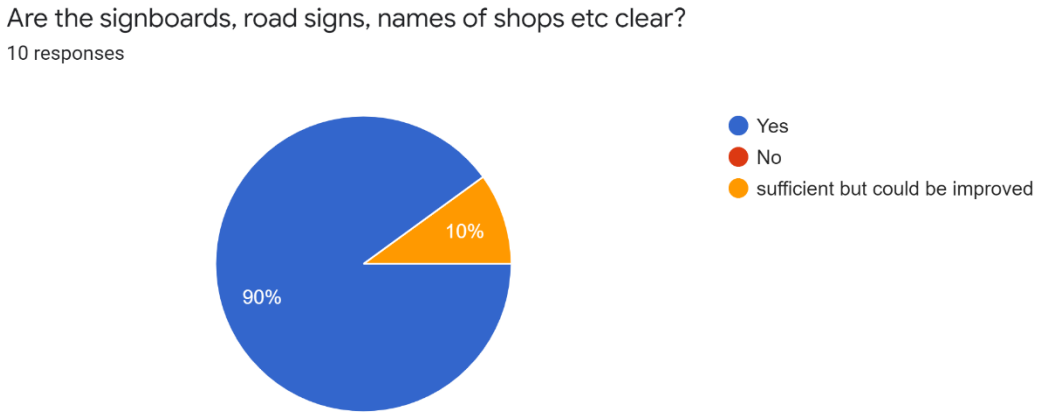


Fig. 6. 54 Survey Responses Street 3

Source: Author, 2022

90% of the respondents find the street signboards, road signs and names clear.

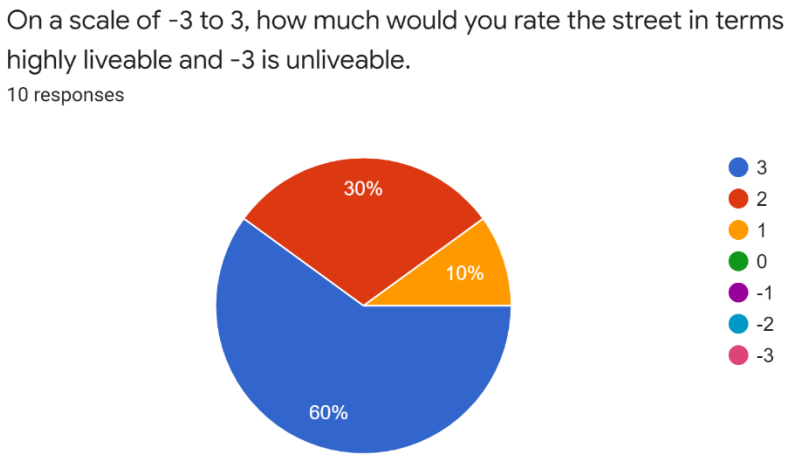


Fig. 6. 55 Survey Responses Street 3

Source: Author, 2022

60% of the respondents rated the liveability at +3.

6.3.3.1 Conclusions on Liveability of Street 3 | Riffa Residential Street 1

Physical:

- It is accessible
- It is clean

Functional:

- Crossing and sidewalks are reported to be safe.
- There are sufficient parking facilities.
- There is no traffic from vehicles.

Social:

- Few social activities are reported.

Economic:

- The street has economic facilities.

Environmental:

- No environmental considerations.

6.3.4 Riffa Residential Street 2

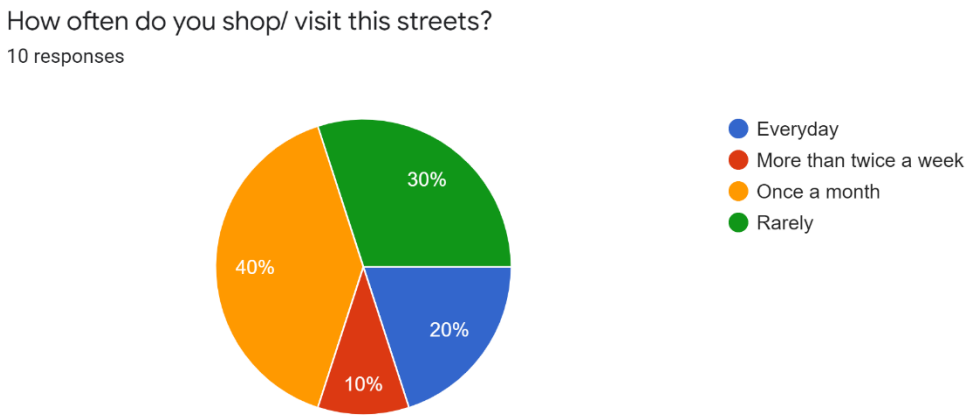


Fig. 6. 56 Survey Responses Street 4

Source: Author, 2022

40% of the respondents use the street once a month, and 30% use the street rarely. Only 20% use it every day.



Fig. 6. 57 Survey Responses Street 4

Source: Author, 2022

80% of the respondents travel the street by vehicle.

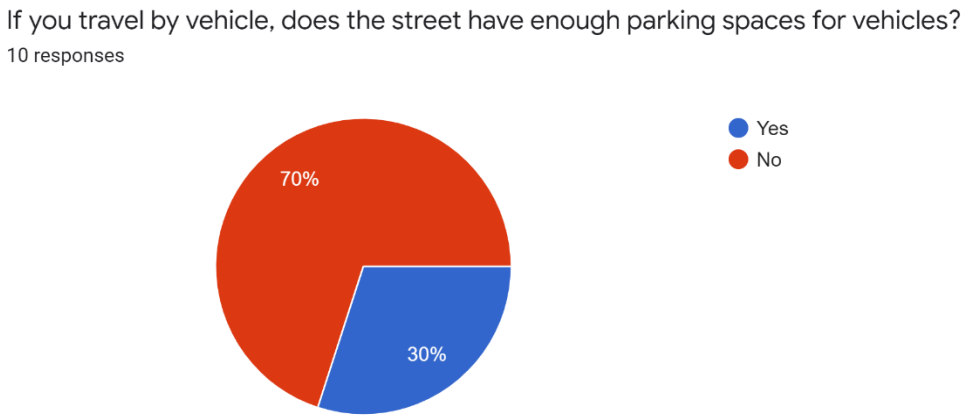


Fig. 6. 58 Survey Responses Street 4

Source: Author, 2022

70% of the respondents reported that the street has parking spaces, while 30% didn't find enough parking.

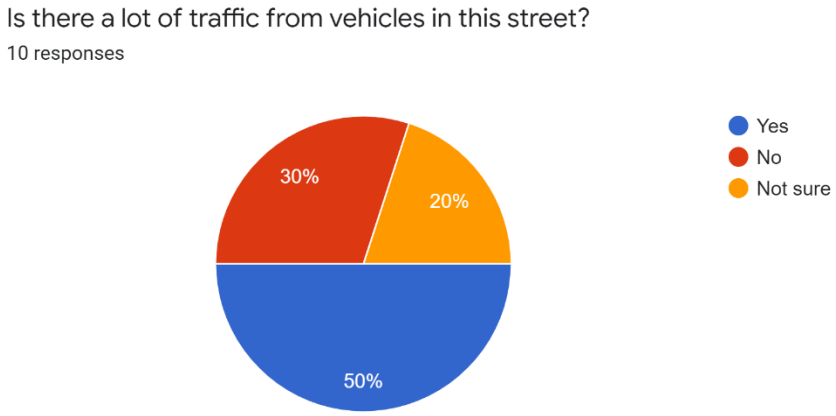


Fig. 6. 59 Survey Responses Street 4

Source: Author, 2022

50% of the respondents reported that there is a lot of traffic from vehicles on this street.

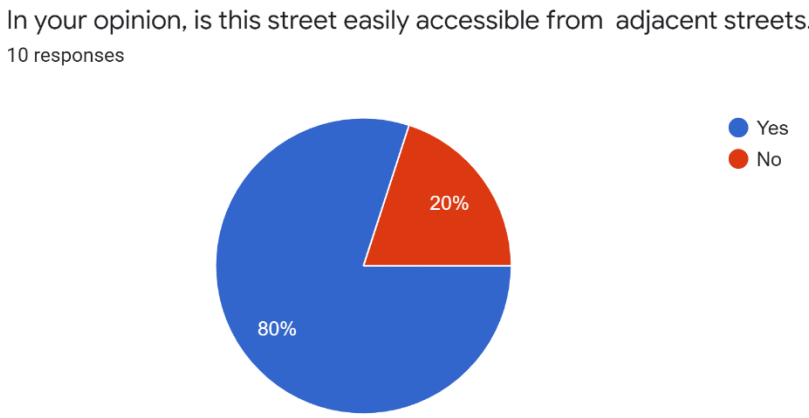


Fig. 6. 60 Survey Responses Street 4

Source: Author, 2022

80% of the respondents reported that the street is accessible from the adjacent streets.

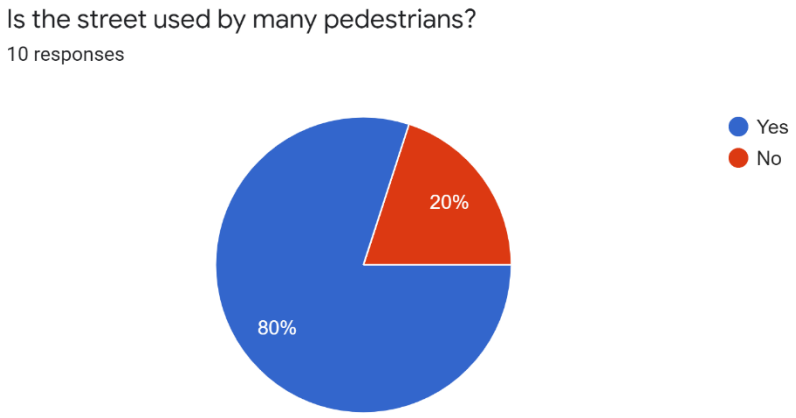


Fig. 6. 61 Survey Responses Street 4

Source: Author, 2022

80% of the respondents reported that the street is used by many pedestrians.

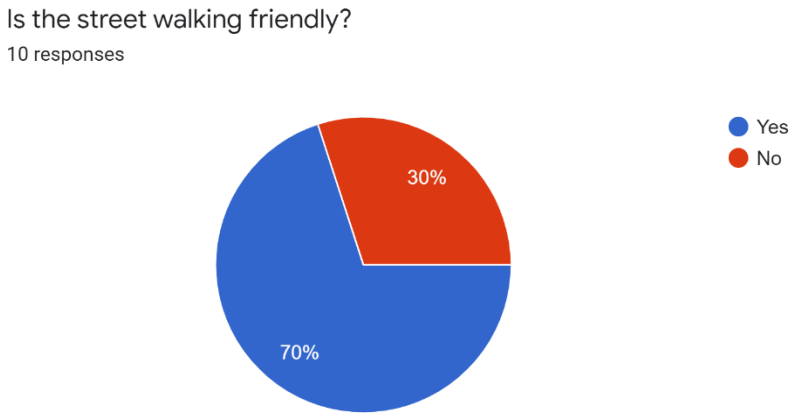


Fig. 6. 62 Survey Responses Street 4

Source: Author, 2022

70% of the respondents reported that the street is walking friendly. However, 30% didn't find the street walking friendly.

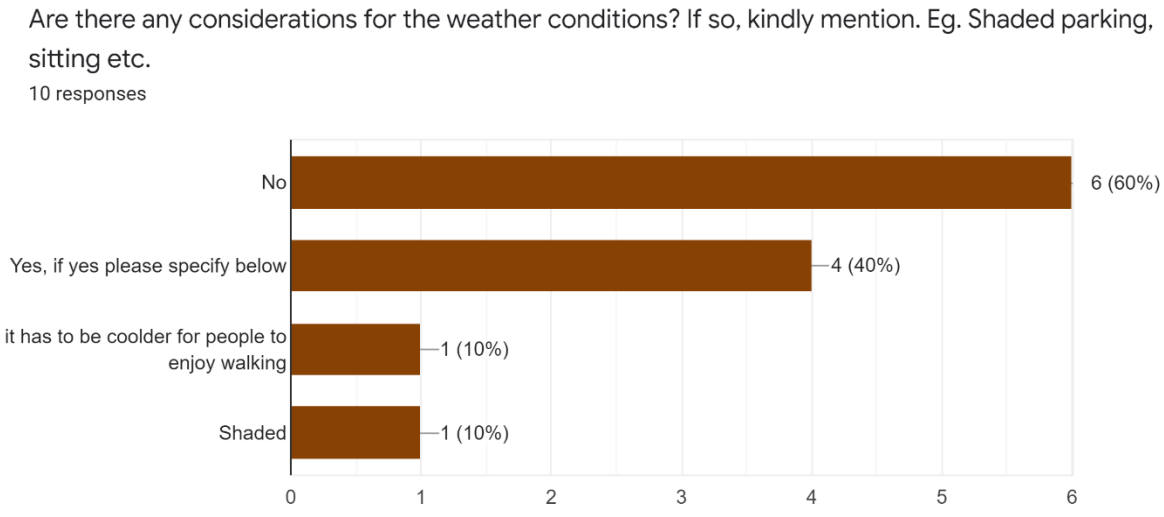


Fig. 6. 63 Survey Responses Street 4

Source: Author, 2022

60% of the respondents reported that there are no considerations for weather conditions. Some issues highlighted are that the street needs to be colder to make walking enjoyable.

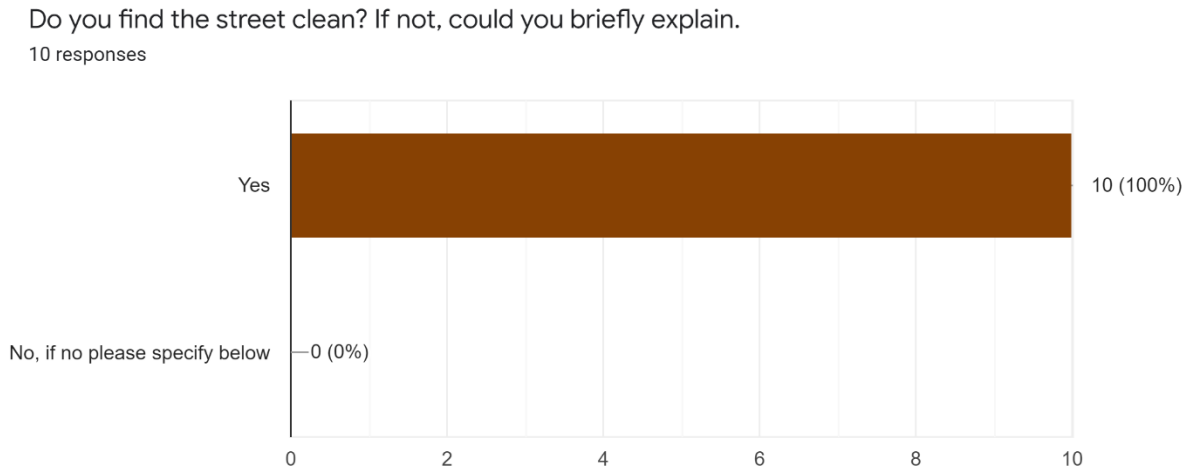


Fig. 6. 64 Survey Responses Street 4

Source: Author, 2022

All the respondents (100%) reported that the street is clean.

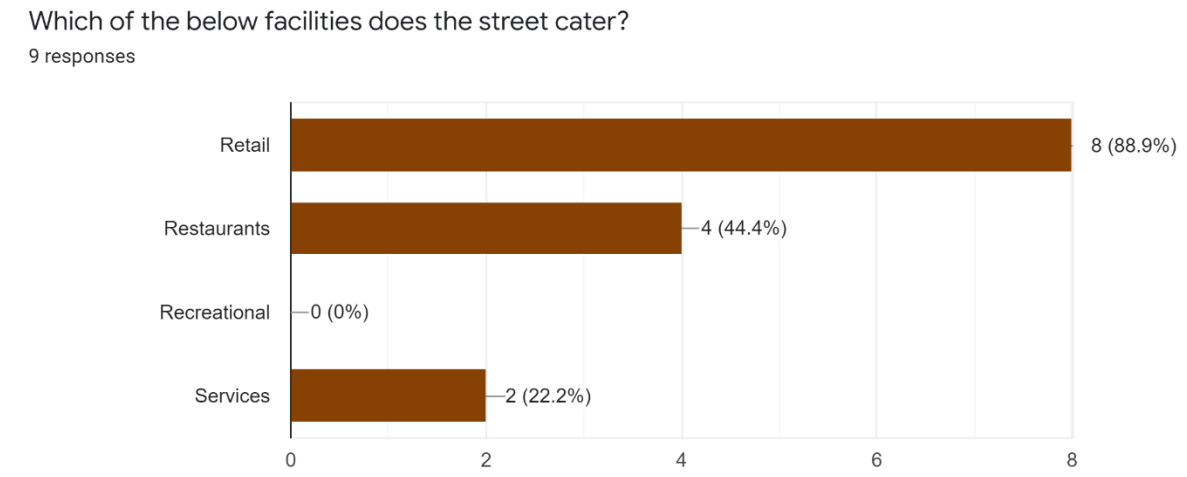


Fig. 6. 65 Survey Responses Street 4

Source: Author, 2022

The street does not offer recreational facilities.

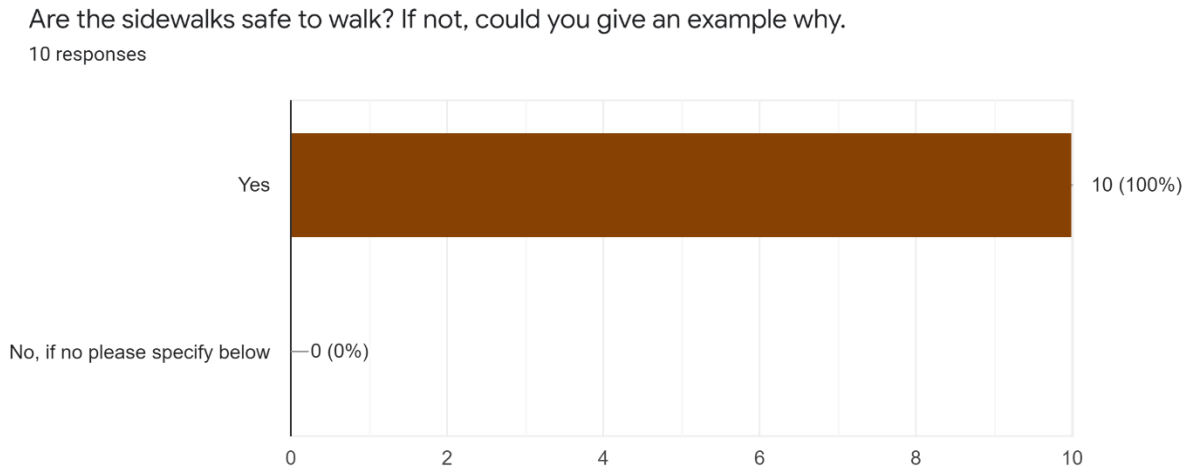


Fig. 6. 66 Survey Responses Street 4

Source: Author, 2022

All the respondents (100%) reported that the sidewalks are safe to walk.

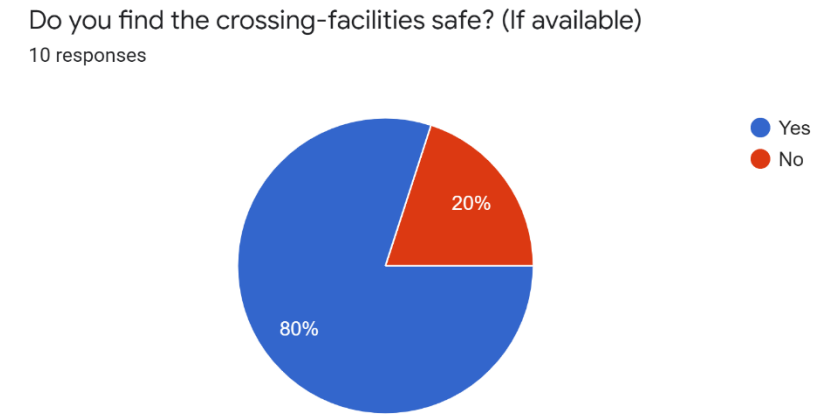


Fig. 6. 67 Survey Responses Street 4

Source: Author, 2022

80% of the respondents find the crossing facilities safe.



Fig. 6. 68 Survey Responses Street 4

Source: Author, 2022

70% of the respondents reported that the signboards are safe.50%

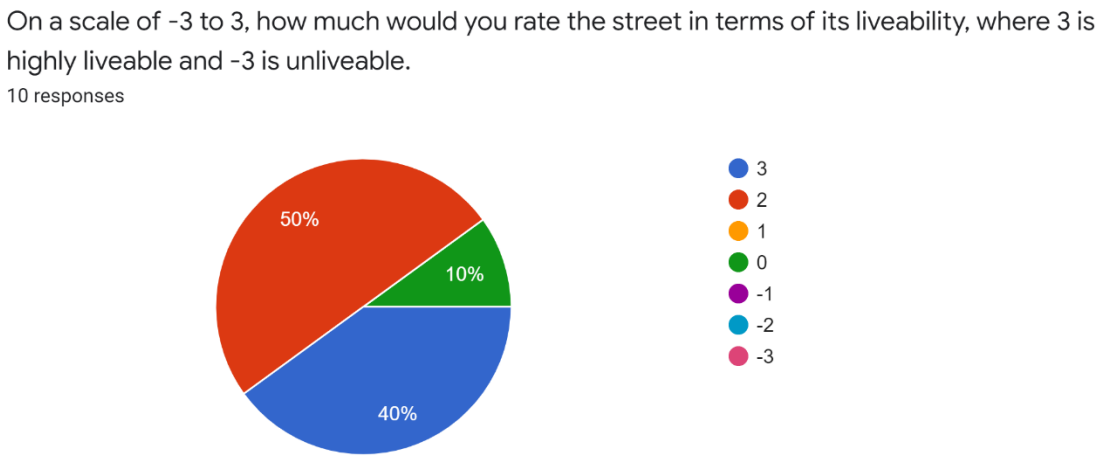


Fig. 6. 69 Survey Responses Street 4

Source: Author, 2022

50% of the respondents rated the liveability at +2 and 40% rated +3.

6.3.4.1 Conclusions on Liveability of Street 4 | the Riffa Residential Street 2

Physical:

- It is clean
- It is accessible

Functional:

- Issues related to usability are reported.
- A lack of sidewalks is reported.
- The sidewalks are safe.
- The street is walking friendly.
- It is used by many pedestrians.
- There are not enough parking spaces.

Social:

- Few social activities are reported

Environment:

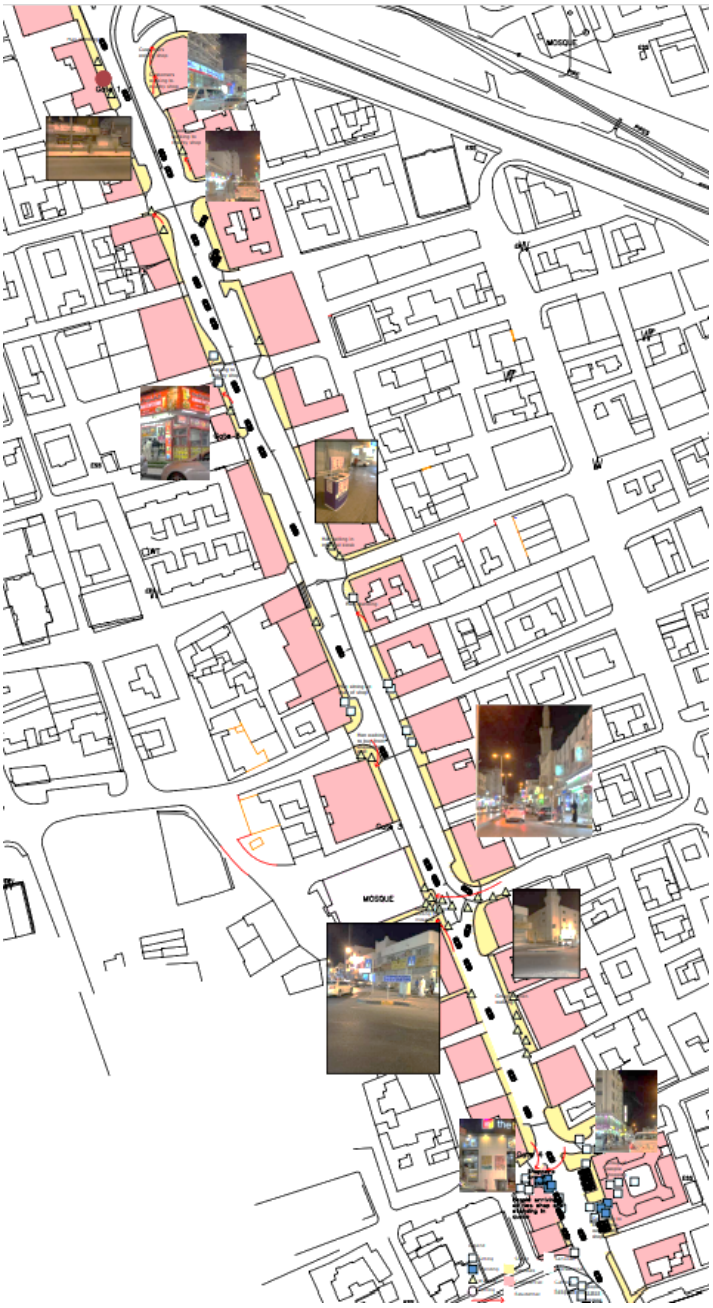
- No environmental considerations.

Economic:

- Satisfactory. No recreational facilities.

6.4 Method 3: Mapping of Movement and Activity Observations

6.4.1 Riffa Commercial Street 1



Gate 1: (21/06/2021) from 8:45-9:00 pm



Fig. 6. 70 Activity Observations in Street 1

Source: Author, 2022

Movement: In terms of movement, there was an influx of vehicles entering the street as it is the main entrance to the street, known to house a famous souq of Bahrain. Hence, the influx of vehicles is constant in this zone. In terms of movements, there are people seen walking to the nearby shops like the Pharmacy and the Textiles shops. This zone is also found to have pedestrians walking to the residential side, which is connected through the tertiary roads. It can be analysed that due to its proximity to the highway and the lack of cafeterias available, it is found that there are not many pedestrians or users seen outside. During the lockdown period, it appeared to be an empty zone with only streetlights lit when

compared to an average day post lockdown. The street was completely isolated with no users in it.

Activity Observations: Concerning the activities, the common activities found in this gate are the entrance and exit of users to the nearby shops. Users are also found waiting in the cars after parking. Users are found arriving from the adjacent pedestrian bridge as well.

Gate 2: (21/06/2021) from 9:00 pm -9:15 pm





Fig. 6. 71:Activity Observations in Street 1

Source: Author, 2022.

Movement: As we proceed to the second gate, more varieties of movement and activities are found. In terms of activities, we can find users arriving for prayer at the mosque, pedestrians walking toward the ends of the souq, a family walking to nearby shops, and users standing on the street.

Activity Observations: Various activities are observed in this zone. This includes a person waiting near the shawarma stall to order food, a person making the shawarma chatting with the customers, a person selling phone recharges/ offers in an informal outdoor kiosk, and people sitting on the entrance stairs of shops and talking to each other and on phone.

Other significant activities include people leaving the mosque after their evening prayers and moving out in large groups. They eventually split into smaller groups and continue walking past the souq.

Gate 3: (21/06/2021) from 9:00-9:15pm & (10/10/2021)



Fig. 6. 72 Activity Observations in Street 1

Source: Author, 2022

Movement: When compared to the previous two gates, the third gate has a variety of movements. Some of the observed movements include walking to the nearby tea shops, entering the food souq, walking to and from the souq and adjacent streets, and the vehicle congestion in the junction due to vehicles arriving from adjacent streets.

Activity Observations: Interesting activities observed in this zone include customers standing in a queue to buy snacks from the tea shop, some customers getting angry as they are made to wait for long, people drinking tea outside the tea shop and talking to each other. A person at the stall was also found taking orders from the car and delivering them to the car. On the other side of the road, people were found approaching the cafeteria to get evening snacks. It was observed that when one or two customers arrived at these shops, more people tend to arrive seeing customers ordering from the shop. The users gather in spots where there is an ongoing activity. Moreover, several pedestrians were found standing and gathering in this zone talking to each other and talking to people passing by in cars. However, most of the users found were gathering near the gold souq which is located at the end of the street. There is a rush of customers gathering at the gold shops, especially during the evenings. Similar to the case in gate 2, in gate 3 men were seen begging from people sitting in parked cars and people walking or buying from tea shops.

6.4.1.1 Liveability of the Riffa Commercial Street 1 based on Mapping of Movement

The characteristics of liveability as explored through various literature studied and through this research are Physical, Functional, Social, Economic, Environmental, Visual and Urban Qualities. In this street based on the movement patterns and activities, the following conclusions were drawn.

Physical- It is accessible and clean.

Functional- Vehicle congestion exists. But users are frequenting the street every time. The influx of visitors proves that it is walkable. Safety concerns exist from other users. This affects overall walkability.

Social- Plenty of social activities have been observed at different gates of the street at different times. Gathering of men, gathering of users shopping, walking, standing, talking, drinking tea etc are observed. It is an extremely lively street. Users are found going near those shops which have people in them.

Economic- Serves a variety of facilities for retail, services, restaurants and recreational.

Environmental- Trees, and canopies for sitting at the bus stop.

Visual- Different types of retail and restaurant, as well as good lighting, are available making it visually pleasing. Proportionate sidewalks and street size.

Urban Qualities- The street has good imageability, places to remember, unique shops/smells and colours. It is highly complex due to its traffic of vehicles and the influx of pedestrians, activities taking place at the same time and buildings adjacent to each other. It is fully transparent.

6.4.2 Riffa Commercial Street 2

(28/06/2022) 5:00-5:10 pm

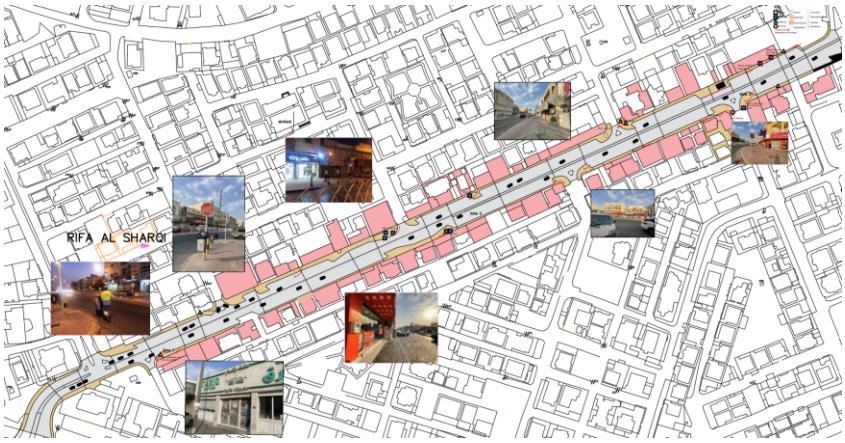


Fig. 6. 73 Activity Observations in Street 2

Source: Author, 2022

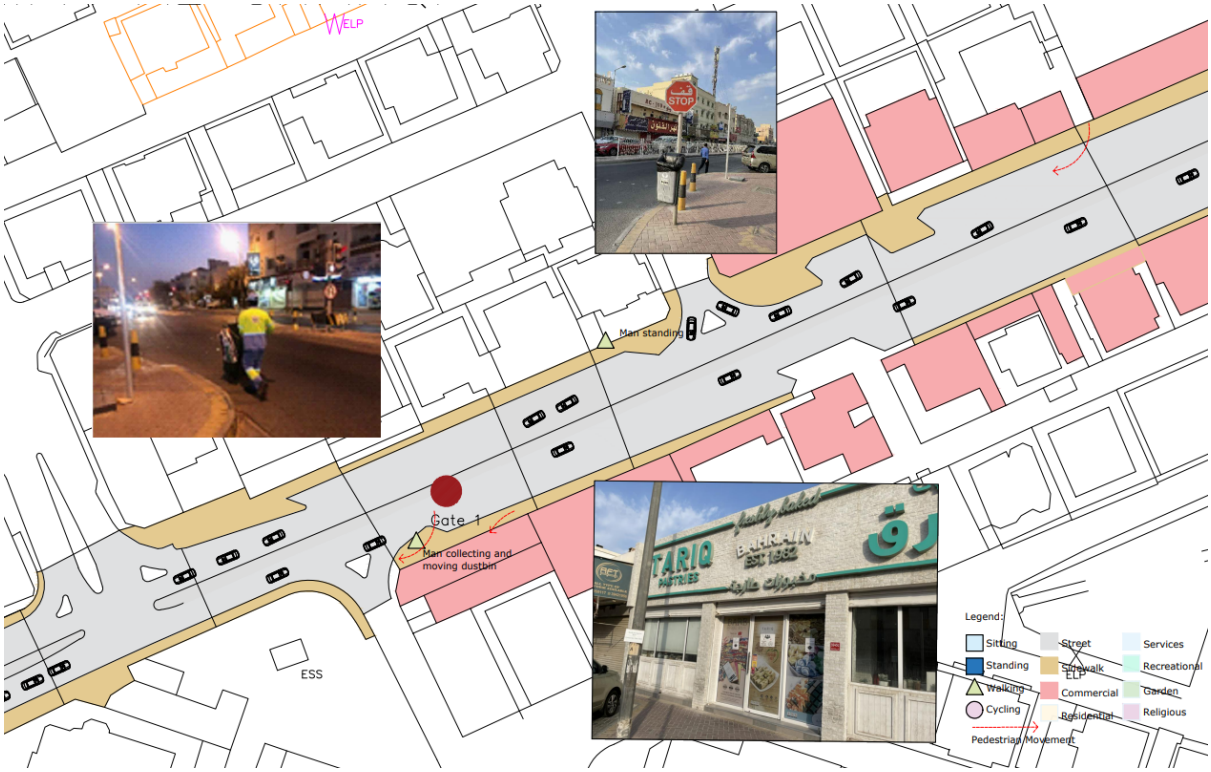


Fig. 6. 74 Activity Observations in Street 1

Source: Author, 2022

The street was visited multiple times during the different intervals before and after the lockdown in 2021 to observe the movement patterns and activities. The street is divided into three gates and observations from the three gates are noted.

Gate 1:

Movement: In gate 1, the movement of vehicles was found more than the movement of pedestrians. The movement of maintenance people was also found. The site had cars being parked on the allocated site parking.

Activity Observations: The shopkeepers of the adjacent street were found to take orders from the customers parked in cars. Customers were observed entering the bakery.

Gate 2: (28/06/2022) 5:10-5:20 pm

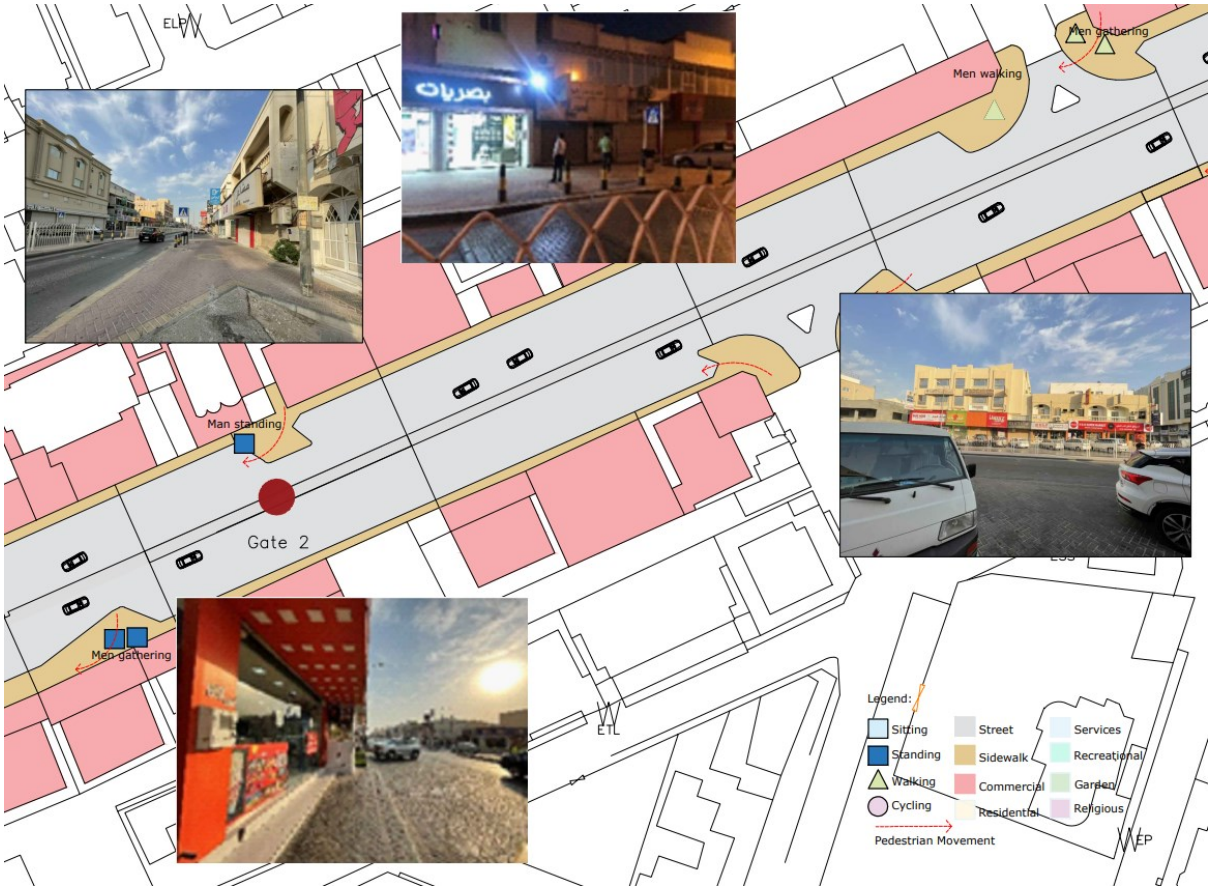


Fig. 6. 75 Activity Observations in Street 2

Source: Author, 2022

Movement: Gate 2 has pedestrian crossings where pedestrians crossed to the other side. Pedestrians were walking to shops and gathering outside. Vehicles were also found stopping outside shops.

Activity Observations: Significant activities found in this zone is that pedestrians were gathering and standing in groups on a wide walkway opposite the pedestrian crossing. Yet another group of delivery men gathered outside the shops with their motorbikes next to them. These made this junction lively.

Gate 3: (28/06/2022) (5:20-5:30 pm)

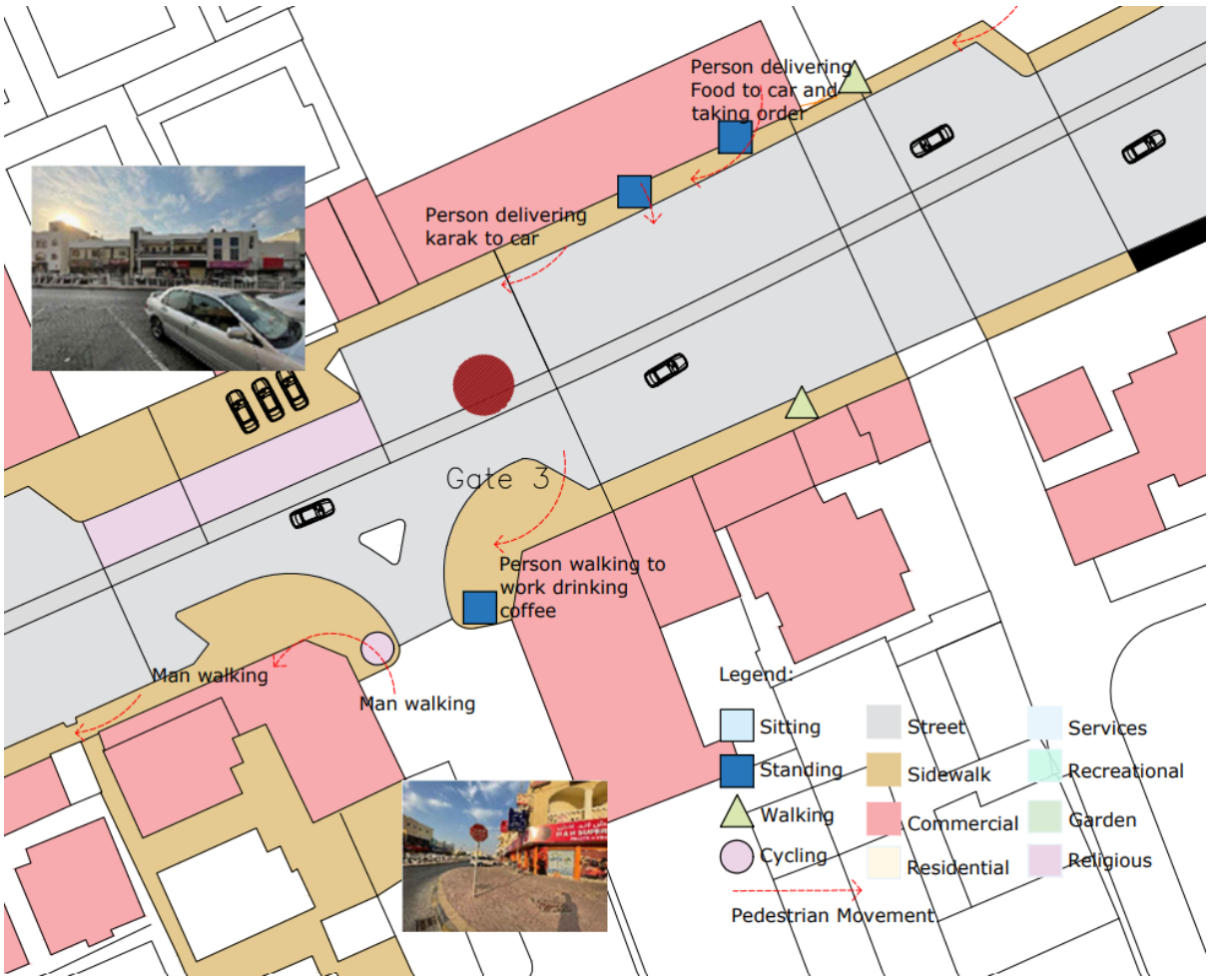


Fig. 6. 76 Activity Observations in Street 2

Source: Author, 2022

Movement: Movement patterns observed in this zone are men walking, women entering and exiting perfume shops, vehicles parking outside the shops, and the pedestrians crossing the road.

Activity Observations: It was observed that vehicles stopped by a specific "Karak Shop" to order tea and tea were delivered to their vehicles. The men delivering from the Karak shop were also found with trays to serve tea and delivering to the opposite building by crossing the road. An adjacent cafeteria also had several customers ordering food and being delivered by the shopkeepers

in the evening. In the morning, men going work to in the opposite building were also found drinking tea and walking. A man was also found taking away teacups from the Karak shop to the adjacent building.

6.4.2.1. Liveability of Riffa Commercial Street 2 based on Mapping of Movement

The characteristics of liveability as explored through various literature studied and through this research are Physical, Functional, Social, Economic, Environmental, Visual and Urban Qualities. In this street, based on the movement patterns and activities, the following conclusions were drawn.

Physical- Accessible from the adjacent streets. The street is cleaned regularly. Plenty of parking facilities available: sufficient.

Functional- Pedestrians crossing the road; the sidewalks are poor. Hence, this is not a walking-friendly street. Though pedestrians are found walking, they are found walking in the pedestrian crossing or on wider sidewalks.

Social- Gathering, men going for work

Economic- Serves a variety of facilities for retail, services, restaurants and recreational.

Environmental- None

Visual- There are colourful facades, and attractive unique facades; a visually appealing street.

Urban Qualities- The street offers good imageability. It is complex with several amenities available next to each other.

6.4.3 Riffa Residential Street 1



(29/06/2022) (3:00-3:10 pm)

Fig. 6. 77 Activity Observations in Street 3 & 4

Source: Author, 2022

Gate:

One common gate was selected from the residential street located in the central node of the street.

Movement: Concerning the movement patterns, we can find vehicles entering and exiting the retail complex adjacent to the road. Moreover, vehicles are also found to enter and exit the inner residential streets. Cyclists are found moving in and out of the adjacent streets. A person is seen walking to the nearby dustbin and another person was seen going to the shop. Vehicles were found entering and exiting the retail strip.

Activity Observations: Activities observed were a group of people sitting near the stair of a restaurant, using their phones and talking to each other. A woman was seen going to the grocery from the opposite residential building. A man and another family were seen exiting the grocery with plastic covers in hand. The man carried the covers and walked towards the direction of his house on the opposite side of the street whereas the family was seen moving in the direction of their vehicle. A woman was seen near the dustbin throwing a cover. Moreover, families were seen gathering and dining in the outdoor dining pocket of the retail complex adjacent to the street.

6.4.3.1. Liveability of Riffa Residential Street 1 based on Mapping of Movement

In this street, based on the movement patterns and activities, the following conclusions were drawn.

Physical- The street is accessible from the adjacent commercial street. Dustbins are available. This is a clean and tidy street.

Functional- There is a good walkable area. It is safe.

Social- Social activities are observed.

Economic- Several amenities are available within a walking distance.

Environmental- Rows of trees, and users were found seated in an outdoor sitting.

Visual- Neutral colour schemed villa facades along with colourful façade of the retail complex create harmony.

Urban Qualities- The street offers good transparency, as the street has tertiary roads opening on either side through which a full view of activities on the other side is visible. It satisfies the human scale. It is complex with activities going on and facilities available. The colourful façade of retail and villas offers good imageability.

6.4.4 Riffa Residential Street 2



Fig. 6. 78 Activity Observations in Street 4 (gate 1)

Source: Author, 2022

Gate 1:

Movement: A vehicle was seen entering the residential street from the residential street 1 and another vehicle was seen exiting the same street. Another vehicle was observed to enter the residential street through a tertiary road. A group of women were found walking towards the inner street, a man walking, and another sitting was also observed.

Activity Observations: A man was found sitting outside a house on the stairs using his mobile. Another man was found walking towards the residential street.



Fig. 6. 79 Activity Observations in Street 4 (gate 2)

Source: Author, 2022

Gate 2 (29/06/2022) (3:10-3:30 pm)

Movement: In the second gate (tertiary road), a vehicle from the inner road was entering; a woman was walking and a man was cycling.

Activity Observations: Two women were accompanying toddlers in their wheeled vehicles outside their houses. A group of young boys were found gathering and playing with balls outside their houses in this tertiary street. The man cycling stopped the cycle and began to wash a car in front of a house. The street appeared to be energetic, full of life with lots of privacy for the children and users.

6.4.4.5 Liveability of Riffa Residential Street 2 based on Mapping of Movement

The characteristics of liveability as explored through various literature studied and through this research are Physical, Functional, Social, Economic, Environmental, Visual and Urban Qualities. In this street, based on the movement patterns and activities, the following conclusions were drawn.

Physical- It is accessible to pedestrians, but there are issues with accessibility for the vehicles. There is a difficulty to enter and exit through the small tertiary roads as vehicles are parked. It is clean.

Functional- It is used by many pedestrians and residents as mentioned above. It is a walkable street with a street wide enough to walk and for a vehicle to pass. But if there is a car parked on the sides of the street, there is congestion to walk.

This is a safe street.

Social- Considering the size and type of the street, there exist good social activities in it.

Economic- Facilities are available at a walking distance as it is near a retail complex and a commercial street.

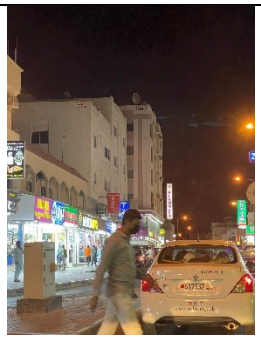
Environmental- There are small clusters of trees. Canopies for car parks are available. Building heights provide shading for pedestrians.

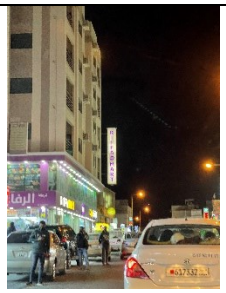
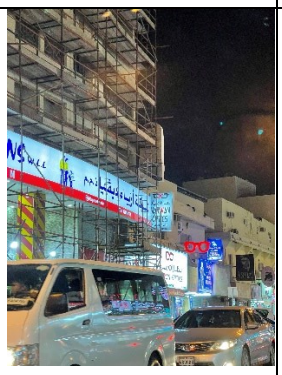
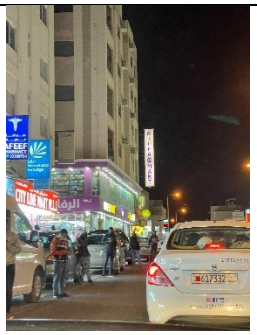
Visual- There are neutral colour schemed villas with trees. Proportionate buildings make the street visually appealing.

Urban Qualities- The street has good imageability and is highly complex considering the number of villas located adjacent to each other. The street offers transparency to an extent. (One can enter, exit and see the other side through the small tertiary roads). It maintains a human scale

6.5.Method 4: Evaluation of Liveability Indicators

6.5.1.Riffa Commercial Street 1

Characteristics	Factors	Indicators	Images	Observations-Qualitative Evaluations	Ev.
Physical	Physical attributes	Floor surfaces - paving		Good.	+2
		Name boards		Clear.	+3
		Signs		Clear.	+3
		Seating		A bus stop with shaded seating.	+2
		Sculpture			+2
		Canopies & Overhangs		Shaded bus stop	+2
		Traffic		Congested street with heavy traffic.	+3
		Parking spaces		A difficult street to find parking, on evenings and weekends.	+1
		Accessibility		Accessible. Traffic congestion is there.	+2
		Variety of retail shops		Yes.	+3

Visual		Scale and Proportion (building heights to street facades)		Proportionate.	+3
		Variety of lighting		Well-lit street with lively shops on either side.	+3
		Compatibility of facades - Compositions		Each has a distinct appearance.	+1
		Legibility of street elements		Edges are marked.	+3
Social	Democratic public spaces for all	General public spaces		Excellent.	+3
		Facilities for the disabled		Only slopes.	+2
		Gathering nodes & Face-to-face communications.		Users found gathering in several locations.	+3
		Socializing spaces nearby/ play spaces (for residential street)		Though there is no specific allocated space, people are found gathering at every available space.	+3

		Recreational facilities (for residential streets)		Public bus stop.	+3
Environmental	Weather conditions	Sunlight		Harsh weather (36 degrees) daytime	-2
		Sound			+2
		Greenery		Potted plants on the entry of the street	+1
		Cleanliness		Cleaned but gets dirty often	+1
Economic	Complexity	Availability of various types of shops		Excellent	+3
		Availability of various types of services.		Excellent	+3
Functional	Safety & Security	Availability of pedestrian crossings		Available, but needs one at the junction of the mosque	+2
		Street Furniture		Some shops have furniture/ items placed on the sidewalk.	+2
		Lighting (Safety)		Safe, but there exist other safety concerns while walking especially in the evening, when people beg.	-3
		Signs		Yes.	+3
		Crossing Facilities (Safety)		Not safe.	+2
		Width of Sidewalk		Good.	+3
		Cycling Lanes		None	-
	Connectivity to city level amenities / Legibility	Easy access to parking		Not easy.	+1
		Connectivity to Street Systems		Vehicles block the linking nodes of the street.	-1
		Road Hierarchy		Causes chaos in the junction near the mosque (gate 2) (vehicles	+2

				entering from the adjacent road)	
	Easy access to public level amenities / Way Finding	Signalised intersections		Not available.	-3
		Identity		Known for being a famous traditional souq.	+3
		Landmarks		Various landmarks.	+3
		Directional		Yes.	+3
		Informational		Yes.	+2
Urban Qualities of Street	Imageability			Unique landmarks provide imageability.	+3
	Enclosure			Yes. Due to the street's complexity and being surrounded by amenities and activities.	+3
	Human Scale			Excellent.	+3
	Transparency			Achieved to an extent.	+2
	Complexity			Excellent	+3

Table 6. 30: Evaluation of Liveability Indicators

Source: Author

6.5.1.1 Summary

Physical:

1. A bus stop with shaded seating
2. Congested street with heavy traffic.
3. A difficult street to find parking, in the evenings and weekends.

Visual:

1. Well-lit street with lively shops on either street.

Social:

1. Users are found gathering in several locations.
2. The street has a public bus stop.

Environmental:

1. No shading or considerations are there in the street.

Economic:

1. A variety of retail facilities are available.

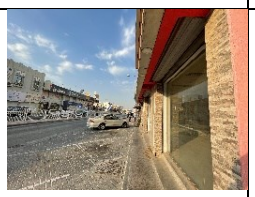
Functional:

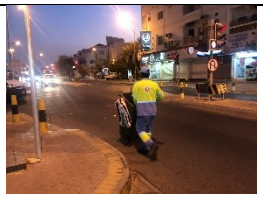
1. Safe, but there exist other safety concerns while walking especially in the evening.
2. Vehicles block the linking nodes of the street.

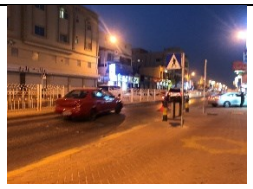
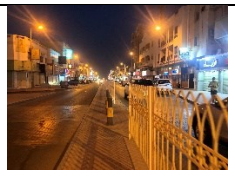
Urban Qualities of Street:

1. Various landmarks and the traditional souq exist.

6.5.2 Riffa Commercial Street 2

Characteristics	Factors	Indicators	Images	Observations - Qualitative Evaluations	Evaluation Score
Physical	Physical attributes	Floor surfaces - paving		Not maintained well	-1
		Name boards		Clear	+3
		Signs		Clear	+3
		Seating		No outdoor seating	-3
		Sculpture		None	-3
		Canopies & Overhangs		Sidewalks are Shaded by shop canopies.	+2
		Traffic		Not much traffic.	+2
		Parking spaces		Parking lots are available on either side of the street.	+3
		Accessibility		Accessible from the adjacent streets.	+3

Visual		Variety of retail shops		Yes	+3
		Scale and Proportion (building heights to street facades)		Proportionate	+2
		Variety of lighting		Lights from shops	+1
		Compatibility of facades - Compositions		Shops have different appearances and building heights and lengths vary. There is no unity.	-1
		Legibility of street elements		Legible	+3
Social	Democratic public spaces for all	General public spaces		Space outside shops on the sidewalks	+2
		Facilities for the disabled		Slope on sidewalks	
		Gathering nodes & Face-to-face communications.		A gathering of people was found outside the wider sidewalk.	+2
		Socializing spaces nearby/ play spaces (for residential street)		People found socializing informally	+1
		Recreational facilities (for residential streets)			+1
		Greenery		Few trees are available.	-1
		Cleanliness		Yes.	+3

Economic	Complexity	Availability of various types of shops		Yes.	+3
		Availability of various types of services.		Yes.	+2
Functional	Safety & Security	Availability of pedestrian crossings		Yes.	+3
		Street Furniture		Some street furniture from shops obstructs walking.	+1
		Lighting (Safety)		Good lighting.	+2
		Signs		Legible.	+3
		Crossing Facilities (Safety)		Excellent pedestrian crossings.	+3
		Width of Sidewalk		Extremely narrow width in certain areas. Difficult for one person to walk.	-1
		Cycling Lanes		None	-3

	Connectivity to city level amenities/ Legibility	Easy access to parking		Yes	+3
		Connectivity to Street Systems		Good connectivity. Needs signages.	+2
		Road Hierarchy			+2
	Easy access to public level amenities/ Way Finding	Signalised intersections		Available.	+2
		Identity		Bakeries and perfume shops provide identity.	+2
		Landmarks		Same as above and cafeterias.	+1
		Directional		Yes.	+2
		Informational		Yes.	+2
Urban Qualities of Street	Imageability			Good imageability.	+2
	Enclosure			Due to the road width, the enclosure is less.	+1
	Human Scale			Human scale is considered, but sidewalks have issues.	+1
	Transparency			Glass facades offer transparency to an extent.	+2
	Complexity			Complexity to an extent is achieved.	+2

Table 6. 31: Evaluation of Liveability Indicators

Source: Author

6.5.2.1 Summary

Physical:

1. Not maintained well
2. Shop canopies provide shading to the sidewalks.
3. Parking lots are available on either side of the street.

Visual:

1. Shops have different appearances and building heights and lengths vary. There is no unity.
2. Lights from shops are attractive.

Social:

1. Space outside shops on the sidewalks has social activities.
2. A gathering of people was found outside the wider sidewalk.
3. People found socializing informally.

Environmental:

1. Few greeneries near the house.

Economic:

1. Availability of various types of shops.

Functional:

1. Pedestrian crossings exist and are safe.
2. There are proper signages.
3. Sidewalks are narrow.

Urban Qualities of Street:

1. Complexity
2. Enclosure
3. Imageability

6.5.3 Riffa Residential Street 1

Characteristics	Factors	Indicators	Images	Observations- Qualitative Evaluations	Evaluation Score
Physical	Physical attributes	Floor surfaces - paving		Good maintenance.	+3
		Name boards		Clear.	+3
		Signs		Excellent.	+3
		Seating		Outdoor dining area for the restaurant.	+2
		Sculpture		Signage in the form of a sculpture.	+2
		Canopies & Overhangs		The retail complex provides shading and acts as an extension of the street.	+2
		Traffic		Traffic from the adjacent commercial street.	+1
		Parking spaces		Row for parking vehicles, especially for the visitors of retail.	+3
		Accessibility		Accessible.	+3

Visual		Variety of retail shops		Accessible from the adjacent commercial street.	+3
		Scale and Proportion (building heights to street facades)		Proportionate	+2
		Variety of lighting		One side of the street appears to be lively, whereas the residential side appears to be dark.	+1
		Compatibility of facades - Compositions		A variety of colours, attractive design elements and materials exist.	+3
		Legibility of street elements		The retail complex, outdoor parking and the street together appear as one entity without a partition.	+1
Social	Democratic public spaces for all	General public spaces		None	-1
		Facilities for the disabled		None.	-3
		Gathering nodes & Face-to-face communications.		Regular gatherings of visitors.	+2
		Socializing spaces nearby/ play spaces (for residential street)		No spaces are allocated nearby. But informally there are such spaces.	+3
		Recreational facilities (for residential streets)		Availability of gym, cafes and outdoor dining.	+3

		Greenery		Greenery outside shops and houses.	+2
		Cleanliness		Excellent	+3
Economic	Complexity	Availability of various types of shops		Yes.	+3
		Availability of various types of services.		Available	+3
Functional	Safety & Security	Availability of pedestrian crossings		No.	-3
		Street Furniture		No.	-
		Lighting (Safety)		Safe.	+3
		Signs		Excellent.	+3
		Crossing Facilities (Safety)		Lack of allocated crossing facility.	+2
		Width of Sidewalk		Sufficient but it is not tarred.	+2
		Cycling Lanes		None.	+3
	Connectivity to city level amenities/ Legibility	Easy access to parking		Yes.	+3
		Connectivity to Street Systems		Connects to a commercial road, which further connects to the highway. It also connects to inner residential streets.	+3
		Road Hierarchy		Tertiary road.	+3
	Easy access to public level amenities/ Way Finding	intersections with Signals		Not available, however, not required.	-1
		Identity		Known for the retail complex.	+3
		Landmarks		Several restaurants, cafes, and other shops act as landmarks.	+3

				As well as a supermarket, gym, pharmacy etc. in the same street.	
		Directional		Limited	+1
		Informational		Limited (due to the location this street is not identified)	+1
Urban Qualities of Street	Imageability			Colourful facades provide imageability.	+2
	Enclosure			Yes	+2
	Human Scale			Yes.	+3
	Transparency			View across the cafes, and pocket roads.	+2
	Complexity			Different types of restaurants and retail provide complexity.	+1

Table 6. 32: Evaluation of Liveability Indicators

Source: Author

6.5.3.1 Summary

Physical:

1. The street has good maintenance.
2. An outdoor dining area for the restaurant exists.
3. Signage in the form of a sculpture acts as a landmark for the retail complex.
4. The retail complex provides shading and acts as an extension of the street.
5. Outdoor parking for vehicles is available.

Visual:

1. Shops are colourful in appearance.
2. A variety of design elements exist.
3. There is a unique design for each façade.
4. The shops add contrast to the residential buildings

Social:

1. Gatherings of visitors occur in the street.
2. Gym, Cafes, and Outdoor dining are available.
3. People gathering, and bikers gathering are activities taking place.

Environmental:

1. Plants are arranged and decorated outdoors on the street.
2. Plants are placed outdoors of restaurants.

Economic:

1. There is a variety of retail shops.
2. There are no banks nearby.
3. Different restaurants are available.

Functional:

1. There is no crossing facility for pedestrians.
2. The street acts as a secondary road connecting the commercial street and inner residential streets.
3. No sidewalks are available.
4. There is safe lighting

Urban Qualities of Street:

1. Transparency due to the openings in the retail complex.
2. Complexity due to different types of retail and restaurant exist.

6.5.4 Riffa Residential Street 2

Characteristics	Factors	Indicators	Images	Observations-	Evaluation Score
Physical	Physical attributes	Floor surfaces - paving		Not properly maintained.	-1
		Name boards		House name boards and road signs exist.	+3
		Signs		None, only road number.	+1
		Seating		None.	-3
		Sculpture		None.	-3
		Canopies & Overhangs		Shading for car.	+1
		Traffic		No traffic when observed.	+2
		Parking spaces		Shaded parking 2 cars for 5 houses. Cars are parked informally when cars park on opposite sides it causes congestion.	+1
		Accessibility		Accessible from different roads.	+3

Visual		Variety of retail shops		Nearby	+1
		Scale and Proportion (building heights to street facades)		Proportionate	+2
		Variety of lighting		Good lighting is there.	+2
		Compatibility of facades - Compositions		Neutral colour scheme, similar houses.	+2
		Legibility of street elements		Vehicles are parked.	+1
Social	Democratic public spaces for all	General public spaces		Open spaces are available as vacant lands.	+2
		Facilities for the disabled		None	-3
		Gathering nodes & Face-to-face communications .		Regular gatherings of families.	+2
		Socializing spaces nearby/ play spaces (for residential street)		Informal play spaces are used by children regularly.	+2
		Recreational facilities (for residential streets)		None.	-3
Environmental	Weather conditions	Sunlight		Shading from buildings	+2
		Sound		Yes	+2
		Greenery		Availability of large trees.	+2
		Cleanliness		Cleaned regularly.	+2
Economic	Complexity	Availability of various types of shops		None. However, a retail complex exists in proximity.	+2
		Availability of various types of services.		They are available at a walkable distance	+2

Functional	Safety & Security	Availability of pedestrian crossings		Not available.	-3
		Street Furniture		None.	-
		Lighting (Safety)		Yes.	+2
		Signs		Clear	+2
		Crossing Facilities (Safety)		Safe	+3
		Width of Sidewalk		No sidewalks.	-3
		Cycling Lanes		None. Informally used by cycles.	-1
	Connectivity to city level amenities/ Legibility	Easy access to parking		Parking informally on the ground adjacent.	+1
		Connectivity to Street Systems		Yes.	+2
		Road Hierarchy		Legible	+2
	Easy access to public level amenities/ Way Finding	Signalised intersections	-	-	-
		Identity		None.	-1
		Landmarks		Carrefour supermarket adjacent.	+1
		Directional		Riffa Village Retail complex	+3
		Informational		Name boards	+2
	Imageability			Not much imageable. Few trees and flowers are available.	+1

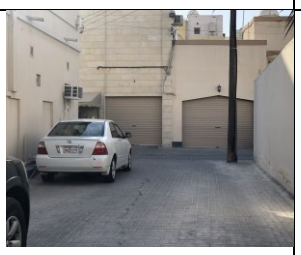
Urban Qualities of Street	Enclosure			The narrow street provides enclosure while walking.	+3
	Human Scale			-	+3
	Transparency			Can see across the street through two inner roads and the ground.	+3
	Complexity			It is not very complex. But concerning its size, it has a complexity to an extent.	+1

Table 6. 33: Evaluation of Liveability Indicators

Source: Author

6.5.4.1 Summary

Physical:

1. Houses are not maintained

Visual:

1. Good lighting is there in the street.
2. Shading from trees is there.
3. Vehicles are parked outside houses
4. Old houses fill the street.
5. Neutral colour scheme.

Social:

1. Family gatherings occur informally
2. Activities performed by children, playing, and cycling.

Environmental:

1. Large trees exist.
2. The street is cleaned regularly.
3. Shading is provided from large trees on open ground.

Economic:

1. Retail and other services are available nearby.

Functional:

1. Safe walkways are there in the street.
2. There are no sidewalks.
3. Informal parking is there.
4. Landmarks nearby are Riffa Village Retail, Carrefour, and Restaurants.

Urban Qualities of Street:

1. 2 shaded car parks, cars parked outside houses informally.
2. Street provides enclosure with trees and houses on either side.
3. Offers transparency with openings with a view of the street.

6.6 Comparative Tables of Liveability based on 4 Methods

6.6.1 Evaluation of Street 1- Summary

Characteristics	Method 1	Method 2	Method 3	Method 4
Physical	**Accessibility-** The street is accessible. **Cleanliness-** The street is clean.	It is accessible It is clean	It is accessible and clean.	1. A bus stop with shaded seating is available. 2. Congested street with heavy traffic. 3. A difficult street to find parking, in the evenings and at weekends.
Visual	xxx	xxx	Different types of retail and restaurant, and good lighting facilities are available making it visually pleasing. Proportionate sidewalks and street size.	1. Well lighted street with lively shops on either street.
Social	There are good social activities here, but there is an issue with children gathering and fighting, resulting in accidents.	The street is highly sociable and has a variety of activities taking place.	Plenty of social activities have been observed at different gates of the street at different times. Gathering of men, gathering of users shopping, walking, standing, talking, drinking tea etc are observed. It is an extremely lively street. Users are found going near those shops which have people in them.	1. Users found gathering in several locations. 2. Public bus stop.
Environmental	There are no significant considerations for the environment.	Few shading, shelter, and sitting are mentioned.	Trees, provide canopies for sitting at the bus stop.	1. No shading or considerations
Economic	All facilities are available in the street.	The street satisfies the economic characteristics.	Serves a variety of facilities for retail, services, restaurants and recreational.	1. Variety of retail facilities
Functional	**Usability:** Parking is found as a critical issue affecting the staff and customers of the street.	The street is walkable Crossing facilities are safe and sidewalks are safe There is an issue with the parking facility	Vehicle congestion exists. But users are frequenting the street every time. The influx of visitors proves it is walkable.	1. Safe, but there exists other safety concern while walking especially in the evening 2. There occurs blockage of vehicles in the linking nodes of the street.

	Functionality: Walkability & Safety: A mixed response is received. There is an issue with crossing the street. Moreover, ladies asking for money is a significant issue affecting the walkability and safety of pedestrians and customers.	Vehicular congestion exists. The street does not fully satisfy the functional characteristics as usability and safety are affected.		
Urban Qualities of Street	**xxx**	**xxx**	The street has good imageability, spots to remember, and unique shops/smells/colours. It is highly complex due to its traffic of vehicles and influx of pedestrians, activities taking place at the same time and buildings adjacent to each other. It is fully transparent.	1. Various landmarks, traditional souq

Table 6. 34: Comparison of data produced from 4 methods

Source: Author

6.6.2 Evaluation of Street 2- Summary

Characteristics	Method 1	Method 2	Method 3	Method 4
Physical	**Accessibility-** The street has easy access. **Cleanliness-** A mixed response it receives. Issue of congestion and cleanliness exists.	It is accessible It is clean. 2 issues related to plastic bags and work items are reported. The street satisfies the physical characteristics to an extent.	Accessible from adjacent streets. The street is cleaned regularly. Plenty of parking facilities, sufficient.	1. Not maintained well 2. Shadings from shops to the sidewalks. A parking lot is available on either side of the street.
Visual	**xxx**	**xxx**	Colourful facades, attractive unique facades, visually appealing street.	1. Shops have different appearances and building heights and lengths vary without unity. 2. Lights from shops

Social	The street is used by some people, but there is no specified seating.	Several social activities are reported taking place here. It satisfies the social characteristics.	Gathering, men going for work	1. Space outside shops on the sidewalks 2. Slope on sidewalks 3. A gathering of people was found outside the wider sidewalk. 4. People found socializing informally
Environmental	There are no environmental considerations.	Shading from shops is available and benches with shading.	None	1. Few greenery near a house
Economic	The street has good economic facilities that are used by the users.	The street caters to all the economic needs.	Serves a variety of facilities for retail, services, restaurants and recreational.	1. Availability of various types of shops
Functional	**Usability:** Users are restricted to crossing roads in pedestrian crossings only and not anywhere else due to street dividers. But most of the respondents are satisfied. **Walkability & Safety**: Street divider is found to affect users. Difficulty walking on sidewalks causes users to walk on the roads. Teenagers are reported to affect the shopkeepers.	The street has parking facilities and does not have much traffic Several issues related to usability are reported, which need serious consideration to fulfil the functional characteristics. Crossing facilities and sidewalks are safe.	Pedestrians crossing the road, poor sidewalks, hence not a walking-friendly. Though pedestrians are found walking, they are found walking in the pedestrian crossing or on wider sidewalks.	1. Availability of pedestrian crossings 2. Crossing Facilities (Safety) 3. Signs
Urban Qualities of Street	**xxx**	**xxx**	The street offers good imageability. It is complex with several amenities available next to each other.	1. Complexity 2. Enclosure 3. Imageability

Table 6. 35: Comparison of data produced from 4 methods

Source: Author

6.6.3 Evaluation of Street 3- Summary

Characteristics	Method 1	Method 2	Method 3	Method 4
Physical	**Accessibility-** The street is accessible. **Cleanliness-** The street is clean.	It is accessible It is clean	The street is accessible from an adjacent commercial street. Dustbins available, clean and tidy street.	1. Good maintenance. 2. Outdoor dining area for the restaurant. 3. Signage in the form of a sculpture acts as a landmark for the retail complex

				4. The retail complex provides shading and acts as an extension of the street. 5. Outdoor parking for vehicles
Visual	**xxx**	**xxx**	Neutral colour schemed villa facades along with colourful façade of the retail complex create harmony.	1. Colourful in appearance 2. Variety of design elements 3. Unique design for each façade 4. Adds contrast to the residential buildings
Social	There are several social activities reported in the street.	Few social activities are reported.	Social activities are spotted.	1. Gatherings of visitors 2. Gym, Cafes, Outdoor dining. 3. People gathering, bikers gathering
Environmental	The street has trees and shadings from restaurants are there.	No environmental considerations.	Rows of trees, users found seated in an outdoor sitting.	1. Plants are arranged and decorated the outdoors on the street. 2. Plants placed outdoors of the restaurants
Economic	All facilities are available in the street.	The street has economic facilities available.	Several amenities are available within a walking distance.	1. Variety of retail shops 2. No banks nearby 3. Different restaurants
Functional	**Usability:** There is a difficulty for users to locate the shops (Retail complex) No other issues. **Walkability & Safety**: Difficulty to cross roads exists.	Crossing and sidewalks are safe. There are sufficient parking facilities. There is no traffic.	There is a good walkable area. It is safe.	1. No crossing facility for pedestrians 2. The street acts as a secondary road connecting the commercial street and inner residential streets. 3. No sidewalks 4. Safe lighting
Urban Qualities of Street	**xxx**	**xxx**	The street offers human scale, and good transparency, as the street has tertiary roads opening on either side through which a full view of activities on the other side is visible. It is complex with activities and facilities. The colourful façade of retail and villas offers good imageability.	4. Transparent, Complexity

Table 6. 36: Comparison of data produced from 4 methods

Source: Author

6.6.4 Evaluation of Street 4- Summary

Characteristics	Method 1	Method 2	Method 3	Method 4
Physical	**Accessibility-** The street is accessible. **Cleanliness-** There exist issues with cleanliness. Residents find it dirty during sandstorms and nearby areas.	It is clean It is accessible	It is accessible by walk, but there are issues with accessibility through vehicles. There occurs difficulties to enter and exit through the small tertiary roads as vehicles are parked. It is clean.	1. Houses not maintained
Visual	**xxx**	**xxx**	Neutral colour schemed villas with trees. Proportionate streets and buildings.	1. Good lighting 2. Shading from trees 3. Vehicles parked outside houses 4. Old Houses 5. Neutral colour scheme.
Social	Plenty of social activities take place on this street. Children have damaged properties of houses.	Few social activities are reported	Considering the size and type of street, there exist good social activities within it.	1. Family gatherings occur informally 2. Activities performed by children, playing, and cycling.
Environmental	The street is found to have shading from trees and car parks.	No environmental considerations.	There is a small cluster of trees. Canopies for car parks are available. Building heights provide shading while walking.	1. Exists large trees 2. Cleaned regularly 3. Shading is provided from large trees on open ground.
Economic	The street caters to the different needs of users.	Satisfactory. No recreational facilities.	Facilities are available at a walking distance as it is near a retail complex and a commercial street.	1. Retail and other services in proximity.
Functional	**Usability:** Difficulty to park/drive exists due to cars being parked on opposite sides. **Walkability & Safety**: The street does not have sufficient lighting.	Issues related to usability are reported. A lack of sidewalks is reported. The sidewalks are safe. The street is walking friendly. It is used by many pedestrians.	It is used by many pedestrians and residents as mentioned above. It is a walkable street with a street wide enough to walk and for a vehicle to pass. But if there is a car parked on the sides of the street, there is congestion to walk. Safe street.	1. Safe walkways 2. No sidewalks 3. Informal parking 4. Landmarks nearby – Riffa Village Retail, Carrefour, Restaurants.

		Not enough parking spaces.		
Urban Qualities of Street	**xxx**	**xxx**	The street has good imageability and is highly complex considering the number of villas located adjacent to each other. The street offers transparency to an extent. (One can enter, exit and see the other side through the small tertiary roads) It considers the human scale.	2 shaded car parks, cars parked outside houses informally. Street provides enclosure with trees and houses on either side. Offers transparency with openings

Table 6. 37: Comparison of data produced from 4 methods

Source: Author

Chapter 7 | Results, Discussion, Conclusion & Recommendations

7.1 RESULTS

Results

7.1.1. Liveability of the 12 streets

Liveability of the 12 streets based on the results derived from the four methods: interviews, the survey, activity mapping and indicators. The table below shows the scale of evaluating the level of liveability on a point 6 semantic scale.

Satisfies 7 characteristics completely	**Highest level of Liveability**
Satisfies 6-7 characteristics to an extent	**High level of Liveability**
Satisfies 4-5 characteristics to an extent	**Good level of Liveability**
Satisfied 2-3 characteristics to an extent	**Moderate level of Liveability**
Satisfies only less than 2 characteristics	**Low level of Liveability**
Does not satisfy any characteristics	**Very low level of Liveability**

Table 7. 1: Criteria to evaluate the liveability of streets using a 6-point scale

Source: Author, 2022

7.1.2 Case Study 1: Manama

7.1.2.1 Street 1: Manama – the Commercial Street 1

Physical: The first characteristic of liveability analysed was the physical characteristics. In comparing the results obtained from the four methods, the following were found. Interviews divulged that the street needs to consider water leakages. There is a lack of parking spaces. Through activity mapping, it was noted that the street is a one-way road and as a result, there are difficulties for vehicles to pass. The liveability indicators show that the street had unfinished pavements and informal entries.

Visual: The first two methods did not examine the visual characteristics, but based on activity mapping, it is found that the street has gatherings of people: people were sitting, and standing, although there were fewer activities taking place and fewer movements. Through the assessment of indicators, it was found

that the street was dull and had no lighting. The street overall had a dull appearance and thus, it is concluded that the street does not satisfy the visual characteristics.

Social: Based on the interviews, it is understood that the street has a good social life with several activities taking place. Through the survey, it was found that several activities took place near the church, the garden, the coffee shops and the restaurants. Through activity mapping, it was noted that social activities take place during the nighttime and not during the daytime. Through the data collection and analysis, it is found that there are informal gathering spots near the church and the restaurant. The results from mapping, the surveys and interviews contrast with each other.

Environmental: Through the interviews, the survey and the activity mapping, similar results were observed. However, the indicators showed that the street is comfortable to walk in the evening but humid during the mornings and afternoons.

Economic: The indicators show that the street lacks several facilities such as retail, services and some restaurants.

Functional: The interviews highlighted that parking, theft and bicycles affect walkability. The survey divulged that there are issues of safety, while the width of the sidewalks affects walkability and overcrowding. Insight from the activity mapping shows that there are pedestrian crossings in the street but the sidewalks are problematic. The indicators show that chairs from the restaurants hinder walkability on the sidewalks.

Urban Qualities: Through the activity mapping and indicators, it is found that urban qualities are not fully achieved. The human scale needs to be taken into consideration, especially on the sidewalks.

Liveability: Since the street satisfies 2 characteristics to an extent: Social and Urban Qualities; the street is concluded to have a **moderate level of liveability.**

7.1.2.2 Street 2: Manama Commercial Street 2

Physical: Through the interviews, the survey and the activity mapping, it is understood that the street is accessible and clean. However, indicators show that the street has name boards that are old and dusty and has congestion. Lack of parking also exists as a significant issue.

Visual: The street offers excellent visual factors, such as a variety of retail and facades. However, activity observations show that the sidewalks are not proportionate.

Social: All four methods show that the street is highly sociable.

Environmental: There are no environmental considerations.

Economic: All the four methods, show that the street has good economic characteristics.

Functional: All four methods divulge issues concerning functionality. They are traffic congestion, overcrowding, narrow sidewalks and crossing roads without pedestrian crossing. Uneasy staring by people has also been noted.

Urban Qualities: The street achieves urban quality indicators such as enclosure, transparency, complexity and imageability. However, it fails to achieve a human scale. There is also a lack of proper sidewalks.

Liveability: *The street achieves the physical, visual, social, economic and urban qualities of liveability to an extent. Therefore, it is concluded to have a* ***good level of liveability.***

7.1.2.3 Street 3: Manama Residential Street 1

Physical: Though the street is clean, accessible and legible, indicators show that the paid parking is limited, and the street is heavily congested.

Visual: The street is legible, proportionate and offers a variety of retails and facades as per the third method (activity mapping) and fourth method (evaluation of liveability indicators)

Social: The street is found to have several social activities and gathering nodes

Environmental: The street does not have any greenery, but the tall buildings provide shade to the street.

Economic: There exists a variety of retail, restaurants, recreational and other services within a walkable distance.

Functional: Safety concerns were observed on the sidewalks while crossing. There is a need for ramps and spaces for vehicle parking on the roadside.

Urban Qualities: The street satisfies the urban qualities to an extent but needs to make it more imageable.

Liveability: *The street achieves 4 characteristics of liveability to an extent. These are Visual, Social, Economic and Urban Qualities. Therefore, it is concluded to have a* ***good liveability of liveability.***

7.1.2.4 Street 4: Manama Residential Street 2

Physical: There is traffic congestion and a lack of parking.

Visual: Activity mapping and indicators show that the street has good lighting, but the road is not proportionate and there is a lack of sidewalks.

Social: The street achieves the social characteristics according to all four methods.

Environmental: There is greenery outside the buildings but no other environmental consideration.

Economic: The street is close to all necessary facilities.

Functional: All four methods divulged critical issues with functionality. Some include entering the wrong way, inadequacy of space available for walking and vehicles parked on either side of the road.

Urban Qualities: There is no transparency or significant imageability.

Liveability: *The street satisfies 3 characteristics of liveability to an extent. These are Social, Environmental and Economic. Thus, the street is rated to have a* ***moderate level of liveability.***

7.1.3 Case Study 2: Muharraq

7.1.3.1 Street 1: Muharraq Commercial Street 1

Physical: The street is accessible, clean and has parking facilities. Satisfies the physical characteristics as divulged by the research.

Visual: The street has several shops. It is a well-lit street.

Social: Different social activities take place as divulged by all four methods.

Environmental: There are no environmental considerations. However, the street has few trees.

Economic: Different facilities are available.

Functional: Parking is found as an issue at the weekend.

Urban Qualities: The street satisfies the urban qualities to an extent.

Liveability: *The street achieves 6 characteristics of liveability to an extent except for environmental characteristics. Therefore, the liveability is rated to have a* ***high level of liveability.***

7.1.3.2 Street 2: The Muharraq Commercial Street 2

Physical: It is accessible but untidy.

Visual: The street has many shops and proportionate facades.

Social: Interviews, the survey and the activity observations show that there are several social activities taking place in the street.

Environmental: There are no environmental considerations. There is only shading from trees.

Economic: Economic characteristics are fulfilled.

Functional: Issues exist related the parking. Sidewalks are unsafe, and the street is not walking-friendly.

Urban Qualities: Not satisfied.

Liveability: *It is understood that the street achieves the visual, social and economic characteristics of liveability. The street liveability is concluded to have a* ***moderate level of liveability.***

7.1.3.3 Street 3: The Muharraq Residential Street 1

Physical: There are critical issues such as traffic congestion, and restriction on movement. It is difficult to drive along this street.

Visual: It has visually appealing facades and structures, but the street is narrow.

Social: Some activities are observed only in the evening.

Environmental: Mixed results are obtained from all four methods. Some shadings and canopies exit.

Economic: Facilities are available but limited.

Functional: The street is good for walking, and cycling and is safe. However, there is an issue when a vehicle enters in. It is extremely difficult, leading to safety hazards. There is also poor lighting.

Urban Qualities: It is complex, considers human-scale, is imageable, and has an enclosure.

Liveability: *The street achieves the visual, social, environmental, economic and urban qualities of liveability to an extent. Therefore, the street liveability is concluded to be* ***"good"***

7.1.3.4 Street 4: The Muharraq Residential Street 2

Physical: The street is accessible from the adjacent streets. However, there is a difficulty for those accessing by vehicles.

Visual: This is a narrow street with a high density of buildings

Social: Children socialize in the street.

Environmental: No environmental considerations exist except for some shading.

Economic: Several retail and recreational facilities are available in walking distance from the street.

Functional: Many problems exist concerning functionality such as congested parking facilities, lack of sidewalks and proper walkways.

Urban Qualities: Like the previous street, it is not transparent. It is complex, considers human-scale, is imageable, and has an enclosure.

Liveability: *The street achieves 4 characteristics; visual, social, economic and urban qualities. Hence, it is concluded to have a* ***good level of liveability.***

7.1.4 Case Study 3: Riffa

7.1.4.1 Street 1: The Riffa Commercial Street 1

Physical: It is accessible and clean.

Visual: In this street, different types of retail facilities and restaurants, are available. Good lighting makes it visually pleasing. The sidewalks are

proportionate to the street size. This is a well-lit street with lively shops on either side.

Social: The street is highly sociable and has a variety of activities taking place.

Environmental: The research shows that there are few shades, shelter, and sitting areas. Trees provide shelter from the canopies at the bus stop.

Economic: All facilities are available in the street.

Functional: Parking is found as a critical issue affecting the staff and customers of the street.

Urban Qualities: The street has good imageability, spots to remember, unique shops, smells and colours. It is highly complex due to its vehicular traffic, the influx of pedestrians, activities taking place at the same time and buildings adjacent to each other. It is fully transparent.

Liveability: *The street achieves the physical visual, social, environmental, economic and urban qualities of liveability. It is concluded to have* ***a high level of liveability.***

7.1.4.2 Street 2: The Riffa Commercial Street 2

Physical: Accessible from the adjacent streets. The street is cleaned regularly. There is a sufficient parking facility. Some cleanliness and congestion issues exist.

Visual: The street has colourful and attractive unique facades. Thus it is a visually appealing street. Lights from shops illuminate the street well.

Social: Several social activities take place here. People socialize informally.

Environmental: Overhangs from the shops exist and there are benches with shading.

Economic: The street caters to all economic needs.

Functional: Several issues related to usability are reported, which need serious consideration to fulfil the functional characteristics. These include the issues such as the widths of the sidewalks.

Urban Qualities: The street offers good imageability. It is complex with many amenities available next to each other. It provides an enclosure.

Liveability: *Like the previous street, this street also achieves the physical, visual, social, environmental, economic and urban qualities of liveability. It is concluded to have a* ***high level of liveability.***

7.1.4.3 Street 3: Riffa Residential Street 1

Physical: It is accessible and clean

Visual: Colourful in appearance. There is a variety of design elements.

Social: Social activities are observed.

Environmental: There are rows of trees, and the users are found seated in the outdoor sitting areas.

Economic: Most facilities are available in the street.

Functional: There is a difficulty for users to locate the shops (Retail complex) There are no other issues. It is difficult to cross the road.

Urban Qualities: The street is transparent, and has complexity.

Liveability: *The street achieves 6 characteristics to an extent. These are physical, visual, social, environmental, economic and urban qualities of liveability. Therefore, the street is concluded to have* ***a high level of liveability.***

7.1.4.4 Street 4: The Riffa Residential Street 2

Physical: It is accessible to pedestrians. However, it is difficult for vehicles to access due to cars being parked.

Visual: The street is bounded by villas painted in neutral colours. The trees soften the harsh built fabric. The buildings have good proportions and create a visual appearance to the street.

Social: Family gatherings occur informally. Children, play and cycle around the street.

Environmental: There is a small cluster of trees. Tree canopies provide shades for the car parks. Tall buildings and trees provide shade to the street.

Economic: There are no recreational facilities. Other facilities are available in walkable distance.

Functional: There are no sidewalks, but users find it walking-friendly on the road.

Urban Qualities: It satisfies the urban qualities to an extent.

Liveability: *The street achieves 5 characteristics of liveability, visual, social, environmental, economic and urban qualities. The street is concluded to have a* ***good level of liveability.***

7.1.5 Comparison of the three case studies: Manama, Muharraq, and Riffa

In the case of Manama, a general understanding is that the liveability is ranging between good to moderate levels of liveability. A common issue in the four streets of Manama is functionality. All four streets achieve social characteristics.

In the case of Muharraq, the first commercial street has a high level of liveability, the second street has a moderate level of liveability and the residential streets have a good level of liveability. A common issue in the four streets is related to

functional characteristics. All four streets achieve visual, social and economic characteristics to an extent. In the case of Riffa, the first three streets have a high level of liveability, while the fourth street (Residential Street 2) has a good level of liveability. A common issue in all four streets is related to functional characteristics like the previous two cases. The streets achieve visual, economic, environmental, social and urban qualities to an extent.

7.1.6 Comparison of the typology of streets: Commercial Vs Residential

Commercial streets of Manama range from good to moderate levels of liveability. Functional and environmental characteristics need to be improved.
Residential streets of Manama also have social activities and possess economic characteristics. Here it fails to achieve the functional and physical characteristics. The streets range from good to moderate levels of liveability.

Commercial streets of Muharraq range from high to moderate levels of liveability. On the second street, the Urban qualities are not satisfied; sidewalks need consideration. Moreover, walkability is an issue. The street needs to address the physical, environmental, functional and urban qualities. In Muharraq, the Residential streets have an issue with the physical, environmental, economic, functional and urban qualities. It only satisfies the social and visual characteristics. The streets have a good level of liveability. In Riffa, the commercial streets have a high level of liveability. Functionality can be improved.

In the residential streets of Riffa, the liveability ranges from good to high level of liveability. The second street needs to improve its physical and functional characteristics.

7.2 DISCUSSION

7.2 DISCUSSION

7.2.1 Purpose of the study

The overall purpose of the study was to evaluate the liveability of streets and sidewalks in Bahrain. The study targeted three main cities of Bahrain and selected 4 streets from each street. It evaluated both commercial and residential streets.

7.2.1.1 The issue, aims and objectives

An alarming number of pedestrian and cyclist fatalities on roads, accidents at pedestrian crossings, and narrow streets with poor accessibility led the path to investigate this issue. These issues have affected the quality of life. Therefore, the study aimed at evaluating the "liveability" of streets and sidewalks and identifying the factors that affect the liveability of streets and sidewalks in Bahrain and further decipher how liveable are these streets and sidewalks. The main objectives were to evaluate the liveability of streets and sidewalks in Bahrain by ascertaining user perception of liveability, identifying characteristics that affect the liveability of streets in Bahrain and identifying the specific concerns and issues (indicators) in the streets and sidewalks.

7.2.1.2 Mode of conducting the research

The research was conducted using qualitative measures. Online questionnaires, in-person interviews, mapping of activities in the street and evaluation of liveability using indicators were conducted. Different indicators of liveability were evaluated using the four methods. Extensive fieldwork was conducted to map out the activities, evaluate and rate the indicators using a semantic scale and interviews were conducted with users on the streets.

7.2.2 Concept of Liveability & How It Manifests

Liveability is a concept that has been defined differently by researchers. As discussed in the second chapter-Literature Review, it was noted that liveability is the amalgamation of social, economic, environmental and quality urban environments. Thus being able to improve the quality of urban places. However, it is associated with long term goals. This involves policy and community planners who plan cities. This research aimed at targeting liveability on the streets and sidewalks of cities in Bahrain. Characteristics of liveability as discussed by previous literature were selected: Economic, environmental, physical, functional and social. Additionally, two new characteristics were put forward to define liveability. These are the Visual characteristics of a street and the Urban Qualities of a street. Through the research, it was proved that these characteristics and their indicators play a role in defining the liveability of a street.

The indicators selected under visual and urban qualities played a role in affecting the usability and co-related with other indicators and characteristics such as functionality and sociability. Thus through this study, the concept of liveability was articulated more precisely as the composition of social, visual, economic, environmental, functional, physical and urban qualities in a street. It is manifested by the usability, movement, activities performed by and walkability of the users.

7.2.2.1 How Liveability exists in Space (Streets and Sidewalks)

Through this study, it is recognized that the way a user perceives the street and its sidewalks, the level of liveability is determined already to an extent. By definition, urban liveability is the ability of an urban space to consummate the

expectations of its inhabitants for well being and quality of life (Martino et al., 2021). To closely analyse the well being and quality of life on streets and sidewalks, several indicators were selected. Some of these include legibility, safety, enclosure, complexity and parking.

7.2.2.2 How it was assessed and evaluated in the streets.

In this study, liveability was assessed using four methods. These are interviews, surveys, mapping of activities and evaluation of indicators. To apply these methods, a set of indicators and characteristics were developed through the literature review and methodology chapters.

7.2.3 Interpretation: What do the results mean?

The results proved that the streets irrespective of the number of characteristics that it achieves, it is still inhabited by users and are spaces where one commutes on an everyday basis. The results showed that the selected streets of Bahrain range from good to high levels of liveability. This means that they achieve a minimum of 2 characteristics of liveability to an extent. Therefore, it is concluded that a street doesn't require to have accomplished all 7 characteristics of liveability put forward completely, to be considered liveable. They are still liveable to a certain level. But the most important insight from the study is that the streets generally lack consideration for the environment.

7.2.4 Implications: Why do the results matter?

The findings proved that the streets and sidewalks of the three selected cases are spaces used by people for different activities. These include walking, shopping, recreation and socialization. The streets cater to various facilities that the user requires. These are economic facilities, and environmental considerations, that enable socialization, provide urban qualities and provide

well-functioning and visually appealing factors in a street. Though the streets do not achieve every characteristic of liveability that was put forward, they were still used by people actively and inhabited.

Liveability has not been extensively studied on streets and therefore, the methods and results produced by this study can help future researchers in defining and evaluating liveability in different places.

7.2.5 Limitations: What can't the results tell us?

The limitations of the results are not being able to convey the liveability of other cities in Bahrain.

7.2.6 Discussing Results and Issues

In the first street of the first case study, Manama, the result obtained was that the street has a moderate level of liveability, while the second street has a good level of liveability. It is found to satisfy the urban qualities and social characteristics. In the second case, being a commercial street itself, a contrasting result is found. The street satisfies 5 characteristics successfully, which are physical, visual, social, economic and urban qualities. Hence, it can be understood that, though these streets are located parallel to each other and are commercial streets, they have their significant characteristics and serves its people differently. The significant issues found in the first street is that it fails to achieve the physical, visual, environmental, economic and functional characteristics. Being a commercial street, it was a surprise to find it only a moderately liveable street. Whereas, in the second street, the issues that persist were with the environmental and functional characteristics.

While looking at the residential streets, the first street that is connected to a commercial street achieves good level of liveability, while the residential street that is located in the inner roads have a moderate level of liveability. Here in the first street, it is found to achieve visual, social, economic and urban qualities of a street, while the second street, satisfies social, environmental, economic characteristics. While looking at the issues, the first street has not successfully achieved physical, environmental and functional characteristics of liveability. The second street, on the other hand, fails to achieve physical, visual, functional and urban qualities.

In the case of Muharraq, in the first commercial street, the result obtained was that the street has a high level of liveability, while the second street has a moderate level of liveability. The first street is found to satisfy 6 of the 7 characteristics, except the environmental, while the second street satisfies the visual, social and economic characteristics. The street fails to achieve the physical, environmental, functional and urban qualities.

In the case of the residential streets, the first residential street, surprisingly achieves 5 of the characteristics very well. These are visual, social, environmental, economic and urban qualities, while the second street satisfies the visual, social, economic and urban qualities. Both the streets have a good level of liveability. However, the issues that arise are in terms of physical and functional characteristics in the case of the first street and physical, environmental and functional in the case of the second street.

In the last case, Riffa, the first commercial street is found to have a high level of liveability and satisfies 6 characteristics successfully. The issue that exists here is in the functional characteristics and it can be improved in the future. A major concern is in the case of parking in most of the streets discussed. In the

second street, similar result to the previous street is obtained. While observing the residential streets, the first street has a high level of liveability which is very different compared to the previously discussed residential streets. The issue that exist here is in the case of functionality where it can be improved in the future. The second residential street, being an inner road still has a good level of liveability. The issues that arise here is in terms of physical and functional characteristics. The accessibility can be improved and a designated sidewalk can make it a highly liveable street.

7.3 CONCLUSION

7.3 Conclusions

7.3.1 Overview of the chapters

This research examined and evaluated the liveability of the streets and sidewalks of Bahrain. The evaluation was made by examining walkability, and various other characteristics that contribute to the liveability of the streets. The aspects examined included physical characteristics, environmental factors, and economic and social factors. Different aspects were addressed under each characteristic such as usability, movement, legibility, walkability and safety. By conducting extensive fieldwork in different streets of Bahrain, by walking through, observing, activity observation, photographing and interviewing the pedestrians and cyclists, an in-depth analysis was made, and insights were gained.

Chapter one of the thesis began by introducing the research issue, the background, the aims and objectives and the formulation of the research. Chapter two provided an overview of the theoretical background defining the inquiry and orientation, by conducting a review of the literature. Chapter three articulated the research methodology. The approach to the research and the research paradigm is introduced following an introduction to the tools and techniques. Once there was sufficient understanding of the mode of conducting such research, relevant tools, techniques and methods were selected from significant literature. In Chapter four, five and six, data collection and analysis is presented. Chapter seven presents the discussion, conclusions and recommendations.

7.3.2 General Conclusion

The key concept examined in this thesis was the liveability of streets and sidewalks in Bahrain. As the previous studies conducted in Bahrain on streets and sidewalks have not examined “liveability” comprehensively, this study intended

to fill this gap. It is understood that to achieve liveable streets, the streets need to cater to the needs of their users. Thus, it is a quality issue. Though liveability is defined differently by different researchers, by compiling the definitions analysed and by merging the results obtained through this study, it is understood that liveability is a broad issue that has many criteria within it. Thus, it is understood differently by each person in a different context.

As discussed previously, for a city to be liveable, its streets should be liveable. Within the street, its sidewalks must be liveable, where walkability is only one criterion. It is found through this study that, the liveability of a street and its sidewalk directly affects its usability, movement, walkability and safety and *vice versa*. It is understood that people play a role in shaping a street into a liveable street. When a street has a higher level of liveability, it is also noted that people can commute seamlessly. However, today's street design involves prioritising vehicular movement over walkability. Therefore, a street may appear to be a well-designed street just because the roads are well paved and there are clear markings, pedestrian crossings, signals, signages, sufficient width and parking spaces but may not be walkable or functional.

One such example is Riffa Commercial Street 2, which satisfies the economic, physical, social and urban qualities of a street. The focus and prioritisation on constructing good roads, signals, crossings and maintenance have drifted from the focus required on the sidewalks. Its result was forcing one to walk on the area marked for parking or on the road where vehicles pass because there is no space to walk on the sidewalk. Due to the lack of proper sidewalks, walkability is affected on this street. Though the street fails to achieve the most important characteristic, which is "functionality", it is comprehended that the street is still used by users regularly to meet their everyday needs and achieves

various other characteristics of liveability effectively. Thus it was concluded that the street has a certain level of liveability, but is not highly liveable.

A striking contrast is the case of Muharraq Residential Street 1 and 2, where “functionality” is prioritised by paving way for people, respecting the human scale, but fails to make segregation between a sidewalk and a road, resulting in congestion, chaos and accidents. Here, the point to be drawn is that each characteristic by itself is broad and has several indicators within itself. In this example, just because the street is walkable doesn’t make it functional. The street also needs to provide access for vehicles, or provide an allocated parking facility elsewhere, as the users require this. A street needs to cater to the different needs and requirements of its users and these requirements are bound to change with time. However, the street is used on an everyday basis by its residents and the residents have found a way to cope with the difficulties. A similar example is the case of Manama Residential Street 2, where the functionality in terms of parking is a serious issue. However, the residents seem to have found ways to adapt to the circumstances and find alternatives to make their life easier. Thus, it is understood that these streets are still liveable though there are issues with certain distinct characters.

To evaluate “how” liveable these streets are, a scale of 6 points was selected ranging from a very low level of liveability to a very high level of liveability. From the 12 streets studied, it is concluded that the streets' liveability ranges from moderate to high level of liveability. This means the streets achieve a minimum of 2 characteristics of liveability to an extent and a maximum of 6-7 characteristics to an extent. Interestingly, none of the streets falls in the category of low level and very low level of liveability. Therefore, it can be generalized that the streets of Bahrain have moderate to high levels of liveability.

Cities require to prioritise characteristics of liveability to have successful urban designs. According to Banerjee et al., (2011) Urban design is the interconnection of various factors such as healthy cities, environmental justice, development of economies, climate change, conservation of energy, sustainable development etc. Community liveability is one aspect of Urban design as well.

7.3.3 Intersection of Research Questions, Aims and Objectives

This research aimed to investigate the liveability of streets and sidewalks in Bahrain. 12 streets of Bahrain were selected for this study from three cities in Bahrain. To ensure different types of streets were investigated, two commercial and two residential streets from each city were investigated. To conduct this study, methodologies from the literature were referred to, relevant ones were selected, modified and new categories, tools and characteristics were added. Previous literature referred to and evaluated liveability using one or two methods: liveability indicators and surveys/interviews.

However, this research has investigated liveability using four methods which are interviews, surveys, activity observations of movements and liveability indicators to reach a comprehensive Outcome. It also engaged people's perceptions and the researcher's observational studies. The study also contributed and introduced two characteristics of liveability that were not included in the previous research: visual characteristics and urban qualities. The most prominent method most useful in this study was the evaluation using liveability indicators.

The objectives of the research were:

To evaluate the liveability of streets and sidewalks in Bahrain

- Ascertaining user perception of liveability
- Identifying characteristics that affect the liveability of streets in Bahrain.

- Identifying the specific concerns and issues (indicators) in the streets and sidewalks.

The research question discussed in chapter one was:

1. **What are the factors that affect the liveability of streets and sidewalks in Bahrain?**

Through this research, various characteristics that affect liveability are found as physical, social, environmental, economic, functional and urban qualities of a Street. In the context of Bahrain, it was found that environmental characteristics have not been articulated in most of the streets that were studied. Only two residential streets had shaded sitting/canopies or trees.It was also observed that most streets do not consider physical and functional characteristics. The indicators that were not achieved were parking, congestion, improper sidewalks, lack of segregated sidewalks and roads and safety.

2. **How Liveable are the Streets and Sidewalks of Bahrain?**

Based on the 12 streets studied, in the case of Manama, the streets require resolving the functional and physical issues that exist. They range from moderate to a good level of liveability. In the case of Muharraq, the residential streets have critical issues with their functionality. The streets of Muharraq range from moderate to good and have high levels of liveability. In the case of Riffa, the commercial streets and residential streets satisfy the social and economic characteristics standards expected. The street liveability ranges from good to high levels of liveability.

7.4 RECOMMENDATIONS

7.3 Recommendations

7.3.1 Recommendations to address the issues and enhance the liveability of Bahrain's streets and sidewalks

1. Focusing on implementing strategies to make the streets environmentally friendly, incorporating green methods and sustainable strategies through quality urban design can help enhance liveability levels.
2. Ensuring that the traffic inflow is controlled and that there is allocated parking in the streets can be beneficial.
3. Extending the width of the sidewalks by reducing the vehicle access and allocating parking facilities nearby for narrow residential streets, ensuring safety and walkability are some recommendations to improve the liveability in streets of Bahrain.
4. Enabling security and surveillance for overall safety and walkability is also a significant improvement needed.
5. Street segregated for walking, cycling and automobiles can be an excellent move towards high levels of liveability. Within the roads, cars can be separated from buses in a different lane, provided the space is available.
6. Providing residents with essential needs in walkable distances is necessary. This includes banks, pharmacy, fresh grocery, and bakeries.
7. Enhancing the visual characteristics of streets with lighting, unique designs that represent the individuality of the place can help create vibrant locations that are memorable.
8. Access to public transportations, shaded bus stops can welcome more individuals to use them.
9. Implementation of metro services and stations in various cities and towns can make the streets more liveable as more individuals are encouraged to walk and commute to the stations. This can help reduce the overall carbon footprint.

10. Providing the streets with several connectors, will allow one to cycle or walk through them.
11. Liveability of streets in Bahrain can be enhanced by adopting necessary policies and strategies by the authorities.
12. These policies include meeting the sustainability pillars and agendas of Bahrain 2030 vision.

7.3.2 The practical benefits of the research process

1. This thesis offers an overview of the liveability status of some streets and sidewalks in Bahrain.
2. This can help improve the significant issues and concerns found in these streets by authorities.
3. The data obtained from the research can be used to improve street designs in the future and understand the role of urban design in enabling liveable spaces.

7.3.3 Recommendations for future research

1. Future research can include investigating different types of streets, avenues and highways.
2. Future research can focus on the application of implementing environmental considerations to improve street liveability.
3. Future research can investigate the liveability of cities of Bahrain, helping understand liveability at a broader level.
4. Other aspects related to liveability can be researched in the future such as community well-being and assessing the quality of life in Bahrain.

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APPENDIX

Appendix (1) Manama- Interviews

INTERVIEWS COLLECTED FROM STREET 1:

Manama Commercial Street 1 -Zubara Avenue

INTERVIEW 1

1. "Do you find the street is accessible from adjacent streets, i.e., is it easy to access?

   "Yes."

2. "Do you find the street clean?"

   "Yes"

3. "Are there good seating facilities/ gathering spots in the street that you use? (shelters/canopies/benches)

   "No"

4. Are there any considerations for the weather conditions? i.e., Shadings/Trees/Shelters to protect from the weather.

   No, I don't think so."

5. Do you travel by your car or walk in the street? Are there any problems you face in general in terms of usability of this street?

   "The main problem is the parking facility. It is difficult to find parking. Before covid, the road was blocked."

6. Is the street walking-friendly?

   Yes. Before covid it was different. Now there are less people using the street."

7. Are the street and sidewalks safe to walk?

   "Maybe"

"Yes. I use the street regularly for my needs."

INTERVIEW 2

1. "Do you find the street is accessible from adjacent streets, i.e., is it easy to access?

   "It is a one way. But I have customers from Hoora, regular customers who come always. It is easy for them to find this place."

2. "Do you find the street clean?"

   "It is 95% bad."

3. "Are there good seating facilities/ gathering spots in the street that you use? (shelters/canopies/benches)

   "No. But there are issues here. There are always gatherings from church. This affects us. They always used to gather here before covid."

4. Are there any considerations for the weather conditions? i.e., Shadings/Trees/Shelters to protect from the weather.

   "No."

5. Do you travel by your car or walk in the street? Are there any problems you face in general in terms of usability of this street?

   "The people don't follow the rules in this street. It is a big problem. Before only my shop was here from 20 years. Now there are other shops, and I am not getting business. Before 16 years it was good place. We need police to come and check here and make the people follow the rules.

6. Is the street walking-friendly?

"No. Let me tell you honestly. This street is very bad for walking. There are always people on cycles, and they walk here (Indian, Bangladeshi, Bahraini Nationalities) It is very difficult to walk because of them."

7. Are the street and sidewalks safe to walk?

"It is safe but There are thieves here who steal. 5-6 times they stole from my shop. They even steal from people walking in the road. They stole from my friend, her bag. One time they stole mobile phone."

"Yes. I am happy with it. But the problem is that now the church is closed because of covid. This is a problem here."

INTERVIEW 3

1. "Do you find the street is accessible from adjacent streets, i.e., is it easy to access?

"Yes. It is very accessible."

2. "Do you find the street clean?"

"It is good."

3. "Are there good seating facilities/ gathering spots in the street that you use? (shelters/canopies/benches)

"Yes, the street is lively from here to the garden"

4. Are there any considerations for the weather conditions? i.e., Shadings/Trees/Shelters to protect from the weather.

"No."

5. Do you travel by your car or walk in the street? Are there any problems you face in general in terms of usability of this street?

"The police must come here. I don't know why they are going in the other road. (Isa Al Kabeer) They need to stay in this road. The thieves steal from 7-8 pm. There is no CCTV or nobody checks it here. When there is no church, more theifs come here it is not safe."

6. Is the street walking-friendly?

   "It is not safe to walk here."

7. Are the street and sidewalks safe to walk?

   "There are many theifs here. Once they stole my purse. They always steal from here, from the shops. I was walking here in this small road. I told the police, but they didn't catch."

   "No. They don't have any good shops or restaurants. There is no branch of KFC/ McDonalds and food chains here in this area. There are only other shops. No coffee shops. There is church, mosque, ATMs here."

INTERVIEW 4

1. "Do you find the street is accessible from adjacent streets, i.e., is it easy to access?

   "To travel by car, it is difficult because it is a one-way road and we need to go through other streets to exit this area"

2. "Do you find the street clean?"

   "I think it's neat"

3. "Are there good seating facilities/ gathering spots in the street that you use? (shelters/canopies/benches)

   "There are people found here in the morning and weekend"
   "People gather as a group near restaurant"

4. Are there any considerations for the weather conditions? i.e., Shadings/Trees/Shelters to protect from the weather.

"No, there are no shadings in this street, in the next street there are trees and garden"

5. Do you travel by your car or walk in the street? Are there any problems you face in general in terms of usability of this street?

   "I don't find any problem with the functionality"

6. Is the street walking-friendly?

   "It is good to walk"

7. Are the street and sidewalks safe to walk?

   "It is safe here, there is always people in these roads"

   It's good. All facilities are available in walking distance"

INTERVIEW 5

1. "Do you find the street is accessible from adjacent streets, i.e., is it easy to access?

   "Yes. But we usually don't take this road to go to restaurants when we drive, we take the main road near central café"

2. "Do you find the street clean?"

   "There are some water leakages on the walkway"

3. "Are there good seating facilities/ gathering spots in the street that you use? (shelters/canopies/benches)

   "The main social activity in this street is from the church on weekends. There are also customers to shops in this lane, mainly, it is vehicles."

4. Are there any considerations for the weather conditions? i.e., Shadings/Trees/Shelters to protect from the weather.

   "It is missing here, it should be more green"

5. Do you travel by your car or walk in the street? Are there any problems you face in general in terms of usability of this street?

   "For me, I feel scared to walk alone because it's very dark in the evening and nobody is near me"

6. Is the street walking-friendly?

   "I think for walking it is fine"

7. Are the street and sidewalks safe to walk?

   "After hearing stories and from news about ladies who are followed, I am scared to walk alone here." "It is also very silent here in this side, so its not safe to be alone" "No, I didn't have a personal bad experience"

   "Shops, cafes and restaurants are nearby. It's a crowded area. This street is bit dull but overall, the area is excellent for economic facilities."

INTERVIEWS COLLECTED FROM STREET 2:

Manama Commercial Street 2 -Isa Al Kabeer Avenue

INTERVIEW 1

1. "Do you find the street is accessible from adjacent streets, i.e., is it easy to access?

   "Yes, it is accessible"

2. "Do you find the street clean?"

   "Yes"

3. "Are there good seating facilities/ gathering spots in the street that you use? (shelters/canopies/benches)

   "It is. I use this street every day."

4. Are there any considerations for the weather conditions? i.e., Shadings/Trees/Shelters to protect from the weather.

   "Not much"

5. Do you travel by your car or walk in the street? Are there any problems you face in general in terms of usability of this street?

   "No, I am very happy."

6. Is the street walking-friendly?

   "It is."

7. Are the street and sidewalks safe to walk?

   "Yes"

INTERVIEW 2

1. "Do you find the street is accessible from adjacent streets, i.e., is it easy to access?

   "Yes. No issues."

2. "Do you find the street clean?"

   "Yes, every day it is cleaned."

3. "Are there good seating facilities/ gathering spots in the street that you use? (shelters/canopies/benches)

   "I work here. I come here every time."

4. Are there any considerations for the weather conditions? i.e., Shadings/Trees/Shelters to protect from the weather.

   "No considerations."

5. Do you travel by your car or walk in the street? Are there any problems you face in general in terms of usability of this street?

   "No issues"

6. Is the street walking-friendly? Are the street and sidewalks safe to walk?

"It is. Evening there is traffic."

7. Are the street and sidewalks safe to walk?

   "No issues"

INTERVIEW 3

1. "Do you find the street is accessible from adjacent streets, i.e., is it easy to access?

   "Yes"

2. "Do you find the street clean?"

   "Yes"

3. "Are there good seating facilities/ gathering spots in the street that you use? (shelters/canopies/benches)

   "I use it on a daily basis, there is lot of people here always."

4. Are there any considerations for the weather conditions? i.e., Shadings/Trees/Shelters to protect from the weather.

   "No shading."

5. Do you travel by your car or walk in the street? Are there any problems you face in general in terms of usability of this street?

   "I am here for 6 years. Didn't find any problem here."

6. Is the street walking-friendly?

   "Yes"

   "I am here for 25 years. No problem."

7. Are the street and sidewalks safe to walk?

   "Yes, it is safe."

INTERVIEW 4

1. "Do you find the street is accessible from adjacent streets, i.e., is it easy to access?

"Yes."

2. "Do you find the street clean?"

   "Yes"

3. "Are there good seating facilities/ gathering spots in the street that you use? (shelters/canopies/benches)

   "There is always traffic here and people shopping, eating. The customers are coming here by car."

4. Are there any considerations for the weather conditions? i.e., Shadings/Trees/Shelters to protect from the weather.

   "No."

5. Do you travel by your car or walk in the street? Are there any problems you face in general in terms of usability of this street?

   "Traffic from car. Need to improve."

6. Is the street walking-friendly? Are the street and sidewalks safe to walk?

   "Before I used to walk 3 times, but not now. Difficult to cross the road."

7. Are the street and sidewalks safe to walk?

   "Unsafe."

INTERVIEW 5

1. Do you find the street is accessible from adjacent streets, i.e., is it easy to access?

   "Yes, it is accessible from nearby streets. It connects them."

2. Do you find the street clean?

   "There are some water leakages on the walkway"

3. Are there good seating facilities/ gathering spots in the street that you use? (shelters/canopies/benches)

"I go by Car and Walk" "Customers walk and come and customers from other places come in the car"

4. Are there any considerations for the weather conditions? i.e., Shadings/Trees/Shelters to protect from the weather.

   "No, I don't think there's any shading or considerations."

5. Do you travel by your car or walk in the street? Are there any problems you face in general in terms of usability of this street?

   "The only problem is that it becomes congested while driving. Also, there are people crossing the road every time causing difficulty to drive."

6. Is the street walking-friendly?

   "Yes"

7. Are the street and sidewalks safe to walk?

   "I mainly use this street for its restaurants and hospital. When I walk, I feel there's no privacy as people from cars stare at those walking. It makes me uncomfortable to use the footpath."

INTERVIEWS COLLECTED FROM STREET 3:

Muharraq Residential Street 1

INTERVIEW 1

1. Do you find the street is accessible from adjacent streets, i.e., is it easy to access?

   "Yes. There is no issue.

2. Do you find the street clean?

   "Yes."

3. Are there good seating facilities/ gathering spots in the street that you use? (shelters/canopies/benches)

   "During weekends, there are more people found on this street."

4. Are there any considerations for the weather conditions? i.e., Shadings/Trees/Shelters to protect from the weather.

   "No."

5. Do you travel by your car or walk in the street? Are there any problems you face in general in terms of usability of this street?

   "No."

6. Is the street walking-friendly?

   "It is good. There is no issue with the street."

7. Are the street and sidewalks safe to walk?

   "There are no safety concerns."

INTERVIEW 2

1. "Do you find the street is accessible from adjacent streets, i.e., is it easy to access?

   "It is accessible. But the main issue here is the traffic block. Usually, you will find the roads blocked in the junction making a congestion to this street. This is because of the cars coming from the other street, especially during evenings."

2. "Do you find the street clean?"

   "Yes, it is clean."

3. "Are there good seating facilities/ gathering spots in the street that you use? (shelters/canopies/benches)

   "Yes, its used by many people"

4. Are there any considerations for the weather conditions? i.e., Shadings/Trees/Shelters to protect from the weather.

"No."

5. Do you travel by your car or walk down the street? Are there any problems you face in general in terms of the usability of this street?

   "There isn't enough parking."

6. Is the street walking-friendly?

   "Yes. It is good for walking, especially for those who live here."

7. Are the street and sidewalks safe to walk in?

   "Yes. There is not safety issue here."

INTERVIEW 3

1. "Do you find the street is accessible from adjacent streets, i.e., is it easy to access?

   "It is okay. But I walk in other streets in other parts of Manama."

2. "Do you find the street clean?"

   "Yes."

3. "Are there good seating facilities/ gathering spots in the street that you use? (shelters/canopies/benches)

   "People come to eat as family, buy fruits and vegetables every day"

4. Are there any considerations for the weather conditions? i.e., Shadings/Trees/Shelters to protect from the weather.
5. Do you travel by your car or walk down the street? Are there any problems you face in general in terms of the usability of this street?

   "No."

6. Is the street walking-friendly?

"It is okay. But I walk in other streets in other parts of Manama."

7. Are the street and sidewalks safe to walk?

"There are no streetlights sometimes at night. This is a concern."

INTERVIEW 4

1. "Do you find the street is accessible from adjacent streets, i.e., is it easy to access?

"Yes. There are no access issues."

2. "Do you find the street clean?"

"Yes. It is well maintained."

3. "Are there good seating facilities/ gathering spots in the street that you use? (shelters/canopies/benches)

"Families who stay here, they come to buy for their needs, other customers come in car and pass."

4. Are there any considerations for the weather conditions? i.e., Shadings/Trees/Shelters to protect from the weather.

"No."

5. Do you travel by your car or walk in the street? Are there any problems you face in general in terms of usability of this street?

"No. it is perfect."

6. Is the street walking-friendly?

"Yes. It is very good."

7. Are the street and sidewalks safe to walk?

"Yes."

INTERVIEW 5

1. "Do you find the street is accessible from adjacent streets, i.e., is it easy to access?

   "Yes."

2. "Do you find the street clean?"

   "Yes."

3. "Are there good seating facilities/ gathering spots in the street that you use? (shelters/canopies/benches)

   "There is gathering near cafes" "It's a good place to meet other people"

4. Are there any considerations for the weather conditions? i.e., Shadings/Trees/Shelters to protect from the weather.

   "No."

5. Do you travel by your car or walk in the street? Are there any problems you face in general in terms of usability of this street?

   "The only problem and the biggest problem is the parking itself. It is very difficult to find parking. Even if you want to go to a restaurant. It's difficult to park."

6. Is the street walking-friendly?

   "Yes."

7. Are the street and sidewalks safe to walk?

   "Yes."

INTERVIEWS COLLECTED FROM STREET 4:

Manama Residential Street 2

INTERVIEW 1

1. "Do you find the street is accessible from adjacent streets, i.e., is it easy to access?

"I think it is accessible."

2. "Do you find the street clean?"

"It is."

3. "Are there good seating facilities/ gathering spots in the street that you use? (shelters/canopies/benches)

"There are informal gatherings here. But I don't use."

4. Are there any considerations for the weather conditions? i.e., Shadings/Trees/Shelters to protect from the weather.

"No, there are no considerations."

5. Do you travel by your car or walk in the street? Are there any problems you face in general in terms of usability of this street?

"No. I find it comfortable to use."

6. Is the street walking-friendly?

"The only problem and the biggest problem is the parking itself. It is very difficult to find parking."

7. Are the street and sidewalks safe to walk?

"Yes."

"Not in this street. But every facility is accessible and is nearby."

INTERVIEW 2

1. "Do you find the street is accessible from adjacent streets, i.e., is it easy to access?

   "Yes."

2. "Do you find the street clean?"

   "Yes."

3. "Are there good seating facilities/ gathering spots in the street that you use? (shelters/canopies/benches)

   "Our neighbours usually gather outdoors with tables and chairs. They sit in the roadside. But we usually don't use the outdoors for gathering."

4. Are there any considerations for the weather conditions? i.e., Shadings/Trees/Shelters to protect from the weather.

   "No."

5. Do you travel by your car or walk in the street? Are there any problems you face in general in terms of usability of this street?

   "No. There is lack of parking. However, it doesn't affect us as the residents are cooperative and adjusts the vehicle whenever required. So, there is no problem in the parking patterns. However, the street is quite congested in the evenings during weekends as there are more visitors here."

6. Is the street walking-friendly?

"It is walking friendly. I do go for walks when whether is not too hot."

7. Are the street and sidewalks safe to walk?

"I feel unsafe to walk or step out of my house alone usually. This is because I have had previous experience where I found neighbour from opposite flat watching me for long period. But it is not the case when I am with my family. Hence, it is unsafe for a woman who is alone."

"Yes. Everything is nearby for us."

INTERVIEW 3

1. "Do you find the street is accessible from adjacent streets, i.e., is it easy to access?

"I face difficulty to exit the road as it's a one-way road and there are cars from opposite direction that are coming (from the other road)"

2. "Do you find the street clean?"

"It is clean"

3. "Are there good seating facilities/ gathering spots in the street that you use? (shelters/canopies/benches)

"Whenever I come here, I see people standing and talking outside the shop (laundry)"

4. Are there any considerations for the weather conditions? i.e., Shadings/Trees/Shelters to protect from the weather.

"Some plants are here outside my building"

5. Do you travel by your car or walk in the street? Are there any problems you face in general in terms of usability of this street?

"It is difficult to drive here and park"

6. Is the street walking-friendly?

"It is good place to walk, I go for a walk every evening"

7. Are the street and sidewalks safe to walk?

"It is very safe" "All things are available here"

INTERVIEW 4

1. "Do you find the street is accessible from adjacent streets, i.e., is it easy to access?

"I think for a new person it is bit hard to find the road, for me it is not difficult to access"

2. "Do you find the street clean?"

"No problem here"

3. "Are there good seating facilities/ gathering spots in the street that you use? (shelters/canopies/benches)

"After praying in the mosque, people go as group"

4. Are there any considerations for the weather conditions? i.e., Shadings/Trees/Shelters to protect from the weather.

"We have trees here"

5. Do you travel by your car or walk in the street? Are there any problems you face in general in terms of usability of this street?

"There is congestion when cars come in wrong way. It is one way road"

6. Is the street walking-friendly?

"Difficult to walk because of cars parked on both sides and cars coming in both direction"

7. Are the street and sidewalks safe to walk?

"Not safe for children to play, there's construction in the opposite building and people" "There is cold store near my house with available items, and other shops I can walk from my house"

INTERVIEW 5

1. "Do you find the street is accessible from adjacent streets, i.e., is it easy to access?

"Yes, it's very easy and connected to main road"

2. "Do you find the street clean?"

"Sometimes there are construction works here in the opposite building, and its not clean"

3. "Are there good seating facilities/ gathering spots in the street that you use? (shelters/canopies/benches)

"Nothing special, as a family its good to go out here"

4. Are there any considerations for the weather conditions? i.e., Shadings/Trees/Shelters to protect from the weather.

"No shading"

5. Do you travel by your car or walk in the street? Are there any problems you face in general in terms of usability of this street?

"It is good. But needs more space to walk because cars are parked here in the road"

6. Is the street walking-friendly? Are the street and sidewalks safe to walk?

"Needs more space to walk"

Appendix (2) Muharraq- Interviews

INTERVIEWS COLLECTED FROM STREET 5:

Muharraq Commercial Street 1

INTERVIEW 1

1. "Do you find the street is accessible from adjacent streets, i.e., is it easy o access?

   "Yes"

2. "Do you find the street clean?

   "Yes."

3. "Are there good seating facilities/ gathering spots in the street that you use? (shelters/canopies/benches)

   "No."

4. Are there any considerations for the weather conditions? i.e., Shadings/Trees/Shelters to protect from the weather.

   "Some trees. But no shade where I will stand."

5. "Does the street cater to your different needs such retail/restaurants/recreation/services etc?

   "Yes"

6. Do you travel by your car or walk in the street? Are there any problems you face in general in terms of usability of this street?

   "I use it every day for work." "No"

7. Is the street walking-friendly? Are the street and sidewalks safe to walk?

"I walk and come. There is some issue while walking as I feel unsafe when I'm alone at night. In the junction near my shop, there are men following me."

INTERVIEW 2

1. Do you find the street is accessible from adjacent streets, i.e., is it easy o access?

   "Yes"

2. Do you find the street clean?

   "Yes."

3. Are there good seating facilities/ gathering spots in the street that you use? (shelters/canopies/benches)

   "Outside the flats, we gather in the building, but not in the road"

4. "Does the street cater to your different needs such retail/restaurants/recreation/services etc?

   "Yes, everything is here"

5. Are there any considerations for the weather conditions? i.e., Shadings/Trees/Shelters to protect from the weather.

   "No, I think"

6. Do you travel by your car or walk in the street? Are there any problems you face in general in terms of usability of this street?

   "I walk here." "No"

7. Is the street walking-friendly? Are the street and sidewalks safe to walk?

   "I walk here. Not safe"

INTERVIEW 3

1. Do you find the street is accessible from adjacent streets, i.e., is it easy o access?

   "It is very easy"

2. Do you find the street clean?

   "Yes, it is clean"

3. Are there good seating facilities/ gathering spots in the street that you use? (shelters/canopies/benches)

   "Not much"

4. "Does the street cater to your different needs such retail/restaurants/recreation/services etc?

   "It is there"

5. Are there any considerations for the weather conditions? i.e., Shadings/Trees/Shelters to protect from the weather.

   "I don't know about it" "Just some flowerpots are there outside"

6. Do you travel by your car or walk in the street? Are there any problems you face in general in terms of usability of this street?

   "Every day I walk."

7. Is the street walking-friendly? Are the street and sidewalks safe to walk?

   "Walk. Yes, compared to areas like gudaibiya where I know women have safety issue, it is very safe here."

INTERVIEW 4

1. Do you find the street is accessible from adjacent streets, i.e., is it easy o access?

"Yes"

2. Do you find the street clean?"

   "Yes, no problem"

3. Are there good seating facilities/ gathering spots in the street that you use? (shelters/canopies/benches)

   "Just the shading from shops while walking"

4. "Does the street cater to your different needs such retail/restaurants/recreation/services etc?

   "I work here from long time, and I walk to other shops also"

5. Are there any considerations for the weather conditions? i.e., Shadings/Trees/Shelters to protect from the weather.

   "No"

6. Do you travel by your car or walk in the street? Are there any problems you face in general in terms of usability of this street?

   "Yes, by walking and car" "There are limited parking."

7. Is the street walking-friendly? Are the street and sidewalks safe to walk?

   "Yes"

INTERVIEW 5

1. Do you find the street is accessible from adjacent streets, i.e., is it easy o access?

   "Yes. It is very easy to reach this road from highway."

2. Do you find the street clean?"

   "Yes."

3. Are there good seating facilities/ gathering spots in the street that you use? (shelters/canopies/benches)

   "We usually gather in the vacant parking area."

4. "Does the street cater to your different needs such

   "There are good shops like boutique, and I walk to BR to get ice cream."

5. Are there any considerations for the weather conditions? i.e., Shadings/Trees/Shelters to protect from the weather.

   "I don't think"

6. Do you travel by your car or walk in the street? Are there any problems you face in general in terms of usability of this street?

   "Sometimes in the weekend, it's difficult to find parking."

7. Is the street walking-friendly? Are the street and sidewalks safe to walk?

   "Yes"

INTERVIEWS COLLECTED FROM STREET 6:

Muharraq Commercial Street 2

INTERVIEW 1

1. "Do you find the street is accessible from adjacent streets, i.e., is it easy o access?

   "Yes."

2. "Do you find the street clean?

   "It is okay."

3. "Are there good seating facilities/ gathering spots in the street that you use? (shelters/canopies/benches)

"Yes. We sit outside during work."

4. Are there any considerations for the weather conditions? i.e., Shadings/Trees/Shelters to protect from the weather.

   "I don't think"

5. "Does the street cater to your different needs such retail/restaurants/recreation/services etc?

   "Yes, all facilities are near for us."

6. Do you travel by your car or walk in the street? Are there any problems you face in general in terms of usability of this street?

   "My shop is here so I visit here every day."

7. Is the street walking-friendly? Are the street and sidewalks safe to walk?

   "Yes. No problem."

   "Yes. No safety problem."

INTERVIEW 2

1. Do you find the street is accessible from adjacent streets, i.e., is it easy o access?

   "Yes, we can access. The parking can be improved as this is a difficulty."

2. Do you find the street clean?

   "Yes"

3. Are there good seating facilities/ gathering spots in the street that you use? (shelters/canopies/benches)

   "Sometimes there is gathering"

4. “Does the street cater to your different needs such retail/restaurants/recreation/services etc?

   “It is there in this street, and some shops in the next street, we have everything here”

5. Are there any considerations for the weather conditions? i.e., Shadings/Trees/Shelters to protect from the weather.

   “Yes. Shading from building.”

6. Do you travel by your car or walk in the street? Are there any problems you face in general in terms of usability of this street?

   “This is a problem, there is not enough parking here.”

7. Is the street walking-friendly? Are the street and sidewalks safe to walk?

   “It is good. Before 5 years, there were more customers. Now its less.”

INTERVIEW 3

1. Do you find the street is accessible from adjacent streets, i.e., is it easy to access?

   “Yes. But it’s difficult to take a U-turn while driving to exit the street as it's always filled with cars.”

2. Do you find the street clean?

   “I don’t find it clean. Its bit untidy.”

3. Are there good seating facilities/ gathering spots in the street that you use? (shelters/canopies/benches)

   “The restaurant has good outdoor spot, but I never used it.”

4. “Does the street cater to your different needs such retail/restaurants/recreation/services etc?

"I think the facilities are available in this region, but no gardens nearby."

5. Are there any considerations for the weather conditions? i.e., Shadings/Trees/Shelters to protect from the weather.

   "No, there is no tree/ shading."

6. Do you travel by your car or walk in the street? Are there any problems you face in general in terms of usability of this street?

   "I faced difficulty to find parking once when there was a event here."

7. Is the street walking-friendly? Are the street and sidewalks safe to walk?

   "I think yes."

   "Yes."

INTERVIEW 4

1. Do you find the street is accessible from adjacent streets, i.e., is it easy o access?

   "It is ok. There are no signs about such a street. When I searched for a parking, I saw this street."

2. Do you find the street clean?"

   "Not much."

3. Are there good seating facilities/ gathering spots in the street that you use? (shelters/canopies/benches)

   "No."

4. "Does the street cater to your different needs such retail/restaurants/recreation/services etc?

   "Yes."

5. Are there any considerations for the weather conditions? i.e., Shadings/Trees/Shelters to protect from the weather.

   "No."

6. Do you travel by your car or walk in the street? Are there any problems you face in general in terms of usability of this street?

   "There are good parking in the morning. It is difficult to walk in the footpath, as it is occupied with other things, so we walk in road."

7. Is the street walking-friendly? Are the street and sidewalks safe to walk?

   "Yes. But less space as cars are parked."

   "But space is less, so we walked in the road."

INTERVIEW 5

1. Do you find the street is accessible from adjacent streets, i.e., is it easy to access?

   "It is okay."

2. Do you find the street clean?"

   "No problem"

3. Are there good seating facilities/ gathering spots in the street that you use? (shelters/canopies/benches)

   "Chairs are there"

4. "Does the street cater to your different needs such as retail/restaurants/recreation/services etc?

   "No, I don't think there are different shops or services here, there is no banks"

5. Are there any considerations for the weather conditions? i.e., Shadings/Trees/Shelters to protect from the weather.

   "No. but it is not very hot here compared to the main street."

6. Do you travel by your car or walk in the street? Are there any problems you face in general in terms of usability of this street?

   "I walk and use car, no problem"

7. Is the street walking-friendly? Are the street and sidewalks safe to walk?

   "Not much for walking" "It is safe"

INTERVIEWS COLLECTED FROM STREET 7:

Muharraq Residential Street 1

INTERVIEW 1

1. "Do you find the street is accessible from adjacent streets, i.e., is it easy o access?

   "Yes, but traveling with car is a bit difficult as sometimes people park in the middle of the road or you should drive through narrow alleys"

2. "Do you find the street clean?

   "Yes, daily early morning its maintained and cleaned"

3. "Are there good seating facilities/ gathering spots in the street that you use? (shelters/canopies/benches)

   "Yes, mostly shop benches"

4. Are there any considerations for the weather conditions? i.e., Shadings/Trees/Shelters to protect from the weather.

   "No"

5. “Does the street cater to your different needs such retail/restaurants/recreation/services etc?

   “Yes, it has almost everything”

6. Do you travel by your car or walk in the street? Are there any problems you face in general in terms of usability of this street?

   “No, I have a hard time finding parking spots, most of the spots are held by people using pipes under the permission of the municipality.”

   “Mostly parking. Parking spots and slight car accidents where people tried driving nearby my car and scratched it due to the narrow space for the car to pass by.”

7. Is the street walking-friendly? Are the street and sidewalks safe to walk?

   “Yes” “Yes”

INTERVIEW 2

1. Do you find the street is accessible from adjacent streets, i.e., is it easy o access?

   “Yes, it is”

2. Do you find the street clean?

   “Yes, given the importance of the area its cleaned by both machine and people almost every day”

3. Are there good seating facilities/ gathering spots in the street that you use? (shelters/canopies/benches)

   “Not really, except for a few benches.”

4. “Does the street cater to your different needs such retail/restaurants/recreation/services etc?

   “Yes, it mostly does but it lacks when coming to providing recreational activities.”

5. Are there any considerations for the weather conditions? i.e., Shadings/Trees/Shelters to protect from the weather.

   "No, no shading apart from shops can be spotted."

6. Do you travel by your car or walk in the street? Are there any problems you face in general in terms of usability of this street?

   "Currently no, but there are plans by the govt to build new parking complexes so that should sort the issue"

   "Parking issues and wrong parking mainly which hinders the movement of cars leading to traffic during peak times"

7. Is the street walking-friendly?

   "Not exactly, sufficient walkways exist but they tend to be blocked by cars parking on them due to lack of space"

8. Are the street and sidewalks safe to walk?

   "Yes, except for cars blocking the walkways that could lead to hazards, especially for kids"

INTERVIEW 3

1. Do you find the street is accessible from adjacent streets, i.e., is it easy to access?

   "Yes"

2. Do you find the street clean?

   "No, due to huge number of shops even though cleaned, in the morning they tend to get dirty by night."

3. Are there good seating facilities/ gathering spots in the street that you use? (shelters/canopies/benches)

   "No"

4. “Does the street cater to your different needs such retail/restaurants/recreation/services etc?

   “Yes, easy access to most facilities.”

5. Are there any considerations for the weather conditions? i.e., Shadings/Trees/Shelters to protect from the weather.

   “No” “Yes, they are safe, but the number of pedestrian crossings could be increased”

6. Do you travel by your car or walk in the street? Are there any problems you face in general in terms of usability of this street?

   “That varies with time, mostly yes except for evening peak times.

   Traffic congestion due to the number of shops in the area”

7. Is the street walking-friendly?

   “Yes”

INTERVIEW 4

1. Do you find the street is accessible from adjacent streets, i.e., is it easy o access?

   “Yes, multi entrance points exist”

2. Do you find the street clean?”

   “In terms of cleanliness yes, it is, but not well maintained as many old, depilated buildings exist.”

3. Are there good seating facilities/ gathering spots in the street that you use? (shelters/canopies/benches)

   “There are limited seating which is always occupied by bachelors making it hard to use.”

4. “Does the street cater to your different needs such retail/restaurants/recreation/services etc?

   “No, only limited things are available.”

5. Are there any considerations for the weather conditions? i.e., Shadings/Trees/Shelters to protect from the weather.

   “Not really”

6. Do you travel by your car or walk in the street? Are there any problems you face in general in terms of usability of this street?

   “No there is a shortage for parking especially in the inner roads.

   Lack of family-friendliness and limited parking opportunities.”

7. Is the street walking-friendly?

   “No, they are unsafe after dark, inner streets are especially not well lit and these areas are a haven for anti-social elements.”

8. Are the street and sidewalks safe to walk?

   “No, as mentioned earlier the unlit streets with men gathering make it uncomfortable and even incidents of verbal attacks or stares are common.”

INTERVIEW 5

1. Do you find the street is accessible from adjacent streets, i.e., is it easy to access?

   “yes”

2. Do you find the street clean?”

   “yes”

3. Are there good seating facilities/ gathering spots in the street that you use? (shelters/canopies/benches)

"No"

4. "Does the street cater to your different needs such as retail/restaurants/recreation/services etc?

   "Yes"

5. Are there any considerations for the weather conditions? i.e., Shadings/Trees/Shelters to protect from the weather.

   "No"

6. Do you travel by your car or walk in the street? Are there any problems you face in general in terms of usability of this street?

   "No"

   "no"

7. Is the street walking-friendly?

   "Yes"

8. Are the street and sidewalks safe to walk?

   "Yes"

INTERVIEWS COLLECTED FROM STREET 8:

Muharraq Residential Street 2

INTERVIEW 1

1. Do you find the street is accessible from adjacent streets, i.e., is it easy to access?

   "Yes"

2. Do you find the street clean?"

   "Yes"

3. Are there good seating facilities/ gathering spots in the street that you use? (shelters/canopies/benches)

   "No"

4. "Does the street cater to your different needs such as retail/restaurants/recreation/services etc?

   "Yes"

5. Are there any considerations for the weather conditions? i.e., Shadings/Trees/Shelters to protect from the weather.

   "No"

6. Do you travel by your car or walk in the street? Are there any problems you face in general in terms of usability of this street?

   "Often crowded and no parking space"

7. Is the street walking-friendly?

   "Yes"

8. Are the street and sidewalks safe to walk?

   "Yes"

INTERVIEW 2

1. Do you find the street is accessible from adjacent streets, i.e., is it easy to access?

   "Yes, but could be difficult using a car"

2. Do you find the street clean?"

   "Yes"

3. Are there good seating facilities/ gathering spots in the street that you use? (shelters/canopies/benches)

"No"

4. "Does the street cater to your different needs such as retail/restaurants/recreation/services etc?

   "Sufficient"

5. Are there any considerations for the weather conditions? i.e., Shadings/Trees/Shelters to protect from the weather.

   "No"

6. Do you travel by your car or walk in the street? Are there any problems you face in general in terms of usability of this street?

   "Illegal parking during peak times that causes traffic jams"

7. Is the street walking-friendly?

   "Yes"

8. Are the street and sidewalks safe to walk?

   "Yes"

INTERVIEW 3

1. Do you find the street is accessible from adjacent streets, i.e., is it easy to access?

   "Yes"

2. Do you find the street clean?"

   "Yes"

3. Are there good seating facilities/ gathering spots in the street that you use? (shelters/canopies/benches)

   "No"

4. “Does the street cater to your different needs such as retail/restaurants/recreation/services etc?

   “Yes”

5. Are there any considerations for the weather conditions? i.e., Shadings/Trees/Shelters to protect from the weather.

   “No”

6. Do you travel by your car or walk in the street? Are there any problems you face in general in terms of usability of this street?

   “No”

7. Is the street walking-friendly?

   “Yes, I walk 2 times.”

8. Are the street and sidewalks safe to walk?

   “It is safe, crossing is difficult”

INTERVIEW 4

1. Do you find the street is accessible from adjacent streets, i.e., is it easy to access?

   “Yes”

2. Do you find the street clean?”

   “Yes”

3. Are there good seating facilities/ gathering spots in the street that you use? (shelters/canopies/benches)

   “No seats”

4. “Does the street cater to your different needs such as retail/restaurants/recreation/services etc?

"There are malls, banks nearby. Customers from Qatar, Kuwait, Oman comes here."

5. Are there any considerations for the weather conditions? i.e., Shadings/Trees/Shelters to protect from the weather.

   "No"

6. Do you travel by your car or walk in the street? Are there any problems you face in general in terms of usability of this street?

   "No"

7. Is the street walking-friendly?

   "No issues to walk"

8. Are the street and sidewalks safe to walk?

   Yes, no problem

INTERVIEW 5

1. Do you find the street is accessible from adjacent streets, i.e., is it easy to access?

   "Yes"

2. Do you find the street clean?"

   "It is."

3. Are there good seating facilities/ gathering spots in the street that you use? (shelters/canopies/benches)

   "There are informal sitting."

4. "Does the street cater to your different needs such as retail/restaurants/recreation/services etc?

   "Yes"

5. Are there any considerations for the weather conditions? i.e., Shadings/Trees/Shelters to protect from the weather.

   "Some shading are there."

6. Do you travel by your car or walk in the street? Are there any problems you face in general in terms of usability of this street?

   "Can't drive inside the street properly."

7. Is the street walking-friendly?

   "I find difficulty as I walk to the inner road."

8. Are the street and sidewalks safe to walk?

   Not very safe, there are cats.

Appendix (3) Riffa- Interviews

INTERVIEWS COLLECTED FROM STREET 5:

Riffa Commercial Street 1

INTERVIEW 1

1. "Do you find the street is accessible from adjacent streets, i.e., is it easy o access?

   "Yes it is accessible."

2. "Do you find the street clean?

   "Yes."

3. "Are there good seating facilities/ gathering spots in the street that you use? (shelters/canopies/benches)

   "Yes there's children playing here"

4. Are there any considerations for the weather conditions? i.e., Shadings/Trees/Shelters to protect from the weather.

   "No"

5. “Does the street cater to your different needs such retail/restaurants/recreation/services etc?

   “Yes”

6. Do you travel by your car or walk in the street? Are there any problems you face in general in terms of usability of this street?

   “There is problem with parking.” “There should separate parking for customers and separate staff parking.”

7. Is the street walking-friendly? Are the street and sidewalks safe to walk?

   “For walking it is good”

INTERVIEW 2

1. “Do you find the street is accessible from adjacent streets, i.e., is it easy o access?

   “Yes”

2. “Do you find the street clean?

   “Yes, it is clean.”

3. “Are there good seating facilities/ gathering spots in the street that you use? (shelters/canopies/benches)

   “Its always having people and cars”

4. Are there any considerations for the weather conditions? i.e., Shadings/Trees/Shelters to protect from the weather.

   “Nothing”

5. “Does the street cater to your different needs such retail/restaurants/recreation/services etc?

   “Yes”

6. Do you travel by your car or walk in the street? Are there any problems you face in general in terms of usability of this street?

   "The problem here is parking"

7. Is the street walking-friendly? Are the street and sidewalks safe to walk?

   "No problem here"

INTERVIEW 3

1. "Do you find the street is accessible from adjacent streets, i.e., is it easy o access?

   "Yes"

2. "Do you find the street clean?

   "Yes, its very clean"

3. "Are there good seating facilities/ gathering spots in the street that you use? (shelters/canopies/benches)

   "Yes, always"

4. Are there any considerations for the weather conditions? i.e., Shadings/Trees/Shelters to protect from the weather.

   "I don't think"

5. "Does the street cater to your different needs such retail/restaurants/recreation/services etc?

   "No hospital in walking distance. There is only pharmacy."

6. Do you travel by your car or walk in the street? Are there any problems you face in general in terms of usability of this street?

   "Difficult to get parking"

7. Is the street walking-friendly? Are the street and sidewalks safe to walk?

   "Yes, it's good. Safe"

INTERVIEW 4

1. “Do you find the street is accessible from adjacent streets, i.e., is it easy o access?

   “Yes we can access it” “

2. “Do you find the street clean?

   “It is clean”

3. “Are there good seating facilities/ gathering spots in the street that you use? (shelters/canopies/benches)

   “Yes”

4. Are there any considerations for the weather conditions? i.e., Shadings/Trees/Shelters to protect from the weather.

   “There are chairs for the bus stop near the mosque”

5. “Does the street cater to your different needs such retail/restaurants/recreation/services etc?

   “Everything we have here”

6. Do you travel by your car or walk in the street? Are there any problems you face in general in terms of usability of this street?

   “Not much”

7. Is the street walking-friendly? Are the street and sidewalks safe to walk?

   “Crossing the street should be done carefully. Yes. 2 people can walk at a time properly.”

INTERVIEW 5

1. “Do you find the street is accessible from adjacent streets, i.e., is it easy o access?

   “Yes”

2. “Do you find the street clean?

   “Clean”

3. “Are there good seating facilities/ gathering spots in the street that you use? (shelters/canopies/benches)

   “Before there were children who used to come and fight here, as 4 people. Before there were many accidents in this street. There are also group of strangers who come in pick up at night and pick up group of people or drop them to the street. It is very suspicious whether a group is being sent to ask for money.”

4. Are there any considerations for the weather conditions? i.e., Shadings/Trees/Shelters to protect from the weather.

   “No, some small plants”

5. “Does the street cater to your different needs such retail/restaurants/recreation/services etc?

   “Yes, it is here”

6. Do you travel by your car or walk in the street? Are there any problems you face in general in terms of usability of this street?

   “Parking is a serious problem here. Customers who come from far find it difficult and the business.”

7. Is the street walking-friendly? Are the street and sidewalks safe to walk?

   “No. There are many problems here. There are ladies who come and ask for money. Sometimes they enter the shops also. This is why the other customers also leave in fear without shopping. They also come in the footpath and ask people who are walking.” “The ladies who come while we work or walk, are causing safety problem, they even call bad words. This affects the business.”

INTERVIEWS COLLECTED FROM STREET 6:

Riffa Commercial Street 2

INTERVIEW 1

1. “Do you find the street is accessible from adjacent streets, i.e., is it easy o access?

   “It is usually busy in the weekend, 6:30-8:30 is the peak time”.

2. “Do you find the street clean?

   “It’s clean”

3. “Are there good seating facilities/ gathering spots in the street that you use? (shelters/canopies/benches)

   “Yes, it is always lively”

4. Are there any considerations for the weather conditions? i.e., Shadings/Trees/Shelters to protect from the weather.

   “There are no shadings”

5. “Does the street cater to your different needs such retail/restaurants/recreation/services etc?

   “There are good retail facilities here” He added, “Before there was rush and many customers, from Qatar, but now business is down”

6. Do you travel by your car or walk in the street? Are there any problems you face in general in terms of usability of this street?

   “No”

7. Is the street walking-friendly? Are the street and sidewalks safe to walk?

   “There is a barrier to walk, which is the grill. Before it was not there, and it was easy for us to walk”

INTERVIEW 2

1. “Do you find the street is accessible from adjacent streets, i.e., is it easy o access?

"I use this street 2 times every day. I travel by car. The parking is ok"

2. "Do you find the street clean?

   "It is congested and dirty sometimes to walk"

3. "Are there good seating facilities/ gathering spots in the street that you use? (shelters/canopies/benches)

   "I don't see any gatherings here"

4. Are there any considerations for the weather conditions? i.e., Shadings/Trees/Shelters to protect from the weather.

   "No"

5. "Does the street cater to your different needs such retail/restaurants/recreation/services etc?

   "There are all shops, but there are children who come and makes trouble"

6. Do you travel by your car or walk in the street? Are there any problems you face in general in terms of usability of this street?

   "No problem with usability"

7. Is the street walking-friendly? Are the street and sidewalks safe to walk?

   "There is an issue, though there is CCTV, some teenagers used to come and disturb us inside the shop. They even go to other shops, you can ask in all other shops in this street. They come in their cycle"

INTERVIEW 3

1. "Do you find the street is accessible from adjacent streets, i.e., is it easy o access?

"There is no proper waste bin, it needs to be a bigger waste bin"

2. "Do you find the street clean?

   "Yes, it's clean"

3. "Are there good seating facilities/ gathering spots in the street that you use? (shelters/canopies/benches)

   "No"

4. Are there any considerations for the weather conditions? i.e., Shadings/Trees/Shelters to protect from the weather.

   "No consideration"

5. "Does the street cater to your different needs such retail/restaurants/recreation/services etc?

   "There are no hospitals here which can be reached in walkable distance"

6. Do you travel by your car or walk in the street? Are there any problems you face in general in terms of usability of this street?

   "I walk and come here, I did not find any problem"

7. Is the street walking-friendly? Are the street and sidewalks safe to walk?

   "It is difficult to walk in the footpath as cars are parked, we need to walk in the road"

INTERVIEW 4

1. "Do you find the street is accessible from adjacent streets, i.e., is it easy o access?

   "It is very comfortable for me to walk"

2. "Do you find the street clean?

"Yes"

3. "Are there good seating facilities/ gathering spots in the street that you use? (shelters/canopies/benches)

"No seats"

4. Are there any considerations for the weather conditions? i.e., Shadings/Trees/Shelters to protect from the weather.

"No"

5. "Does the street cater to your different needs such retail/restaurants/recreation/services etc?

"Yes"

6. Do you travel by your car or walk in the street? Are there any problems you face in general in terms of usability of this street?

"Just we cannot cross the road easily now, before there was no grill in the middle. Now we have to go till the crossing to go to other side. It is a problem."

7. Is the street walking-friendly? Are the street and sidewalks safe to walk?

"It is good"

INTERVIEW 5

1. "Do you find the street is accessible from adjacent streets, i.e., is it easy o access?

"Yes, it is easy"

2. "Do you find the street clean?

"Some waste we can find sometimes"

3. "Are there good seating facilities/ gathering spots in the street that you use? (shelters/canopies/benches)

"I don't sit here but there are other people who sit"

4. Are there any considerations for the weather conditions? i.e., Shadings/Trees/Shelters to protect from the weather.

   "There is a bus stand, but there is no shading here. This should be resolved".

5. "Does the street cater to your different needs such retail/restaurants/recreation/services etc?

   "Everything is available here. I always buy tea from Karak Shop here. Every morning I buy tea and walk to my office nearby"

6. Do you travel by your car or walk in the street? Are there any problems you face in general in terms of usability of this street?

   "No, I am happy with this area. I walk"

7. Is the street walking-friendly? Are the street and sidewalks safe to walk?

   "It is safe"

INTERVIEWS COLLECTED FROM STREET 7:

Riffa Residential Street 1

INTERVIEW 1

1. "Do you find the street is accessible from adjacent streets, i.e., is it easy o access?

   "Yes, it's easy"

2. "Do you find the street clean?

   "Yes"

3. "Are there good seating facilities/ gathering spots in the street that you use? (shelters/canopies/benches)

   "Yes"

4. Are there any considerations for the weather conditions? i.e., Shadings/Trees/Shelters to protect from the weather.

   "There are good outdoor sitting for cafes and restaurants with shading. It is a good spot to walk"

5. "Does the street cater to your different needs such retail/restaurants/recreation/services etc?

   "I find all facilities nearby, but to meet my relatives and go to church, I have to travel far away.

6. Do you travel by your car or walk in the street? Are there any problems you face in general in terms of usability of this street?

   "Walk" "No"

7. Is the street walking-friendly? Are the street and sidewalks safe to walk?

   "It is safe to walk"

INTERVIEW 2

1. "Do you find the street is accessible from adjacent streets, i.e., is it easy o access?

   "I can access it well"

2. "Do you find the street clean?

   "Yes"

3. "Are there good seating facilities/ gathering spots in the street that you use? (shelters/canopies/benches)

   "Yes always there are people here who visit it to meet at the restaurants"

4. Are there any considerations for the weather conditions? i.e., Shadings/Trees/Shelters to protect from the weather.

   "Trees"

5. "Does the street cater to your different needs such retail/restaurants/recreation/services etc?

   "There are shops near but it is restaurants mostly, I buy groceries from other part of Riffa"

6. Do you travel by your car or walk in the street? Are there any problems you face in general in terms of usability of this street?

   "I come in my car" "It is difficult for customers to come here as its in the inside road"

7. Is the street walking-friendly? Are the street and sidewalks safe to walk?

   "The cars come suddenly from the other street and this leads to safety issues"

INTERVIEW 3

1. "Do you find the street is accessible from adjacent streets, i.e., is it easy o access?

   "Yes"

2. "Do you find the street clean?

   "Yes"

3. "Are there good seating facilities/ gathering spots in the street that you use? (shelters/canopies/benches)

   "Yes there is seating here outside the restaurant"

4. Are there any considerations for the weather conditions? i.e., Shadings/Trees/Shelters to protect from the weather.

"There are trees here in the ground"

5. "Does the street cater to your different needs such retail/restaurants/recreation/services etc?

   "There are all shops and services available here like supermarket, banks, restaurants, but the things available in the supermarket is limited, so we go to other areas."

6. Do you travel by your car or walk in the street? Are there any problems you face in general in terms of usability of this street?

   "No place"

7. Is the street walking-friendly? Are the street and sidewalks safe to walk?

   "Sometimes I face difficulty to cross road and go to my house as there are many cars"

INTERVIEW 4

1. "Do you find the street is accessible from adjacent streets, i.e., is it easy o access?

   "Yes"

2. "Do you find the street clean?

   "Yes, it is clean"

3. "Are there good seating facilities/ gathering spots in the street that you use? (shelters/canopies/benches)

   "Yes"

4. Are there any considerations for the weather conditions? i.e., Shadings/Trees/Shelters to protect from the weather.

   "Some greenery is here, its good"

5. "Does the street cater to your different needs such retail/restaurants/recreation/services etc?

"I walk in this street for all my needs"

6. Do you travel by your car or walk in the street? Are there any problems you face in general in terms of usability of this street?

"I have car, no problem here"

7. Is the street walking-friendly? Are the street and sidewalks safe to walk?

"Yes"

INTERVIEW 5

1. "Do you find the street is accessible from adjacent streets, i.e., is it easy o access?

"Yes. It is"

2. "Do you find the street clean?

"Yes"

3. "Are there good seating facilities/ gathering spots in the street that you use? (shelters/canopies/benches)

"It's having many activities"

4. Are there any considerations for the weather conditions? i.e., Shadings/Trees/Shelters to protect from the weather.

"We need more trees so there is less sun when I walk"

5. "Does the street cater to your different needs such retail/restaurants/recreation/services etc?

"But to travel to my work it is far, so I use public bus"

6. Do you travel by your car or walk in the street? Are there any problems you face in general in terms of usability of this street?

"No"

7. Is the street walking-friendly? Are the street and sidewalks safe to walk?

"I like to walk here, I didn't find any problem for safety"

INTERVIEWS COLLECTED FROM STREET 7:

Riffa Residential Street 2

INTERVIEW 1

1. "Do you find the street is accessible from adjacent streets, i.e., is it easy o access?

"Yes"

2. "Do you find the street clean?

"Yes"

3. "Are there good seating facilities/ gathering spots in the street that you use? (shelters/canopies/benches)

"Sometimes when guests arrive, we gather in the street, usually during the weekends"

4. Are there any considerations for the weather conditions? i.e., Shadings/Trees/Shelters to protect from the weather.

"We have a small garden and plants in our compound"

5. "Does the street cater to your different needs such retail/restaurants/recreation/services etc?

"I find it safe to walk but I am afraid to walk my dog as there are cars coming in unexpectedly. Because there is less light"

6. Do you travel by your car or walk in the street? Are there any problems you face in general in terms of usability of this street?

"There are parking available for residents"

7. Is the street walking-friendly? Are the street and sidewalks safe to walk?

"I find it safe to walk but I am afraid to walk my dog as there are cars coming in unexpectedly. Because there is less light"

INTERVIEW 2

1. "Do you find the street is accessible from adjacent streets, i.e., is it easy o access?

   "Yes its near to main highway"

2. "Do you find the street clean?

   "They come from company every day to clean"

3. "Are there good seating facilities/ gathering spots in the street that you use? (shelters/canopies/benches)

   "This street was full of children. They always play during afternoons and evenings. But, now it is reduced, as there was news of mongoose walking in the area, children are afraid to play"

4. Are there any considerations for the weather conditions? i.e., Shadings/Trees/Shelters to protect from the weather.

   "There is shaded parking for cars, we can walk under it"

5. "Does the street cater to your different needs such retail/restaurants/recreation/services etc?

   "No, I have not found any shadings in this street except for the cars and some trees"

6. Do you travel by your car or walk in the street? Are there any problems you face in general in terms of usability of this street?

   "It is difficult to park in my garage, as the road is very narrow and there are cars parked on the opposite side."

7. Is the street walking-friendly? Are the street and sidewalks safe to walk?

   "Yes, its walking-friendly, for walking there is space"

INTERVIEW 3

1. “Do you find the street is accessible from adjacent streets, i.e., is it easy o access?

   “It is easy”

2. “Do you find the street clean?

   Its very neat place”

3. “Are there good seating facilities/ gathering spots in the street that you use? (shelters/canopies/benches)

   “It was very active and noisy before”

4. Are there any considerations for the weather conditions? i.e., Shadings/Trees/Shelters to protect from the weather.

   “Shading for cars”

5. “Does the street cater to your different needs such retail/restaurants/recreation/services etc?

   “Yes, sometimes we buy from here, but other shopping is mainly from lulu or other malls”

6. Do you travel by your car or walk in the street? Are there any problems you face in general in terms of usability of this street?

   “It is okay I think, because I come by walk or transport”

7. Is the street walking-friendly? Are the street and sidewalks safe to walk?

   “I find it safe here”

INTERVIEW 4

1. “Do you find the street is accessible from adjacent streets, i.e., is it easy o access?

   “Yes”

2. “Do you find the street clean?

“Sometimes its dirty when there’s sandstorm”

3. “Are there good seating facilities/ gathering spots in the street that you use? (shelters/canopies/benches)

“We take our toddlers to walk and play every evening”

4. Are there any considerations for the weather conditions? i.e., Shadings/Trees/Shelters to protect from the weather.

“Some trees”

5. “Does the street cater to your different needs such retail/restaurants/recreation/services etc?

“Yes”

6. Do you travel by your car or walk in the street? Are there any problems you face in general in terms of usability of this street?

“Both” “No problem it’s a good street”

7. Is the street walking-friendly? Are the street and sidewalks safe to walk?

“It is very safe and very good for children” “They enjoy to play here”

INTERVIEW 5

1. “Do you find the street is accessible from adjacent streets, i.e., is it easy o access?

“It is”

2. “Do you find the street clean?

“It is sometimes not clean outside my door and I have observed that the trash from nearby areas are collected here”

3. “Are there good seating facilities/ gathering spots in the street that you use? (shelters/canopies/benches)

"We find noise and sounds of children playing behind this street. Sometimes it affects us as they have damaged our ac"

4. Are there any considerations for the weather conditions? i.e., Shadings/Trees/Shelters to protect from the weather.

   "There are shading from trees"

5. "Does the street cater to your different needs such retail/restaurants/recreation/services etc?

   "Carrefour supermarket is in walking distance, we also have pharmacy and other restaurants right here"

6. Do you travel by your car or walk in the street? Are there any problems you face in general in terms of usability of this street?

   "No problem"

7. Is the street walking-friendly? Are the street and sidewalks safe to walk?

   "Yes" "Yes"
